Varieties of Capitalism: National Institutional Explanations of Environmental Product Developments in the Car Industry

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Declaration

This work contains no material that has been accepted for the award of any other degree or diploma in any other university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. Interview research was undertaken with the approval of the University of Sydney Ethics Committee.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying.

John Mikler
Discipline of Government and International Relations
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For Kara and Annika

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Abstract

Changing the behaviour of firms to take environmental concerns into account is seen as unlikely without effective regulations. However, corporations are increasingly keen to represent themselves as 'green', including those in the world's largest manufacturing sector: the car industry. Given rising concern for the environment and environmental sustainability since the 1990s this thesis asks: what motivates car firms to actually make environmental commitments? Answering this question has implications for whether these commitments are 'real' and if so whether they are occurring in response to material factors (e.g. state regulations and consumer demand) versus normative factors (e.g. social attitudes and internal company strategies). In order to answer it, the thesis applies the insights of the institutional varieties of capitalism approach to the German, United States and Japanese car industries, and specific firms within them, in respect of the environmental issue of climate change from 1990 to 2004. Empirical national data is analysed, as well the environmental reporting of individual firms and interviews with key personnel.

The main findings are that what leads the car industry to see environmental issues as central to their business interests hinges on the impact of differing national institutional factors. Specifically, it is a matter of whether firms have a liberal market economy (LME) as their home base, in the case of US firms, or a coordinated market economy (CME) as their home base, in the case of German and Japanese firms. US car firms react more to the material imperatives of consumer demand and state regulations. German and Japanese firms are more mindful of normative factors for their initiatives, such as social attitudes (especially for German firms) and internal company strategies (especially for Japanese firms). They have more of a partnership approach with government. Therefore, car firms have very distinct 'lenses' through which they see the environmental performance of the cars they produce. As such, the thesis concludes that the variety of capitalism of nations has implications not just for the type of products that economic actors such as car firms produce, and the competitive advantages they develop, but also the way they address related issues arising as a result of their activities, including environmental issues.

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List of Abbreviations

AAM	Alliance of Automobile Manufacturers
ACEA	Association des Constructeurs Europeens
ADB	Asian Development Bank
CAFE	Corporate Average Fuel Economy
CCFA	Comite des Constructeurs Francais d'Automobiles
CEO	Chief Executive Officer
CERES	Coalition of Environmentally Responsible Economies
CME	Coordinated Market Economy
CNG	Compressed Natural Gas
CO_2	Carbon Dioxide
DOT	US Department of Transportation
EC	European Commission
ECMT	European Conference of Ministers of Transport
EIA	US Energy Information Administration
EPA	US Environment Protection Agency
EU	European Union
FCV	Fuel Cell Vehicle
GCC	Global Climate Coalition
GRI	Global Reporting Initiative
ICC	International Chamber of Commerce
IEA	International Energy Agency
JAMA	Japan Automobile Manufacturers Association
LME	Liberal Market Economy
LPG	Liquefied Petroleum Gas
METI	Ministry of Economy Trade and Industry
MITI	Ministry of International Trade and Industry
MNC	Multinational Corporation

NGO	Non-Government Organisation
NHTSA	National Highway Traffic and Safety Administration
NO_x	Nitrogen Oxides
OECD	Organisation for Economic Cooperation and Development
OICA	Organisation Internationale des Constructeurs d'Automobiles
SUV	Sports Utility Vehicle
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
VDA	Verband der Automobileindustrie
VOC	Variety(ies) of Capitalism
WBCSD	World Business Council for Sustainable Development
WTO	World Trade Organization
WVS	World Values Survey

Chapter 1: Introduction

Introduction

Changing the behaviour of firms to internalise environmental externalities (costs to the environment arising from economic activity that are not borne by those engaged in the economic activity and are not reflected fully in prices)[1] is seen as unlikely in the absence of changes in market forces or effective state regulation.[2] However, corporations are increasingly keen to represent themselves as 'green'. In the case of the car industry there is evidence that concern for the environment may be more than just rhetoric. This is because significant commitments have been made to incorporate environmental concerns in business strategies.[3] The car industry is dominated by multinational corporations (MNCs), and the world's largest manufacturing sector. It also produces a product that has major environmental impacts. Therefore, any behavioural change occurring within it is central to the debate on addressing the environmental impact of business.

This thesis does not so much ask whether the environmental initiatives of car firms represent a real belief in the importance of the environment. It asks a more fundamental question: what *motivates* car firms to actually make environmental commitments in the first place? The reason for asking this question is that if one understands the key motivators of economic actors such as these car firms, one has the basis for answering questions of whether or not the commitments made are likely to be *real* or simply 'window dressing'. The issues raised by the question are complex. Multiple interrelationships are involved between states, business, markets and society. Business to business relationships (e.g. inter-firm competitive pressures) and the effect of international regulations are also relevant. Theoretically, there are also multiple perspectives for considering the puzzle. Disciplinary boundaries will inevitably be crossed and readers with an interest in government, international business and management, global environmental politics and the role of civil society, among others, should be particularly interested in the findings.

The thesis takes as its starting point the dichotomy between material factors and rationalist ways of viewing the world, versus normative perspectives that view

institutions as important. A belief that states remain central, rather than the view that global markets are now in charge, also informs the analysis because firms remain embedded in their home markets. They are therefore subject to the normative factors that constitute capitalist relations that become institutionalised over time in their home states. Recognising this, the thesis employs the Varieties of Capitalism (VOC) approach.[4] The findings demonstrate that car firms' motivations for taking the environmental impacts of their behaviour into account, and how they do so, is fundamentally a question about differences in capitalist relations. Specifically, in this thesis, it is one about the different capitalisms of Germany (and to some degree the European Union), the United States (US) and Japan.

This introductory chapter first highlights the global economic and environmental importance of the car industry. Addressing the environmental damage resulting from its activities is then considered in the light of the contrasting theoretical perspectives on addressing environmental externalities resulting from the actions of economic actors. The mainstream rationalist liberal economic perspective, which focuses more on material factors, is described and contrasted with institutional perspectives, which focus on normative factors. The idea that the influence of firms' home states remains important, for both material and institutional reasons, is then introduced along with the VOC approach. Finally, the contribution of the thesis and the research questions it seeks to answer in light of the actions of the car industry and contrasting theoretical perspectives are presented. The chapter concludes with the working hypothesis for the thesis. It is that both material and institutional perspectives are relevant to understanding and explaining the car industry's environmental initiatives, but state-specific institutional variations in capitalist relations, as suggested by the VOC approach, are crucial for understanding what might motivate such initiatives in firms of different nationalities.

The Global Economic and Environmental Importance of the Car Industry

The car industry has been described as "the economic sector most emblematic of modern times and of the polluting consequences of modernity".[5] Its economic and

environmental significance mark it as a crucial case for study because, more than any other manufacturing sector, it possesses the material capabilities to either reduce or increase global environmental damage. This section outlines some key aspects of the industry's global economic significance. In light of its economic significance, the manner in which the industry's products are a major cause of global environmental damage is then introduced. This provides background information for the subsequent discussion of alternative approaches to addressing the environmental impacts of the fundamentally environmentally damaging products produced by the industry.

Economic Significance

MNCs are perhaps the most important economic actors shaping the contemporary global economy. The car industry is the archetypal example of an industry sector dominated by MNCs. It manufactures and distributes its products on an integrated global scale and today is often taken as the paradigm case of a globalised industry.[6] Most of the largest car manufacturers have over 40 percent of their production outside their 'home' state,[7] and in addition to the finished product being produced and traded internationally the international dimension of the product is embedded in its production. This is because various parts and components are produced in different countries, so that the final product itself is global in character.[8] Furthermore, collaborative agreements between firms of different nationalities, and often cross-ownership, mean that a 'global connectedness' exists in research and development, the dissemination of new production techniques and other advances.[9]

The car industry dominates global manufacturing. Vehicle production is the largest manufacturing sector in the world, with five of the top ten largest businesses in the world by sales being accounted for by car manufacturers, and another three in the top 45.[10] The industry contributes four to eight percent of total GDP for Organisation for Economic Cooperation and Development (OECD) countries and leads all other industries, including information technology, in research and development investment.[11]

Table 1.1: Turnover, Investment and Production Volumes for Cars in 2003 in Germany, the US and Japan

Country	Turnover (cars and commercial vehicles in €million)	% total	Investment (cars and commercial vehicles in €million)	% total	Car production (units)	% total
Germany	204,043	13	12,300	19	5,145,403	12
US	363,050	23	13,060	20	4,509,565	11
Japan	365,604	23	5,309	8	8,478,328	20
Germany, US and Japan Total	932,697	59	30,669	47	18,133,296	43
WORLD TOTAL	1,598,951	100	66,052	100	42,011,951	100

Source: OICA (2004a), *The World's Automotive Industry: Some Key Figures*, http://www.oica.net/htdocs/Main.htm, accessed 13 January 2006. Car production accounts for 69 percent of all vehicles produced.

Table 1.1 presents turnover, investment and production figures for the global car industry and the top three countries in the world where this is undertaken: Germany, the US and Japan. It shows that the industry's total turnover in 2003 was almost €1.6 trillion, its investment totalled over €66 billion, and it produced over 42 million cars worldwide. By location of economic activity, Germany, the US and Japan account for 59 percent of the industry's turnover, 47 percent of the industry's investment and 43 percent of production. Therefore, it is clear that in addition to the industry's global economic significance, it is of particular significance to the world's three largest industrialised states where around half (or more on the basis of turnover) of its total economic activity is located.

Environmental Damage

Given the economic dominance and importance of the car industry, plus the concentration of its economic activity in the world's three largest industrialised states, there is also ample evidence of the environmental damage caused by cars. Here is a brief summary. Transportation accounts for around 25 percent of total carbon dioxide ($CO_{2)}$ emissions, with up to 85 percent of this accounted for by road transport.[12] This is exclusive of related activities linked with transportation such as fuel extraction, processing and transport, and the manufacturing process. If these are included, passenger cars alone are responsible for around 33 percent of the OECD's CO_2

emissions.[13] The implication is that just a 10-15 percent reduction in passenger cars' contribution to CO_2 emissions would meet half of Germany or Japan's greenhouse gas emission reductions under the Kyoto Protocol.[14] In terms of exhaust emissions other than CO_2, cars contribute 90 percent of all carbon monoxide emissions, and are a major cause of acid rain through the sulphur oxides they emit. Road transport also accounts for 48 percent of nitrogen oxide (NO_x) emissions in OECD countries on average, and around 60 percent of this is accounted for by cars.[15] In fact, of all land-based modes of transport, cars are the most energy intensive, with petrol-powered cars consuming in aggregate more energy and producing more greenhouse gas emissions than any other type of vehicle.[16] In addition, cars are a prime cause of the depletion of the world's resources,[17] and the international car industry produces over 3 million tonnes of scrap and waste every year.[18] Based on current growth rates, the number of vehicles worldwide is projected to increase from around 700 million at present to 1.1 billion by 2020, so the environmental problems caused by cars will get worse, not better, unless dramatic changes are made.[19] It is not surprising that the US Environmental Protection Agency declares that driving a car is "the single most polluting thing that most of us do".[20]

Given their economically powerful position, car firms have historically put strong political pressure on governments against environmental regulation. They have supported national lobby groups such as the Coalition for Vehicle Choice in the US, and international lobby groups such as the Global Climate Coalition (GCC) and the Climate Council. These consistently lobbied governments against emission controls to reduce greenhouse gases on the basis that this would lead to severe economic impacts.[21] Although US firms resigned their membership of lobby groups like the GCC prior to its ultimate demise in 2002 in favour of openly embracing (or at least declaring) support for environmental commitments,[22] and firms now announce their support for, and membership of, environmentally-motivated industry organisations such as the World Business Council for Sustainable Development (WBCSD),[23] there remains vast scope for improvements in efficiency and thence environmental sustainability within the industry. For example, the big three American firms of Ford, General Motors and DaimlerChrysler make most of their profits from the sale of light trucks, primarily in the form of pick-up trucks and sports utility vehicles (SUVs), the latter of which are

particularly notorious for their size, weight and high fuel consumption. In the US, light trucks account for over half the total passenger vehicle market. Far from seeking to differentiate themselves from the production and sale of these vehicles, European and Japanese manufacturers are producing similar gas-guzzlers to compete for market share in this sector, albeit primarily in the US market.[24]

Therefore, the industry's size and global economic significance is mirrored in the environmental damage caused by its products. Without action these problems will inevitably worsen based on current market trends.

Addressing Environmental Externalities

Environmental problems are usually characterised as cases of market failure due to externalities. Environmental externalities arise as a problem due to the intrinsically public good nature of the environment caused by ill-defined property rights. These terms, and the ideas behind them, deserve a brief explanation.

Putting it simply, externalities occur when factors that should be taken into account by markets are left external to them. The primary reason for this is that property rights in respect of the environment are often ill-defined – i.e. it is not clear who 'owns' the environment, and so it is often the case that economic actors responsible for environmental damage are not clearly made responsible for the environmental impacts of their actions. Due to ill-defined property rights, the environment is often a public good – i.e. it is in the public domain and can be jointly consumed by several agents simultaneously. The result of environmental externalities arising from a lack of property rights because of the environment's public good nature is that the prices of goods and services do not reflect the environmental impacts of their production and consumption. This is known as market failure. Far from market failure being the exception, due to the public good nature of the environment, "environmental externalities are pervasive".[25] Therefore, the environmental costs of economic activity are incorrectly priced by markets, and economic actors can ignore the negative environmental effects of their actions. In fact, in being ignored or incorrectly priced by markets, the cost of environmental externalities is often borne by those who were not responsible for them. Specifically, they are often borne collectively by those not

directly involved in their creation. And when the public good attribute of the environment is a global or transborder phenomenon, as is often the case, the environment is said to be in the realm of the "global commons".[26]

Ameliorating the problem of pervasive, often global, environmental externalities can be approached in two ways. Mainstream liberal economic perspectives are challenged by institutional perspectives. Both are considered in the following sections, along with the major divide between them: rational choice versus norms as the basis for action.

Mainstream Liberal Economic Perspectives

The liberal economic perspective is the mainstream view that informs analysis in the business/government/environment debate. Liberal is a somewhat 'rubber' term to the extent that it has been given different definitions by different commentators, but it is used here to refer to approaches in economics, political science and international relations that apply the ideas of individual autonomy, freedom and rationality to firms, the state, interstate relations and global economic relations generally.[27] Broadly speaking, it refers to those theories in which "people behave in self-interested and broadly rational ways".[28] Firms are viewed as rational profit maximisers and states as "rational egoists" that maximise their individual prosperity on the international stage.[29] There are two clear implications. First, without state intervention environmental externalities will never be internalised as firms responsible for them can rationally ignore the cost of them. States' intervention is required to increase the price of environmental resources so that "trade can take place on the basis of prices reflecting true social costs".[30] Secondly, international organisations are needed to coordinate states' intervention because without some cooperative mechanism states face a collective action problem where each has the incentive to opt out of regulating firms within their jurisdiction and appropriate the benefits for themselves from so doing.[31]

The key assumption in the liberal economic approach is the rationality of actors, whether they be individuals, firms, states or in respect of international relations between states, and the self-interested manner in which they make rational choices to further their ends. For firms, this is therefore also fundamentally a materialist perspective in

which they act instrumentally to make profits in markets, subject to the constraints of state regulators. They may also act to increase their power, but it is their material power in terms of power in markets. This is the basis on which rationality is assumed: rational choice defined in terms of materialist profit and power maximising outcomes. Such a perspective has proved to be a parsimonious way of explaining firms' behaviour. However, there are four inherent epistemological foundations contained within it that are relevant to the analysis here.[32]

First, rational choice models are ahistorical. Rationality is assumed to apply at all times, and therefore questions such as path dependency, timing and sequencing of events are not considered as important determinants of outcomes. Secondly, rational choice models aim for generalisability. 'Rules of the game' are examined and equilibrium solutions posited that result from these. It follows that in addition to such solutions applying at all times (i.e. ahistorically), they apply in all cases. Thirdly, rational choice models exogenise the interests, identities and preferences of actors. The limited understanding of actors' motivations that results means that their behaviour is constrained to certain utility (in terms of profit or power) maximising assumptions. Fourthly, rational choice models focus on methods with the research agenda set by the model. By incorporating ahistoricity, generalisability and exogeneity of actors' interests, identities and preferences, parsimony is certainly more likely and one can also say that any resulting model will be widely applicable in theory (or more accurately by definition). However, the end result is that most of what remains to argue about is methods.[33]

The first three foundations of rational choice models mean that approaches employing rational choice mechanisms are static. This limits their ability to explain behavioural change. The fourth limits the questions that can be asked to address this drawback of the first three assumptions. However, perhaps most importantly, by making a priori assumptions about the motivations of economic actors they postulate a universal source of behavioural change. If firms are taking environmental concerns into account, it must be because it is in their interest to do so, with this interest defined in materialist instrumental profit seeking terms. Although such a clear causal path is intuitively appealing and logically plausible, such a simplistic rendering in the case of firms has clear limitations that must be acknowledged in addition to the intuitive appeal.

The risk in constructing them as purely instrumental profit-maximisers is that the range of possible explanations for firms taking more environmentally-friendly courses of action is constrained: it must, *by definition*, be because it is profitable for them to do so. Ergo, it must be that consumers' revealed preferences indicate that firms should take such a course of action or regulations leave them no choice. The risk is therefore what Katzenstein colourfully terms "vulgar rationalism" as it "infers the motives of actors from behaviorally revealed preferences".[34] Therefore, the risk is over-simplification, in the sense that the result may be tautological explanations that "succeed in explaining everything and so explain nothing".[35]

While not necessarily rejecting the usefulness of such simplifying abstractions, alternative institutional perspectives do not constrain explanations to the same extent. The different foundations for institutional perspectives are considered in the following section.

Institutional Perspectives

Institutional perspectives have been promoted by scholars such as North, March and Olsen, Ruggie, and even Goldstein and Keohane.[36] They do not assume actors are 'rational' or, more accurately, they do not define actors' rationality in terms of a priori assumptions ascribing actors' motivations. Instead, their starting point is that actors are motivated by certain norms that prescribe and proscribe appropriate action. That is to say, rationality is contingent on norms of behaviour. When such norms become institutionalised, they have a taken-for-grantedness about them so that behaving in a manner commensurate with them may be taken for 'rational' behaviour, but not necessarily rational behaviour in the liberal economic sense.

Before discussing the implications of institutional perspectives, a simple and clear definition of the terms is required. North defines norms as "shared common beliefs" that give rise to institutions defined as "the rules of the game in a society or, more formally….the humanly devised constraints that shape interaction".[37] A more specific definition of the institutions to which norms give rise is provided by Hall and Soskice who say institutions are "a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive, or material reasons".[38] Institutional

perspectives thus challenge the rational choice mechanism in the liberal economic model by seeing the role of ideas, beliefs and the resulting norms of behaviour – i.e. socially appropriate ways of behaving - as providing richer explanations of how decisions are made and institutions constructed.

Liberal economic versus institutional perspectives are therefore delineated by the manner in which the rational choice mechanism is applied in the former versus the role of norms of behaviour in the latter. Followers of the mainstream liberal economic perspective understand the world in terms of material interests, based on a logic of consequentialism (the outcomes of taking certain courses of action), whereas institutionalists accentuate the role of ideas and social behaviour (i.e. norms) based on a logic of appropriateness (i.e. that there is an appropriate way to act not necessarily contingent on the outcome of such behaviour).[39] Institutionalists "focus on the role of ideas, norms, knowledge, culture and argument in politics, stressing in particular the role of collectively held or 'intersubjective' ideas and understandings of social life" and assert that: "(a) human interaction is shaped primarily by ideational factors, not simply material ones; (b) the most important ideational factors are widely shared or 'intersubjective' beliefs, which are not reducible to individuals; and (c) these shared beliefs construct the interests and identities of purposive actors".[40] Furthermore, institutionalists apply an "ideational" ontology in a holistic rather than specific way.[41]

Taking an institutional approach does not mean that the fundamental problem of pervasive environmental externalities is irrelevant. What it does mean is that approaching solutions to the problem of environmental externalities becomes more complex. For example, Paterson rejects the idea that states in a liberal international economic order can ever make the required interventions to effectively address environmental problems because "existing political, social and economic structures are part of the problem".[42] Elsewhere he notes that the focus for analysis should be on the structural power of capital and how it relates to/with the state.[43] Whether or not such structures are part of the problem necessitates an examination of norms and the manner in which they are diffused within states, organisations and groups of individuals responsible for environmental degradation to become institutions. Viewed this way, the liberal economic view is more an ideology, or the result of institutional embedding that says markets and governments must operate in certain ways.[44] Alternative and often

more successful approaches for internalising environmental externalities may be suggested. Indeed, they may be essential if one accepts the view that "preventing situations such as global warming requires more than just market mechanisms that simply assign economic value to intangibles".[45] That is to say, behavioural change is about more than just changing material returns. It requires normative change in the light of prevailing institutions.

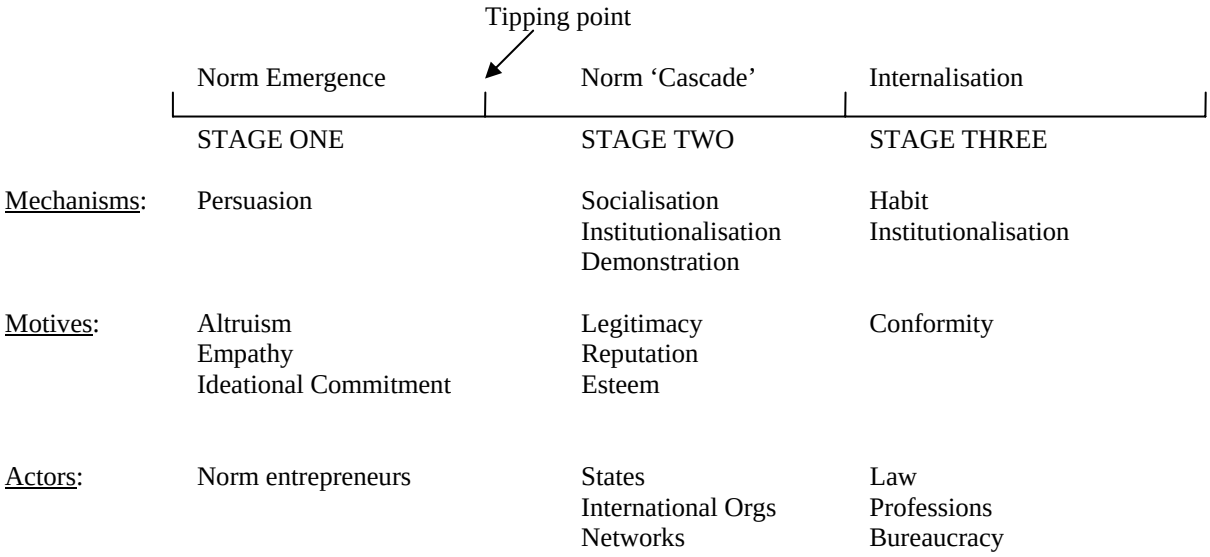
A key implication is that rather than economic actors taking 'rational' decisions in the sense of operating purely with a priori assumed instrumental profit maximising goals, one must admit the possibility raised by Ostrom that individuals are:

> fallible, boundedly rational, and norm-using. In complex settings, noone is able to do a complete analysis before actions are taken, but individuals learn from mistakes and are able to craft tools – including rules – to improve the structure of the repetitive situations they face.[46]

This does not mean that irrationality is the alternative, but that rationality is not defined by such a priori assumptions as employed in the mainstream liberal economic model. A key implication is that at some stage self-regulation may be effective for normative reasons, as opposed to the traditional liberal economic view that it cannot for rationalist reasons.

This builds on work by commentators such as Florini, Ostrom, Cutler et al., and Prakash, but perhaps the neatest outline of the normative approach is provided by Finnemore and Sikkink who conceptualise the *norm lifecycle* outlined in Figure 1.1.[47] In stage one 'norm entrepreneurs', such as NGOs and often radical activists, advocate for a new approach to be taken that embraces a new norm. By raising the profile of the new norm, a 'tipping point' is reached after which the norm is taken up in stage two by states, international organisations and other actors who intervene to promote the norm and construct rules flowing from its implementation. This leads to the new norm 'cascading' through other states and organisations. Finally, in the third stage norms are so habitualised that they become part of how actors in professions, the bureaucracy and the public at large behave, almost without them knowing that they are there. They become institutionalised (e.g. few people today would recognise women having the vote or abolishing slavery as issues worth discussing for their pros and cons). The norm lifecycle model therefore implies that behaviour is actually the result of institutionalised norms that change over time and form the basis of what is seen as 'rational' behaviour.[48]

Figure 1.1: Norm Lifecycle



Source: M. Finnemore and K. Sikkink (1998), 'International Norm Dynamics and Political Change', *International Organization*, Vol.52, No.4, pp.896-898.

In practical terms, in terms of the car industry, such a model as that proposed by Finnemore and Sikkink suggests that if firms are to change their behaviour in respect of the environment, this behavioural change will be a product of institutions that constrain certain types of behaviour and promote others. The former chairman of the WBCSD appears to agree in declaring that business in general is changing its behaviour because:

> A paradigm shift has clearly taken place. Business used to be depicted as a primary source of the world's environmental problems. Today it is increasingly viewed as a vital contributor to solving those problems and securing a sustainable future for the planet.[49]

However, whether or not a "paradigm shift" has taken place necessitates an analysis that goes down to the firm level to see what political, economic and structural forces, and the institutionalised norms that inform their interpretation, are at work. In other words, it is necessary to tell an 'insider's story' to make sense of what events and actions mean.[50] A key part of so doing is recognising the importance of firms' home states, for both material and institutional reasons. This is the subject of the following section.

The Material and Institutional Importance of Firms' Home States

Despite the picture painted earlier of the car industry as a global industry dominated by large MNCs, there is a tension between conceiving the industry as truly global, versus the idea that it is represented by companies with national bases that operate internationally. This reflects a larger debate about the extent to which a shift in power has occurred from states to markets and the forces of transnational capital, versus the enduring relevance of states in international capitalist relations. The former may be thought of as a global perspective, the latter an international perspective. The global perspective is held by authors such as Strange, Ohmae, Friedman and adherents of the neoliberal view that markets are increasingly in command as a result of globalisation, with states having diminished power to influence market outcomes.[51] The international perspective is a view that sits more comfortably with scholars of international relations in the more traditional vein who see commerce as based in national territories, with interaction between states and their major corporations occurring *internationally*. They include Doremus et. al., Weiss, Hobson, Vogel, Boyer, Wade and those who subscribe to the VOC approach.[52]

In this section, the case is made for why, on the basis of both material and institutional factors, car firms' home states remain important. Therefore, whatever the theoretical perspective adopted, car firms' behaviour is more a product of their national home bases than global markets. As such, an international perspective in respect of the car industry, and thus an approach based on a comparative national analysis, is more appropriate. Evidence will also be presented that the industry's activities are concentrated in a handful of firms from each of these three territories that dominate their markets. From an institutional perspective, the relevance of the VOC approach for analysing the industry is then introduced. The insights of the VOC approach deserve much more explanation than they are given here, as they are central to the empirical analysis conducted in this thesis. With this in mind, the purpose here is to introduce the reader conceptually to the VOC approach, before a more detailed overview in Chapter 2.

The Material Importance of Firms' Home States

Although the car industry is characterised by global networks for production and distribution, this is not the case for ownership, the geographical focus of firms' activities and the location of their key markets. National/regional contexts for the industry and individual firms remain important, especially those of Germany/the European Union (EU), the US and Japan.

Turning to ownership first, while cross-ownership linkages may characterise the industry globally, some firms own others, or have a controlling stake in them, rather than being owned themselves. Of the eight major German, US and Japanese firms, General Motors and Ford are wholly US-owned; Toyota and Honda are wholly Japanese-owned; and Volkswagen and BMW are wholly German-owned, with Volkswagen also being the largest European firm.[53] However, cross-national ownership is the case for DaimlerChrysler and Nissan. DaimlerChrysler was formed through the merger of Daimler Benz (a German firm) and Chrysler (a US firm) in 1998 in what was supposed to be partnership of equals, but which in practice was a takeover of Chrysler by its German partner. Although this means it is culturally somewhat of a 'two-headed beast', with operations and a history that is half German and half US, the nature of the takeover and the subsequent setting of corporate policy and strategic direction in Germany mean it is in fact a German firm. Despite Chrysler's long history as a US company and its continuing operations there, the firm's Chrysler operations report to a "German-based parent" with the whole company being a "German-controlled group".[54] Nissan has been part-owned by Renault since 1999 when Renault acquired a 37 percent stake in the company, now increased to 44 percent. Rather than a merger or takeover, Renault acquired a substantial minority shareholding. The result is better characterised as a strategic alliance, because both brands have retained separate identities, separate operations and undertake separate reporting. Thus, while there is undoubtedly sharing of ideas and the fact of Renault's part ownership is inescapable, the cultural separation of the firms in practice is more evident than for DaimlerChrysler. In short, both, in different ways, retain their respective national identities to a significant degree.[55]

Observations on firms' ownership structures are important because they have implications for how strategic decisions are taken and implemented, in the sense that strategic decisions are more likely to be taken by firms that own others rather than ones

that are themselves majority controlled by other manufacturers. And when the major firms that own or strategically control others are identified, it is clear that in addition to their economic activity, by the location of their headquarters and board membership the largest firms are all of European (mainly German), US or Japanese nationality. Their headquarters where strategic decisions are made remain in their home states, and the nationalities of their board members reflect firms' nationalities.[56]

On the geographical focus of firms' activities, although the point has been made that the industry is global in its reach and significance, this masks important national specificities. Table 1.1 demonstrated that turnover, investment and production are concentrated in Germany, the US and Japan where almost half or more all activity still takes place. In fact, if one includes all European countries, four fifths of world car output is produced in the 'triad' of the US, EU and Japan.[57] In each of these territories, the industry has a magnified significance due to its concentration in them – e.g. in 1998 five of the seven largest US industrial firms produced either cars or their fuel.[58] On a firm-by-firm basis, Table 1.2 presents passenger car production by manufacturer for the eight largest manufacturers in these territories. It demonstrates that over half of total world production (62 percent) is concentrated in the hands of these eight firms. This is a symptom of the increasing concentration of the industry generally, from 52 independent firms in 1964 to only 12 now as a result of takeovers and mergers between firms.[59] Therefore, these eight firms also represent two thirds of the independent firms currently operating worldwide.[60] The industry is therefore not just concentrated on a state (and regional) basis, but also in terms of the number of firms from each of these states.

Table 1.2: Passenger Car Production by Manufacturer in 2004 in Germany, the US and Japan

Firm	Nationality (by ownership)	Car production (units)	% total
Toyota	Japan	5,869,629	13
Volkswagen	Germany	4,892,529	11
General Motors	US	4,502,680	10
Ford	US	3,497,334	8
Honda	Japan	3,183,269	7
Nissan	Japan	2,423,893	6
DaimlerChrysler	Germany	1,913,693	4
BMW	Germany	1,250,345	3
Total for Firms Shown Here		27,533,372	62
WORLD TOTAL		44,435,199	100

Source: OICA (2005), *Motor Vehicle Production by Manufacturer: World Ranking 2004*, http://www.oica.net/htdocs/Main.htm, accessed 13 January 2006.

In addition to the car industry's concentration in terms of economic activity and ownership, the car industry's production hubs of the US, Japan and the EU are also where its key markets are. Seventy five percent of all cars are sold in these three territories, with Germany the largest market in Europe.[61] Despite growth in emerging markets such as China, it is still the case that only around 8 percent of the world's population are car owners, and most of these remain in the industry's three traditional markets.[62] Furthermore, Table 1.3 demonstrates that firms continue to dominate their home markets where they have their headquarters. US and European brands hold a 63 percent share of their home markets. In the case of European manufacturers, the German car industry is of critical importance because in addition to dominating their home market with a 71 percent share, German firms hold nearly half the market for new car registrations in the EU. The only possible emerging exception to this rule is the Japanese industry whose products penetrate markets outside Japan more than their EU or US counterparts, especially in the case of the US where they have taken a 28 percent share of the market. Even so, they dominate their home market more than German and US firms do theirs with a 94 percent share of the Japanese market. The implication is that although firms should be concerned with global market trends and regulations, those corresponding to their own nationalities should be of critical importance because these are the markets they dominate and where they make most of their sales.[63]

Table 1.3: Market Shares for Major EU, US and Japanese Firms, 2002

	Share of EU Registrations (%)	**Share of US Registrations (%)**	**Share of Japanese Registrations (%)**
US Brands	21	**63**	0.6
Asian Brands	14	33	0.3
Specifically Japanese Brands	11	28	**94**
European Brands	**63**	6	5
Specifically German Brands	**46[a] (71 percent share of German registrations)**	6	4

[a] German brands are the market leaders in Europe.

Sources: VDA (2003), *Annual Report 2003*, Frankfurt: VDA, http://www.vda.de/en/service/jahresbericht/files/VDA_2003_EN.pdf, accessed 17 March 2004, p.24, 35 and 45; JAMA (2003), *2003: The Motor Industry of Japan*, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, Tokyo: Japan, accessed 18 January 2004, pp.6-7; and CCFA (2003), *Analysis and Statistics*, Paris: CCFA, http://www.ccfa.fr/pdf/2003eng.pdf, accessed 10 January 2004, p.13.

In a nutshell, the car industry embodies aspects of both global and international ways of operating in that it is an industry with globally networked operations in investment, production and distribution, but national strategic bases.[64] These observations in respect of the car industry are mirrored in the observations of authors such as Wade who note the enduring importance of national differences in the world economy more generally. He says:

> The world economy is more international than global. In the bigger economies, more than 80 percent of production is for domestic consumption and more than 80 percent of investment by domestic investors. Companies are rooted in national home bases with national regulatory regimes.[65]

Wade's comment on the world economy also have implications for states' different in institutional frameworks, a point made by authors such as Boyer who notes the following:

> Firms and sectors are clearly integrated within the international economy and, nevertheless, display very different institutional forms to cope with the same challenge of structural competitiveness. Even if the economic performances are quite similar, there is no one best way.[66]

Therefore, a national comparative analysis on the basis of firms' home states is appropriate for a thesis that is focussing on the car industry's actions in respect of the environment from a strategic perspective, with implications beyond this to other industries more generally. Hence the relevance of the VOC approach.

The Institutional Importance of Firms' Home States: The Varieties of Capitalism Approach

Dicken observes that MNCs are "produced through an intricate process of embedding in which the cognitive, cultural, social, political and economic characteristics of the national home base play a dominant part".[67] The evidence on the material importance of car firms' home states, despite their global operations, suggests that this perspective is especially relevant to them. Rather than 'placeless' entities, they are likely to be institutionally embedded in their home states. Although it would be an over-simplification to say that all MNCs from one home state are the same, firms from the same home state should share certain national characteristics. In this light, the VOC

approach is an institutional approach which says that different capitalist states have different histories, cultures and structures that inform the nature of their capitalist relations, and that far from convergence on a liberal economic model globally, national differences persist. That is to say, the persistence of different institutional potentials gives rise to the persistence of different capitalisms.[68]

Given their different institutional potentials, the VOC approach uses a dichotomous classification to categorise capitalist states as liberal market economies (LMEs) versus coordinated market economies (CMEs). Broadly speaking, firms in LMEs coordinate their activities via hierarchies and competition in markets. Firms in CMEs are characterised by more non-market cooperative relationships to coordinate their endeavours and develop their core competencies, so that it is not primarily the market and its price signals that determines firms' behaviour, but rather relationships based on these cooperative networks. This has implications for the success or otherwise of policies aimed at addressing environmental problems because of the underlying idea that "in any national economy, firms will gravitate towards the mode of coordination for which there is institutional support".[69] Following this line of thought, firms in LMEs are happier with formal contracts and decisions based on market signals that define shorter-term profit levels, and they will usually prefer deregulation over heavier state guidance and intervention. Firms in CMEs tend more towards consensus decision-making between a range of stakeholders internal and external to the firm based on long-established networks. In regulatory terms, firms in LMEs will react more efficiently to clearly specified regulations, especially those aimed at altering price signals in the market, whereas firms in CMEs will react more efficiently to regulations based on negotiated and agreed rules and standards.[70] In other words, while these are all capitalist countries, their institutions establish different 'rules of the game'.

Hall and Soskice categorise OECD countries as follows. LMEs include US, UK, Australia, Canada, New Zealand and Ireland, or what are often referred to as the Anglo Saxon economies.[71] CMEs include Germany, Japan, Switzerland, the Netherlands, Belgium, Sweden, Norway, Denmark, Finland and Austria. States that fall somewhere in between include France, Italy, Spain, Portugal, Greece and Turkey.[72] As such, Germany and Japan are CMEs, the US is an LME, and most European countries fall into either the CME category or somewhere between the two.

Obviously, the point about firms favouring cooperative coordination in CMEs versus deregulated market competition in LMEs is a very broad one. Underlying this divide are a myriad of aspects, the nuances of which are discussed by Hall and Soskice and others.[73] The ones most applicable to the analysis in this thesis are: state-business relations; the role of product markets; the role of financial markets; the organising principles of firms; the role of technology; the relationship between exogenous versus endogenous factors impacting on firms; and the centrality of historical context. These are explained in detail in Chapter 2. However, the relevance here is that, as the WBCSD notes, institutions determine how environmental issues are addressed in different states, the extent to which corporations take the lead in encouraging change and the type of action they take.[74]

Contribution of the Thesis

This thesis represents a step in redressing the gap that still endures, despite growing interest in environmental sustainability, between international relations theory and ecological approaches. This gap means that voices and approaches that may be more appropriate and successful in tackling the challenge of international environmental degradation tend to be ignored in favour of the nation state.[75] This is because, with few exceptions, it is still true to say that "it is striking to note that there are no typologies where other actors [besides government] with *their* instruments (companies, consumers, environmentalists) are included"[76] which is a problem because as Cutler et. al. note, "in an era when the authority of the state appears to be challenged in so many ways, the existence of alternative sources of authority takes on great significance, especially when that authority is wielded internationally by profit-seeking entities".[77] The author is therefore sympathetic to Hall and Soskice with their desire "to bring firms back into the centre of the analysis of comparative capitalism", in recognition that firms are "the crucial actors in a capitalist economy".[78] By focussing on the international car industry, including firms within it and the stakeholders surrounding it with whom it interacts (including states), this thesis attempts to redress the imbalance that sees the state as the sole actor in addressing environmental degradation.

However, this does not mean that the state is irrelevant. After all, employing the insights of the VOC approach as the theoretical basis for analysis demonstrably leaves the state 'in' the analysis.[79] The key point to stress is that it does so in a way that moves away from the traditional liberal model where the state and its intervention is the focus of analysis, to one which sees a *networked* approach as more appropriate, because it recognises that the process of interaction between the state and sub-national actors is increasingly important.[80] The former approach is demonstrated by Figure 1.2, whereas the latter approach is demonstrated by Figure 1.3. Figure 1.4 illustrates the case in which the network is international in nature, where actors in one state are interlinked with those in other states. This thesis takes the approach suggested by Figures 1.3 and 1.4.[81]

Figure 1.2: The State as Central

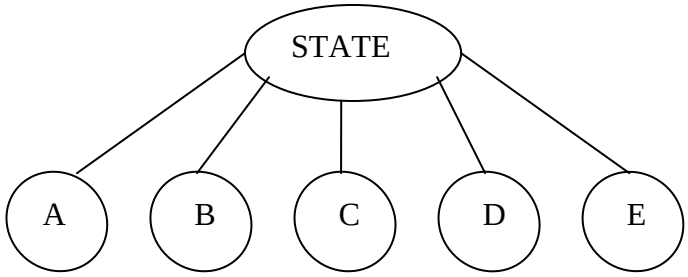


Figure 1.3: The State as Part of a Network

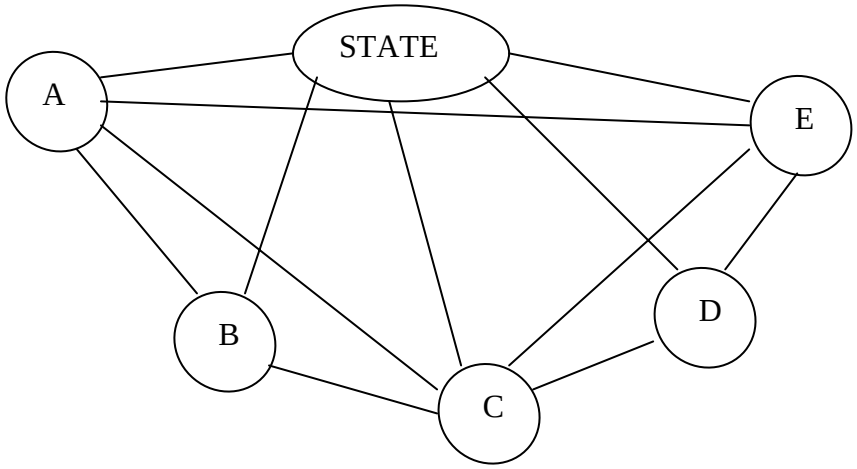
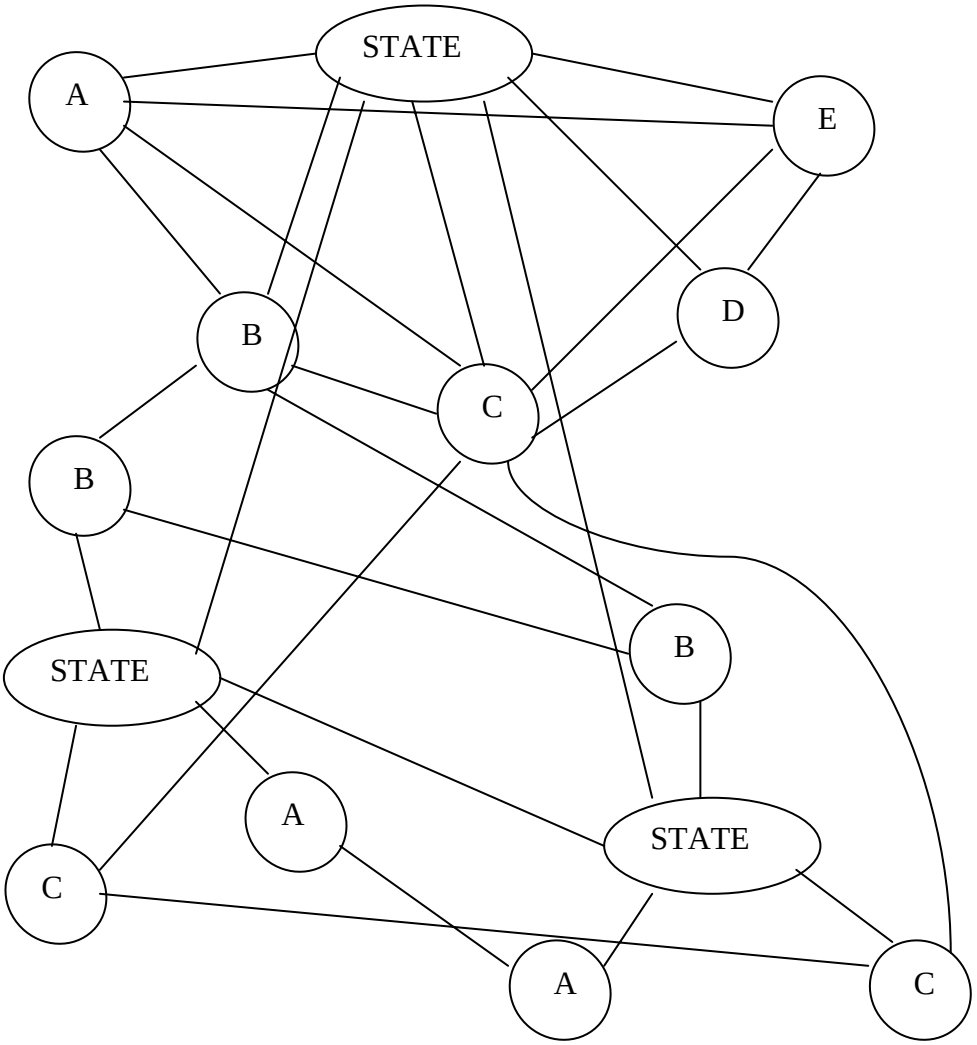


Figure 1.4: States and Actors within Them as Part of International Networks



Substantively, empirical evidence will be gathered to explain what might motivate the car industry to behave in a more environmentally concerned manner. The author is unaware of any empirical study exists that has done this comprehensively via an in-depth case study analysis down to the level of individual firms from an institutional perspective. The only publication that comes close is the UNEP's recent report *Industry as a Partner for Sustainable Development – Automotive,* which the UNEP describes as "the first document to provide information on economic, social and environmental performance in a compact form".[82] The suggestion is that seeing the international car industry as one which proactively addresses environmental sustainability within its business strategies is *new*, and so this report has proved invaluable as a starting point for the research to be undertaken. It presents examples of

"numerous activities related to sustainable development"[83] that have been *initiated* by car manufacturers who the UNEP finds have embraced "sustainable entrepreneurship" as an overall objective.[84] However, rather than being a critical analysis it represents a summary of these activities. Therefore, greater in-depth empirical analysis is required to ascertain what might *motivate* car firms to embrace such an objective.

The research is empirically important because given that the car industry's record shows its products to be a major cause of worldwide environmental damage, if such an industry can improve the environmental impact of its operations, then *any* industry can.[85] In addition, its linkages with independent firms in other industries that supply components and parts means that there is a strong multiplier effect from any behavioural change it initiates.[86] Furthermore, given its visibility and the magnitude of its responsibility for environmental damage, any progress made in this industry is likely to have a strong demonstration effect in terms of bringing about cultural change in other less directly related industries. In short, the centrality of the international car industry to the business/environment debate marks it out as a "crucial case" and a "least likely" case for environmental sustainability.[87]

Turning to the VOC approach, as Coates notes, the approach taken by those applying the VOC approach is one of "talking about social embededness, path dependency and comparative institutional advantage".[88] This is certainly the approach taken in this thesis. In doing so, it will also address a major drawback of the VOC approach so far identified by Hay, which is that its relatively recent arrival on the scene has not yet produced secondary literature that evaluates its core theoretical and substantive contributions.[89] The thesis will do so because it will add to institutionalist literature from an international perspective, rather than a global one. It will do so by bringing the firm back in to the analysis, yet recognising the institutional embededness of firms in their home states. In addition, while the insights of the VOC approach will support the empirical analysis to be conducted in respect of the car industry and the environment, the converse is also true: the empirical analysis will support the insights of the VOC approach. It will do so because in all the VOC literature, it is striking that there is little in-depth analysis of particular industry sectors, and certainly none that I am aware of from an environmental perspective. For example, related issue areas such as education and industrial relations feature, but not environmental ones. Thus while

Hall and Soskice want to make firms central to the analysis, this is not done in any analysis as much as they would seem to desire, except at the most macro of levels.[90]

Finally, given the two contrasting approaches to environmental externalities - one based on a rationalist material framework (the liberal economic model) and the other on a normative institutional one (the VOC approach) - the aim of this thesis is to assess whether the liberal economic model is universally applicable, and therefore enough to explain the behaviour of firms, or whether it is a special case contingent on certain institutional foundations that may vary from state to state. It will be shown that the latter is the case. In taking a view that the nationality of firms matters, this thesis contributes to the VOC literature that promotes the view that rather than isomorphism in the motivators for economic action globally, states' institutional differences persist. The new insights it will provide in this light are that the VOC of firms' home states impacts on whether they are more or less disposed to take environmental initiatives, and the form these initiatives are likely to take. Thus, it will be shown that car firms' environmental initiatives are a product of the institutions of their home states' VOC.

Research Questions

The perspectives and issues outlined in this chapter give rise to three over-arching, related questions. The first, and central question, is: what institutional factors are likely to motivate firms in the car industry to see environmental issues as central to their business interests? This is a more precise rendering of the question posed at the outset of this chapter. The second question, related to the first one, is: are the motivators for firms embracing environmental improvements universal, or specific to firms based on their nationality or, possibly, individual cultures? Depending on the answers to the first two questions, the third is: why should the car industry be concerned about the environment, particularly given its global economic significance and resulting political power?

There is a dichotomy in how the questions are approached. On the one hand is the liberal economic perspective that says if environmental externalities are being internalised, this must be because firms are rationally responding to material exogenous factors: market forces and state regulation. On the other hand is the institutional

perspective of the VOC approach which says that institutional factors at the state level (i.e. the persistence of different varieties of capitalism) are relevant for how material factors are interpreted and their significance.

Conclusion: Working Hypothesis

It is not unreasonable to say that there is more than just rational profit maximisation going on in the car industry because "the world does not fit the Panglossian belief that firms always make optimal choices".[91] Indeed, *both* rational profit maximising motivations and behaviour based on institutionalised norms may explain the car industry's actions. Although the two are often presented in a way that makes them appear mutually exclusive, this need not necessarily be the case. Theoretically, Hall similarly sees the attraction in "occupying the middle ground" which permits the possibility "that human beings have values, but that equally they are purposive calculators" and that to lean too much one way or another is to lean towards "false extremes".[92] Legro too argues that neither of what he terms the "polarised positions" is sustainable, and that a balancing point somewhere between the two extremes is more likely to pertain.[93] March and Olsen, discussing the logic of consequentialism inherent in rational-choice approaches versus the logic of appropriateness inherent in institutional approaches, say:

> Any particular action probably involves elements of each [logic]. Political actors are constituted both by their interests, by which they evaluate their expected consequences, and by the rules embedded in their identities and political institutions. They calculate consequences *and* follow rules, and the relationship between the two is often subtle.[94]

This suggests a more holistic explanation in which aspects of the liberal economic rational choice model still hold to some degree but preferences are tempered by ideas, norms and practices that may lead to a concern for the environment, and therefore must be taken into account too. It fits with the idea that firms must face material political and economic realities, and alter their behaviour in order to sustain competitive advantage, but that there are also other normative dynamics at work.

The working hypothesis adopted in this thesis may therefore be expressed as the following statement made by Haufler: "corporate management obviously responds to

market signals, as in the neoclassical model, but the character of that response is not equally obvious [because] corporate preferences are driven in part by norms about the appropriate approaches to business".[95] The author similarly agrees with the observation of Levy and Rothenberg on the car industry in respect of climate change, that:

> The formulation of strategy is generally treated as a rational process of matching corporate capabilities to market demands. But this does not always account well for the heterogeneity observed in corporate strategies towards complex environmental issues.[96]

These authors, like the author of this thesis, believe that while both material and institutional factors matter, the former is always predicated on the latter. In fact, "market trends are themselves subject to institutional construction".[97] By employing the insights of the VOC approach, it will be shown that state-specific institutional variations in capitalist relations are crucial for understanding how firms of different nationalities approach the question of making environmental commitments given the material factors they face.

In Chapter 2, the insights of the VOC approach are outlined in greater detail as well as how the research will be operationalised by focussing on the environmental issue of climate change, and the car industry's contribution to it via the CO_2 emissions of passenger cars in use. Chapter 3 outlines the actual environmental product development initiatives being undertaken by the car industry in respect of the CO_2 emissions of passenger cars in use, and highlights the different national emphases placed on these initiatives by firms depending on their 'nationality'. This sets up the analysis to be conducted in Chapters 4 to 7, the four empirical analysis chapters. Chapters 4 and 5 examine the key material factors of state regulations and market forces. What is found is that the institutional insights of the VOC approach provide greater explanatory power than the rationalist perspective of the liberal economic model, and that the latter is sufficient only in the case of the US car industry because its LME attributes are themselves institutionally determined. The analysis then focuses down to the level of individual car firms in Chapters 6 and 7 by qualitatively examining their environmental reports and the results of interviews with key personnel. The analysis in these chapters encompasses institutional factors at the state level, but endogenous institutional factors at the level of the firm are also brought to bear. As such, not only do these latter two chapters represent an analysis of the first-hand perspectives of firms, they also serve as a way of uncovering endogenous factors in

greater detail that are not revealed in an analysis of exogenous state regulations or market forces. Chapter 8 presents the conclusions.

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[1] This definition of environmental externalities paraphrases that given by The Economist (no date), *Research Tools: Economics A-Z*, http://www.economist.com/research/Economics/searchactionterms.cfm?Query=externality, accessed 12 April 2006.

[2] There is, however, a growing literature particularly in the discipline of management that examines the institutional basis of organizational change within industry around issues such as the environment, and how industry incorporates voluntary initiatives – eg. A. Hoffman (1999), 'Institutional Evolution and Change', *Academy of Management Journal*, Vol.42, No.4, pp.351-371. But this is not the focus of the thesis as explained in the following paragraph.

[3] For a comprehensive overview of the industry's initiatives, see for example OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD; UNEP and ACEA (2002), *Industry as a Partner for Sustainable Development: Automotive*, http://www.uneptie.org/outreach/wssd/docs/sectors/final/automotive.pdf, accessed 14 May 2003, especially the Summary and Conclusions section and Annex B; Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG; and D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004.

[4] The VOC approach, and the literature supporting it, is outlined below. Perhaps the best introduction to it is provided in P. Hall and D. Soskice eds. (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press.

[5] R. Orssatto and S. Clegg (1999), 'The Political Ecology of Organizations', *Organization and Environment*, September 1999, Vol.12, No.3, p.264. A similar view is taken by J. Womack, D. Jones and D. Roos (1990), *The Machine that Changed the World*, New York: Rawson Associates.

[6] M. Paterson (2000), 'Car Culture and Global Environmental Politics', *Review of International Studies*, Vol. 26, No.2, p.264.

[7] *Ibid.*, p.261.

[8] J. Braithwaite and P. Drahos (2000), *Global Business Regulation*, Cambridge: Cambridge University Press, p.440-441; and P. Dicken (1998), *Global Shift: Transforming the World Economy*, 3rd ed., London: Paul Chapman Publishing, p.338-348.

[9] All three major US producers (Ford, General Motors and DaimlerChrysler) have collaborative of cross-ownership links with Japanese and Korean firms, and the major European firms have joint research programs. See Dicken, *op. cit.*, pp.335-339. A similar point is made by T. Koshiba, P. Parker, T. Rutherford, D. Sanford and R. Olson (2001), 'Japanese Automakers and the NAFTA Environment: Global Context', *Environments*, Vol.29 No. 3, pp.1-14. A comprehensive list of firms and their cross ownership percentages is provided by Deutsche Bank (2004), *op. cit.*, p.13. For example, it shows that General Motors owns 12 percent of Isuzu, 20 percent of Suzuki, 42 percent of Daewoo, 20 percent of Fuji Heavy Industries, 100 percent of Saab and 100 percent of Opel/Vauxhall.

[10] The Economist (2002), *Pocket World in Figures 2003 Edition*, London: Profile Books, p.62. The largest businesses refer to industrial and service corporations and the data is for the year ended 31 December 2000, except for Japanese companies where they refer to the year ended 31 March 2001. The companies, with their nationality and sales in brackets, are: General Motors (US, US$184.7 billion); Ford (US, US$180.6 billion); DaimlerChrysler (Germany, US$150.1 billion); Mitsubishi (Japan, US$126.6 billion); Toyota (Japan, US$121.4 billion); Volkswagen (Germany, US$78.9 billion); Honda (Japan, US$58.5 billion); and Nissan (US$55.1 billion).

[11] UNEP and ACEA, *op. cit.*, p.12. In fact, on the basis of the value of the industry's output, the Organisation Internationale des Constructeurs d'Automobiles (OICA) declares that if vehicle manufacturing was a country it would be the sixth largest in the world. See OICA (2004a), *The World's Automotive Industry: Some Key Figures*, http://www.oica.net/htdocs/Main.htm, accessed 13 January 2006.

[12] The estimates vary, but these are the ones given in UNEP (2003), *Transport*. http://www.uneptie.org/energy/act/tp/index.htm accessed 26 May 2003.

[13] This is calculated as follows. Paterson, *op. cit.*, pp.253-270, says that up to 85 percent of transport-related CO_2 emissions are caused by passenger cars, and that total transport accounts for 23 percent of emissions in Organisation for Economic Cooperation and Development (OECD) countries (as opposed to the 25 percent quoted by the United Nations Environment Programme – see the previous footnote). Therefore, this means that 19.55 percent of OECD countries' CO_2 emissions are car-related (i.e. 85 percent x 23 percent). He goes on to say that these emissions are only around 60 percent of emissions throughout the life of a car, the rest coming from other related activities. When one inflates the 19.55 percent of OECD emissions to take account of this, the total is 32.6 percent (i.e. 100/60 x 19.55 percent). This corresponds reasonably closely with the percentage of 30 percent for the transport sector quoted in Deutsche Bank (2004), *op. cit.*, p.58.

[14] This is based on Germany and Japan's commitments to reduce their emissions by 7.4 and 8.5 percent respectively. The US had made commitments to reduce its emissions by 7 percent, but subsequently decided not to ratify the Kyoto Protocol. See UNFCCC (no date a), *Kyoto Protocol*, http://unfccc.int/essential_background/kyoto_protocol/items/2613.php, accessed 12 February 2005; UNFCCC (no date b), *Status of Ratification*, http://unfccc.int/essential_background/kyoto_protocol/status_of_ratification/items/2613.php, accessed 12 February 2006; and UNFCCC (no date c), *Kyoto Protocol: Status of Ratification*, http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf, accessed 12 February 2006.

[15] Paterson, *op. cit.*, pp.258-259

[16] IEA (l993), *Cars and Climate Change*, Paris: OECD, p.14

[17] P. Freund and G. Martin (1993), *The Ecology of the Automobile*, Montreal: Black Rose, pp.17-19. They point out that cars consume 35 percent of the oil used in Japan and 63 percent of the oil used in the US simply in their application (i.e. exclusive of related activities such as road building which also uses oil). In the US, car production consumes 13 percent of all steel, 16 percent of the aluminium, 69 percent of the lead, 36 percent of the platinum and 58 percent of the rubber.

[18] This is based on a conversion from 7 billion pounds of scrap quoted in P. Hawken, A. Lovins and H. Lovins (1999), *Natural Capitalism: Creating the Next Industrial Revolution*, New York: Little Brown and Co, p.23.

[19] L. Burns, J. McCormick and C. Borroni-Bird (2002), 'Vehicle of Change', *Scientific American*, Vol.287, Iss.4, pp.64-73.

[20] G. Maxton and J. Wormald (2004), *Time for a Model Change: Re-engineering the Global Automotive Industry*, Cambridge: Cambridge University Press, p.31.

[21] M. and C. van der Linde (1995a), 'Towards a New Conception of the Environment – Competitiveness Relationship', *Journal of Economic Perspectives*, Vol.9, No.4, pp.97-118; P. Newell and M. Paterson (1998), 'A Climate for Business: Global Warming: The State and Capital', *Review of International Political Economy*, Vol.5, No.4, pp.679-703; K. Bradsher (2002), *High and Mighty – SUVs: The World's Most Dangerous Vehicles and How they Got That Way*, New York: Public Affairs, p.66; and D. Levy and S. Rothenberg (2002), 'Heterogeneity and Change in Environmental Strategy: Technological and Political Responses to Climate Change in the Global Automobile Industry', in A. Hoffman and M. Ventresca eds., *Organizations, Policy, and the Natural Environment: Institutional and Strategic Perspectives*, Stanford: Stanford University Press.

[22] For example, in his speech to the Fifth Annual Greenpeace Business Conference in 2000, the Chairman of Ford, Bill Ford, said his company had resigned its membership of the GCC because it "felt that

membership in that organisation was an impediment to [its] ability to move forward credibly with [its] agenda on environmental responsibility". Ford Motor Company (no date), *Speech: William Clay Ford, Jr.*, The 5th Annual Greenpeace Business Conference, London, October 5, 2000, http://media.ford.com/article_display.cfm?article_id=6217, accessed 12 April 2006. See also Source Watch (no date), *Global Climate Coalition*, http://www.sourcewatch.org/index.php?title=Global_Climate_Coalition, accessed 12 April 2006;

[23] Membership of the WBCSD's Sustainable Mobility Project include DaimlerChrysler, Volkswagen, General, Ford, Toyota, Honda, Nissan, and energy companies including BP and Royal Dutch Shell. See WBCSD (2004), *Mobility 2030: Meeting the Challenges of Sustainability*, Geneva: WBCSD.

[24] Bradsher, *op. cit.*, points out that light trucks, which include SUVs, account for 75 percent of DaimelrChrysler's US production. See also no author (2002b), 'Storm Clouds over Detroit', *The Economist*, 16-22 November, pp.55-56; and no author (2003), 'Ford's Troubles – One Hell of a Birthday Bill', *The Economist*, 14-20 June, pp.57-60.

[25] P. Ekins, C. Folke and R. Costanza (1994), 'Trade, Environment and Development: the Issues in Perspective', *Ecological Economics*, Vol.9, No.1, p.7.

[26] The classic article on the commons and public goods is G. Hardin (1968), 'The Tragedy of the Commons', *Science*, Vol. 162, pp.1243-1248. A similarly classic article on the actions of firms that impose harmful effects, or "social costs", on others is R. Coase (1960), 'The Problem of Social Cost', *The Journal of Law and Economics*, Vol.3 (October 1960), pp.1-44. A basic explanation of many of the concepts presented here may be found in almost any economics textbook, such as R. Boadway and D. Wildasin (1984), *Public Sector Economics*, Boston: Little, Brown and Company, pp.55-62. For a more social and political perspective see E. Ostrom (1990), *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge: Cambridge University Press., especially chapter 1. For a discussion of the application of these concepts see B. Bürgenmeier (1997), 'Economic Instruments and Social Acceptability: A Debate About Values' in C. Jeanrenaud ed., *Environmental Policy Between Regulation and Market*, Basel: Birkhauser Verlag. In an international relations context see O. Greene (2005), 'Environmental Issues', in J. Bayliss and S. Smith eds., *The Globalisation of World Politics: An Introduction to International Relations*, 3rd edition, Oxford: Oxford University Press.

[27] For example see I. Wallerstein (1995), *After Liberalism*, New York: The New Press; and S. Burchill (1996), *Liberal Internationalism*, in S. Burchill and A. Linklater eds., *Theories of International Relations*, New York: St Martins Press. In the discipline of economics the technical name given to the mainstream liberal economic perspective is, of course, 'neoclassical' economics.

[28] J. Goldstein and R. Keohane (1993), 'Ideas and Foreign Policy: An Analytical Framework', in J. Goldstein and R. Keohane eds., *Ideas and Foreign Policy: Beliefs, Institutions and Political Change*, Ithaca: Cornell University Press, p.5.

[29] A. Hasenclever, P. Andreas, and V. Rittberg (1997), *Theories of International Regimes*, Cambridge: Cambridge University Press, p.26; and J. Mearsheimer (1990), 'Back to the Future: Instability in Europe After the Cold War', *International Security*, Vol.15, No.1, p.42.

[30] I. Ropke (1994), 'Trade, Development and Sustainability: A Critical Assessment of the Free Trade Dogma', *Ecological Economics* Vol.9, No.1, p.17. This is also the view held by the WTO and UNEP. See UNEP and International Institute for Sustainable Development (2000), *Environment and Trade: A Handbook*, Winnipeg Canada: International Institute for Sustainable Development; and H. Nordstrom and S. Vaughan (1999), *Trade and Environment*, WTO Special Studies 4, Geneva: WTO Publications.

[31] J. Elster (1989), *Nuts and Bolts for the Social Sciences*. Cambridge: Cambridge University Press, pp.124-134.

[32] For example, see P. Ordeshook (1993), 'The Development of Contemporary Political Theory', in W. Barnett, M. Hinich and N. Schofield eds., *Political Economy: Institutions, Competition and Representation*, Cambridge: Cambridge University Press. For a description of classical liberalism see G. Crane and A. Amawi (1997), 'Classical Liberalism' in G. Crane and A. Amawi eds., *The Theoretical Evolution of International Political Economy*, Oxford: Oxford University Press. For an analysis of economic liberalism from a critical perspective see E. Helleiner (2003), 'Economic Liberalism and its Critics: The Past as Prologue', *Review of International Political Economy*, Vol.10, No.4, pp.685-696. For

an analysis, and criticism, of rationalism as a way of conceiving the actions of actors generally, see D. Green and I. Shapiro (1994), *Pathologies of Rational Choice Theory: A Critique of Applications in Political Science*, New Haven and London: Yale University Press. For further elaboration of the liberal economic perspective in general also see T. Dunne (2005), 'Liberalism' , in J. Bayliss and S. Smith eds., *The Globalisation of World Politics: An Introduction to International Relations*, 3rd edition, Oxford: Oxford University Press; and S. Lamy (2005), 'Contemporary Mainstream Approaches: Neo-Realism and Neo-Liberalism', in J. Bayliss and S. Smith eds., *The Globalisation of World Politics: An Introduction to International Relations*, 3rd edition, Oxford: Oxford University Press.

[33] A strong case against rational choice-based theories and their narrow research agendas is given by P. Pierson and T. Skocpol (2000), 'Historical Institutionalism in Contemporary Political Science', in I. Katznelson and H. Milner eds., *Political Science: The State of the Discipline*, New York: W.W. Norton and Company; D. Boniface and J. Sharman (2001), 'An Analytical Revolution in Comparative Politics?', *Comparative Politics***,** Vol.34, No.4, pp.475-493; and Green and Shapiro, *op. cit.*

[34] P. Katzenstein (1996), *Cultural Norms and National Security: Police and Military in Postwar Japan*, Ithaca: Cornell University Press, p.27.

[35] *Ibid.*, p.27.

[36] See D. North (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press; J. March and J. Olsen (1989), *Rediscovering Institutions, The Organizational Basis of Politics*, New York: The Free Press; J. March and J. Olsen (1998), 'The Institutional Dynamics of International Political Orders', *International Organization*, Vol. 52 No.4, pp.943-969; J. Ruggie (1998a), *Constructing the World Polity*, New York: Routledge; and Goldstein and Keohane, *op. cit.* The author accepts that it might be going too far to cast Goldstein and Keohane as staunch advocates of the institutional approach. Even so, the importance of the approach is explicitly acknowledged and addressed by them.

[37] North, *op. cit.*, p.3 and 14.

[38] P. Hall and D. Soskice (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, p.9.

[39] March and Olsen (1989), *op. cit.*; March and Olsen (1998), *op. cit.*; and Hasenclever et. al., *op. cit.*

[40] M. Finnemore and K. Sikkink (2001), 'Taking Stock: The Constructivist Research Program in International Relations and Comparative Politics', *Annual Review of Political Science 2001*, Vol.4, p.393. They are, of course, speaking specifically of constructivism, an umbrella term for a range of institutional perspectives in international relations and comparative politics, but the points they make have clear relevance here as well. They draw on the following authors for their neat summary: E. Adler (1997), 'Seizing the Middle Ground: Constructivism in World Politics', *European Journal of International Relations*, Vol.3, No.3, pp.319-363; R. Price and C. Reus-Smit (1998), 'Dangerous Liaisons? Critical International Relations Theory and Constructivism', *European Journal of International Relations*, Vol.4, No.3, pp.259-294; J. Ruggie (1998b), 'What Makes the World Hang Together? Neo-utilitarianism and the Social Constructivist Challenge', *International Organization*, Vol.52, No.4, pp.855-887; and A. Wendt (1999), *Social Theory of International Politics*, Cambridge UK: Cambridge University Press.

[41] For a detailed discussion of institutionalist perspectives and the role of ideas, beliefs and norms more broadly see T. Risse (2002), 'Constructivism and International Institutions: Toward Conversations across Paradigms', in I. Katznelson and H. Milner eds., *Political Science: The State of the Discipline*, New York: W.W. Norton and Company; T. Risse (2000), "'Let's Argue!": Communicative Action in World Politics', *International Organisation*, Vol.54 No.1, pp.1-39; J. Hall (1993), 'Ideas and the Social Sciences', in J. Goldstein and R. Keohane eds., *Ideas and Foreign Policy: Beliefs, Institutions and Political Change*, Ithaca: Cornell University Press; P. Hall (1997), 'The Role of Interests, Ideas and Institutions in the Comparative Political Economy of Industrialised Nations', in M. Lichbach and A. Zuckerman eds., *Comparative Politics: Rationality, Culture and Structure*, Cambridge: Cambridge University Press; A. Wendt (1995), 'Constructing International Politics', *International Security*, Vol.20, No.1, pp.71-81; A. Wendt (1998), 'On Constitution and Causation in International Relations', *Review of International Studies*, Vol.24, No.4, pp.101-117; Elster, *op. cit.*; Hasenclever et al., *op. cit.*; March and

Olsen (1989), op. cit.; March and Olsen (1998), *op. cit.*; and Ruggie (1998a), *op. cit.* In relation to economic relations and economic performance specifically, see North, *op. cit.*.

[42] Paterson, *op. cit.*, p.254.

[43] Newell and Paterson, *op. cit.*, p.680.

[44] J. Karliner (1997), *The Corporate Planet*, San Francisco: Sierra Club Books, p.2. He sees the role of states and business in the environment debate as constrained by the rise of neoliberalism which opposes the notion of states intervening for the "social good".

[45] *Ibid.*, p.47.

[46] E. Ostrom (1999), 'Coping with Tragedies of the Commons', *Annual Review of Political Science 1999*, No.2, p.496.

[47] M. Finnemore and K. Sikkink (1998), 'International Norm Dynamics and Political Change', *International Organization*, Vol.52, No.4, pp.887-917; A. Florini (2003a), 'Business and Global Governance: the Growing Role of Corporate Codes of Conduct', *Brookings Review*, Spring, pp.4-8; A. Florini (2003b), *The Coming Democracy: New Rules for Running a New World*, Washington: Island Press; A. Cutler, V. Haufler and T. Porter (1999a), 'The Contours and Significance of Private Authority in International Affairs', in A. Cutler, V. Haufler and Tony Porter eds., *Private Authority and International Affairs*, Albany: State University of New York Press; A. Prakash (2000), *Greening the Firm: The Politics of Corporate Environmentalism*, Cambridge: Cambridge University Press; and Ostrom, *op. cit.*

[48] Finnemore and Sikkink (1998), *op. cit.*

[49] Livio de Simone, chairman of the WBCSD quoted in Karliner, *op. cit.*, p.31.

[50] Wendt (1998), *op. cit.*

[51] S. Strange (1996), *The Retreat of the State: The Diffusion of Power in the World Economy*, Cambridge: Cambridge University Press; K. Ohmae (1990), *The Borderless World: Power and Strategy in the Interlinked Economy*, London: Collins; and T. Friedman (1999), *The Lexus and the Olive Tree*, London: Harper Collins. Strange sees global capital's ability to transcend borders as resulting in states becoming powerless, with power having transferred to markets. Ohmae similarly sees the world as becoming "borderless", with corporate strategies now characterised predominantly by a global perspective. In Friedman's view, states must adopt the "golden straightjacket" approach to intervening in their economies, in the sense that any activist-style policies run the risk of capital flight. By way of contrast, though not necessarily contradiction, a more critical perspective is provided by Helleiner, *op. cit.*. He identifies Margaret Thatcher's 'TINA Principle' ('There Is No Alternative' to neoliberal policies of minimum state intervention in markets due to the global interconnectedness of production and trade) as a choice in itself taken by powerful industrialised states.

[52] P. Doremus, W. Keller, L. Pauly and S. Reich (1999), *The Myth of the Global Corporation*, Princeton: Princeton University Press; L. Weiss (1998), *The Myth of the Powerless State: Governing the Economy in a Global Era*, Cambridge: Polity Press; L. Weiss and J. Hobson (1995), *States and Economic Development, a Comparative Economic Analysis*, Cambridge: Polity Press; S. Vogel (1996), *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries*, Ithaca: Cornell University Press; S. Vogel (2001), 'The Crisis of German and Japanese Capitalism: Stalled on the Road to the Liberal Market Model?', *Comparative Political Studies*, Vol.34, No.10, pp.1103-1133; R. Boyer (1996), 'The Convergence Hypothesis Revisited: Globalisation but Still the Century of Nations?', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press; and R. Wade (1996), 'Globalisation and its Limits: Reports of the Death of the National Economy are Greatly Exaggerated', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press. See also L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation', *International Organization*, Vol.51, No.1, pp.1-30. For the VOC approach, see in particular Hall and Soskice, *op. cit.*

[53] Deutsche Bank (2004), *op. cit.*

[54] Maxton and Wormald, *op. cit.*, pp.249-251. See also Deutsche Bank (2004), *op. cit.*, pp.117-121.

[55] Maxton and Wormald refer to Chrysler as having been "bought by Daimler", but Nissan as having been "subsumed (but nicely this time) into Renault". There is therefore a qualitative difference in the associations of the companies involved in each case. See Maxton and Wormald, *op. cit.*, p.116 and also pp.221-222. For a colorful description of the take over of Chrysler by Daimler-Benz see B. Vlasic and B. Stertz (2001), *Taken for a Ride: How Daimler-Benz Drove Off with Chrysler*, New York: Harper Business. For Renault's share in Nissan and the nature of the relationship between the two companies from Renault's perspective, see Renault (2001), *2000 Annual Report Summary*, Boulogne Billancourt: Renault, http://www.renault.com/docs/finance_gb/synthese_2000_gb.pdf, accessed 17 January 2006, pp.12-15. See also Deutsche Bank (2002), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG. The current cross-ownership percentages are also reported in Deutsche Bank (2004), *op. cit.*, Deutsche Bank AG, p.13. *The Economist* also notes the following: "Although Renault and Nissan have cross-shareholdings and a deep alliance, their relationship deliberately stops well short of outright merger. Perhaps that is why it has been so successful, avoiding the integration pain that has marred, for instance, Daimler-Benz's *takeover* of Chrysler. In his book, 'Shift: Inside Nissan's Historic Revival', published in English last month, Mr Ghosn (former President and CEO of Nissan) says that the strength of the alliance 'can be found, on the one hand, in its respect for the identities of the two companies, and on the other, in the necessity for developing synergies'." See no author (2005), 'The $10 Billion Man', *The Economist*, 26 February–4 March, p.62 (emphasis added).

[56] See Deutsche Bank (2004), *op. cit.*, Part 2. This provides details of board membership and location of firms' headquarters on a firm by firm basis.

[57] Dicken, *op. cit.*, p.319. That is to say, even if firms a significant percentage of firms' production occurs outside their home state, it is still most likely to occur in the EU, US or Japan.

[58] Hawken et. al., *op. cit.*, p.23.

[59] They are: Volkswagen, BMW, DaimlerChrysler, Porsche, PSA Peugeot Citroen, General Motors, Ford, Renault, Toyota, Honda, Hyundai and Rover. See Deutsche Bank (2004), *op. cit.*, p.13.

[60] Although, of course, this two thirds only reflects the actual number of firms rather than their size and economic importance. For example, of the other four independent firms, two are quite small: Rover has gone into bankruptcy and Porsche is a niche producer of expensive high performance sports cars.

[61] Burns et. al., *op. cit.*. Data on German car sales was presented in Table 1.1 by value. For data on sales volume (i.e. units sold) which shows that Germany is the largest market in Europe on this basis as well, see ACEA (no date a), *Passenger Cars in EU15: Breakdown by Segments and Bodies*, http://www.acea.be/ACEA/Segment-Bodies.pdf, accessed 9 June 2004. For a historical time series that shows this to be true throughout the 1990s to the present, see ACEA (no date b), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications: Average Cubic Capacity*, http://www.acea.be/ACEA/Average_CC-PC-90-02.pdf, accessed 9 June 2004.

[62] J. Jain and J. Guiver (2001), 'Turning the Car Inside Out: Transport, Equity and Environment', *Social Policy and Administration*, Vol.35, No.5, pp.569-586.

[63] This view coincides with P. Hirst and G. Thompson (1997), 'Globalisation in Question: International Economic Relations and Forms of Public Governance' in J. Hollingsworth and R. Boyer eds., *Contemporary Capitalism: The Embeddedness of Institutions*, Cambridge: Cambridge University Press. They note on page 346 that there are few truly transnational corporations, and that "most major manufacturing multinationals account for two thirds of their sales within their home region; moreover, there seems to be no tendency for this ratio to diminish". And more broadly, it agrees with authors who hold that the strategic impact of globalisation in general is overstated, and that firms' nationalities and home markets remain of crucial importance.

[64] A point also well made in Maxton and Wormald, *op. cit.*

[65] Wade, *op. cit.*, Robert, p.61. He also points out that the observations made here on national ownership and geographical location of operations are generalisable to MNCs more generally. Similar observations are made by Weiss, *op. cit.*

[66] Boyer, *op. cit.*, p.51. See also Hirst and Thompson, *op. cit.*

[67] Dicken, *op. cit.*, p.196.

[68] The literature in this vein continues to burgeon and includes contributions in edited works such as D. Coates ed. (2005), *Varieties of Capitalism , Varieties of Approaches*, Basingstoke: Palgrave Macmillan; P. Hall and D. Soskice eds. (2001), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press; H. Kitschelt, P. Lange, G. Marks and J. Stephens eds. (1999), *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press; C. Crouch and W. Streeck eds. (1997), *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications; J. Hollingsworth and R. Boyer eds. (1997), *Contemporary Capitalism: the Embeddedness of Institutions*, Cambridge: Cambridge University Press; S. Berger and R. Dore eds. (1996), *National Diversity and Global Capitalism*, Ithaca: Cornell University Press; and S. Clegg and S. Redding eds. (1990), *Capitalism in Contrasting Cultures*, Berlin: Walter de Gruyter. Individual contributions from these are cited in the following chapter.

[69] Hall and Soskice, *op. cit.*, pp.8-9.

[70] *Ibid.*, pp.21-33.

[71] For example, see R. Dore (2000a), *Stock Market Capitalism: Welfare Capitalism: Japan and Germany versus the Anglo Saxons*, Oxford and New York: Oxford University Press.

[72] Hall and Soskice, *op. cit.*, pp.19-21.

[73] For example, see Weiss (1998), *op. cit.*; Weiss and Hobson (1995), *op. cit.*; Hollingsworth and Boyer (1997), *op. cit.*; Pauly and Reich (1997), *op. cit.*; as well as A. Griffiths and R. Zammuto (2005), 'Institutional Governance Systems and Variations in National Competitive Advantage: an Integrative Framework', *Academy of Management Review*, Vol.30, No.4, pp.823-842.

[74] WBCSD, *op. cit.*, pp.145-146.

[75] M. Williams (1996), 'International Political Economy and Global Environmental Change', in M. Imber and J. Vogler eds., *Environment and International Relations: Theories and Processes*, London and New York: Routledge. For an example of the way in which the challenge is approached from a state perspective, and international cooperation between states, see S. Barrett (2003), *Environment and Statecraft: the Strategy of Environmental Treaty-Making*, New York: Oxford University Press.

[76] W. Hafkamp (1997), 'Covenants from Instrument of Environmental Policy to Implementation Tool', in C. Jeanrenaud ed., *Environmental Policy Between Regulation and Market*, Basel: Birkhauser Verlag, p.260.

[77] A. Cutler, V. Haufler and T. Porter (1999b), 'Private Authority and International Affairs', in A. Cutler, V. Haufler and T. Porter eds., *Private Authority and International Affairs*, Albany: State University of New York Press, p.4.

[78] See Hall and Soskice, *op. cit.*, p.4 and 6. A similar desire is expressed in P. Hall (1999), 'The Political Economy of Europe in an Era of Interdependence', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press, p.147.

[79] The reason for this, put simply, is that "the basic institutional structures of MNCs may be influenced or even determined by the characteristics of states". See Pauly and Reich, *op. cit.*, p.5.

[80] Such an approach is advocated by the OECD in OECD (2001a), *Corporate Responsibility: Private Initiatives and Public Goals*, Paris: OECD; and OECD (2001b), *OECD Guidelines for Multinational Enterprises, Global Instruments for Corporate Responsibility*, Annual Report 2001, Paris: OECD. On page 80 of the latter publication Seiichi Kondo, Deputy Secretary General of the OECD is quoted as saying that "international order and prosperity is no longer achieved through a traditional balance of power among states, nor through the hegemony of a superpower. In this new age of globalization, cooperation among four key actors – states, international organizations, civil society and markets – has become more essential than ever."

[81] Figures 1 and 2 are based on those used in Hafkamp, *op. cit.*, p.262.

[82] UNEP and ACEA (2002), *op. cit.*, p.7.

[83] *Ibid*., p.7.

[84] *Ibid*., p.8.

[85] This is also the view of Hawken et. al., *op. cit.*, p.23.

[86] It is estimated that one qualified job in the automotive industry indirectly creates up to ten qualified jobs in related industry sectors. See UNEP (2002), *Industry as a Partner for Sustainable Development – 10 Years After Rio: the UNEP Assessment*, http://www.uneptie.org/Outreach/wssd/contributions/publications/pub_global.htm, accessed 13 June 2003, p.24. See also Dicken (1998), op. cit., p.326, where the car industry is described as an "assembly industry" requiring hundreds of thousands of components mostly sourced from suppliers.

[87] H. Eckstein (1975), 'Case Study and Theory in Political Science', in F. Greenstein and N. Polsby eds., *Strategies of Enquiry*, Reading: Addison-Wesley Publishing Company, pp.113-123; and G. King, R. Keohane and S. Verba (1994), *Designing Social Inquiry: Scientific Inference in Social Research*, Princeton: Princeton University Press, pp.208-212.

[88] D. Coates (2005), 'Paradigms of Explanation', in D. Coates ed., *Varieties of Capitalism, Varieties of Approaches*, Hampshire: Palgrave Macmillan, p.4.

[89] C. Hay (2005), 'Two Can Play at That Game…or Can They? Varieties of Capitalism, Varieties of Institutionalism', in D. Coates ed., *Varieties of Capitalism, Varieties of Approaches*, Hampshire: Palgrave Macmillan, p.106.

[90] See Hall and Soskice, *op. cit.*, p.4 and 6; and Hall, *op. cit.*, p.147.

[91] Porter and van der Linde (1995a), *op. cit.*, p.99.

[92] J. Hall, *op. cit.*, pp.42-43.

[93] J. Legro (1997), 'Which Norms Matter? Revisiting the "Failure" of Internationalism', *International Organization*, Vol.51, no.1, pp.31-63. A similar point is made in Risse (2000), *op. cit.*

[94] March and Olsen (1998), *op. cit.*, p.952, with italics added.

[95] V. Haufler (1999), 'Self-Regulation and Business Norms: Political Risk, Political Activism', in A. Cutler, V. Haufler and T. Porter eds., *Private Authority and International Affairs*, Albany: State University of New York Press, p.201.

[96] Levy and Rothenberg, *op. cit.*, p.173.

[97] *Ibid*., p.173.

Chapter 2: The Varieties of Capitalism Approach and Operationalising the Research

Introduction

In Chapter 1, the key questions to be addressed in the thesis were posed. They bear repetition before discussion of the varieties of capitalism (VOC) approach and how the research will be operationalised in the light of it. The first, and central question, is: what institutional factors are likely to motivate firms in the car industry to see environmental issues as central to their business interests? The second question, related to the first one, is: are the motivators for firms embracing environmental improvements universal, or specific to firms based on their nationality or, possibly, individual cultures? Depending on the answers to the first two questions, the third is: why should the car industry be concerned about the environment, particularly given its global economic significance and resulting political power? In discussing how these questions will be answered, the importance of institutional as well as material factors was highlighted. The assertion was made, to be proved on the basis of the empirical analysis to follow, that although material factors are important, institutional factors are crucial for explaining why firms of different nationalities approach making environmental commitments – i.e. internalising environmental externalities – in different ways.

In Chapter 1, the enduring importance of firms' home states in terms of production and key markets, as well as ownership and headquarters, led to the identification of an institutional analysis on the basis of firms' home states via the VOC approach. The VOC approach suggests insights into specific institutional differences in capitalist relations between states, and thus is applicable to a comparative analysis of the industry's activities in its three hubs of Germany, the United States (US) and Japan. Although the broad divide between liberal market economies (LMEs), such as the US, and coordinated market economies (CMEs), such as Germany and Japan, was introduced in Chapter 1, this chapter describes key aspects of the divide in greater detail. By employing the VOC approach, the contribution made to the VOC literature is that its insights are applied in a novel way to the environmental motivations of firms. The application is novel in the sense that rather than examining the competitive

advantages of states' industrial bases, or the operation of their product and financial markets etc., what is shown is that a state's variety of capitalism has implications for traditionally less 'core' considerations such as the environment. As environmental questions increase in importance for business, the point is that institutional differences in capitalist relations between states have implications for whether, and how, firms from different states address the environmental impact of their operations.

After outlining the insights of the VOC approach in detail, this chapter then turns to how these insights are methodologically brought to bear in operationalising the research. First, the question of environmental sustainability, or indeed simply 'concern for the environment', is defined. Secondly, the case is made why the environmental issue of climate change, and its related concern of fuel economy for passenger cars in use, will be central to the analysis. Thirdly, the timeframe for analysis is specified. Finally, a chapter outline is provided.

Insights of the Varieties of Capitalism Approach

As intimated in Chapter 1, the VOC approach speaks to two debates. The first is whether the imperatives of free trade and neoliberal capitalism mean that all capitalist economies are converging on the neoliberal model resulting in privatisation, minimal government regulation, deregulation and free markets. The power of states is being transferred to markets, or more specifically internationally mobile capital. The major adherents to this line of thought are authors such as Ohmae and Strange, the latter of whom sees states as increasingly "merely the handmaidens of firms" and characterises the state as "a kind of landlord for the enterprises inhabiting the national territory".[1] On the other side of the argument are authors such as Weiss, Hobson and Vogel[2] who say that this misrepresents what has happened. Rather than saying that "states are now virtually powerless to make real policy choices" with all states "forced to adopt similar fiscal, economic and social policy regimes",[3] they argue that states still do have power, but that some are better able to exercise it than others because state power is taking new forms. This new power is not so much coercive power, but institutional power. The VOC approach says that because there are different varieties of capitalisms that reflect the different institutional capacities of states, this occurs in different ways.

The second, related, debate regards the power that multinational corporations (MNCs) possess. One perspective is that MNCs have incentives to standardise their products to reap economies of scale from their global investment, production and distribution networks. Alternatively, there is the view that MNCs use their international reach and information networks to tailor products for local markets.[4] The VOC approach walks a line between these two arguments by saying that while MNCs may operate both globally and tailor their products to satisfy local market conditions, there is another factor to be considered. This is that the products they offer in the first place are very much determined by the institutional framework of their home territories.

Fundamentally, the VOC approach therefore says that firms are institutionally embedded in their home states for economic, political, social, cultural and historic reasons, and that capitalist states possess historically institutionalised norms which endure over time. Rather than isomorphism as a result of the forces of globalisation, national institutional variations produce different outcomes in terms of competitiveness, the types of goods and services produced and the ways these are produced. The capitalisms of different states also suggest different propensities for change and how change occurs. The contention of this thesis is that it therefore has implications for non-economic outcomes such as environmental performance, and that such outcomes are directly related to the institutional framework of different capitalisms discussed in the VOC literature.[5]

As noted in Chapter 1, in perhaps the most comprehensive overview of the VOC approach, Hall and Soskice define institutions as "a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive, or material reasons".[6] Starting from this point, they see capitalist economies as coming in a variety of forms. They are shaped by the institutions that underpin them which provide different "capacities for the exchange of information, monitoring, and the sanctioning of defections relevant to cooperative behaviour among firms and other actors".[7] As noted in Chapter 1, the contention is that this perspective leads to the categorisation of the institutional framework of states as tending more towards LMEs versus CMEs. It was noted that firms in LMEs coordinate their activities via hierarchies and competition in markets. Firms in CMEs are characterised by more non-market cooperative relationships to coordinate their endeavours and develop their core competencies, so

that it is not primarily the market and its price signals that determines firms' behaviour, but rather relationships based on cooperative networks between them and the state. Furthermore, firms in LMEs are happier with formal contracts and decisions based on market signals that define shorter-term profit levels, and they will usually prefer deregulation over heavier state guidance and intervention. By contrast, firms in CMEs tend more towards consensus decision-making between themselves and between them and states based on long-established networks.

It was also noted in Chapter 1 that underlying the LME/CME divide are a myriad of aspects. Those most applicable to the analysis in this thesis are: the nature of state-business relations; the role of product markets; the role of financial markets; the organising principles of firms; the role of technology; the relationship between exogenous versus endogenous factors impacting on firms; and the centrality of historical context. This is not an exhaustive list, but one that would seem to describe the institutional relations most pertinent to the analysis here.[8] The following discussion is a distillation of a growing array of texts by authors identifying themselves as writing on the VOC approach specifically,[9] as well as authors who believe that institutions matter in describing similarities and differences between industrialised capitalist states, and thus may be said to precede or be writing in the VOC tradition in a related capacity.[10] This is because they analyse the institutional aspects of states' economic performance based on the idea that "institutions are embedded in a culture in which their logic is symbolically grounded, organisationally structured, technically and materially constrained, politically defended, and historically shaped by specific rules and norms".[11] They therefore speak to the LME/CME divide identified by VOC authors.[12]

State-Business Relations

The major divide between LMEs and CMEs in respect of state-business relations is the extent to which the state and business cooperate to achieve mutual objectives. Firms in LMEs tend to pressure their governments for deregulation.[13] They believe in free markets that operate on laissez faire principles unless there is a clear case for state intervention due to market failure. By contrast, firms in CMEs expect the state to be an

activist one, a partner in the market with them. As a result, in addition to being strategically coordinated by markets, firms in CMEs are to a large extent also state coordinated.[14]

As the archetypal LME, the US has long had an ideology of non-intervention in markets. This means the US government has never had an effective industry policy. It has taken the more indirect approach of creating an *environment* for business to succeed in markets. The distinction is important because it means that when it comes to regulation, the US has taken the LME perspective that the state should only intervene to internalise market externalities. Of course, this is not to say that one should caricature US industry as a paragon of self-reliance operating in some vacuum free from government intervention, assistance, or protection from time to time. However, relative to other states there is certainly a stronger ideology that this is a virtuous state of existence, and there is the reality of less state coordination of business in an atmosphere of greater state-business conflict.[15]

Following from this last point, when intervention does occur, it does not occur so much in a coordinated manner, but is highly pluralistic in nature, occurring at many levels and with many 'voices' taking part. Consensus is hampered by competition for representation of views by industry and others, and a tendency to reject compromise. The result is an adversarial relationship between the state, industry and other stakeholders, with the observation that "the most characteristic, distinctive and persistent belief of American corporate executives is an underlying suspicion and mistrust of government".[16] The ideology underlying this belief is characterised by Wilks as follows:

> The dominant value is an emphatically and sincerely articulated support for the 'free enterprise system' and associated with that is the practical norm of rejecting any action that inhibits management autonomy. More specific to government is a parallel value that wholeheartedly rejects the legitimacy of state intervention in the economy and a norm that is suspicious of the competence and the motives of public officials.[17]

Given such a relationship between the state and markets, state-business relations are often characterised more by industry lobbying and attempting to "capture government agencies", rather than working with or following the agenda set by those agencies.[18] The aim is that business should have its 'head' as much as possible to pursue its profit-

motivated interests, so individualism and market orientation in business is promoted over collectivism and national spirit.[19]

In contrast, German state-business relations are generally conceived as more amicable and constructive. It is not a laissez faire economy, but one in which there is a national approach to economic development with the state playing a "passive, facilitative role".[20] Thus, the state's role has been more one of support for industry and working with industry to further its objectives, and help coordinate its activities. The German state is thus an "enabling state".[21] State-business relations in Japan go even further to exhibit an almost symbiotic, or 'organic', relationship. An 'iron triangle' of business-bureaucracy-government relations means that a type of "corporatism without labour" exists, in the context of a belief that "capitalism needs the visible hand of the state".[22] Though not a centrally planned economy, Japan can still be thought of as a 'developmental state' where the government has a vision for the goals of the private sector, arranges preferential allocation of capital to targeted industry sectors and key firms, and has a bureaucratic architecture designed specifically to consult and work with firms and industry sectors - e.g. the Ministry for International Trade and Industry (MITI), now renamed the Ministry of Economy Trade and Industry (METI).[23] This leads Broadbent to label Japan a "nationalist-paternalist capitalist state".[24] However, this potentially overstates the role of government if it is taken as simply meaning the government takes decisions and business implements them.[25] Instead, a more 'organic' relationship is implied by Redding and Whitley who characterise Japanese state-business relations as "subtle but indirect strategic guidance and only limited use of open suggestion",[26] or Wilks who emphasises the Japanese preference for harmony and consensus via accommodation, consultation and conflict avoidance wherever possible that leads Japanese bureaucrats to be able to issue legally non-binding instructions.[27] The result is "reciprocal consent" between the state and business, such that industry groups are involved in developing policies with the state setting stringent yet flexibly implemented regulations that are constructed with industry consultation.[28]

Overall, whatever the difference in emphasis between the German and Japanese CMEs, the line between business and government interests is more blurred than in the US. Business and nationalism are thus to some extent conflated.[29] While US firms desire deregulation and hands-off laissez faire market operations, German and Japanese

firms operate more on the basis of consensus-oriented negotiation with the state. While 'cooperation' with government has as its goal the 'capture' of government agencies to meet the goals of the firm in the US, the state sets the agenda more in Germany and Japan, and coordinates firms or informally suggests what should be done. Instead of what is basically a lobbying and conflict model in the US, German and Japanese firms operate within a collaborative and consensus model for cooperating with the state to develop regulations, agree on targets to be met, and establish priorities and goals to be achieved.

The Role of Product Markets

Differences in the role of product markets (i.e. markets for goods and services) revolve around the degree to which they drive firm strategies in LMEs, versus being one among a range of motivating factors in CMEs. This is a question of the priority accorded market forces, with the observation being that they are accorded higher priority in LMEs. A related question is the degree to which markets drive firm strategies in LMEs, as opposed to reflect them in CMEs. This is a question of causality, with the suggestion being that firm strategies reflect market forces more in LMEs, whereas market forces are to some extent a reflection of firm strategies in CMEs.

Hollingsworth notes that in LMEs such as the US, "a market mentality tends to become pervasive", the result being that "the dominant institutional arrangements for coordinating a society's economy tend to be markets, corporate hierarchies, and a weakly structured regulatory state". [30] Concomitant with the preference of firms in LMEs for the state to be 'in the background' rather than interventionist,[31] a market mentality comes to dominate firms' strategic thinking. Competition in markets is held to be of paramount importance because it is seen as necessary for 'efficient' outcomes. Markets thus play the role of organising economic activity and are a primary determiner of production and strategy, with the goal being shorter term profits via competition in them. Indeed, even when the state does intervene in LMEs, Hall and Soskice find that they "should find it more feasible to implement market-incentive policies that do not put extensive demands on firms to form relational contracts with others, but rely on markets to coordinate their activities".[32]

Markets play less of a strategic organising role in CMEs. It is not that markets are unimportant in CMEs like Germany and Japan, but other factors are just as important, possibly moreso at times, so that market forces are not the driving force they are said to be in LMEs such as the US. In their place, communitarian obligations (e.g. to the state and society) and higher levels of trust and coordination between economic actors, rather than competition, are more the norm. Indeed, there tend to be institutional arrangements that facilitate cooperation between competitors rather than competition. Rather than focussing on short term gains and profits in markets, this also facilitates a longer term view when it comes to strategic planning because if 'winning' in the market is not the aim, but coordinated action with competitors and the state to be more competitive on a larger scale, then short term financial gains are less important than longer term ones.[33]

The difference in emphasis on the role of product markets has direct implications for non-economic outcomes. In CMEs, concepts such as reputation and standing have heightened importance, and in addition to market success there is the idea of firms possessing a social contract with society. By contrast, in LMEs non-economic action[34] is seen as 'philanthropy' – i.e. an 'add-on' to the core purpose of making profits.[35] Putting it bluntly, the division is between the firm serving society in CMEs and the firm serving itself in LMEs. By way of illustration, Wilks notes in the case of Germany that government support for industry's interests is reflected in private entrepreneurs often seeing themselves as embodying principles of "good citizenship", with public obligations as important as "the private concerns of selfish individuals". Thus, private enterprise sees itself as serving societal interests as well as amassing private wealth.[36] In the case of Japan, he notes that paternalistic authority on the part of the state is reflected in a broader desire to act for the greater good. In sum, "the fear of letting down the side, of breaking with consensus, of not meeting expected standards provides the main psychological drive for generating what must be the most impressive political and social power in Asia".[37]

The above observations also have implications for relations between firms as much as within them. LME inter-firm relations are characterised by competitive market relationships and enforceable formal contracts. In the US, market competition is enshrined by law in rigorous anti-trust legislation. Anti-trust laws, for which there have

been largely no equivalents in Germany of Japan,[38] work against oligopolistic competition in theory, if not necessarily always in practice, to promote the belief that market competition between firms is to be favoured.[39] Thus, reputation building is more market contingent than founded on close business networks or associations. Indeed, it is estimated that as little as one percent of research and development funds spent in the US private sector is devoted to collaborative research.[40] For US firms this inability to act collectively, or at least a predilection to not do so, reflects an institutional framework that generally favours shorter-term and more competitive relations based on market forces.[41]

Inter-firm relations in CMEs are not so much seen in competitive terms as in the need for coordination through large, organised firm groupings that present views to government. In the case of Germany, competition is not so much seen in terms of competing with other firms, as a focus on product differentiation and niche production, given an overall goal of harmonious inter-firm relations.[42] Hampden-Turner and Trompenaars observe that Japanese markets are characterised by deep relationships between firms and their customers and suppliers, and that Japanese firms are reluctant "to break relationships with those particular partners who keep them supplied and informed".[43] Instead, they cultivate "deep relationships over time with clients [because] you do not switch customers or suppliers day by day on the basis of price calculations".[44]

On the whole, a preference for deregulated competition in product markets, and the primacy of competitive market forces as a motivator for action, is a feature of LMEs such as the US. By contrast, market forces are one factor among many for firms in CMEs such as Germany and Japan, with a preference for coordination, cooperation and longer-term relationships based on trust as organisers of economic activity in markets.

The Role of Financial Markets

Reflecting differences in the role of product markets in LMEs versus CMEs, are differences in the role of financial markets (i.e. mechanisms for accessing investment finance). Specifically, reliance on stockmarkets and the interests of shareholders is a (possibly *the*) major focus for firms in LMEs, whereas a broader range of stakeholders

are the focus for firms in CMEs. This is because the latter have relied more on debt rather than equity finance. As with differences in the role of product markets, this produces shorter term perspectives in LMEs and longer term perspectives in CMEs.

US capitalism has been labelled "stock market capitalism"[45] because US firms rely heavily on equity finance and shareholder support for their ongoing operations. Indeed, stock market capitalisation is of a magnitude two to three times grater in the US and other LMEs by comparison to CMEs such as Germany and Japan.[46] There is thus a reliance on "market modes of coordination in the financial sphere".[47] US firms' access to finance is more contingent on shareholders' access to publicly available financial data and payment of financial returns in the form of dividends in the current period, and this means that they are encouraged to "focus on the publicly assessable dimensions of their performance that affect share price, such as current profitability".[48] Shareholdings are volatile and often held by smaller portfolio investors so market sentiment can lead to firms' ownership changing hands if their stock price falls. Firms are expected to pay dividends reflecting their profitability in the current period and are judged on their ability to do so. Shareholder value is the primary goal of the firm, because diversified portfolio investors seek higher short term returns than stable institutional investors, meaning that firms must adopt a short term, shareholder focussed strategy or risk being starved of the capital they need to invest and survive.[49]

In Germany and Japan debt finance has been more the norm. In Germany, banks are often represented on major companies' boards and are regarded as strategic industry partners rather than simply financiers.[50] In Japan, the major financial groups are also often attached or closely affiliated with large corporations, and it is common for large firms to rely on one bank for all their capital requirements.[51] More than half the equity of Japanese firms is held by "stable shareholders": banks, insurance companies and related companies with which the firm trades or has joint ventures.[52] Therefore, in Japan and Germany the shareholder is the investor, rather than the controller, and dividends are not so closely related to profits. Reciprocal trust between firms is also increased in the case of Japan where cross-firm stable shareholdings are the norm, and in Japan the board is this appointed from management ranks, not outsiders (i.e. not the largest shareholders).[53] Therefore, rather than being monitored by shareholders on the basis of their short term financial performance, firms in CMEs such as Germany and

Japan rely more on their reputation for solid performance in the longer term, and trust and support from their stable shareholders and financial partners based on their reputation.[54] A "stakeholder model" rather than a "shareholder model" is often said to describe the difference because a wider variety of constituencies have "voice" in the firm, including employees, suppliers and customers.[55]

There are some differences in the stakeholder model between Germany and Japan though. The major difference is the location of key stakeholders. For Japanese firms, key stakeholders are located within the "enterprise community", largely within the firm. Therefore, concern for stakeholders beyond the firm is very much a function of how they affect the inner community of the firm itself. A large part of the reason for this is the long term nature of employment in Japanese corporations and resulting strong feelings of belonging to the firm, as if to a family, traditionally for the whole of an employee's working life. Thus, for management "decent treatment of customers and concern for suppliers affects the reputation of the firm in the society at large; hence it affects the 'standing' which the manager himself has when he goes to seminars and meetings of his business federation, as somebody who is identified with, and identifies himself with, his firm". For German firms the key stakeholders are primarily located outside the firm. A sense of responsibility to society in particular is stronger for German firms. Even if they are majority privately owned and operated, they are to some degree regarded as public institutions in their responsibilities to society, certainly moreso than in the case of Japanese firms. Thus, while Japanese firms look inwards to fulfil their responsibility to their stakeholders, German firms look outwards to society as a whole.[56]

Whatever the differences in the stakeholder model for Germany and Japan, the implications in terms of timeframe by comparison to US firms are clear. US firms *must* be more focussed on shorter term profit maximisation because they are "dependent for raising capital on liquid financial markets rather than on banks" and in so doing are "dependent on the whims and strategies of stockholders and bond owners".[57] By contrast, German and Japanese firms' reliance on debt finance means they have a longer term perspective because their major banks and other debt financers have a stake in the company's fortunes at a more strategic level. Such close interlinkages produce more stable business relations, and mean firms are more "immune" to short-run sharemarket

fluctuations than LME-based US firms.[58] German and Japanese firms are thus more willing to focus on strategic goals such as increasing market share and postponing short term profits to achieve this, as opposed to US firms which cannot afford the luxury of incurring the disapproval of equity investors for too long.

Organising Principles of Firms

A picture starts to emerge of what motivates firms in LMEs versus CMEs. In LMEs, the separation of the states from business characterised by more adversarial relations leads to support for free markets with state intervention only in cases of market failure. Markets are in the lead in coordinating economic activity, and this is true for both product and financial markets. A shorter term perspective is the result as firms seek profits on the basis of current market forces, particularly driven by the imperative of paying dividends to shareholders. By contrast, CMEs are characterised by closer state-business relations for coordinating economic activity. This means markets are less important, with greater prominence given to cooperative, relational factors. This is true in product as well as financial markets. The result is a longer term perspective.

Authors in the VOC mould relate these observations to the organising principles of firms at a micro level. This is because firms' different perspectives on the role of the state, markets, and the strategic timeframe this produces have implications for how they organise themselves internally. Some key implications are summarised in Table 2.1.

On the shareholder (or market) versus stakeholder model divide between LMEs and CMEs, the point about mergers and acquisitions is largely the one already made. Differences in the role of financial markets mean that mergers and acquisitions are far more common in LMEs than CMEs. In addition, in the case of Japanese firms the enterprise community aspect of stakeholder concern is reflected in a view that firms possess individual cultures that cannot easily be merged. More on this is said below, but for now the point is that this puts a 'brake' on mergers and acquisitions in addition to the different role played by financial markets.

Management objectives reflect differences in the role of markets, especially financial markets. In LMEs, management is concerned with making profits and delivering these to shareholders in the form of dividends in the short term, whereas in

CMEs they are more concerned with the longer term prosperity of the firm and their reputation within it. Concomitant with this observation is the fact that share price as an indicator of firm performance is the main preoccupation of managers in LMEs, but in CMEs the longer term prospects of the firm in the broader sense of market share, sales margins etc. is also considered. Thus, while managers in LMEs are accountable to shareholders via the share price, managers in CMEs are accountable in a more holistic sense to stakeholders within and external to the firm.

Table 2.1: Organising Principles of Firms in LMEs versus CMEs

	LMEs (US)	CMEs (Germany and Japan)
SHAREHOLDER/MARKET VERSUS STAKEHOLDER MODEL		
Mergers and acquisitions	Common, including hostile takeovers, and therefore a major preoccupation of top managers and the financial press.	Exceedingly rare, and of low concern to top managers and the press. Also inhibited (in the case of Japan) by a view of the firm as an entity with a specific culture that cannot easily be merged with another.
Management objectives	Delivering profits to shareholders, thereby enhancing personal claims on increased financial rewards, and maintaining the share price.	Working for the long term prosperity of the firm, and their reputation within it. Other factors such as market share, sales margins, value added per employee, growth in all of these plus sales growth are important, as well as the share price.
Disciplinary constraints on managers: accountability	The share price, because a fall in it can lead to dismissal by shareholders at the annual general meting, or hostile takeover.	Managers are responsible to the firms' stakeholders: their bankers and *committed* shareholders; and peers and juniors within the firm. This is where managers' reputations lie.
INTRA-FIRM RELATIONS		
Social perception of the firm and nature of the employment contract	The place where, at the moment, one earns a living. A legal entity to which one owes obligations under an employment contract. The firm can be conceived of as a web of contracts prescribing and proscribing behaviour for individuals who work for it. Therefore, the employment contract is for a certain salary/wage for a certain job function, with promotion through an internal labour market via bids for vacant posts.	For Japanese firms, a community of people that is slowly renewed as people retire and new employees are recruited. It has an identity that is greater than the sum of its parts. CEOs can talk about "the future of our great firm" much as a nation's leader might talk about the state, without being regarded cynically. For German firms, a public institution with social responsibilities, and relationships between managers and between managers and employees codified by law. The nature of the employment contract is more in the nature of a career contract. Shedding labour is rare/seen as extremely undesirable (Japan), or legally difficult (Germany).
Response to economic pressures: recession (short term cyclical) versus industry sector decline (long term structural)	Recession: Strenuous efforts to maintain profitability to maintain dividend payments and the share price, mean that costs are quickly cut to match falls in sales. This often entails labour shedding. Industry sector decline: Rapid liquidation of loss-making divisions, usually by labour shedding.	Recession: Strenuous efforts to increase/maintain sales with the prime objective of maintaining employment and financial rewards to employees, even if this means a temporary drop in profitability and dividend payments. Industry sector decline: Gradual withdrawal and diversification to other areas to seek new markets and products in growth industries that can capitalise on the firm's existing technological skills or market expertise. Employees are internally transferred accordingly.
Wages and salaries	Clear distinction between wage and salary earners. For both, the 'market rate' for the job and 'equal pay for equal work' are key concepts. Large reward dispersion between managers and workers.	Little wage/salary distinction, with predictable pay-rise trajectories related to job functions, period of service and educational qualifications. Small reward dispersion between mangers and workers.
Effort-inducing incentives	Mostly individual, in the form of cash, and short term.	Rewards are less cash based and more long term through building up reputation for appointments over the next 20 years.
Workers' interests	Workers' interests are seen as antithetical to shareholders' interests. Unions seek to protect their members' wages and conditions.	Lower-ranking members of Japanese firms speak up to protect their rights against arbitrary managers and for their wage claims. In German firms employees are represented on the board via state legislated co-determination laws.
Nature of authority relations	Relations between managers and workers are adversarial and based on contracts. The hierarchy of the firm is seen as more one of licence to command obedience than one based on technical competence.	For Japanese firms, a sense of membership of a community, with authority more on the basis of technical competence (e.g. there are more PhDs and engineers on German and Japanese boards than accountants). German managers are more collective in their relations with employees than their US counterparts, but slightly less so than the 'organic' form of management relations in Japanese firms.

Sources: R. Dore (2000a), *Stock Market Capitalism: Welfare Capitalism: Japan and Germany versus the Anglo Saxons*, Oxford and New York: Oxford University Press, pp.26-32.[59] See also S. Vitols (2001), 'Varieties of Corporate Governance: Comparing Germany and the UK', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press; L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation'', *International Organization*, Vol.51, No.1, pp.1-30; P. Doremus, W. Keller, L. Pauly and S. Reich (1999), *The Myth of the Global Corporation*, Princeton: Princeton University Press; and C. Hampden-Turner and A. Trompenaars (1993), *The Seven Cultures of Capitalism: Value Systems for Creating Wealth in the United States, Japan, Germany, France, Britain, Sweden and the Netherlands*, New York: Currency Doubleday.

The imperatives of making profits and paying shareholders dividends in the short term mean US managers need to possess evidence that investment in new products is likely to provide tangible returns in the near future. However, the present value of investment in something which might produce returns in the distant future is often minimal due to the risks and uncertainties involved. German and Japanese managers are more willing to take a 'bet' on products that might produce some benefit 10 of 15 years down the track, because they can strategise more for growth and market share, rather than focussing on profit now. Hampden-Turner and Tompenaars use the analogy of a 'train' to illustrate the point. US managers want to catch it before it leaves the station, whereas German and Japanese managers are more willing to invest in a process of learning and development for a train that may never come, but if it does they hope they will already be on board when it reaches the station.[60] Thus, German and Japanese firms have much longer timeframes than US ones.[61]

Of course, US managers are not solely driven by making profits and maximising shareholder value, but these are their "dominant touchstone objective".[62] They may also focus on employees, customers, suppliers and (by inference) the environmental impact of their firm's activities, but rarely at the expense of the bottom line, increased earnings and thence raised share prices.[63] However, for CMEs, the quality of activity is as important, if not moreso, than the rewards it brings. Thus, Hampden-Turner and Trompenaars say German and Japanese firms focus more on the value of the activity, rather than on the end of profits. Profits are the means of generating further activity rather than an end in themselves. Their focus is on enduring, growing, gaining market share, and making an excellent product via a customer/stakeholder focus, rather than market focus. The difference is that a customer/stakeholder focus has to do with more intangible notions such as service, quality and timeliness, while a market focus has to do with profits and margins. A focus on the latter means that, for LMEs, the focus isles on where one's profit comes from than the fact and level of the profit itself: $3 million dollars in profit from currency speculation is as good as that from the sale of advanced-technology products. The notion of value in production is replaced by notions of value in the market.[64]

Turning to intra-firm relations leads to the question: what is a 'firm'? Given the narrower shareholder/market focus of LME firms, US firms are not so characterised by

close-knit cooperative networks. The firm is a legal entity, a place where one works for the moment, where hiring and firing occur in response to changed market (i.e. profitability) conditions, where management has the power to do this and is expected to, and where there is a large gap between managers and workers in terms of their rewards. Top management and the board tend to exert control over the firm, and in-keeping with external relations, especially with regulators, relations between management and employees tends to be more adversarial, including a willingness to shed labour for economic gains when the firm faces profitability pressures. Thus, firms are characterised by shorter job tenures and "fluid labour markets".[65]

By contrast, cooperation and collaboration are terms that apply more to CME firms. In the case of Germany, this leads to a "structural bias towards consensus decision making",[66] or what this author would call *negotiated consensus*. This reflects a stakeholder model of relations in German capitalism that reinforces the importance of supporting long-standing business networks, both internal and external to the firm, rather than focussing on short term profitability.[67] Long term, cooperative product development and productivity growth are emphasised.[68] For example, large German firms must have union and worker representation on their boards by law. The German Codetermination Act of 1976 mandates that all companies of more than 2,000 employees must have supervisory boards with employee as well as shareholder representation on them. The result is that 48 percent of the seats on the supervisory boards of the 100 largest German industrial corporations are held by union or employee representatives.[69] All companies with more than five members must also have a Works Council through which managers are reminded on a daily basis about group morale and opinion on productivity and specific issues in the workplace. As a result, by law managers are obliged to consult and take into the account of employees and shareholders in a cooperative fashion.[70] Thus, cooperation and consensus-building are legislated.[71]

In a Japanese firm, workers and management share a sense of relationship with it closer to that of a soldier's sense of loyalty to her/his regiment. The firm's top management are closer to the status of elders than shareholders' principals.[72] Indeed, the point has been made by many commentators that traditionally an employee joins a Japanese firm for life. There is no external market for executives in Japan, or at least it

is a very small one largely the preserve of foreign firms operating there. Japanese CEOs are appointed from within their firms, and the sense of "enterprise community" referred to earlier means there is a smaller distance between managers and staff. In contrast the US LME model where firms hire and fire employees in the face of economic pressures that threaten the share price, nobody really 'owns' a Japanese firms but the firm itself (at least in the sense of who determines its destiny).[73] In times of economic trouble, the "sense of responsibility for managing difficult processes of restructuring within tight traditional constraints is palpable".[74]

In practical terms, in a survey of 15,000 managers from European, American and Asian companies, 74 percent of US managers saw a company as a system designed to perform functions and tasks efficiently (i.e. make profits), but only 41 percent of German managers and 29 percent of Japanese saw their companies in these terms. Instead, they saw a company as a group of people working together, dependent on social relations with others inside and outside the company. Similarly, while 40 percent of US managers saw the prime goal of a company as making profits, only 24 percent of German managers and a miniscule 8 percent of Japanese managers saw their companies this way. Instead, they had a more holistic view in which a company, besides making profits, is focussed on the well-being of a wide range of stakeholders and endures on the basis of attending to their needs.[75]

The implications for effort-inducing incentives and workers' interests are therefore as follows. Japanese employees see achievement as coming from a commitment and length of service with the company that is not so strongly favoured by their German and US counterparts. While 99 percent of US managers surveyed said they had a relationship of limited duration with their company, only 41 percent of Japanese managers saw their relationship in such a short term. German managers were somewhere in between at 83 percent.[76] Achievement as a concept thus requires qualification. In the case of the US it is strongly linked to individual achievement, with cash rewards for success, and winning through a competitive process, whereas in the case of Japan it comes from bonds of family, a cadre of juniors and seniors within a firm and a cooperative approach to success over a longer period of time. The result in the case of US managers is that they are far more mobile and footloose than their Japanese counterparts who will tend to see their future as more tightly linked to that of

their colleagues within the company for which they will work in the long term, traditionally the duration of their working lives. Thus, achievement in the case of Japanese firms is more likely to be ascribed to teams and groups than the heroic individual.

The Japanese preference for achievement by teams and groups is reflected in the organic ordering within Japanese companies that mirrors the relations they have with the state externally. Junior team members bring information to their seniors in the context of a goal of creating harmony within the organisation so that the vision at the top is one that is agreed widely at all levels. Therefore, it is not so much a matter of top management giving orders and junior staff carrying them out as reaching a broadly agreed position within the entire company. Reflecting this, Akio Morita of Sony has said:

> Our encouragement of long-range plans from up-and-coming employees is a big advantage for our system, despite all the meetings…It enables us to create and maintain something that is rare in the West, a company philosophy…Even if a new executive takes over, he cannot change that. In Japan, the long-range planning system and the junior management proposal system guarantees that the relationship between top management and junior management remains very close.[77]

Thus, a system that is based not on the rule of the individual but the communitarian whole, is more likely to produce a long term and enduring company vision than in, say, a US firm.

Something similar happens in German firms, but reflecting their legally mandated negotiated consensus approach to coordination, rather than the organic ordering in Japanese firms, even if initiation comes from top management, "*formally* structured mutualities between suppliers, industries, unions and customers" are the basis on which this initiation is made real.[78] In the US, the direction of initiation is downward, with the vision coming from the top and spread through the lower levels of the organisation. In US firms, ideas come from the top and it is the responsibility of those lower down to initiate them. This reflects a culture which is more a function of the individual driven by profits and the need to ensure shareholder value in a position of power. This puts key senior individuals very much in the drivers' seat in developing and promoting a company vision.

Finally, this brings us to the nature of authority relations within firms. Commensurate with the idea of a firm as a network of contracts, relations between

managers and workers in US firms are generally more adversarial than in German or Japanese firms. Managers have more distance from their employees and more power to act unilaterally of them. By contrast, CME firms are more communitarian, in the Japanese case, and more collective, in the German case. Japanese firms turn to the informal bonds of the enterprise community whereas German firms have formal systems for coordinating internal collective action. If one was searching for metaphors, one might say that German firms are well-oiled machines (i.e. all the parts are put together formally to form the whole efficiently operating machine),[79] Japanese firms are organisms (i.e. they operate on the basis of communitarian obligations and understandings as much as rules and regulations)[80] and US firms are mechanisms (i.e. they are designed on a more contractual basis to produce certain outcomes).[81]

On the organic nature of Japanese firms, versus German firms, Dore notes the following:

> Japanese firms are inhibited only by their unions and employee sentiment: the business and political community and the whole of the press cheer on restructuring efforts. By contrast, opposition to surgical restructuring is more vocal in Germany, and it is mobilised on the political level.[82]

The implications are clear. While Japanese firms are communities where sentiment and mutual respect and sense of purpose define strategies, German firms operate more on the basis of negotiated consensus mandated by law and supported at the political level. Another aspect to the difference is that membership of Chambers of Commerce is required by law in Germany, but not in Japan where membership of equivalent organisations is more a matter of course. In Germany, these chambers are also expected to perform a role in respect of the needs of society, as much as for their members themselves. This, while the national interest figures strongly for industry in both states, in Germany it is a more formal requirement, whereas in Japan it is more informal on what Dore terms an "ad hoc basis".[83]

Overall, the difference in the organising principles of firms between Germany and Japan is summarised by Soskice as one of "industry coordination" for European CMEs versus "group coordination" for Japan. The divide is between the extent to which coordination occurs at an industry level, across firms, for German firms versus coordination across the company group for Japanese firms. Thus, while unions tend to be industry-based in Germany, they are company-based in Japan. While technical

standard setting occurs at an industry level in Europe and Germany, it occurs at a company level in Japan. German firms are likely to be more outward looking in their strategic vision, whereas Japanese firms are likely to be more inward looking, to be more focussed on the company group and the community of the firm, in developing strategies.[84]

However, whatever the nuances, Dore summarises Germany and Japan's similarities as follows:

> They remain economies in which the stock market plays a much less central role, and the state a larger one; in which the financial sector is less dominant; and manufacturing industry correspondingly more important; in which engineers tend to have the edge over accountants; and the doctrine of the supremacy of shareholder value is still a much weaker element in determining company goals.[85]

Although their differences are not irrelevant, it is their common CME institutional framework that should be stressed more and contrasted with the LME institutional framework of the US.

The Role of Technology

The role of state-business relations, product and financial markets, and the organising principles of firms themselves have been discussed above. General points have been made in respect of each. However, when discussing improvements in firms' environmental performance, one is often implicitly discussing something quite specific related to each of these: technological improvements. Although it is not impossible to imagine car firms encouraging alternatives to the car (e.g. more bicycle use), they are more likely to develop technological solutions to reduce the environmental impacts of the products they sell. Therefore, the role of technology is a key consideration. Based on the factors already discussed above, the VOC approach observes that LME firms tend towards more radical technological innovation, whereas CME firms tend to innovate more incrementally.

The institutional framework of LMEs supports radical, rapid change and innovation because firms have a short term market focus, can buy and sell subsidiaries without concern about long term stable shareholdings, and top management possesses greater power to make decisions and implement them relatively unilaterally, including

the ability to hire and fire labour. Taken together, these characteristics mean that they can move quickly to exploit opportunities in markets and thereby rapidly embrace new ideas and opportunities. Being less 'weighed down' by long term networks based on mutual cooperation, they are more able to adjust rapidly and act opportunistically.[86]

CMEs are better at supporting incremental innovation over the longer term by virtue of their denser corporate networks that facilitate a more gradual, less market-focussed, diffusion of new technologies.[87] They focus better on more traditional, well-developed markets in consultation with suppliers, workers and other stakeholders. Thus, Soskice notes the following of German firms' predisposition to incremental technological change: "Germany is the undisputed leader in improving and upgrading technology in fields in which its industry is established, but there are weaknesses in newer fields".[88] In a similar vein, Hollingsworth notes that "Germans have placed less emphasis on developing entirely new technologies and industries than in applying the latest technologies to the production of more traditional products".[89]

Japanese firms share these characteristics, but there is an added dimension to state-business relations in Japan that amounts to a shared over-arching goal of economic independence.[90] This manifests itself in a national drive to develop the latest technology and thereby have a competitive edge in so doing. This is labelled "technonationalism" by Pauly and Reich.[91] In-keeping with the technonationalist version of Japan's CME, Japanese firms in aggregate spend a higher percentage of their resources on research and development than any other country.[92] Their aim is to be at the technological forefront in every industrial sector in which they participate.

The discussion in the preceding paragraphs on Germany and Japan seem to confound any clear distinction regarding the role of technology in LMEs versus CMEs, or at least between the three territories considered in this thesis. But perhaps Vitols offers a clue to a key distinction when he notes that LME firms are radical in their innovation and entry into *new* industry sectors, but behave more conservatively in established ones where they compete more on the basis of price. By contrast, CME firms compete more via non-price competition through incremental innovation.[93] Therefore, the distinction is one that revolves around the role of price competition in markets in established industries. For established industries, such as the car industry, the implication is that CME firms will compete more through non-price product

innovation than LME firms, which will tend to place greater emphasis on price competition in markets. For Germany, competition via non-price product innovation in mature industries is likely to be more incremental. For Japan, competition via non-price product innovation means technological innovation with the goal of always leading competitors and pushing technological frontiers. This may produce radical innovation even in established industries.

Exogenous versus Endogenous Factors

The preceding discussion also has implications for the role of exogenous versus endogenous factors that, while not explicitly addressed by the VOC approach, are nevertheless implied by its insights. Exogenous factors are those factors external to firms that impact on their activities. They are exogenous in the sense that they derive from outside firms and impact on them. They may be conceived as both material and institutional factors, encompass market forces and state regulations, but also the institutional context of these as illuminated by the VOC approach that affects how market forces and regulations are constructed in terms of both their fact and importance. Endogenous factors arising from within firms affect how exogenous factors are interpreted and addressed. These include the actual material facts of the situation in which individual firms find themselves, such as their product line-ups and the competencies these represent, but also normative questions about internal company strategies such as corporate policies and leaders' visions.[94]

How does the intersection of exogenous and endogenous factors relate to the VOC approach? The following observation of Dicken's is a good starting point:

> As US companies, Ford and GM are quite distinctive from Toyota, Volkswagen, Fiat or Renault. But they are also different from each other. Similarly, Toyota and Nissan are distinctive, but not identical, Japanese automotive firms; the same point can be made about the French auto producers and so on. However, there are generally greater similarities than differences between firms from the same national base.[95]

The point Dicken makes is that while it is an over-simplification to say that firms of the same nationality are identical, national characteristics are nevertheless predominant. Therefore, although Hall and Soskice raise the caveat that the "point is that institutional structure conditions corporate strategy, not that it fully determines it",[96] firms of the

same nationality are still more similar overall than firms of different nationalities. Hence, "organisational forms tend to become remarkably uniform within societies dominated by particular institutional conventions".[97] The value of the VOC approach, in terms of facilitating comparative analysis, is that it points allows us to concentrate on these broad differences in organisational forms between states' capitalist institutions.

Given the broad national differences, the VOC approach suggests some national variations in the importance of exogenous versus endogenous factors. For US LME-based firms, a preference for market forces and adhering to government regulations with material goals in mind suggests they should be more exogenously motivated. However, the distance between management and workers, the ability of managers to act more unilaterally and hire and fire labour also suggest that the vision of a firm's leader may carry considerable weight from an endogenous perspective. Of course, even then environmental concerns are likely to be seen in more materialist terms along the lines of making profits and addressing state regulatory requirements.

As the VOC of German and Japanese firms leads them to be less profit-motivated, less market driven and more long term in their perspective, a greater role for endogenously derived strategies is suggested. This is especially the case for Japanese firms because their focus on the enterprise community suggests a very strong role for internal strategies as a motivator for action, rather than exogenous forces. German firms occupy the middle ground, operating on the basis of negotiated consensus with a range of stakeholders both exogenous and endogenous to the firm, with an eye to their social responsibilities by both convention and law.

Historical Context

Finally, it should be stressed that the institutional insights of the VOC approach, and the implications of them in terms of the role of technology and exogenous versus endogenous factors, are the result of historical processes. Indeed, the VOC approach is fundamentally a historical approach that focuses on the institutional results of structures, processes, necessities and cultural imperatives that have historical roots. For example, the Japanese drive to techno-nationalism has its roots in the Meiji Restoration. The industrial conglomerates that this spawned, along with the drive for education and

skills development, industrialisation and the competitive drive for market share were then further (re)interpreted through the lens of the aftermath of the second world war. Similarly, the Prussian state's drive to unite Germany, the impact of Nazism and the aftermath of the second world war helped to shape its VOC, including the cartelisation of industry, the role of unions on company boards, the role of banks in financing growth and the incremental, inclusive, consensus-approach to decision making. For the US, the establishment of the stockmarket as a prime driver of perceptions of company worth and endurance was already evident in the 1920s when the separation of management from ownership of major corporations was entrenched.[98]

There are many implications of such a historical approach, but fundamentally the point is that the mainstream approach to understanding capitalist economies (i.e. market forces and the role of government, including with respect to environmental externalities) is a particularly LME one derived from historical specificities. However, Germany and Japan's different histories have produced institutions that "deviate from the prescriptions of neoclassical textbooks".[99] This raises two key implications. First, a degree of path dependence is built into the institutions and norms that underpin them in each society considered here. Although commentators like Hall and Soskice point to economic actors gravitating to modes of action and coordination that are most efficient given particular institutional environments, this should not in any way imply that the institutions and norms of individual states' capitalisms are necessarily efficient of themselves. They are the results of historical processes and so are 'sticky': how they start off to a large degree endures or 'colours' future trajectories. States' institutions are not "plastic" or "open to opportunistic adoption and combination" on the whims of either policy makers or firms, but possess an "inertia" once in place.[100] Secondly, and in opposition to the first observation, because they are the product of history, norms and institutions change and can be changed over time. Therefore, although it would be a mistake to believe that a certain state will always have the same institutions, or that it always has because that is what it has at present, change is constrained and enabled by what has gone before, and current institutional arrangements.[101]

Summarising the Varieties of Capitalism of Germany, the US and Japan

At the core of the VOC approach is the belief that there is no universal rationality that describes firms' strategic priorities across all states. Individual states have developed particular institutions over time that underpin their different varieties of capitalism. As such, "standards for evaluating organisational performance and prevalent criteria for judging firms' strategic priorities vary significantly across institutional regimes and cannot be derived from a single universal market rationality".[102] From the above discussion, it is possible to distil five key linked drivers of firms' strategic priorities in LMEs versus CMEs. They are as follows:

1. Closer state-business relations in CMEs versus a separation of the state and markets in LMEs. For Germany, a coordinating role for the state is the case, while for Japan a more organic, symbiotic relationship is suggested based on mutual understanding.

2. A resulting priority for markets as organisers of economic activity in LMEs, in both the product and financial spheres, versus markets as one among a variety of mechanisms for organising economic activity in CMEs on a more relational, cooperative basis. In the case of Germany, the role of society and a feeling of responsibility towards it is particularly important, as well as negotiated consensus between a range of stakeholders often prescribed by law. For Japan, the enterprise community, and the relationship between stakeholders within it, plays a stronger role.

3. The firm may be conceived of as a network of contracts with significant power invested in management in LMEs, that acts on market signals to make profits in the short term and pay dividends to shareholders, versus the firm as collective (Germany) or community (Japan) in CMEs, that acts to enhance its reputation through close relational ties with stakeholders. US firms are 'mechanisms' (of profit), German firms are 'well-oiled machines' and Japanese firms are 'organisms'.

4. US firms are likely to be more focussed on exogenous material factors, but with more power in the hands of management to act unilaterally in devising strategies to respond to these. Because Japanese firms are more internally driven strategically, endogenous factors have greater prominence. German firms are somewhere in between, but with prominence given to (exogenous) social responsibilities.

5. A preference for non-price competition via product innovation in established industries in CMEs via incremental technological change, versus price competition in established industries in LMEs. Radical technological change is favoured in new industries in LMEs, however in the case of Japan a preference for technonationalism may produce quite radical technological advances over time even in established industries.

Taken together, these drivers of firm strategies imply a shorter-term perspective for LMEs versus a longer-term perspective for CMEs. This is because in the latter there is less focus on markets, profits, paying shareholders dividends, and competing in established industries on the basis of price. A clear preference for materialist perspectives on the part of LME-based firms is also implied. This is the result of the institutional basis for capitalist relations in LMEs, whereas institutions in CMEs lead firms to focus more on responsibility to society rather than shareholders, responsibility to fellow employees rather than economic pressures, market share and influence rather than short term profit.

Given the differences identified, the VOC approach also says that firms gravitate to those modes of behaviour and action that have institutional support and are therefore most efficient. This has implications for traditionally less 'core' considerations such as the environment and suggests a further lesson, which bears explicit identification here. It is that universal *prescriptions* for the 'best' institutional foundations miss the point. Different cultures within firms and the societies that give rise to them mean that similar actions have different ramifications. If anti-trust laws were removed in the US would this lead to greater cooperation and collaboration to the benefit of society as is the case in Germany and Japan? The result is surely no, because the LME form under which capitalist relations operate in the US would surely increase the propensity for

exploitation of the market to the detriment rather than the benefit of consumers. Should the US adopt the elaborate codification process for workers' and managers' rights and responsibilities, and the regulatory framework between the state and business as it exists in Germany? This would surely tie the US system up in more disputation and litigation than it currently has and potentially rob the US of its key advantage over the Japanese and Germans: the ability to act rapidly to respond to market challenges. Therefore, this author takes the view that value judgements as to whether different VOCs are 'good' or 'bad' are largely futile. The institutional features of these states are what they are. They may change over time, or they may not. It is hard to tell.[103] Rather than declaring which variety of capitalism is better, the point is to tease out the implications of these institutions.

Operationalising the Research

Given the insights of the VOC approach, the way in which these will be methodologically brought to bear in operationalising the research is considered in the remainder of this chapter. The concept of environmental sustainability, or indeed simply 'concern for the environment', is defined, and the reason for focussing on the environmental issue of climate change is explained, along with its related concern of fuel economy for passenger cars in use. The timeframe for analysis is then specified as 1990-2004. The chapters to follow are outlined, and how the theoretical perspectives of the thesis are to be applied via the empirical analysis undertaken in them.

Concern for the Environment and Environmental Sustainability

While the concept of the environment itself is obvious, 'environmental issues' and 'concern about the environment' are less clear. Inevitably, one ends up discussing 'sustainability', a somewhat 'murky' concept because "everyone knows what this word means; it's just that noone knows exactly what it looks like in practice".[104] However, the Organisation for Economic Cooperation and Development (OECD) notes that a broad distinction is possible between absolute indicators *of* sustainability, versus

relativist indicators of movement *towards* sustainability.[105] This thesis will take a relativist approach in the sense of actual action aimed at moving in the 'right' direction. The question is therefore also whether there is a real shift in attitude rather than mere 'greenwashing', and what is motivating it.[106] The question is not one of what the appropriate level of environmental protection should be, but rather whether firms are *proactively* disposed to action and taking it, plus how they are doing so and why. Thus, in this thesis, environmental issues and concern about the environment are defined in terms of the *actions* taken by the international car industry and the *motivators* for them.

The Relevance of Climate Change and Fuel Economy

Environmental issues are complex. This makes it difficult to analyse them holistically. For example, it may be possible to speak of attitudes to the environment, but in terms of action and data in respect of such attitudes, something tangible must be the focus for analysis. For the sake of manageable analysis, the focus in the following chapters is primarily on the issue of climate change and the fuel economy of passenger cars in-use. There are three main reasons for this: the growing international visibility of the climate change issue from the 1990s onwards; the relationship of fuel economy to carbon dioxide (CO_2) emissions; and the resulting visibility of the issue to consumers of the industry's products. The reason for considering passenger cars in-use is explained on the basis that this is the stage at which most environmental damage is done, as opposed to other stages in a car's lifecycle such as manufacturing.

The issue of climate change has been the most visible environmental issue internationally over the last decade. The profile of climate change and how to address it has been growing since it was first brought to the attention of corporations, governments and civil society through the "crucial event" of the United Nations Conference on Environment and Development (UNCED) in Rio do Janeiro in 1992.[107] The subsequent Kyoto Protocol, signed in 1997 by over 180 states and subsequently ratified by all industrialised nations with the exception of Australia and the US, has been described as "the most conspicuous policy step" in terms of environmental regulation impacting on the car industry.[108] The major greenhouse gas contributing to climate change, CO_2, is also the major greenhouse gas produced by industrialised states,

and is responsible for the majority of their contribution to climate change.[109] Car CO_2 emissions account for up to 20 percent of all CO_2 emissions in the European Union (EU), US and Japan, hence the relevance of the issue to the car industry in particular.[110] The result is that policy makers, the general public and the car industry are widely aware of the issue, and that addressing it critically depends on the actions of the car industry in respect of the products it develops. Indeed, the International Energy Agency (IEA) finds that the transport sector must make a greater contribution to reducing CO_2 emissions than the proportion for which it is accountable:

> Whilst over a quarter of total carbon dioxide emissions in the group of IEA countries comes from transportation, it is too simplistic to argue that roughly one quarter of abatement ought necessarily to occur in this sector. Transport is today implicated at the core of many social and environmental problems. There is intense pressure within the policy process in many IEA countries for radical changes in transportation.[111]

As such, with climate change the issue is not just visible in itself, but for the pressure it brings to bear on the car industry to address it.

Car CO_2 emissions are the result of fossil fuels being combusted in internal combustion engines, and a fixed amount of CO_2 is emitted as fuel is combusted in a standard petrol or diesel engine. For example, a typical petrol engine that uses a litre of petrol will combine 635g of carbon from the petrol with 1,702g of oxygen from the air to produce 2,337g of CO_2. Thus, CO_2 emissions expressed in grams per kilometre (g/km) have commensurate fuel economy measures in litres per hundred kilometres (l/100km): the lower the l/100km measure of fuel economy, the lower the g/km of CO_2 emitted.[112] In fact, virtually everything emitted from a car's exhaust is CO_2. This makes climate change a fundamental issue for the car industry, and it faces major challenges in addressing its contribution to the problem. This is because the fleet of all vehicles in use worldwide is growing by 16 million vehicles per annum and is forecast to reach one billion by 2025. If nothing is done, it is projected that the contribution of CO_2 emissions from cars will also grow significantly, at around 2 percent per annum in absolute terms.[113] In OECD countries alone, if no action is taken, transport sector CO_2 emissions are projected to increase by 30 percent by 2010.[114] Therefore, dramatic improvements in fuel economy are needed if the contribution of cars to CO_2 emissions is to remain constant, let alone reduce their contribution. For the industry to stabilise CO_2 emissions at current levels, based on current conditions and trends fuel economy

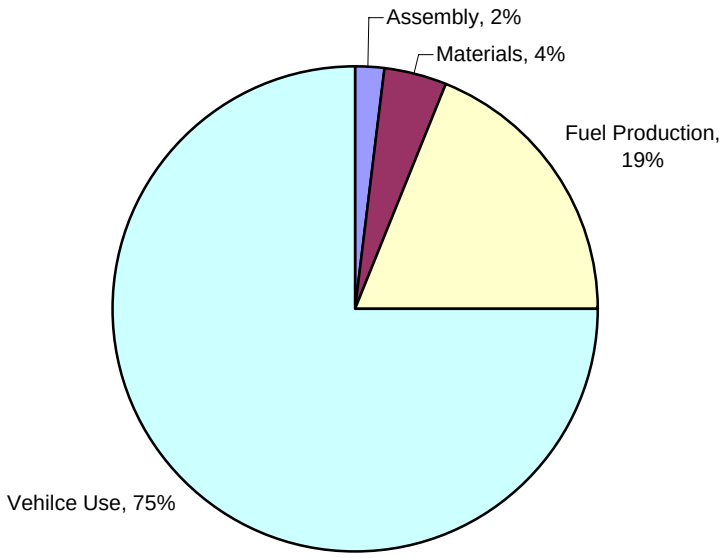
improvements of around 32 percent will be required for the whole fleet of cars in use by 2020.[115] It therefore is a major focus for the car industry and regulatory authorities in the industrialised states where its major firms are headquartered.[116]

Finally, fuel economy is arguably the most visible aspect of a car's environmental performance. Consumers are widely informed of fuel economy figures which are provided by manufacturers and regulatory authorities, and they are made aware of their car's fuel consumption every time they refuel. Some consumers will know that fuel economy is related to CO_2 emissions, but all will know that a fuel efficient car is more environmentally-friendly than a 'gas guzzler'. While improvements in manufacturing processes and in reporting environmental activities are important, it is cars' actual fuel economy that governments and consumers will be most aware of, and therefore this is a 'spotlight' environmental issue for the car industry above all others.[117]

Given the relevance of the issue of climate change, and the direct relationship between of CO_2 emissions and fuel economy, the focus for analysis will be on passenger cars in use. The reason for focusing on passenger cars in use is that as Figure 2.1 shows, around 75 percent of CO_2 emissions over the lifecycle of a car occur in use. It dwarfs all other CO_2 emission sources – e.g. the assembly of a vehicle in the manufacturing process accounts for only 2 percent of total lifecycle CO_2 emissions. Therefore, the focus for analysis is on industry initiatives that reduce the CO_2 emissions/improve the fuel economy of their cars in use.

Overall, the issue of climate change is one that has global significance, and particular significance to the industrialised states where the major car firms are headquartered – i.e. Germany and the EU, the US and Japan. It is of direct relevance to the car industry because of its contribution to the problem, it is of concern to states as they must legislate to address the problem, and it is the most visible environmental attribute of passenger cars' environmental performance in use because of its relation to fuel economy. This makes it especially visible to consumers.

Figure 2.1: CO_2 Emissions in the Life Cycle of a Typical Vehicle



Source: Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG, p.58.

Timeframe

This thesis will primarily consider the period from 1990 to 2004. On occasions, this may vary on the basis of the availability of comparable data at the time of writing, but in all cases the timeframe considered is within these boundaries. There are five key reasons why this timeframe is appropriate.

First, international organisations have significantly raised the profile of environmental concerns over this period. For example, the United Nations Environment Programme (UNEP) views the 1992 Rio Earth Summit[118] as a watershed in the discussion of environmental sustainability from which sustainable development initiatives have sprung, such as the high profile Kyoto Protocol signed in 1997 and subsequently ratified by nearly all its signatories.[119] Even economically focussed international organisations such as the World Trade Organisation (WTO) recognised that through the 1980s, and going into the 1990s, "environment, gender and labour

concerns are on the agenda in ways that would have been deemed illegitimate in the 1970s".[120] They realised that ignoring the views of often noisy and angry protestors, and the broader social movements they represent, undermined the agendas they were attempting to further. The WTO's answer was to established a Committee on Trade and Environment in 1995 at its inception. Throughout the 1990s, a series of international agreements with business also emerged such as the United Nations' (UN) Global Compact, announced in 1999. This brings companies together with UN agencies, labour and civil society to support nine principles in the areas of human rights, labour and the environment. Another such agreement is the Global Reporting Initiative, started in 1997 by the Coalition of Environmentally Responsible Economies (CERES) and now an official collaborating centre of the UNEP that works in cooperation with the Global Compact.[121]

Secondly, in terms of business attitudes and societal expectations, commentators such as Florini identify corporate social responsibility (CSR) as having come to the fore as an ideological shift that started in the 1990s.[122] CSR includes environmental sustainability among a range of initiatives in labour standards, human rights, disclosure of information, corporate governance, public safety, privacy protection and consumer protection. There is a growing body of research that shows environmental sustainability and other socially responsible behaviour on the part of MNCs, such as those in the car industry, to be *voluntary* initiatives. Such initiatives are further identified as being a *global* phenomenon.[123] For example, the World Business Council for Sustainable Development (WBCSD) was established at the same time as the 1992 Rio Earth Summit and has been working ever since to be at the forefront of the business response to sustainable development. It is a coalition of 165 companies drawn from 30 countries and 20 industry sectors. It also links a network of 43 national and regional business councils and partner organisations in 39 countries. It includes all the major car firms in its membership,[124] and has been regarded as a manifestation of a broader acceptance of the importance of environmental issues by corporations generally that commenced in the 1990s.[125]

Thirdly, outspoken critics of international capitalism vis a vis the environment suggest that we are actually witnessing a fundamental change in how firms do business worldwide as they incorporate environmental sustainability concerns in their operations.

For example, before the mid-1990s Hawken et. al. find there is not much evidence of the car industry proactively addressing environmental concerns, with any gains the result of social activism or government regulations.[126] Indeed, in 1993 David Suzuki, a strident critic of capitalism, globalisation and the environmental degradation in which it results worldwide, declared:

> Environmentally responsible corporations may seem like an oxymoron. But as pressure by ecologically aware consumers and activists increases, more and more businesses are cloaking themselves in green rhetoric. How genuine is it or can it be?[127]

His answer in 1993 was that it was not genuine, and that "the ground rules of profit make it hard to be a friend to the environment" so that "amid…the suicidal demand for steady growth, happy stories are few". He singled out the international car industry for the enormous social and ecological costs it imposes on societies above all other industries.[128] But by 2002 he notes a *philosophical shift* within corporate hierarchies manifested in attitudinal changes, such as General Motors supporting a 50 per cent tax on petrol for environmental reasons![129] He applauds the attitudinal change within Ford quoting its Chairman who said in his speech to a Greenpeace business conference on 5 October 2000:

> We're at a crucial point in the world's history. Our oceans and forests are suffering; species are disappearing; the climate is changing…Enlightened corporations are beginning to…realise that they can no longer separate themselves from what is going on around them. That, ultimately, they can only be as successful as the communities and the world that they exist in….I personally believe that sustainability is the most important issue facing the automotive industry in general in the 21st century.[130]

Within the space of one decade, Suzuki's attitude changed from pessimism to a decidedly more optimistic view of the possibilities for change, with the car industry at the forefront of moves by big business towards environmental sustainability.[131]

Fourthly, environmental reporting by car firms largely commenced in this time period. US firms have been producing such reports for the longest time, with Ford first in 1989 and General Motors since 1994. German firms have been doing so since the mid to late 1990s, and Japanese firms are the most recent with reports released since 1998. Such reports represent a desire by firms to represent themselves as environmentally concerned (whether in image or fact), and report on their environmental commitments, suggesting the rise in prominence of environmental considerations as of strategic importance in this timeframe.[132]

Finally, while considering the environmental initiatives of the industry from 1990 onwards, the timeframe for analysis stops at 2004. The main reason for this is that material factors in terms of the price of oil are reasonably constant over this time, but change dramatically thereafter. For most of the 1990s the spot price for crude oil was US$15-20 per barrel. From 2000 to 2003 there is a slight increase to US$20-25 per barrel. However, after this there is a price shock that sees the price per barrel nearly double to almost US$50 per barrel by 2005. Therefore, a ceteris paribus analysis based largely on fuel economy and the cost of running a car in terms of fuel purchased is only meaningful prior to, and up until, 2004.[133]

Details of the Chapters to Follow

The car industry in Germany, the US and Japan, and in-depth analysis of a small number of individual firms from each, will be the focus of analysis for this thesis. The environmental impact of their products in the form of passenger cars is considered. The primary environmental impact considered is CO_2 emissions because of its contribution to the issue of climate change. In general, the analysis will be characterised by what Pierson and Skocpol describe as "theoretical eclecticism, multiple analytic techniques and a broad comparative and historical purview".[134] Therefore, although one specific industry is studied, and individual firms within it in Chapters 6 and 7, as is generally the case with research of this nature it is expected that the total number of observations will be large.[135] This is because, as Eckstein notes, the purpose is intensive study "to capture the whole individual".[136]

The points made in the previous paragraph suggest the research will take a strongly qualitative approach, and indeed it will. However, where possible a balance is sought between qualitative and quantitative approaches, in the manner discussed by Adcock and Collier. The aim is not so much one or the other, as an analysis that ensures measurement validity: "whether operationalising and the scoring of cases adequately reflect the concept the researcher seeks to measure".[137] Thus, it will be seen that a mixture of quantitative and qualitative analysis is suited to the data gathered in respect of state regulations in Chapter 4, quantitative statistical analysis is most suitable, indeed essential, to the survey data analysed in Chapter 5, and qualitative content

analysis is most suited to the analysis of firm reports and interviews in Chapters 6 and 7. A description of the empirical analysis to be conducted in the chapters to follow is provided below.

Chapter 3

In Chapter 3, a brief summary is presented of the product development initiatives of car firms aimed at reducing the CO_2 emissions of passenger cars in use. This is done to provide some background on the types of technologies and product developments that are relevant to the question of addressing the environmental problem of climate change for the car industry. However, most importantly, it is shown that there are clear national differences in the initiatives being undertaken by the industry. This suggests that firms' nationalities matter, and hence that institutional factors pertaining in firms' home states affect their strategies, the environmental initiatives they choose to stress, and how they do so. Prior to detailed empirical analysis in Chapters 4-7, reasons for the national differences are shown to be suggested by the VOC approach that are further explored in these following chapters.

Chapters 4 and 5

Chapters 4 and 5 address the two key material factors of state regulations and market forces, and the manner in which the institutional differences of firms' home states suggested by the VOC approach affect firms' perceptions and actions in respect of them.

In Chapter 4, regulations in the EU, US and Japan are the focus. Regulations in each state (and territory in the case of the EU) are presented and ranked in terms of their stringency and timing. The role of the industry in constructing and implementing them is highlighted, and the degree to which the industry meets or exceeds regulations in each territory is considered. The insights of the VOC approach are used to explain variations in this. It is found that the VOC approach has greater explanatory power in terms of how regulations are constructed and met than a purely materialist perspective, and that

national institutional variations determine whether the industry merely reacts to regulations or is more proactive in establishing and exceeding them.

In Chapter 5, market forces are the focus, including the impact of social attitudes. This is because social concern for environmental sustainability is said to be flowing through to consumer preferences in the industrialised societies where car firms have their home bases. Three aspects of the relationship between social attitudes, consumer demand and firm behaviour are the focus. First, the change in social attitudes to the environment in Germany, the US and Japan is considered using data from the World Values Survey, a global survey of social attitudes conducted in several waves worldwide throughout the 1990s. Responses to questions on respondents' attitudes to the environment are quantitatively analysed using SPSS software. Secondly, the extent to which such attitudes are reflected in consumer demand via purchasing decisions is analysed. Finally, the insights of the VOC approach are used to show the impact of institutional differences on how the relationship between social attitudes and consumer demand impacts on firms strategies. It is shown that the influence of social attitudes versus consumer demand varies between states based on the institutional priority accorded each of them.

Chapters 6 and 7

Focussing on the rationales offered by firms in their environmental reports and in interviews with key personnel, Chapters 6 and 7 examine and compare how environmental commitments are approached by individual firms. Two major questions are posed. First, what do car firms say is driving them to make environmentally positive changes to how they do business? In other words, what is their rationale? This includes an assessment of whether they highlight reacting to material factors (i.e. market forces and public policy/regulation) or proactively taking steps for more normative reasons (i.e. social concerns and internal company strategies). Secondly, what are the implications of this for how change on environmental concerns occurs within the industry in each territory? Answering this will involve seeing whether firms' nationality matters and whether firms of different nationality are key drivers of change and why.

In Chapter 6, a snapshot is taken of the following firms' 2003/04 environmental reports, the latest available at the time of writing:

- Germany: Volkswagen Group, BMW Group, and DaimlerChrysler.
- US: General Motors, Ford Motor Company.
- Japan: Toyota, Honda, and Nissan.

Not only are these firms the production and sales leaders in their home territories, they account for over 60 percent of total world passenger car production. Toyota, Volkswagen, General Motors, DaimlerChrysler and Ford are also the top five passenger car producers in the world.[138]

These firms' environmental reports are analysed using QSR NVivo 2.0 qualitative analysis software. The sections of the reports that are qualitatively analysed are the executive messages contained at the front of them, the 'vision' the companies have of environmental matters, and the environmental principles under which they operationalise their visions. The intention is to compare and contrast what it is that firms say is driving them to invest in environmentally-friendly product development. Therefore, Chapter 5 examines firms' stated rationales to see what they say is driving their concern for, and investment in, environmental technologies. It is shown that the rationales they offer in the reporting is supportive of the VOC approach and also highlights some significant differences in endogenous factors between individual firms.

In Chapter 7, the results of interviews with key personnel in four firms are presented. They are Volkswagen, BMW, Ford and Toyota. The interviews cover state regulations, market forces in terms of consumer demand versus social attitudes, and the endogenous internal strategies/drivers of the firms themselves. Analysing these interviews serves two purposes. First, the views expressed by personnel provide first-hand accounts to compare with the empirical evidence analysed previously in respect of the exogenous factors of state regulations and market forces. Secondly, they build on the qualitative analysis of firms' environmental reports and the rationales stated within them for environmental initiatives. Again, the insights of the VOC approach for national differences, coupled with endogenous factors, are shown to have greater explanatory power than a purely materialist approach that focuses simply on state

regulations and market forces to explain why firms have taken their environmental initiatives.

Chapter 8

Chapter 8 presents the conclusions of the research. It draws together the analysis of state regulations; market forces in terms of social attitudes and consumer demand; and firms' perspectives on their environmental initiatives as presented in their environmental reports and revealed in interviews. The manner in which material versus institutional factors are relevant for the industry in each territory is summarised, along with the reasons why the VOC pertaining to firms' home states is the key to understanding why they have taken the environmental initiatives they have taken, and whether or not endogenous factors have been important in tempering the effects of national institutional differences.

Conclusion

The insights of the VOC approach and how they will be methodologically brought to bear in operationalising the research have been outlined in this chapter. The contribution to be made to the VOC literature in the process is that its insights will be applied in a novel way to the environmental motivations of firms. As stated in the introduction to this Chapter, the application is novel in the sense that rather than examining the competitive advantages of states' industrial bases, or the operation of their product and financial markets etc., what is shown is that a state's variety of capitalism has implications for traditionally less 'core' considerations such as the environment. As environmental questions increase in importance for business, the point is that institutional differences in capitalist relations between states have implications for whether, and how, firms from different states address the environmental impact of their operations.

The case has been made for why climate change is a highly relevant environmental issue for the car industry, in terms of moving towards greater

environmental sustainability. It is relevant for its growing profile among policy makers, business and civil society worldwide as a result of international developments such as UNCED and the Kyoto Protocol. In many ways, it was the global environmental issue of the 1990s, and continues to be so in the twenty first century. It is of particular relevance to the car industry, because of the industry's contribution to CO_2 emissions, the major greenhouse gas responsible for climate change. CO_2 emissions are in turn related to fuel economy, arguably the most visible environmental aspect of passenger cars in use. This leads to an analysis of environmental product developments because it is the industry's products in-use that are responsible for 75 percent of CO_2 emissions in the life cycle of a typical vehicle. The time period for consideration largely mirrors that of the emergence of climate change as an issue itself: 1990 to 2004.

However, the main focus of this chapter was to describe in some detail the relevant insights of the VOC approach. The major point to stress is that what is to be explained in the chapters to follow is national variation in motivations for responding to environmental challenges, on the basis of national institutional differences, rather than some global convergence on environmental priorities per se. The insights outlined will not be re-summarised here, but before moving on to the empirical analysis in the following chapters, some conclusions may be drawn in the form of suggestions on what may be expected to be found based on employing the VOC approach.

We should expect to see an incremental approach to environmental concerns from German firms that is based on consensual cooperation with regulators and mindful of the concerns of society and a variety of stakeholders. The aim of firms will be to balance competing views and interests via gradual/incremental measures aimed at ensuring ongoing consensus and cooperative coordination, while at the same time maintaining profits. Furthermore, we should see firms exhibit a belief that the maintenance of constructive stakeholder relationships contributes to their material business goals – i.e. the maintenance of a well-oiled machine.

We should expect to see similar drivers for Japanese firms, but with a more radical technologically-driven approach to environmental concerns, in concert with the state and guided by techno-nationalist imperatives. There should be less of a role for organised civil society, but more for society and the nation as an 'organic' whole of which the firm is a part. A longer term internally-driven strategic view based on future

benefits and market leadership should be the main drivers behind environmental initiatives.

For the US, we should expect concern for the environment to be expressed more in material terms of market forces, profits and competition (i.e. winning rather than consensus). If firms are taking environmental action, we should expect to see the rationale for this expressed in terms of what consumer demand dictates and state regulations require. These must be addressed in the shorter-term in order to maintain their market position, profits and shareholder value.

Therefore, the key perspective taken by this thesis is that car firms' environmental initiatives are, to a significant degree, a consequence of different capitalisms in their home states. Rather than a convergence on a single way of addressing environmental concerns, their divergent approaches reflect different institutional frameworks for capitalist relations in the states where they are headquartered, and in which they are economically, politically, socially, culturally and historically embedded.

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[1] S. Strange (1997), 'The Future of Global Capitalism; or Will Divergence Persist Forever?', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications, p. 184. She also declares that the problem with authors who take a comparative approach to the political economy of modern capitalism is that they do not "see the wood for the trees [and] overlook the common problems while concentrating on the individual differences". See also S. Strange, (1996), *The Retreat of the State: The Diffusion of Power in the World Economy*, Cambridge: Cambridge University Press. It should be noted that Ohmae is probably one of the most extreme adherents to this view and somewhat 'caricatures' this side of the debate. See K. Ohmae (1990), *The Borderless World: Power and Strategy in the Interlinked Economy*, London: Collins.

[2] L. Weiss (1998), *The Myth of the Powerless State: Governing the Economy in a Global Era*, Ithaca: Cornell University Press; L. Weiss and J. Hobson (1995), *States and Economic Development, a Comparative Economic Analysis*, Cambridge: Polity Press; and S. Vogel (1996), *Freer Markets, More Rules: Regulatory Reform in Advanced Industrial Countries*, Ithaca: Cornell University Press.

[3] Weiss, *op. cit.*, p.188.

[4] For a discussion of the role of MNCs see P. Dicken (1998), *Global Shift: Transforming the World Economy*, 3rd edition, London: Paul Chapman Publishing; D. Held, A. McGrew, D. Goldblatt and J. Perraton (1999), *Global Transformations: Politics, Economics, Culture*, Cambridge: Polity Press; and J. Dunning (1993), *Multinational Enterprises and the Global Economy*, Wokingham: Addison-Wesley Publishing Company.

[5] The author recognises that environmental externalities are, of course, not strictly non-economic considerations. They represent market failure in economic terms, and therefore are usually held to require action to internalise their value in market transactions. However, the point here is more that the environmental implications of institutional differences in capitalist relations between states is not usually addressed in the VOC literature, yet that literature has clear implications for whether, and how, the environmental impact of economic activity is addressed.

[6] P. Hall and D. Soskice (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford

University Press, p.9. As noted in Chapter 1, this definition is similar, yet more specific than the widely accepted "rules of the game" one offered in D. North (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press, p.14.

[7] Hall and Soskice (2001), *op. cit.*, pp.10-11.

[8] It does so in the sense that it covers the role of the state and markets, their impact on firms' operations, the nature of technical advances in product development firms are likely to take, and how all these factors are evolving over time. Of course, the VOC literature has a lot to say about other aspects of the LME/CME divide such as differences in the education, training and vocational skills of workers, and there is some extensive literature on the nature of union power and bargaining. However, these are only relevant to the research here in as much as they describe the organising principles of firms, and so have been grouped under this umbrella rather than treated separately.

[9] These include the contributions in D. Coates ed. (2005), *Varieties of Capitalism , Varieties of Approaches*, Basingstoke: Palgrave Macmillan; P. Hall and D. Soskice eds. (2001), *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University; and S. Berger and R. Dore eds. (1996), *National Diversity and Global Capitalism*, Ithaca: Cornell University Press. See also R. Dore (2000a), *Stock Market Capitalism: Welfare Capitalism: Japan and Germany versus the Anglo Saxons*, Oxford and New York: Oxford University Press; R. Dore W. Lazonick and M. O'Sullivan (1999), 'Varieties of Capitalism in the Twentieth Century', *Oxford Review of Economic Policy*, Vol.15, No.4, pp.102-120.

[10] These include P. Doremus, W. Keller, L. Pauly, and S. Reich (1999), *The Myth of the Global Corporation*, Princeton: Princeton University Press; L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation', *International Organization*, Vol.51, No.1, pp.1-30; P. Hall (1997), 'The Role of Interests, Ideas and Institutions in the Comparative Political Economy of Industrialised Nations', in M. Lichbach and A. Zuckerman eds., *Comparative Politics: Rationality, Culture and Structure*, Cambridge: Cambridge University Press; J. Hollingsworth (1997a), 'Continuities and Change in Social Systems of Production: The Cases of Japan, Germany, and the United States', in J. Hollingsworth and R. Boyer eds., *Contemporary Capitalism: The Embeddedness of Institutions*, Cambridge: Cambridge University Press; R. Whitley (1999), *Divergent Capitalisms: The Social Structuring and Change of Business Systems*, Oxford: Oxford University Press; A. Griffiths and R. Zammuto (2005), 'Institutional Governance Systems and Variations in National Competitive Advantage: an Integrative Framework', *Academy of Management Review*, Vol.30, No.4, pp.823-842; C. Hampden-Turner and A. Trompenaars (1993), *The Seven Cultures of Capitalism: Value Systems for Creating Wealth in the United States, Japan, Germany, France, Britain, Sweden and the Netherlands*, New York: Currency Doubleday; Held et. al., *op. cit.*; Weiss, *op. cit.*; and Weiss and Hobson, *op. cit.* See also the contributions in C. Crouch and W. Streeck eds. (1997), *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications.

[11] Hollingsworth (1997a), *op. cit.*, p.266.

[12] After all, the VOC approach only coalesced as a distinct strand of comparative political economy in the 1990s, and is one of several institutional approaches that often share common perspectives and insights. See, for example, the discussion in the introduction of P. Hall (1999), 'The Political Economy of Europe in an Era of Interdependence', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press.

[13] Hall and Soskice (2001), *op. cit.*, p.57.

[14] S. Berger (1996), 'Introduction', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press.

[15] Dicken, *op. cit.*, pp.119-121. Weiss and Hobson, *op. cit.*, note that "the state was not the principal driving force in industrialisation" (p.219) and follow this statement with "American political economy subsequently developed in an anti-statist direction, leaving economic coordination to the business organisation" (p.220). The result is said to be "a regulatory rather than developmental central state" (p.221). In respect of the environment specifically, see also K. von Moltke and A. Rahman (1996), 'External Perspectives on Climate Change: a View from the United States and the Third World', in T.

O'Riordan and J. Jager eds., *Politics of Climate Change: A European Perspective*, London and New York: Routledge.

[16] Vogel quoted in S. Wilks (1990), 'The Embodiment of Industrial Culture in Bureaucracy and Management', in S. Clegg and S. Redding eds., *Capitalism in Contrasting Cultures*, Berlin: Walter de Gruyter, p.143. On the adversarial, competitive nature of reaching 'consensus' see L. Scruggs (2003), *Sustaining Abundance: Environmental Performance in Industrial Democracies*, Cambridge: Cambridge University Press, pp.227-228; and OECD (1996), *Environmental Performance Reviews: United States*, Paris: OECD. See also M. Kraft (2002), 'Environmental Policy and Politics in the United States: Toward Environmental Sustainability?' in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press.

[17] Wilks, *op. cit.*, p.143

[18] *Ibid.*, p.131.

[19] *Ibid.*, p.150.

[20] *Ibid.*, p.138.

[21] W. Streeck (1997), 'German Capitalism: Does it Exist? Can it Survive?', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications, p.38.

[22] J. Broadbent (2002), 'Japan's Environmental Regime: The Political Dynamics of Change' in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press; and Wilks, *op. cit.*, p.143.

[23] Dicken, *op. cit.*, pp.121-125. See also Dore (2000a), *op. cit.*

[24] Broadbent, *op. cit.*, p.300.

[25] This may be relevant for other East Asian states in their post war development such as South Korea though.

[26] S. Redding and R. Whitley (1990), 'Beyond Bureaucracy: Towards a Comparative Analysis of Forms of Economic Resource Coordination and Control', in S. Clegg and S. Redding eds., *Capitalism in Contrasting Cultures*, Berlin: Walter de Gruyter, p.92.

[27] Wilks, *op. cit.*, p.142.

[28] *Ibid.*, p.143.

[29] Associated with this is the view that business must to some extent be altruistic and principled in its behaviour, looking beyond its own 'selfish' concerns to that of society and the state. This point is made by authors such as Wilks, *op. cit.* and expanded on further in the following section on the role of product markets.

[30] Hollingsworth (1997a), *op. cit.*, p.271.

[31] Being interventionist means the state playing a more coordinating role in the case of Germany, and having a more organic, symbiotic relationship with business in the case of Japan.

[32] Hall and Soskice, *op. cit.*, p.49.

[33] Hollingsworth (1997a), *op. cit.*, pp.271-277.

[34] Or, more accurately, action that does not clearly return financial rewards in the short term.

[35] A point implicitly made in no author (2006), 'The Business of Giving: A Survey of Wealth and Philanthropy', *The Economist*, 25 February.

[36] Wilks, *op. cit.*, p.138.

[37] L. Pye and M. Pye (1985), *Asian Power and Politics: The Cultural Dimension of Authority*, Belknap: Harvard University Press, quoted in Wilks, *op. cit.*, p.141.

[38] Japan has recently introduced such laws and the European Commission has responsibility for such matters in Europe now, but this statement remains true for much of Germany and Japan's post-World War Two economic development.

[39] R. Boyer (1996), 'The Convergence Hypothesis Revisited: Globalisation but Still the Century of Nations?', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press, p.45. See also J. Hollingsworth (1997b), 'The Institutional Embeddedness of American Capitalism', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications.

[40] Hall and Soskice, *op. cit.*, p.31.

[41] D. Soskice (1999), 'Divergent Production Regimes: Coordinated and Uncoordinated Market Economies in the 1980s and 1990s', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press, pp.110-113.

[42] Hall and Soskice, *op. cit.*, pp.26-27.

[43] Hampden-Turner and Trompenaars, *op. cit.*, p.25.

[44] *Ibid.*, p.25. See also R. Dore (1997), 'The Distinctiveness of Japan', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications. On p.23 he notes that "a list of the sixty-odd members of Toyota's first-line suppliers' club in 1990 has only two or three names not present in 1970, and only two or three of the names which figured in the earlier list have now disappeared".

[45] R. Dore (2000a), *op. cit.*

[46] Hall and Soskice, *op. cit.*, p.18. This is despite per capita GDP being comparable between LMEs and CMEs on average, data for which is provided on p.19 – i.e. the magnitude of stock market capitalisation in the US versus CMEs such as Germany and Japan is not a function of the different magnitudes of their economies.

[47] *Ibid.*, pp.18-19.

[48] *Ibid.*, p.29. See also *ibid.*, p.22.

[49] S. Vitols (2001), 'Varieties of Corporate Governance: Comparing Germany and the UK', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, p.337-339.

[50] A point made repeatedly in the VOC literature. See for example Dore et. al., *op. cit.*; Wilks, *op. cit.*, especially p.138; and Pauly and Reich, *op. cit.*

[51] Hollingsworth (1997a), *op. cit.*, p.279.

[52] R. Dore (2000b), 'Will Global Capitalism be Anglo-Saxon Capitalism?', *New Left Review*, Vol.6, p.108. See also Pauly and Reich, *op. cit.*, where they point out on page 10 that cross-shareholdings in Japanese firms have barely changed in past decade.

[53] Redding and Whitley, *op. cit.*, p.89. See also Hollingsworth (1997a), *op. cit.*, especially pp.280-285.

[54] Hall and Soskice (2001), *op. cit.*, p.23.

[55] Vitols, *op. cit.*, p.337-339. See also Dore (2000a), *op. cit.*

[56] Dore (2000a), *op. cit.*, with the quotations on pp.10-11 and p.18. See also Streeck, *op. cit.*

[57] Hollingsworth, (1997a), *op. cit.*, p.293.

[58] *Ibid.*, p.280 and 285.

[59] Dore also comments on the nature of pension funds, and how these are applied to portfolio investment in multiple firms in LMEs, versus held within the firm as investment capital in CMEs. This is not included here as it does not bear on the arguments in this thesis beyond the fact of greater short term portfolio investment in LMEs generally, versus longer term investment in CMEs, reflecting the different natures and importance of their stock markets.

[60] Hampden-Turner and Trompenaars, *op. cit.*, p.75.

[61] *Ibid.*, p.135.

[62] Dore (2000b), *op. cit.*, p.103.

[63] *Ibid.*

[64] Hampden-Turner and Trompenaars, *op. cit.*. This is a theme of theirs. For example, they note that managers of US firms believe that "if they are profitable, then everything else must be all right" (p.44). However, "for Germans, value must be deeply imbedded in products of solidity and worth [because] they do not like it when money and its enjoyment becomes separated from worthwhile artifacts" (p.213). Indeed, "for German managers, money is a means, not an end; a lubricant of industrialisation, not a potion in itself; of value in furthering work, but dangerous in itself" (p.218).

[65] Hall and Soskice, *op. cit.*, p.30 and 33.

[66] *Ibid.*, p.24.

[67] *Ibid.*, p.24.

[68] O. Fioretos (2001), 'The Domestic Sources of Multilateral Preferences: Varieties of Capitalism in the European Community', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, pp.220-221.

[69] Pauly and Reich, *op. cit.*, p.12.

[70] Dore (2000b), *op. cit.*, p.222.

[71] A point particularly stressed in Streeck, *op. cit.*

[72] Dore (2000b), *op. cit.*, p.107.

[73] By way of illustration, Dore notes that in a meeting of shareholders a US company chairman is likely to address the audience by talking about "your firm", whereas a Japanese company chairman will talk about "our firm". See Dore (1997), *op. cit.*, p.20.

[74] Pauly and Reich, *op. cit.*, p.11. See also Dore (2000a), *op. cit.*, pp.24-26.

[75] Hampden-Turner and Trompenaars (1993), *op. cit.*, p.32.

[76] *Ibid.*, p.60.

[77] *Ibid.*, p.158.

[78] *Ibid.*, pp.97-99, with emphasis added.

[79] More specifically, the "values that Germans bring to their processes of wealth creation is(sic) manifested in a highly codified economic system". See *ibid.*, p.198.

[80] In fact, the Japanese themselves appear to believe that "the company resembles an organism that grows and develops, even more, it is a family with deep and affectionate bonds". See *ibid.*, p.132.

[81] A US firm may be thought of as a "perfectly tuned machine" as well, but it is one in the sense of being designed for "responding to a market mechanism". See *ibid.*, p.73. Therefore, the emphasis is most appropriately on the latter rather than the former – i.e. it is a mechanism for responding to material market signals.

[82] Dore (2000a), *op. cit.*, p.193

[83] *Ibid.*, p.207.

[84] Soskice, *op. cit.*, pp.106-110. The divide between industry and group coordination between these states, as well as between them and LMEs, is also discussed in H. Kitschelt, P. Lange, G. Marks and J. Stephens (1999), 'Convergence and Divergence in Advanced Capitalist Democracies', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press.

[85] Dore (2000b), *op. cit.*, p.106.

[86] A point made in Hall and Soskice, *op. cit.*, pp.35-40; Soskice, *op. cit.*, pp.117-118; and Hollingsworth (1997a), *op. cit.*, p.296. Whether or not this is an advantage of the US variety of capitalism is hotly debated, because while an ability to act rapidly and embrace radical technological change would seem to confer competitive advantages, some commentators say that the US' lack of ability to embrace incremental technological change is resulting in its firms losing the competitive edge they once possessed. They are increasingly is in a position of always having to play catch-up with technological advances made by firms in Japan and other East Asian states, and possibly Europe too. For example, see Weiss, *op. cit.*; and Weiss and Hobson, *op. cit.*

[87] Hall and Soskice, *op. cit.*, p.41.

[88] Soskice, *op. cit.*, p.114.

[89] Hollingsworth (1997a), *op. cit.*, p.289. A similar point is made in Streeck, *op. cit.*, p.41.

[90] Wilks, *op. cit.*, p.142.

[91] Pauly and Reich, *op. cit.*. See also Doremus et. al., *op. cit.*

[92] Hollingsworth (1997a), *op. cit.*, p.291.

[93] Vitols, *op. cit.*, p.339. He makes this distinction by comparing the competitive strategies of UK LME-based firms versus German CME-based firms.

[94] For example, because Ford is more dependent on the production of light trucks than Toyota, this might explain why Toyota introduced a medium-sized petrol-electric hybrid passenger car in the form of the Prius, while Ford chose to introduce a hybrid version of its SUV Escape. But this does not answer the question of why each firm decided to introduce a hybrid at all, especially in the case of Ford as it is the first US company to do so. For firms' different production profiles, see the relevant sections on each firm in Part 2 of Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG. The timing and nature of the firms' introduction of petrol-electric hybrids is discussed in their environmental reports. For example, see Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation; and Ford Motor Company (2004), *2003/4 Corporate Citizenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company.

[95] Dicken, *op. cit.*, p.197.

[96] Hall and Soskice, *op. cit.*, p.15.

[97] Whitley, *op. cit.*, p.13.

[98] These are widely-held views that are well summarised in Dore et. al. (1999), *op. cit.* See also Hollingsworth (1997a), *op. cit.* They are also at the core of the arguments made in Doremus et. al., *op. cit.*, and Pauly and Reich et. al., *op. cit.* The latter note on page 3 that "the institutional legacies of distinctive national histories continue significantly to shape the core operations of multinational forms based in Germany, Japan and the United States".

[99] Dore et. al. (1999), *op. cit.*, p.102.

[100] Berger, *op. cit.*, p.22; and Boyer, *op. cit.*, p.56. The point about the path dependence of institutions in specific societies is widely made. For further examples, see Hall (1999), *op. cit.*, p.150; and generally in Hollingsworth (1997a), *op. cit.*

[101] This point is made particularly explicitly in Dore et. al. (1999), *op. cit.*

[102] Whitley, *op. cit.*, p.13. He makes a similar point in Redding and Whitley, *op. cit.*

[103] This is exactly the point made in Dore et. al. (1999), although Dore later confesses to "an underlying evaluative bias" against LMEs because of a belief that "the processes of marketisation and financialisation are a bad thing". See Dore (2000a), *op. cit.*, p.219.

[104] D. Suzuki and H. Dressel (2002), *Good News for a Change: Hope for a Troubled Planet*, Toronto: Allen and Unwin, p.16.

[105] OECD (2000), *Frameworks to Measure Sustainable Development*, Paris: OECD, p.8.

[106] 'Greenwashing' is a term used by environmentalists to describe well publicised commitments to environmental concerns that do not translate into action. They therefore amount to cynical public relations exercises. See for example no author (2002a), 'Greenwashing the Car', *Scientific American*, Vol.287, No.4, p.8.

[107] The issue is described as a "crucial event" for the car industry in D. Levy, and S. Rothenberg (2002), 'Heterogeneity and Change in Environmental Strategy: Technological and Political Responses to Climate Change in the Global Automobile Industry', in A. Hoffman and M. Ventresc eds., *Organizations, Policy, and the Natural Environment: Institutional and Strategic Perspectives*, Stanford: Stanford University Press. See also M. Paterson (1996), 'Neorealism, Neoinstitutionalism and the Climate Change Convention', in M. Imber and J. Vogler eds., *The Environment and International Relations: Theories and Processes*, London and New York: Routledge; U. Luterbacher and D. Sprinz (2001), 'Problems of Global Environmental Cooperation', in U. Luterbacher and D. Sprinz eds., *International Relations and Global Climate Change*, Cambridge: The MIT Press; M. Schreurs (2002), *Environmental Politics in Japan, Germany and the United States*, Cambridge: Cambridge University Press, especially chapters 6 and 7; G. Porter and J. Brown (1996), *Global Environmental Politics*, Boulder: Westview Press; and S. Barrett (2003), *Environment and Statecraft: the Strategy of Environmental Treaty-Making*, New York: Oxford University Press.

[108] Deutsche Bank (2004), *op. cit.*, p.58. For a list of which states have ratified the Kyoto protocol and the implications, see UNFCCC (no date a), *Kyoto Protocol*, http://unfccc.int/essential_background/kyoto_protocol/items/2613.php, accessed 12 February 2005; UNFCCC (no date b); *Status of Ratification*, http://unfccc.int/essential_background/kyoto_protocol/status_of_ratification/items/2613.php, accessed 12 February 2005; and UNFCCC (no date c), *Kyoto Protocol: Status of Ratification*, http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf, accessed 12 February 2006.

[109] For example, it is responsible for 94 percent of Japan's greenhouse gas emissions. See OECD (2002a), *Environmental Performance Reviews: Japan*, Paris: OECD, p.218.

[110] Estimates vary, but this is based on OECD (2003), *CO_2 Emissions from Fuel Combustion 1971-2002*, Paris: OECD; OECD (2002b), *Strategies to Reduce Greenhouse Gas Emissions from Transport*, Paris: OECD; D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004, p.5; JAMA (2003), *2003: The Motor Industry of Japan*, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, accessed 18 January 2004, p.24; ECMT (2001), *Vehicle Emission Reductions*, Paris: OECD, p.35; ECMT (1997), *CO_2 Emissions from Transport*, Paris: OECD, p.52; W. Harrington and V. McConnell (2003), *Motor Vehicles and the Environment*, Washington: Resources for the Future, http://www.rff.org/Documents/RFF-RPT-carsenviron.pdf, accessed 2 January 2004, p.8; and OECD (2002a), *op. cit.*, p.67 and pp.232-233

[111] IEA (1997), *Transport, Energy and Climate Change*, Paris: OECD, p.9.

[112] The science behind this is explained in K. Bradsher (2002), *High and Mighty – SUVs: The World's Most Dangerous Vehicles and How they Got That Way*, New York: Public Affairs, p.246 and 451. See also OECD (2002b), *op. cit.*, p.17; and Austin et. al., *op. cit.*, p.20. A conversion chart of fuel economy to CO_2 emissions in grams per kilometre is provided in Austin et. al., *op. cit.*, p.74.

[113] Deutsche Bank (2004), *op. cit.*, p.58; and OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD, p.7.

[114] IEA (1997), *op. cit.*, pp.19-20. As an indicator of the contribution of passenger cars to these figures, approximately 80 percent of emissions from transport in Europe are accounted for by road transport, and of this two thirds is accounted for by passenger cars. See ECMT (1997), *op. cit.*, p.10.

[115] OECD (2004), *op. cit.*, p.18.

[116] Indeed, Deutsche Bank believes that that "fuel economy and CO_2 emissions standards offer the best prospect for reducing vehicles' contribution to climate change". See Deutsche Bank (2004), *op. cit.*, p.58.

The IEA also sees improving fuel economy, such as via switching to alternative fuels, as *the* way for the industry to reduce the CO_2 emissions of cars. See IEA (1993), *Cars and Climate Change*, Paris: OECD.

[117] It could be argued that another is noxious emissions for the smog they cause at a primarily local rather than global level. However, there is no doubt that climate change and CO_2 emissions are *the* global environmental issue of the last decade, and one of primary concern to the car industry.

[118] This is the colloquial name for the United Nations Conference on Environment and Development held in Rio de Janeiro on 3-14 June 1992. See UN (no date a), *Earth Summit: UN Conference on Environment and Development*, http://www.un.org/geninfo/bp/enviro.html, accessed 8 February 2006.

[119] Australia, Kazakhstan, Croatia, Monaco and the US are the only non-ratifiers. See UNFCCC (no date a), *op. cit.*; UNFCCC (no date b), *op. cit.*; and UNFCCC (no date c), *op. cit.*

[120] R. O'Brien, A. Goetz, J. Scholte and M. Williams (2000), *Contesting Global Governance: Multilateral Economic Institutions and Global Social Movements*, Cambridge: Cambridge University Press, p.231.

[121] GRI (2002), *Sustainability Reporting Guidelines: 2002*, http://www.globalreporting.org/guidelines/2002/GRI_guidelines_print.pdf, accessed 10 December 2004; and UN (no date b), *The Global Compact*, http://www.unglobalcompact.org/Portal/, accessed 25 August 2003.

[122] A. Florini (2003a), 'Business and Global Governance: the Growing Role of Corporate Codes of Conduct', *Brookings Review*, Spring, pp.4-8; and A. Florini (2003b), *The Coming Democracy: New Rules for Running a New World*, Washington: Island Press.

[123] Florini (2003a), *op. cit.*; Florini (2003b), *op. cit.*; OECD (2001a), *Corporate Responsibility: Private Initiatives and Public Goals*, Paris: OECD; OECD (2001b), *OECD Guidelines for Multinational Enterprises, Global Instruments for Corporate Responsibility*, Annual Report 2001, Paris: OECD; C. Holliday Jr, S. Schmidheiny and P. Watts (2002), *Walking the Talk*, Sheffield: Greenleaf.

[124] For example, see WBCSD (2000), *Annual Review 2000: Ten Years of Achievement*, Geneva: WBCSD, http://www.wbcsd.org/DocRoot/fQ4x089Xp5OEnrs0Gp2i/ar2000.pdf, accessed 17 August 2003.

[125] J. Karliner (1997), *The Corporate Planet*, San Francisco: Sierra Club Books, p.30. He points out that over this timeframe the environment began to be taken seriously by business. Corporate environmental departments and policies emerged, and senior executives came to be in charge of environmental issues.

[126] P. Hawken, A. Lovins and H. Lovins (1999), *Natural Capitalism: Creating the Next Industrial Revolution*, New York: Little Brown and Co, p.24.

[127] D. Suzuki (1993), *Time to Change*, St Leonards: Allen and Unwin, p.135.

[128] *Ibid.*, pp.137-139.

[129] Suzuki and Dressel (2002), *op. cit.*, pp.289-290.

[130] *Ibid.*, pp.290-291.

[131] A similar viewpoint on the car industry is evident in Hawken et. al., *op. cit.*

[132] This is based on a review of the environmental reports available from the major firms' websites, and/or discussion of them there. In addition, pdf files on firms' environmental initiatives downloaded from the website of the UNEP's Division of Technology, Industry and Economics were also used to confirm firms' first year of publication of environmental reports. These pdf files are summaries of information from "publicly available sources, such as environmental reports, press statements and the internet, and in many cases comments kindly provided by auto manufacturers". They include sections on environmental reporting and when it commenced. See UNEP (no date), *Environmental Action Already Undertaken by Auto Manufacturers*, http://www.uneptie.org/energy/act/tp/amf/action.htm, accessed 7 January 2005.

[133] US Energy Information Administration (no date), 'Crude Oil Prices: World Prices', *Historical Petroleum Price Data*, http://www.eia.doe.gov/neic/historic/hpetroleum2.htm , accessed 9 January 2006, Washington DC: EIA.

[134] P. Pierson and T. Skocpol (2002), 'Historical Institutionalism in Contemporary Political Science', in I. Katznelson and H. Milner eds., *Political Science: The State of the Discipline*, New York: W.W. Norton and Company, p.698.

[135] G. King, R. Keohane and S. Verba (1994), *Designing Social Inquiry: Scientific Inference in Social Research*, Princeton: Princeton University Press, p.52.

[136] H. Eckstein (1975), 'Case Study and Theory in Political Science', in F. Greenstein and N. Polsby eds., *Strategies of Enquiry*, Reading: Addison-Wesley Publishing Company, p.81.

[137] R. Adcock and D. Collier (2001), 'Measurement Validity: A Shared Standard for Qualitative and Quantitative Research', *American Political Science Review*, Vol.95, No.3, p.529.

[138] Global production data is given in OICA (2005), *Motor Vehicle Production by Manufacturer: World Ranking 2004*, http://www.oica.net/htdocs/Main.htm, accessed 13 January 2006; and OICA (2004b), *World Motor Vehicle Production by Manufacturer: World Ranking 2003*, http://www.oica.net/htdocs/Main.htm, accessed 29 November 2004. Production and sales data on a territorial basis is given in G. Maxton and J. Wormald (2004), *Time for a Model Change: Re-engineering the Global Automotive Industry*, Cambridge: Cambridge University Press, pp.115-123; CCFA (2003), *Analysis and Statistics*, Paris: CCFA, http://www.ccfa.fr/pdf/2003eng.pdf, accessed 10 January 2004; and VDA (2003), *Annual Report 2003*, Frankfurt: VDA, http://www.vda.de/en/service/jahresbericht/files/VDA_2003_EN.pdf, accessed 17 March 2004, p.45. The exception to the home territory production and sales rule is BMW in Germany which has slightly smaller market share than General Motors Opel. However, it is the other major purely German-owned firm after Volkswagen. Of the top passenger car producers in the world, Nissan and Honda were ranked seventh and eighth respectively and BMW was ranked fifteenth.

Chapter 3: Firms' CO_2 Emission Environmental Product Development Initiatives

Introduction

In Chapter 2, the case was made for why the focus for empirical analysis in this thesis will be climate change, and firms' product development initiatives that address their contribution to this environmental problem. The crucial relevance of climate change to the car industry was outlined, along with its links to fuel economy, and why the focus should be on passenger cars in use rather than other aspects of firms operations. With these points in mind, this Chapter serves as a brief interlude to summarise firms' product development initiatives aimed at reducing the carbon dioxide (CO_2) emissions of passenger cars in use, and which initiatives firms of different nationalities highlight. The reason for doing so is to provide some background on the types of technologies and product developments that are relevant to the question of addressing the environmental problem of climate change. Having done this, by focussing on the relative emphasis placed on different environmental product development initiatives by different firms, it is shown that there are clear national differences. Furthermore, prior to detailed empirical analysis being undertaken in the following chapters, the insights of the varieties of capitalism (VOC) approach are shown to already highlight potential reasons for why this should be the case.

The chapter proceeds as follows. The car industry's main environmental product development initiatives affecting the contribution of passenger cars in use to climate change are summarised, based on a selection of authoritative literature that does this in more detail. These are identified as incremental technologies; petrol and diesel-electric hybrid drivetrains; hydrogen fuel cell vehicles and alternative fuels. The summary of these product development initiatives is followed by a comparative analysis of the ones individual firms themselves choose to highlight in their latest environmental reports. It is shown that far from a universal approach to the issue of climate change, there are distinct national differences. This supports the view expressed in Chapters 1 and 2 that firms' home states matter, that a study on the basis of national institutional

differences is pertinent, and therefore that the VOC approach is pertinent for explaining national differences in firms' product development strategies.

The insights of the VOC approach are shown to be pertinent in the following ways. First, Japanese firms are taking the most technologically radical approach, whereas the approach of German and United States (US) firms is more incremental. This highlights the technonationalist nature of Japanese capitalism versus the others. Secondly, US firms very clearly place a high priority on market forces and market potential for new products in their development process. By contrast, Japanese firms seem to be more internally driven for the initiatives they are undertaking, and German firms are developing a range of technological solutions based on their technological competencies. This highlights the role of market forces for LME-based US firms, versus other non-material drivers for product development in CME-based German and Japanese firms. Thirdly, the timing differences between firms for the development and introduction of environmental product attributes further illustrates the LME/CME divide in terms of the importance of markets, and the technonationalist drivers of Japanese firms versus the others. Japanese firms aim to be first on the market with the latest technologies, whereas German firms aim to have environmental technological solutions ready when the moment is right, although not necessarily for market reasons. US firms are investigating a range of product development alternatives but are driven by markets for their introduction and the aim of selling the most vehicles, rather than being first on the market with them.

Environmental Product Development Initiatives

Given the relevance of the issue of climate change, and the direct relationship between CO_2 emissions and fuel economy, the major areas in which the industry is taking initiatives aimed at reducing the CO_2 emissions of its passenger cars in use are: incremental technologies; petrol and diesel-electric hybrid drivetrains; hydrogen fuel cell vehicles (FCVs); and alternative fuels. The literature on these product development areas is extensive. The following summary is drawn from reliable sources that summarise the trends: the Organisation for Economic Cooperation and Development

(OECD), the United Nations Environment Programme (UNEP), Deutsche Bank and a report of Sustainable Asset Management and the World Resources Institute.[1]

Incremental Technologies

Incremental technologies refer to advances in the design of the conventional product of the car industry.[2] They involve advances in vehicle design, such as the use of lighter materials, reduction of a car's rolling resistance and improved aerodynamics (all of which mean less fuel needs to be used to propel the vehicle). Transmission advances, such as the introduction of six speed manuals, advanced intelligent automatics, and continuously variable transmissions have also improved the performance that can be accessed from conventional drivetrains. In addition, cars with larger engines that can deactivate some of the engine's cylinders when not required are now available in order to reduce their fuel consumption. But most significant are advances in the design of conventional petrol and diesel internal combustion engines. It is estimated that since 1996, improvements to conventional petrol engines have resulted in CO_2 emission reductions of around 35 percent.[3] These have been achieved through the development and commercial introduction of engine technologies such as electronic fuel injection systems, multi-valve engines and variable cam timing that have led to efficiency improvements in engine operation as well as increased power.

For diesel engines, remarkable technological advances have been made by European firms through the introduction of advanced high pressure direct injection engines. Diesel is denser than petrol and so burning a litre of diesel produces about 2,636g of CO_2 (by comparison to 2,337g of CO_2 for petrol). But diesel engines are inherently more fuel efficient than petrol engines because a diesel vehicle tends to be 20 to 40 percent more fuel efficient than a comparable petrol vehicle, and therefore emits 10 to 30 percent fewer CO_2 emissions per kilometre travelled.[4] Therefore, not only are these advanced diesel engines more efficient than the conventional ones they replace, they are more efficient than equivalent advanced petrol engines. By running a lot cleaner than older diesel engines they also produce fewer noxious emissions,[5] often less than equivalent petrol engines. The technology is now well developed with European

suppliers on the verge of introducing third generation advanced diesel drivetrains in 2006.[6]

Petrol and Diesel-Electric Hybrid Drivetrains

Petrol-electric and diesel-electric hybrid drivetrains use two sources of power instead of one. They consist of a normal internal combustion engine mated to an electric engine. Mild hybrids deactivate the internal combustion engine when the car is idling, while full hybrids can operate on either power source or a combination of both. Japanese firms (Toyota and Honda) were the first to introduce full petrol-electric hybrids in the 1990s with models such as the Toyota Prius and Honda Insight. Toyota sold 300,000 hybrid cars globally in 2005, with Japan and the US being the biggest markets for such vehicles. They are now expanding the range of models offered in hybrid form.[7] Ford is the first non-Japanese firm to release a full petrol-electric hybrid vehicle with a hybrid version of its Ford Escape sports utility vehicle (SUV). Other US firms have plans to release mild hybrids. No diesel-electric hybrid vehicles have been commercially released yet.

Hydrogen Fuel Cell Vehicles

Hydrogen FCVs are the long term goal of the car industry. Fuel cells are "electrochemical devices that convert a fuel's energy directly into electrical energy".[8] FCVs fuelled by hydrogen only emit water vapour as their exhaust gas. They produce no CO_2 emissions at all. Hydrogen internal combustion engines are also being considered by many firms that would similarly emit only water vapour, but use a more conventional drivetrain. The main problem with the technology is that it is currently more expensive than petrol and diesel internal combustion engines to produce, and little refuelling infrastructure for hydrogen exists. To date, research into hydrogen technologies has only resulted in prototypes rather than vehicles for commercial sale.

Alternative Fuels

Vehicles that run on alternative fuels, or dual fuel vehicles that have the capability of running on conventional petrol/diesel as well as alternative fuels, have been commercially available for some time. They include liquefied petroleum gas (LPG), compressed natural gas (CNG), ethanol and methanol. These have CO_2 emission advantages over petrol engines, but not necessarily over diesel engines. Methanol is not widely used any more because of its corrosiveness and toxicity. In addition to these, new biofuels are now being trialled that are sourced from biomass stocks that can be used in conventional diesel engines, as well as advanced synthetic fuels. These have the potential to deliver CO_2 emission benefits in the order of 30-60 percent less than petrol or diesel cars, while also reducing noxious emissions and reliance on non-renewable fossil fuels.[9]

What About Fully Electric Cars?

Fully electric vehicles were once seen as the way to minimise the environmental impact of cars, because they produce no emissions in use at all. Car firms have all had electric vehicle research and development programs, and some still mention them in their environmental reports.[10] However, the commercial impact of such vehicles has been minimal. They have not been widely offered by firms, nor embraced by consumers, in the way that advanced diesels or petrol-electric hybrids have been. In terms of impacting on the overall CO_2 emissions of the industry and future developments in this regard their impact has been, and is likely to continue to be, minimal. It is now hard to find a current reference in which fully electric vehicles are cited as a major strategy for addressing the challenge of climate change by the industry or commentators on it.[11]

Convergent or Divergent Strategies?

The environmental product development initiatives that impact on climate change that firms choose to highlight in their environmental reports are summarised in Table 3.1.

The critical reader will be concerned that, while this table is quite extensive, much has been left out in such a dramatic distillation. Such a concern would be well-founded, because firms' activities are more complex than this summary, and their environmental reports are dense documents with a great deal more information. However, the purpose is not to describe firms' investment activities in detail, but to distil the essence of their activities for the purpose of comparative analysis, to show the broad brushstrokes in terms of the most evident initiatives that firms report they are taking that impact on CO_2 emissions/fuel economy. Also, the author is aware that not all firms' investment in product development that has positive environmental outcomes is necessarily undertaken out of concern for the environment.[12] The purpose here is not to judge the extent to which such developments were initially undertaken for environmental reasons, but to highlight the key product development initiatives that *firms themselves* choose to give priority to in their environmental reports as having such benefits, and then to draw some obvious associations between the national differences and the insights of the VOC approach.

Table 3.1: Investment in Climate Change Related Environmental Product Development Initiatives Reported in Firms' Environmental Reports

	Main Product Development Focus to address Environmental Concerns
GERMANY **Volkswagen**	Incremental technologies The focus is on development of advanced small diesels that have been commercially brought to the market – e.g. 3 l/100km 'Lupo' diesel model in production. Plans to release lower fuel consumption models by 2006 are outlined - e.g. a 1l/100km diesel car prototype was produced in 2002. Hybrids Prototypes produced since 1986 and still being improved and tested, but not yet made commercially available. Hydrogen FCVs Seen as at least 20 years away and therefore a long term proposition. Prototypes are in testing. Alternative fuels Research on synthetic fuels ('synfuel') and fuel from biomasss ('sunfuel'). This involves working with oil companies and government to encourage implementation of strategies to produce these and make them available to consumers.
BMW	Incremental technologies Modifications to diesel engines to prevent particle emissions before they need filtering at the tailpipe. Research and implementation of advanced diesel technologies is stressed as a key feature, as are other incremental technologies for conventional engines such as variable valve intake technology; weight reductions in components and wheels; improved aerodynamics; six speed transmissions etc. Hybrids No activity reported. There is not even a reference to such vehicles. Hydrogen FCVs Seen as the long term objective of the firm. It appears that the firm very much sees hydrogen FCVs as the next step, rather than any interim technology such as hybrids. Prototypes have been developed, and further development of the '7 series' range of vehicles with fuel cells is under way. The focus is on "the development of hydrogen technology ready for series production" (p.47). Alternative fuels Other than hydrogen as the long term solution to environmental problems, no other reference is made to alternative fuels. In fact, hydrogen is seen as *the* most promising alternative fuel.
DaimlerChrysler	Incremental technologies Low weight, small advanced models that get 3 l/100km are referred to, such as the Smart range of models. In general, the firm's goal is to "optimise the exhaust emissions and

	Main Product Development Focus to address Environmental Concerns
	fuel consumption of current gasoline and diesel engines" (CD ROM). Other advances are also highlighted, particularly those associated with advanced diesels such as: common-rail injection; turbochargers with variable turbine geometry; electronic exhaust gas recirculation; and boost pressure and fuel injection. Hybrids The focus is on *diesel*-electric hybrids. There are plans to launch these on the US market for the company's biggest SUVs such as the Dodge Ram and Jeep Liberty. The power advantages, as well as the environmental advantages, of such an approach are stressed. Production of such vehicles for the North American market is given as late 2004. Such vehicles are seen as an interim stage prior to hydrogen FCVs. Hydrogen FCVs Prototypes have been produced and are in operation. In 2003, 60 A-class Mercedes FCVs were produced and in 2004 these were given to customers in Japan, Germany, Singapore and the US for testing over the next two years. The goal is to commercially sell hydrogen FCVs by 2010. They are seen as the most promising technology for the mid to long term, but the belief is also stated that "it will probably be about 20 years, however, before fuel cell cars are part of the everyday street scene" (CD ROM). Alternative fuels Dual fuel vehicles able to run on natural gas are highlighted, such as the Mercedes E200 limousine (i.e. a large, powerful model). Also, great potential is seen in fuel derived from biomass such as 'SunDiesel', a renewable synthetic diesel fuel launched in 2003 that Volkswagen is also a partner in developing. This can be used in current diesel engines without requiring modification.
JAPAN **Toyota**	Incremental technologies The focus is on increasing the fuel efficiency of all its vehicles, across the board, through technological innovation in place. Hybrids The world leader, along with Honda. Toyota has the successful Prius model in the market in its second generation. As at march 2004 it had sold 210,000 hybrid vehicles, and is now licensing the technology to other firms such as Ford. Hydrogen FCVs Prototypes have been produced with the aim of commercially introducing them as early as possible. Sixteen hydrogen FCVs have been leased and a fuel cell bus began operations in Tokyo in 2003. Alternative fuels There is some mention of CNG and other alternative fuels, but this is not highlighted as strongly as the potential for technological improvements in conventional engines, hybrid technologies and hydrogen FCVs.

	Main Product Development Focus to address Environmental Concerns
Honda	Incremental technologies Various technical improvements for petrol engines are highlighted with the aim of developing "the ultimate gasoline engines" (Ecology, p.13) including: variable cylinder management system (a six cylinder engine that uses only three cylinders when heavy acceleration is not required); variable cams for different engine power requirements mounted on a single camshaft; downsizing engines by 10 percent in terms of weight; advanced transmissions such as continuously variable transmissions; improved aerodynamics; all engines installed "sideways" for maximum efficiency; and lean burn combustion. No mention is made of diesels in the Environmental Report at all, but they are mentioned in passing in "Ecology" in the sense that there is a goal of improving diesel efficiency too (Ecology, p.13). Hybrids Developed in 1999 and in the market (the Insight and hybrid Civic), and their performance and sales are mentioned along with other low emission petrol and natural gas vehicles. Hydrogen FCVs The first prototype was developed in 1999. Leasing of hydrogen FCVs to customers commenced in 2002. By March 2004, five FCVs were leased to customers in Japan and seven to customers in the US. Their FCVs were certified for commercial use by the Japanese Ministry for Land, Infrastructure and Transport in 2003, and in July 2002 they had the first hydrogen FCV in the world to be approved for commercial sale in the US. The car will be released for sale in 2005. Alternative fuels Natural gas vehicles are mentioned, specifically the natural gas version of the Civic (a small four cylinder car), released in 1997. However, only 79 were sold in 2003. Also mentioned are electric vehicles, developed in the 1980s and released in 1996.
Nissan	Incremental technologies Rather than just focussing on future technologies, Nissan "believe that it is also extremely important to make improvements to each individual vehicle" (p.20). Advances are highlighted aimed at improving involve reducing fuel consumption with the aim of reducing CO_2 emissions. These include: continuously variable transmissions; reducing the weight and rolling resistance; direct injection engine developed in 1997 and lean burn engine in 1994; and electronically controlled variable valve timing introduced in 2001. Examining reforestation as a way to offset the effects of vehicle use is also mentioned. There is no mention of diesel, other than in the executive message and in terms of meeting regulations. Hybrids Identified as a priority. A hybrid system was developed and released via the Tino hybrid in 2000. Nissan has signed a "technology cooperation agreement" with Toyota and have built a hybrid prototype of the Altima to go on sale in 2006 (p.30). Hydrogen FCVs "Full-scale development" (p.19) commenced in commenced in 2001, although the firm describes itself as "a late starter" compared with other car manufacturers (p.10). Since then, prototypes were produced in 2001, 2002 and 2003, but the technology is seen as a long term prospect as energy sources "shift" over the next 20-30 years (p.10). Hydrogen FCVs are highlighted as the technology of the future, but it is also stated that 2005 is the projected year for technical development to a level for practical use (p.61).

	Main Product Development Focus to address Environmental Concerns
	Alternative fuels Not mentioned other than in the executive message. No details of product development.
US **General Motors**	The ultimate goal of zero exhaust emissions is stated, along with higher fuel economy. Incremental technologies Seen as the major current objective. Advances highlighted are: alternative fuelled vehicles (ethanol, LPG and CNG) with over 1 million ethanol-capable vehicles on the road in the US; diesels in Europe; and 'displacement on demand' that allows cars with larger engines to operate on fewer cylinders when more power is not required focussing on vehicles with 6 and 8 cylinders, such as large SUVs. Hybrids Seen as a medium term goal from now into the next decade. Mild hybrids (based on stop-start technology), to be commercially introduced in 2004-2006 on SUVs and pickup trucks. The focus is on "the largest vehicles with the highest fuel consumption" (p.4-5). Hydrogen FCVs Seen as a long term goal. Research is in progress and prototypes have been produced. The aim is to make these commercially viable by 2010 and to be the first manufacturer to sell one million of them. To date, the company has spent over US$1 billion on fuel cell research. Alternative fuels A major current focus with dual-fuel and specialised vehicles that can run on them already in the market (CNG, LPG and ethanol). The focus is, again, on the larger pickup trucks and SUVs.
Ford	Incremental technologies Advances mentioned include: continuously variable transmissions; six speed automatic and automatically shifted manual transmissions that improve fuel economy; and common rail advanced diesel engines developed in partnership with PSA Peugeot Citroen. Some very technical information is provided on "the anatomy of a partial zero emissions vehicle" (p.24). The potential of diesel is highlighted for Europe, but it is noted that market perceptions are strongly against them in the US. The focus is very clearly on Europe for diesels and elsewhere for hybrids. For the US, the importance of SUVs to the company is acknowledged, along with the strategy that 2004 was the "year of the car" for the company in North America in an attempt to broaden the company's product base. In a special focus on the company's (and America's) top selling vehicle, the F150 pickup truck, Ford notes that despite improvements in its emissions of noxious gases, the 2004 model actually has no improvement in fuel economy over the 2003 vehicle it replaces, with the non-4wd version actually having slightly worse fuel economy. Hybrids Ford states its commitment to hybrid vehicles, focussed on large SUVs, with the launch of the Escape SUV hybrid in 2004. There are plans to introduce another SUV hybrid (the Mercury Mariner) in 2007 as well as a midsize sedan. The Escape hybrid is the first full hybrid to be offered in the US. Although it is being built on Toyota's system

	Main Product Development Focus to address Environmental Concerns
	(licensed from Toyota according to Toyota's report), no mention is made of this in Ford's report. What is stressed is Ford' research and development commitment to hybrids and bringing further models to the market. Ford foresees the potential for diesel-electric hybrids, but says both hybrids and diesel will require "consumer education". <u>Hydrogen FCVs</u> Seen as the ultimate long term goal of technology development, but highly contingent on a range of factors, such as consume demand, government regulations, fuel infrastructure etc. Ford has produced prototypes and has 20 of these on the road at present in testing, with plans to double this number in the next two years. They are being trialled in Canada, the US and Germany. No clear timeframe is given for their commercial introduction, because the market is seen as too uncertain at present and so the company is waiting to see "if the societal will and resources emerge to support a major shift to hydrogen fuel cells" (p.64). The need for the development of a retail hydrogen infrastructure is stressed as necessary before commercial sales of FCVs. No timeframe is given for the introduction of FCVs, other than that of the US Department of Energy which states that by 2015 a determination will need to be made on whether there has been sufficient technical progress, whether manufacturers are ready, whether there is sufficient demand and whether the infrastructure exists as a result of the demand. The company has a partnership with BP which is looking at developing hydrogen fuelling infrastructure. <u>Alternative fuels</u> There is a belief that CNG and LPG have a role to play, particularly in fleet vehicles. The potential of dual fuel vehicles able to run on petrol/LPG and petrol/natural gas is stressed for Europe, but Ford says that limited demand has led to the discontinuation of such models in the US. Dual fuel vehicles that can run on ethanol continue to be manufactured for sale in both the US and Europe. No other new fuels are mentioned in any detail, although biomass fuels are mentioned once in passing along with a range of other possibilities.

Sources: Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG; DaimlerChrysler (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM; BMW Group (2003), *Sustainable Value Report 2003/2004: Innovation. Efficiency. Responsibility.*, Munich: Bayerischen Motoren Werke; Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation; Honda Motor Company (2004), *Honda Environmental Annual Report 2004*, Tokyo: Honda Motor Company; Honda Motor Company (2002), *Honda Ecology*, Tokyo: Honda Motor Company; Nissan Motor Company (2004), *Sustainability Report 2004*, Tokyo: Nissan Motor Company; Nissan Motor Company (2004), *Environmental Report 2004*, Tokyo: Nissan Motor Company; Ford Motor Company (2004), *2003/4 Corporate Citzenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company; General Motors Corporation (2004), *2004 Corporate Responsibility Report*, Detroit: General Motors Corporation.

What Major German, US and Japanese Firms Say in Their Environmental Reports

All firms stress their concern for fuel economy and CO_2 emission reductions, and highlight technology-driven solutions with conventional engines. They all mention the product development initiatives already identified to one degree or another. The main point of difference is that German firms stress their advances in diesel technologies whereas the others do not stress the diesel option as strongly. For German firms, the promotion of clean, small diesel engines is seen as a key way to reduce fuel consumption and meet European Union (EU) CO_2 emission commitments. DaimlerChrysler, showing the German side of its heritage, notes the following on diesel:

> In 1936 came the highly acclaimed debut of the first diesel-engined car: the Mercedes-Benz 260D – soon the vehicle of choice for every German taxi driver….Today, diesels are top-notch high-tech machines, with only a fraction of the emissions of their ancestors.[13]

Thus, German firms are developing an existing technology to its furthest point, one that they invented and have experience in producing.

US firms, recognising diesel cars' potential in the European market, mention them in relation to their European operations. However, outside of Europe they see limited opportunities for diesels. For example, General Motors states:

> Diesel usage in the US will depend on how diesel-equipped vehicles will comply with future emissions requirements, customer acceptance, and the price of diesel fuel. We see advanced diesel engines as complementary to gasoline-powered engines. Concerns over emissions regulations, market acceptance, taxation based on engine displacement, fuel consumption, and the price of fuel largely dictate in which markets diesels are popular today.[14]

Fundamentally, General Motors sees diesel's acceptance outside Europe in regulatory and market acceptance terms, and limited as a result of these. Ford takes a similar view when it notes that "when it comes to perception of diesel engines, Europe and North America seem to be more than an ocean apart".[15] Japanese firms might be expected to take a similar view for their European operations, but do not. Despite increasing their market share in Europe, they barely mention diesel technologies at all. In conventional engines, Japanese firms are clearly focussed on advanced petrol engines.

Hybrid vehicles occupy a central position in Japanese firms' environmental strategies. They see hybrids as the next step in the mass production of highly fuel-efficient small cars, and not necessarily an interim step in advance of hydrogen FCVs. Not only do they have research and development programs, but in the case of Honda and Toyota have been selling hybrids commercially since the 1990s. Toyota is licensing its hybrid technology to US firms and Nissan (e.g. for the Ford Escape SUV hybrid and the Nissan Altima hybrid). Although Nissan does not yet have a hybrid product on the market, it identifies the development of petrol-electric hybrid cars as a priority.

US firms also see hybrids as important enough to warrant the recent/imminent release of a range of models. However, there are qualitative differences. The first hybrid released by a US firm is the Ford Escape, an SUV. This is mirrored in General Motors' plans to release hybrid SUV models, as well as that of DaimlerChrysler for the US side of its operations. While Japanese firms are producing small, efficient cars using hybrid technologies, US firms see hybrids as a way of making their light trucks more fuel efficient.

The German firms are not at all focussed on hybrids to the same extent. Volkswagen has been producing prototypes since 1986, which is as early if not earlier than Toyota, yet has not commercially released any hybrid models. It continues to undertake research. BMW sees FCVs and hydrogen powered drivetrains as the next step without any reference to hybrids in the interim.[16] DaimlerChrysler sees hybrids as "an important interim stage" yet dismisses them as inferior to diesels because they use more fuel and do not generate less CO_2 emissions than a modern diesel engine.[17]

FCVs are seen as the future by all firms, and all are investing in FCV technologies. However, the 'future' is varying distances away depending on firm nationality. US and German firms see the commercial introduction of hydrogen FCVs as 10-20 years away whereas Japanese firms see them as a more imminent prospect. German firms report that they continue to undertake development work with the aim of having excellent prototypes that perform well, so they can be introduced when the time is right. Thus, DaimlerChrysler's goal is to sell FCVs commercially by 2010, while agreeing with Volkswagen that real commercialisation is at least 20 years away. BMW sees them as the most promising long term solution. Both General Motors and Ford see

FCVs as a long term goal, the former aiming to make them commercially *viable* by 2010, but the latter having no clear timeframe and suggesting commercial viability is highly contingent on a range of factors the results of which will not be clear until 2015. By contrast, Japanese firms are keen to *sell* FCVs as soon as possible. Toyota wants to introduce FCVs "early"[18] while Honda plans to release an FCV for commercial sale in 2005, and is the first company in the world to have an FCV approved for commercial sale. Nissan sees 2005 as the year it develops FCVs to a level where they are suitable for practical use.

The approach to the introduction of FCVs is thus qualitatively different between Japanese firms versus US and German firms. Japanese firms want to be the first with products on the market, rather in the vein of hybrids. Indeed, Toyota sees the possibility of hybrid FCVs, so that rather than hybrids being an interim technology, it is one that may be incorporated in FCVs.[19] This first-on-the-market approach may be contrasted with General Motors' goal of being the first company to sell one million FCVs – i.e. rather than being first to sell hydrogen FCVs, General Motors wants to be first to sell the most of them. Ford wants the market to mature enough and the refuelling infrastructure to be in place before it makes clear commitments to releasing FCVs, and likewise German firms simply see them as a technology solution whose day will eventually come. Therefore, US and German firms are focussed more on market conditions, whereas Japanese firms are keen to make the technology commercially available and shape the market for them. While US firms are waiting for the market to mature and German firms have the technology ready for when the moment is right, Japanese firms are releasing their products in the hope that markets will catch up with their advanced, commercially available products.

Alternative fuels barely rate a mention in Japanese firms' environmental reports. Their focus is much more on radical new technologies involving alternative drivetrains, particularly hybrids and FCVs. It is US and German manufacturers who focus most on alternative fuels. However, once again there are qualitative differences. The US manufacturers stress that they are already producing dual-fuel vehicles and vehicles that can run on alternative fuels such as ethanol. Again, this is primarily for their light trucks in the US, and for normal cars in the EU and fleets.[20] Of the German manufacturers, BMW makes no mention of alternative fuels at all, again focussing on

hydrogen as the most effective fuel of the future. However, Volkswagen and DaimlerChrysler stress the potential of, and their investment in, synthetic alternative fuels, and fuels derived from biomass that may be used in their current diesel engines. They are working together in a cooperative partnership with a range of other companies and organisations to develop such fuels which Volkswagen describes as "an ideal interim stage between the hydrocarbon and hydrogen economies".[21] Such 'biofuels', mentioned in passing in the Ford report, are thus a centrepiece of Volkswagen and DaimlerChrysler's environmental strategies.

In summary, all firms have strategies in respect of all the environmental product developments identified, regardless of their nationality. However, there are distinct differences in emphasis, and this appears to be on the basis of firms' nationalities. What all car firms have in common is that while research and development continues on hydrogen FCVs, these are seen as a distant prospect. Germany, US and Japanese firms are also working on incremental technologies and introducing them to vehicles that they have on the market. Beyond this there are three major differences. First, in Germany (and Europe) there have been strong moves towards diesel cars.[22] Secondly, hybrid vehicles are very much a Japanese initiative, and even though Ford has introduced a petrol-electric hybrid model it has done so licensing the technology from Toyota. Hybrids are thus the key strategy for Japanese firms while being gradually introduced by the US industry and considered by German firms. Thirdly, for the US no clear strategy is evident, except possibly dual fuel vehicles, and vehicles than operate on alternative fuels generally. These have primarily been promoted in the US, and mostly for larger vehicles such as SUVs.[23] The relative emphasis and qualitative differences in the way these technologies are viewed by firms themselves have implications in the light of the VOC approach because the differences appear to be related to firms' nationalities.

National Differences and the Varieties of Capitalism Approach

The clear national differences evident from firms' treatment of CO_2 emissions and fuel economy in their environmental reports speak to the institutional differences highlighted

by aspects of the VOC approach. These are considered on a territory by territory basis below.

German Firms

German firms are largely focussed on diesels and alternative fuels. They were the pioneers in the former, and the latter is complimentary in that it allows them to advance conventional technologies, particularly diesel, without needing to turn to more radical drivetrains. Hydrogen drivetrains, particularly in the form of FCVs, are seen as a long term environmental solution, or *the* environmental solution in the case of BMW, but one that is at least 20 years away. Overall then, German firms demonstrate a somewhat conventional technology strategy. This is not to say that significant investment in new technologies is not the case, but that those brought to the market now are primarily based on a platform of diesel engines and knowledge of them. German firms embrace of advanced diesel technologies, in smaller cars, as the centrepiece of their product environmental strategies is largely responsible for the successes of the German, and indeed entire EU car industry, in reducing CO_2 emissions. Not only have they developed more technically advanced diesel engines, but the commercialisation of them on a large scale and the uptake of them by consumers has had very beneficial results.[24]

Generalising on German firms is to some extent difficult because of BMW and DaimlerChrysler. Being more a prestige car maker, BMW's strategic focus is somewhat different to the others for whom the prestige market is one segment among others in which they compete. Because BMW's focus is narrower, the scope of its activities is also more limited. No activity is reported on hybrids and no mention is made of alternative fuels other than hydrogen as the long term final solution. However, what it does have in common with the other German firms is a focus on more traditional technologies and developing these to advanced levels. Therefore, BMW fits the German model in the *nature* of its activities, even if the *scope* of them is more limited.

DaimlerChrysler's mixed heritage makes categorising its activities more problematic. Sometimes it looks like a German firm, while at others it looks more like a US firm. For example, it is focussed more on diesel technologies than hybrids as a way of reducing CO_2 emissions and improving fuel economy, like Volkswagen and

BMW. Like a German company, it stresses its implementation of advanced diesel technologies in small efficient cars like the 'Smart' range, and in advances in conventional engines generally. However, it sees potential in melding diesel and hybrid technologies and putting such engines in its larger SUVs and pickup trucks, in a similar manner to Ford and General Motors. It sees FCVs as a long term alternative, like the other German firms, yet wishes to introduce them within the next 20 years subject to market conditions in the manner of General Motors' and Ford's indicative timeframes. It stresses the potential for alternative biofuels in the manner of Volkswagen, and CNG for its European models, but does not mention ethanol as an alternative fuel for its US models at all.

Clear conclusions on DaimlerChrysler are therefore hard to come to grips with here, but the German side of its operations does square with what is evident on Volkswagen and BMW's reporting. DaimlerChrysler's focus on diesels fits with the observation that German firms prefer an incremental approach based on refining and advancing existing, proven technology. Particularly with Volkswagen, the impression one gets is of a company not taking radical steps, but focussed on what can be done now with conventional technologies to be the best and a market leader in diesel technologies, clean emissions, recyclability and cleaner/more environmentally friendly fuels. Where investment is being undertaken on more radical technologies, such as FCVs and hydrogen power, such advances are being done *in the background* rather than in the market. In short, German firms are advancing conventional technologies in the market and developing radical technologies for when conditions emerge that permit these to be implemented.

These observations fit with Germany's incremental approach to technological improvements and quality-driven nature of its CME style of capitalism. German firms are taking an incremental approach with the aim of balancing competing interests via gradual/incremental measures – i.e. technological environmental advances while maintaining profits. They have developed advanced diesel technologies, in which they have a history of expertise, are examining alternative fuels, and are introducing new products to the market in a considered and measured manner. CME-style, it is not so much a matter of responding to market forces, as having the appropriate vehicles for the overall environment as and when this may be appropriate, and developing technologies

on the basis of their histories of expertise in particular technologies (i.e. firms' expertise dictates their actions rather than market forces).

Japanese Firms

Japanese firms have a more radical technological focus than their German or US counterparts. Although fuel economy is seen as a priority in all vehicles, along with emission reductions, and the goals set by firms involve optimisation of conventional technologies, more radical drive technologies are embraced and highlighted. FCVs are not seen so much as a distant possibility as one that is on the way, and soon. Hybrid petrol-electric vehicles are seen as a viable alternative *now* and being brought to the market. Diesel technologies are not so much dismissed, if they are mentioned at all, as in the background. Alternative fuels for conventional engines are similarly in the background by comparison to US firms, Volkswagen and DaimlerChysler. Thus, Japanese firms have, or intend to have, radical technological solutions in the market before anyone else, while improving the environmental performance of conventional drivetrains.

The more radical technology-driven, first-to-market approach of Japanese firms suggests they are driven more by internal strategies than reacting to market forces. They are not waiting until the moment is right, in the vein of German firms, but are developing and marketing new technologies regardless of whether a market exists for them yet, and without waiting for markets to mature. This fits with the technonationalist version of Japan's CME-style of capitalism, as well as the point that markets are less of a driver for action in CMEs generally - i.e. like German firms, it fits with what they have a history of expertise in, in the sense that the Germans are diesel experts, whereas the Japanese are petrol and advanced technology experts.

US Firms

Rather than being focussed on a single clear strategy, one gets the impression that US firms are doing *everything*. Of course, the German and Japanese firms operate in the same way to some extent, but they are more strategically focussed on one type of

technological solution. US firms' lack of focus does seem to be a conscious strategic decision though. Ford explicitly acknowledges this in noting that "benefits can be gained by exploring these technologies simultaneously and in combination, rather than trying to select one 'winner'".[25] This is not to say that German and Japanese firms do not recognise this point too, it's just that their reports do not demonstrate it so clearly.

It also does not mean that US firms are random in their approach to the environmental impact of their products, so much as one that is contingent on the market potential for such products, or specifically the potential for them in different markets with different conditions. Thus, hybrids are seen as a solution for light trucks in the US market and diesels are seen as the solution for Europe. Such a market driven approach suggests not so much a market leading or market defining role for US firms, as one in which market conditions must be recognised and *reacted* to. So, as German firms define their strategy in terms of where their expertise lies and Japanese firms focus on a radical technology approach that may shape what the market evolves to, US firms look first to what market conditions exist *now* and tailor their products accordingly. Their environmental solutions are less radical than those of Japanese firms, and although they exhibit a German stance in terms of focusing more on conventional technologies they do so more overtly in terms of maintaining their position in markets and competing in them.

Overall, for US firms what is evident is a horses-for-courses approach, with different solutions for different markets, and environmental initiatives for large SUVs rather than new vehicles in the mould of Toyota's Prius. They focus on market success expressed in terms of sales targets, rather than on being first in the market per se. Overall, this suggests a more materialist perspective in which reaction to, and tailoring products to fit, market conditions is more to the fore, LME-style. Market forces are the primary consideration, and maximising sales rather than being first on the market with a new product. When they do market new environmentally friendly products they react to different market situations and provide the products that they see as most suitable, rather than attempting to lead the market with new innovations.

Conclusion

Four key areas in which the car industry is taking initiatives aimed at reducing the CO_2 emissions of its passenger cars in use have been identified: incremental technologies; petrol and diesel-electric hybrids; hydrogen FCVs and alternative fuels. It was shown that although all firms are interested in, and have strategies for developing, all these technological approaches to addressing CO_2 emissions and the fuel economy of their passenger cars, the relative emphasis depends on their nationality. Japanese firms are focussed on hybrids, German firms are focussed on diesels. German and US firms are focussed on alternative fuels, but in different ways: for US firms this is a strategy for addressing the fuel consumption of their larger light trucks, for German firms it is an across the board strategy. Alternative fuels are not such a high priority for Japanese firms. While FCVs are a relatively distant prospect for all firms, Japanese firms want to introduce them as soon as possible, whereas German and US firms want to be ready to introduce them when the environment for them is appropriate. There is clearly a stronger emphasis on reacting to market forces and developing products to suit different markets for US firms. Such market motivations are less prevalent for German and Japanese firms whose strategies seem more internally-driven - e.g. on the basis of technological expertise for German firms, and an embrace of radical new technologies by Japanese firms.

These observations have implications in a VOC context for three reasons. First, the technonationalist version of the Japanese CME appears to be manifested in Japanese firms' more radical embrace of hybrid technologies, and radical leading-edge technological advances generally. The focus is then on being first on the market with such technologies. Secondly, LME-style, US firms appear to be more driven by market forces than CME-based Japanese and German firms for whom for whom non-price, internally-driven innovation strategies are more the case. Thirdly, the time frame for the introduction of these technologies is commensurate with the divide between LME US-based firms on the one hand, and CME German and Japanese based firms on the other. The time frames for the latter are not as determined by market forces as they are for the former. The Japanese firms in particular appear to be driven by a desire to be

first on the market with new technologies and new products, regardless of market forces.

However, these are simply observations at this stage, more in the nature of suggested implications of the activities that firms are undertaking. They are not the result of rigorous analysis. This is the task at hand for the next four chapters where firms' product development initiatives are examined in the light of state regulations, market forces, and the rationales offered by firms themselves in their environmental reports and in interviews with key personnel.

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[1] OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD; UNEP and ACEA (2002), *Industry as a Partner for Sustainable Development: Automotive*, http://www.uneptie.org/outreach/wssd/docs/sectors/final/automotive.pdf, accessed 14 May 2003, especially the Summary and Conclusions section and Annex B; Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG; and D. Austin, N. Rosinki., A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004.

[2] Austin et. al., *op. cit.*, especially chapter 2.

[3] Depending on how these are measured. The lower percentage is from Deutsche Bank (2004), *op. cit.*, p.60.

[4] Austin et. al., *op. cit.*, p.20; and K. Bradsher (2002), *High and Mighty – SUVs: The World's Most Dangerous Vehicles and How they Got That Way*, New York: Public Affairs, p.246.

[5] This is especially the case for emissions of nitrogen oxides (NO_x) and particulate matter.

[6] Deutsche Bank (2004), *op. cit.*, p.61.

[7] J. Dowling (2006), 'Ours are Bigger than Yours, says US…but it's all Torque', *Sydney Morning Herald*, 11 January 2006, http://www.drive.com.au, accessed 11 January 2006; and G. Maxton, and J. Wormald (2004), *Time for a Model Change: Re-engineering the Global Automotive Industry*, Cambridge: Cambridge University Press, p.80.

[8] Deutsche Bank (2004), *op. cit.*, p.63.

[9] OECD (2004), *op. cit.*, p.14.

[10] For example, Volkswagen notes that it has been researching and developing electric concept vehicles since the 1970s. See Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG, p.15.

[11] The OECD would seem to concur with this perspective. See OECD (2004), *op. cit.*, pp.12-13.

[12] For example, developments in engine technology may result in engines with greater efficiency that use less fuel and emit less CO_2 and other harmful emissions, but they also deliver greater power and performance.

[13] DaimlerChrysler (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM, p.33.

[14] General Motors Corporation (2004), *2004 Corporate Responsibility Report*, Detroit: General Motors Corporation, p.6-30.

[15] Ford Motor Company (2004), *2003/4 Corporate Citzenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company, p.17.

[16] The word 'hybrid' is not even mentioned in BMW's report. See BMW Group (2003a), *Sustainable Value Report 2003/2004: Innovation. Efficiency. Responsibility.*, Munich: Bayerischen Motoren Werke.

[17] DaimlerChrysler, *op. cit.*

[18] Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation, p.14.

[19] *Ibid.*, p.49.

[20] Although Ford notes that it is discontinuing vehicles that can run on LPG and CNG in the US. See Ford Motor Company (2004), *op. cit.*

[21] Volkswagen AG, *op. cit.*, p.46.

[22] The shift to diesel cars has occurred to the extent that in some EU member states they now account for almost half of all new car registrations. This phenomenon is explored in further detail in the following chapters, and also see, for example, ACEA (2004a), *Why Diesel?*, http://www.acea.be/ACEA/20040212PublicationsWhyDiesel.pdf, accessed 5 July 2004. For European diesel sales see ACEA (no date c), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications: Share of Diesel Cars*, http://www.acea.be/ACEA/DIESEL-PC-90-02.pdf, accessed 9 June 2004.

[23] On the diesel strategies of German and European firms more broadly, and the industry's strategic focus on them, see ACEA (2004a), *op. cit.* On the rationale for the US industry's multi-faceted approach with strategies dictated by market forces and consumer demand, see AAM (no date), *Consumers and Fuel Economy*, http://autoalliance.org/archives/CAFE9.pdf, accessed 23 July 2004. For Japan, there is the inescapable fact, already cited in Chapter 1, that Toyota and Honda were the first on the market with such products, and Toyota has reaped significant market success with sales of its petrol-electric hybrid Prius.

[24] The European Conference of Ministers of Transport concurs. See ECMT (2003), *Monitoring of CO2 Emissions from New Cars*, CEMT/CM(2003)10, provided by the ECMT on request, p.7.

[25] See Ford Motor Company (2004), *op. cit.*, p.64.

Chapter 4: State Regulations in the European Union, US and Japan

Introduction

Changing the behaviour of economic actors to internalise environmental externalities is seen as unlikely without effective regulation. As outlined in Chapter 1, the liberal economic argument is that economic actors responsible for environmental damage will not face the costs of such environmental externalities without effective state regulation that forces them to do so. This is because, traditionally, the degree to which environmental regulations are effective is seen in material terms: when regulations are introduced, their stringency, effective monitoring of the behaviour of those subject to regulation, penalties for non-compliance etc. However, while accepting that regulation is necessary and can alter behaviour, it will be argued in this chapter that an institutional perspective on the way such regulations are developed – how rules are made - is necessary to explain the extent of compliance with them and their effectiveness. The proposition is this: that the institutional basis for developing regulations explains their effect and the level of compliance by economic actors with them more than the material facts of the regulations themselves. Specifically, when the institutional basis of state-firm relations is based more on cooperation and consensus and a longer-term view less dictated by short term gains, as in coordinated market economies (CMEs), the effect of regulations and compliance is greater.

The analysis proceeds by first outlining how the institutional basis of state-firm relationships suggested by the varieties of capitalism (VOC) approach outlined in Chapter 2 is related specifically to environmental regulations in the European Union (EU), United States (US) and Japan. Given the focus on climate change specifically, actual regulations to reduce carbon dioxide (CO_2) emissions from passenger cars in use are then outlined in each of the territories, following which empirical evidence for the effect of these regulations is considered. The regulations are compared with actual CO_2 emissions and equivalent fuel economy for vehicles produced by firms by territory and nationality. The

empirical analysis demonstrates that the toughest and longest-standing regulations do not necessarily produce the lowest CO_2 emissions. For example, point-of-sale fuel taxes do not necessarily raise fuel prices, fuel price rises do not necessarily reduce fuel consumption, and tougher CO_2 emission standards do not necessarily produce better compliance by the car industry nor lower CO_2 emissions. Therefore, while there are differences in the timing and stringency of regulations in the EU, US and Japan, and such material factors matter, it is shown that such material differences are less important than the institutional nature of the relationship between business and government that informs the way in which regulations are developed.

The conclusion reached is therefore that the insights of the VOC approach in general apply specifically to the manner in which CO_2 emission regulations have been developed in each of the three territories. The greater the extent to which environmental regulations have been developed on a co to self-regulatory basis, rather than imposed by regulators, the greater the compliance with them, the greater the effect of them, and thus the more environmental externalities are internalised. Therefore, institutional aspects of the way regulations are developed are more important than the material facts of them. Importantly, it is also shown that this has ramifications beyond the borders of the territories considered, as to a large extent car firms 'export' the institutional features of their home states' regulations in the products they sell – i.e. the products they offer for sale beyond their borders reflect the effectiveness of their home states' regulations. Specifically, US firms trail EU and Japanese firms when it comes to addressing the CO_2 emissions of the passenger cars they sell not just in their home territory, but internationally. The reason for this is that the CME nature of EU and Japanese firms' home states means that regulation is based more on co to self-regulation, and therefore EU and Japanese firms are more likely to be proactive in suggesting and implementing initiatives to further reduce CO_2 emissions than their liberal market economy (LME) based US counterparts.

Institutional Aspects of Regulation: The Varieties of Capitalism Approach and How Environmental Regulations are Developed

Chapter 2 outlined the insights of the VOC approach in respect of state-business relations in LMEs versus CMEs. Briefly, in LMEs a separation of states and markets is preferred, as opposed to closer state-business relations in CMEs. This is reflected in a preference for markets as organisers of economic activity in LMEs, versus greater state coordination of economic activity, and state involvement in markets in CMEs. A greater focus on the material imperatives of markets, and reacting to them, was found to produce a shorter-term perspective for firms in LMEs, whereas a longer-term perspective not dictated as strongly by the short term material imperatives of markets is the case for firms in CMEs. Following this line of thought, firms in LMEs are happier with formal contracts and decisions based on market signals that define shorter-term profit levels, and they will usually prefer deregulation over heavier state guidance and intervention. Firms in CMEs tend more towards consensus decision-making between themselves and between them and states based on long-established networks. In regulatory terms, firms in LMEs will react more efficiently to regulations that alter price signals in the market, whereas firms in CMEs will react more efficiently to regulations based on rules and standards.

Germany and Japan are CMEs, while the US is an LME. Based on the discussion in Chapter 2, it was shown that most countries in Europe fall into either the CME category or somewhere between the two. This last point is important because the focus in this chapter is on EU rather than German regulations. This is because, as Hall and Soskice note, "the regulations of the European Union have become almost as important as national policies".[1] Indeed, for all intents and purposes, EU environmental policies are effectively national policies given their applicability to all EU member states. The Treaty on European Unity of 1991 (the Maastricht Treaty) represented "the most extensive abdication of national sovereignty in modern times",[2] and resulted in a good deal of what were previously national policies being transferred to the European Commission (EC).[3] Therefore, on regulations it is appropriate that those put in place at the regional level of the EU be

considered in place of the German regulations. To focus on the latter would be to deny the pan-European realities of regulatory settings for EU member states.

The following discussion expands on the institutional basis of state-firm relations in the EU, US and Japan by introducing some key observations on what this means in terms of environmental regulations.

The European Union

EU regulations effectively are the Germany regulations for the purpose of analysis, as they are the regulations for all other EU member states. Furthermore, when speaking about the German car industry, we are to a large extent speaking about a European industry (given its dominance of the EU market).[4] Therefore, the author concurs with the following point made by Pauly and Reich on the relationship between Germany and the EU in their comparative analysis of German, US and Japanese industrial bases:

> Although some of our evidence draws on the larger industrial base of the European Union, we view the German base as distinctive enough and regionally dominant enough to be the central analog to the American and Japanese cases. Of Europe's top one hundred firms, twenty seven are German. They account for the largest share of European industrial production and sales, and, across key technology-intensive sectors, German firms hold a much larger - and rising - share of world production than firms based in any other European country.[5]

As such, clearly drawing the boundaries between what is a German versus a European firm, or industry, is a somewhat futile exercise because the boundaries are not clearly defined. Crossing them is somewhat inevitable, certainly in regulatory terms.

The key question arising is can it be said that the EU has a VOC? There are at least three problems in doing this. First, there are methodological problems in doing so as the VOC approach is fundamentally one about states, not regions.[6] Secondly, there are practical reasons, to the extent that within the time period considered here the EU expanded from 15 to 25 member states. Therefore, the EU itself has undergone a compositional change. Thirdly, there are problems even generalising among its key, founding members. As Schmidt so clearly demonstrates using the cases of Germany, France and the UK, it is

hard to say these member states possess a European VOC between them. Instead, she finds that national variations mean they have three distinct varieties of capitalism.[7] What is true in general for EU member states is also shown to be the case in respect of environmental policy and regulations in particular by authors such as Scruggs and Leveque.[8]

It would seem anathema to the VOC approach to ascribe one type of capitalism to an entire region. Even so, there are reasons why the EU overall may be said to be CME-like in setting environmental regulations. First, Leveque argues that the EU has increasingly performed a centralising role for environmental policy-making that includes industry and peak bodies in what may be best thought of as a coordinated regulatory 'game'.[9] Since the Maastricht Accord followed by the Act of Political Union in 1992, environmental protection has been established as an explicit action of the EU with decisions made on the basis of qualified majority voting. This has created "a harmonised environmental policy and regulatory system among the member states"[10] that has increased the impetus for coordination between member states and harmonisation of their rules.

Secondly, the fact of a regional market provides impetus for firms to coordinate their actions through peak bodies in order to influence the outcome of regulatory processes, and indeed to be proactive in so doing. This allows them to avoid the complexities and additional costs that come from the existence of different regulations in individual member states. Firms lobby and influence EU-wide environmental policy-making via inter-firm coalitions, meaning that "the regulator is confronted with a dominant source of information instead of obtaining contrasted data from competing industry interest groups".[11] Industry peak bodies suggest environmental targets and regulations to be adopted in order to provide greater regulatory clarity and certainty, and thus voluntary agreements with industry are being increasingly employed. Directives are the main legal instrument of EU environmental policy, proposed by the EC and approved by the Council of Ministers, and because the EU has increasingly gone down the path of voluntary industry agreements Directives often confirm as legally binding regulations initiatives that were initially proposed by industry. Once in effect Directives are binding on all member states. Therefore, the EU is CME-like in the sense that Directives on environmental regulations are often proposed voluntarily by industry peak bodies, negotiated with the EC and,

subsequent to their acceptance, generalised to the whole of the EU. Firms, who were instrumental in their proposal, have a stake in their implementation in concert with relevant state authorities.[12]

Thirdly, there is a wealth of literature on the EU, often quite critical, that points to the way in which the EU moves in slow, bureaucratic, incremental steps in the development and implementation of policy.[13] This is characterised by an iterative process of rounds of negotiations, compromise, and consensus-building. Understanding the process, let alone the outcome, of these processes is so problematic that to view them as merely the state imposing regulations (LME-style), rather than the result of close business-regulatory relations and a complex negotiation process, would be to completely miss the point.

The US

State-business ties in the US have historically been institutionally weak. The adversarial relationship between state and business highlighted in Chapter 2 means that rather than being based on voluntary commitment and consensus, US environmental regulations have primarily taken the form of command-and-control regulations. Environmental regulations have been imposed by government with stiff penalties for non-compliance.[14] Coupled with this, or because of it, high levels of litigation are employed to challenge environmental measures. In fact, litigation is generally built into environmental regulations to ensure their acceptance by both non-government organisations (NGOs) and firms, and litigation is frequently used both before and after regulations are introduced.[15]

Litigation exists in tandem with a pluralistic multi-tiered federal system of government and bureaucracy that sees many levels of environmental regulation possible and existing simultaneously in a context of "shared authority" that the OECD characterises as follows:

> The complexity of federal-state-tribal-local government relationships, and of procedures regulating pollutant emissions, has meant that the process of implementation of regulatory policies has involved high transaction costs to regulatory agencies at all levels of government and to the regulated industries. [16]

The many layers of lobbying that go on all the time through many and varied highly-organised NGOs and industry groups, the fracturing of the implementation of national rules through the federal system and high litigation levels mean that the legal enforcement capacity of the state is actually quite weak. All this concurs with the idea of firms in LMEs preferring clearly stipulated contracts, competing for supremacy in the market and preferring competition and conflict over relational cooperation.

Japan

Along with Japan being characterised by a strong partnership between government and industry, it is generally true that environmental regulations have not been as tough as in the EU or US.[17] Although stiff penalties may exist for breaking environmental regulations, in reality litigation is very much a last resort because environmental policy is based on a consensus approach between industry and government. Implementation is more a case of moving forward slowly so that consensus is more likely. Negotiated (legally non-binding) agreements between industry and government are common for achieving environmental targets. Often, targets are suggested by the government in the form of vague guidelines initially, industry has time to digest them and incorporate them in business plans, and government-industry consultation is ongoing throughout. The result is that when legally binding targets are set they are widely agreed on and attainable by firms and their rationale is accepted.[18] Given the blurred line between government and business interests in Japan, Scruggs notes that the two cooperate closely on environmental issues to consciously attempt to shift the economy out of high environmental impact modes to ones with lower environmental impacts.[19]

This suggests the more organic nature of state-business relations in Japan postulated in Chapter 2, in the sense that rather than regulations being the result of collectively negotiated agreements, and a drawn out process of negotiated consensus-building a la the EU, Japanese environmental regulations are more the result of a common position reached behind closed doors between industry and government. This is typical of the Japanese

blurred line between government and business interests, as opposed to the drawn-out bureaucratic process of reaching a common position that characterises the EU.

Comparing the EU, US and Japan

Clear points of difference emerge from the preceding discussion that lead commentators such as Schreurs to observe that different levels of support for the Kyoto Protocol between the three territories is directly related to the nature of their capitalisms:

> The differences voiced in the climate change negotiations speak to larger differences that have developed among these countries in terms of the roles they feel that government and markets should play in environmental protection and where responsibility for taking action lies. They further reflect differences in the relationships that have emerged among governments, business, and environmental NGOs in the policy-making process.[20]

The US sees the problem in terms of the LME preoccupation with market efficiency and competition with a minimal role for government. A more arms-length and at times litigious relationship between NGOs, business and government based on pluralism and a lack of consensus has helped to foster such a view. By comparison, a more coordinating/partnership approach is taken in the EU and Japan where firms and regulators are likely to cooperate on setting regulatory strategies. In the EU and Japan it is seen as a more natural state of affairs for the state/regulator to be involved to promote good policy and guide business in the attainment of environmental goals on the basis of consensus and cooperation. This does not mean that industry in the EU and Japan is keen to be regulated and industry in the US is not. While firms in both are keen to avoid regulation, in the EU and Japan they are more likely to work closely with regulators to find regulatory solutions in a spirit of consultative decision-making rather than confrontation.[21]

What are the implications of this? Firms in the EU and Japan are more likely to cooperate with government in setting regulations on a more voluntaristic basis than in the US. They will be more willing to accept command-and-control style regulations, on which they have had considerable input, rather than the idea of competition in the market. They will be more inclined to consensus driven regulation rather than regulations that have been

imposed as a result of a multi-stakeholder fight the outcome of which may have been decided through acrimonious litigation. The result is that they are more likely to feel comfortable with, and committed to, the aims of regulation and comply with its requirements more willingly.

We now turn to actual regulations on CO_2 emissions in each of the three territories before seeing how the empirical evidence bears out the points made by the institutional perspective outlined so far.

CO_2 Emission Regulations in the EU, US and Japan

The close and fixed relationship between fuel economy and CO_2 emissions means there are only three ways to reduce CO_2 emissions for cars powered by the combustion of fossil fuels: reduce car use; improve fuel economy; or switch to alternative fuels/propulsion systems.[22] While the first is less applicable to car manufacturers (because it is hard to imagine they would desire reduced car use) it nevertheless has been the focus of governments, particularly through the market mechanism of point-of-sale fuel taxes. These should make vehicles with higher CO_2 emissions more expensive to run, and indirectly alter firms' behaviour as they will switch to the production of vehicles with lower CO_2 emissions that are cheaper to run and thus regarded more favourably by consumers. The latter two sit very much with car manufacturers and command-and-control regulations put in place by regulators, more simply referred to as standards. Standards that focus on CO_2 emissions and fuel economy are considered here.

Market Mechanisms

Point-of-sale fuel taxes have been imposed in the EU, US and Japan for a considerable period of time. There have been a variety of rationales for them other than reducing CO_2 emissions or improving fuel economy (e.g. funding road construction). They have also been implemented in a rather uncoordinated way with national, regional and local taxes

levied by a variety of authorities.[23] But regardless of their rationale they should indirectly affect manufacturers' strategic decisions due to changed price signals faced by consumers who should initially attempt to reduce their car use and then demand cars with greater fuel efficiency. Table 4.1 presents fuel prices and the total of all taxes as a percentage of fuel prices in the EU, US and Japan in 1980, 1990 and 2000. Table 4.2 summarises the findings.

Clearly, the EU and Japan have substantial fuel taxes. With the exception of diesel in 2000 when Japan had higher taxes, the EU has always had the highest taxes followed by Japan with the US a distant third. In terms of tax increases as a share of price, these were much greater over 1980-1990 than 1990-2000. In fact, increases in the 1990s were modest with the exception of Japan where the tax share of diesel prices increased by 54 percent and that of petrol by 17 percent. The US actually reduced taxes on petrol in the 1990s and the EU had small increases. For the EU and Japan the magnitude of state-imposed taxes clearly encourages consumers to use less fuel or buy cars that are more fuel efficient. In the case of Japan the impetus for doing so has been strengthened through substantial tax rises over the entire 1980-2000 period, but unlike the EU where the tax on diesel is lower than that for petrol, there is now virtually no difference in Japan between taxes on diesel and petrol. While the EU's taxes therefore encourage the greater uptake of diesel over petrol cars to encourage lower fuel consumption, Japanese taxes signal a desire for greater fuel efficiency across the board. Low US taxes, and falls or only modest increases in them in the 1990s encourage higher fuel consumption by comparison.

While the tax share in price gives an indication of government policy, fuel prices actually impact on consumers and their purchasing decisions. And there are obviously more factors that affect price than taxes. Prices in all territories fell over 1980-1990 as world oil prices stabilised after the shocks of the 1970s. This much is unsurprising. What is interesting though are price movements after 1990. Given tax levels in the EU it is unsurprising to find that it has both the highest petrol and diesel prices, but that diesel is cheaper thereby encouraging its use over petrol. The EU's petrol and diesel prices both rose over 1990-2000. The US, with the lowest taxes (falling in the 1990s in the case of petrol) also has the lowest fuel prices,[24] but unlike the EU fuel prices in the US went down and stayed down in the 1990s. For Japan, despite a large rise in petrol taxes and a huge rise

in diesel taxes in the 1990s, petrol and diesel prices actually fell by 13 and 11 percent respectively. In other words, fuel prices came down and went down further to the extent that by 2000 petrol in Japan was cheaper than diesel in the EU, and diesel was cheaper than petrol in the US. Only the EU has clear price signals to encourage the use of less fuel, thereby encouraging the production of more efficient vehicles. While fuel prices in Japan have been on the whole higher than in the US, continuing falls in price have reduced incentives for fuel efficiency, although price incentives exist for favouring diesel over petrol in Japan. In the US there have been and remain no strong price incentives for fuel efficiency.

Apart from summarising the tax and price movements in the three territories, one major overall observation emerges from the above discussion: tax rises do not necessarily lead to concomitant price increases. But even focussing on prices it will be shown below that higher prices do not necessarily reduce fuel consumption and car use. Before turning to the empirical evidence for this, standards in each territory are outlined in the following section.

Table 4.1: Fuel Prices and Taxes in 1980, 1990 and 2000 in Real Terms at 1995 Prices Adjusted for Purchasing Power Parity

Country	Unleaded Petrol						Diesel					
	1980 ($US/litre)	1990 ($US/litre)	2000 ($US/litre)	1980 tax (%price)	1990 tax (%price)	2000 tax (% price)	1980 ($US/litre)	1990 ($US/litre)	2000 ($US/litre)	1980 tax (%price)	1990 tax (%price)	2000 tax (% price)
USA	0.61	0.4	0.41	..	27	23	0.46	0.35	0.36	15	28	30
Japan	1.11	0.75	0.65	37	47	55	0.77	0.44	0.39	24	36	55
EU15 average	1.21	0.91	1.01	49	62	63	0.68	0.58	0.70	25	45	48

Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.23. Prices and taxes are for unleaded petrol except that 1980 prices and taxes for European countries are for leaded petrol, and 1990 prices and taxes for Spain and Sweden included in the average for EU15 are for leaded petrol. Data is not available on US unleaded petrol taxes for 1980.

Table 4.2: Ranking Fuel Prices and Taxes in the EU, US and Japan

	1980 (1=highest 3=lowest)	1990 (1=highest 3=lowest)	2000 (1=highest3=lowest)	Average Rank	Change 1980-1990	Change 1990-2000
TAXES						
USA						
Petrol	..	3	3	3	..	Decrease (15%)
Diesel	3	3	3	3	Big increase (89%)	Small increase (7%)
Japan						
Petrol	2	2	2	2	Increase (28%)	Increase (17%)
Diesel	2	2	1	1.7	Big increase (52%)	Big increase (54%)
EU						
Petrol	1	1	1	1	Increase (25%)	Almost no change (3%)
Diesel	1	1	2	1.3	Big increase (81%)	Small increase (8%)
PRICES						
USA						
Petrol	3	3	3	3	Decrease (-34%)	Almost no change (3%)
Diesel	3	3	2	2.7	Decrease (-24%)	Almost no change (3%)
Japan						
Petrol	2	2	2	2	Decrease (-32%)	Decrease (-13%)
Diesel	1	2	3	2	Decrease (-43%)	Decrease (-11%)
EU						
Petrol	1	1	1	1	Decrease (-25%)	Increase (11%)
Diesel	2	1	1	1.3	Decrease (-15%)	Increase (21%)

Standards

Although market mechanisms may have played an indirect role in changing car industry strategies, regulations in the EU, US and Japan have also been based on standards that target firms directly. These have been introduced at different times and in different ways, but regardless of this they should directly impact on firms' strategies based on their timing and stringency.

Although the EU has had an environment policy since 1973, the Act of Political Union has seen greater harmonisation of environmental regulations in the 1990s generally and in vehicle emission standards specifically.[25] With respect to car CO_2 emissions, the EU car industry's peak body, the Association des Constructeurs Europeens d'Automobiles (ACEA), came forward in the 1990s to make voluntary commitments to reduce new car CO_2 emissions for cars produced in the EU. This commitment was submitted to the EC in July 1998, although it was first foreshadowed in 1995 through a Joint Declaration with the European Conference of Ministers of Transport (ECMT) under which the ACEA agreed to find ways to reduce the fuel consumption of all new cars sold in ECMT countries. This industry-led voluntary commitment was subsequently made a Directive of the EC, and through it more than 15 percent of total CO_2 emission savings being sought under the EU's Kyoto Protocol targets will be met.[26] The targets are shown in Table 4.3.

Table 4.3: EU Industry Commitments on CO_2 Reductions

Category	Date Effective	g/km
Some new cars	2000	120
All new cars	2003	165-170 fleet average
All new cars	2008	140 fleet average
All new cars	2012	120 fleet average

Sources: Official Journal of the European Communities (1999), *Commission Recommendation of 5 February 1999 on the Reduction of CO_2 Emissions from Passenger Cars*, 1999/125/EC, http://europa.eu.int/comm/environment/co2/99125/en.pdf, accessed 19 July 2004.

For the EU, individual car models were to be made available with CO_2 emissions of 120g/km or less by 2000 and the fleet average for all new cars will be 140g/km by 2008 and 120g/km by 2012. An interim 2003 target of 165-170g/km was also set. The target of

140g/km equates to average fuel economy of 5.8l/100km for petrol cars and 5.25l/100km for diesels, representing a 25 percent reduction on 1995 levels. These voluntary commitments are described by the ECMT as "ambitious, both technically and economically".[27]

The US introduced fuel economy standards in the 1970s via its Corporate Average Fuel Economy (CAFE) program. CAFE was launched through the 1975 Energy Policy Conservation Act with standards coming into force in 1978. It applies to all cars manufactured for sale in the US, whether produced domestically or imported, and is a sales weighted average fuel economy of a manufacturer's passenger car fleet in any given model year. Unlike the EU's voluntary industry commitments, CAFE standards have always been state-mandated with long-standing stiff penalties in the form of fines for firms failing to meet the standards for new car fleets.[28] In fact, for most of the 1990s, the US was the only industrialised state with mandatory fuel economy standards.[29] Table 4.4 presents the CAFE standards for passenger cars and light trucks since the program commenced. Light truck standards are included because a separate category exists for them and because light trucks, mostly in the form of four wheel drive sports utility vehicles (SUVs) as passenger vehicles, now account for approximately 50 percent of the new car market in the US. In recognition of this 50:50 split a derived average standard combining the individual standards for passenger cars and light trucks is also presented.[30]

Despite the consistent strengthening of US standards up to the mid-1980s there has been no change in the CAFE standard for passenger cars since 1990, nor for light trucks since 1996. Before this the standard actually regulated for *worsening* fuel economy in the late 1980s for passenger cars before being strengthened again in 1989, so the current fuel economy standard for passenger cars is really the same as it was in 1985. For light trucks, there is a similar story with the standard little changed from 1987 levels. It is also at significantly weaker levels than for normal passenger cars. Given the 50:50 sales split between passenger cars and light trucks, the effective standard is really best thought of as the average for the two categories at around 10 l/100km since the mid 1980s.[31]

Table 4.4: US CAFE Standards

Model Year	Passenger Cars (l/100km)	Combined Average for 2wd and 4wd Light Trucks (l/100km)[a]	Derived Average Standard - Passenger Cars plus Light Trucks (l/100km)
1978	13.07		
1979	12.38	14.28	13.65
1980	11.76	15.75	14.42
1981	10.69	14.88	13.49
1982	9.80	13.44	11.62
1983	9.05	12.38	10.71
1984	8.71	11.76	10.24
1985	8.55	12.06	10.31
1986	9.05	11.76	10.40
1987	9.05	11.47	10.26
1988	9.05	11.47	10.26
1989	8.88	11.47	10.17
1990	8.55	11.76	10.16
1991	8.55	11.64	10.10
1992	8.55	11.64	10.10
1993	8.55	11.53	10.04
1994	8.55	11.47	10.01
1995	8.55	11.42	9.99
1996-2004	8.55	11.36	9.96

Sources: ECMT (2001), *Vehicle Emission Reductions*, Paris: OECD, p.79; and NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calender Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.4.

[a] From 1982 manufacturers could comply with separate standards for two-wheel drive and four-wheel drive light trucks, or a combined standard. After 1991 there has only been the combined standard. Only the combined standard is shown here and before 1982 it is derived as the average of the two-wheel drive and four wheel drive standards.

In Japan, fuel economy targets were introduced in the 1970s under the Energy Conservation Act. They were first set in 1979 for 1985 targets under the Law Concerning the Rational Use of Energy, and most recently revised in 1998 by the Ministry of International Trade and Industry (MITI) and the Ministry of Transport to accommodate Japan's Kyoto Protocol commitments. Petrol passenger cars must achieve average fuel economy improvements of 22.8 percent on 1995 levels by 2010, and diesel passenger cars must achieve increases of 14.9 percent by 2005. Car manufacturers who do not meet these standards are to be penalised, but penalties are less likely to be imposed than in the US because since 1998 targets have been set on the basis of the 'top runner method'. Rather than setting ambitious targets for firms to achieve, this method sets standards based on the most efficient model in a given weight class and then all manufacturers are given time to match it.[32]

Table 4.5: Japanese Fuel Economy Standards for Passenger Cars

Weight (kg)	1985 Petrol Target (l/100km)	1985 Average Petrol Target (l/100km)	2000 Petrol Target (l/100km)	2000 Average Petrol Target (l/100km)	2010 Petrol Target (l/100km)	2010 Average Petrol Target (l/100km)	2005 Diesel Target (l/100km)	2005 Average Diesel Target (l/100km)	2010 Average Target based on 1995 Weight Class Sales (l/100km)
<703	5.56		5.21		4.72				
703-827	5.85		5.49		5.32				
828-1015	6.58		6.13		5.59				
1016-1265	9.01		8.26		6.25		6.17		
1266-1515	9.01		8.26		7.69		7.58		6.62
1516-1765	12.05		10.99		9.52		8.40		
1766-2015	12.05	8.59	10.99	7.9	11.24	7.19	9.26	7.85	
2016-2265	19.23		17.24		12.82		10.20		
>2265	19.23	19.23	17.24	17.24	15.63	14.23	11.49	10.85	

Sources: OECD (2002a), *Environmental Performance Reviews: Japan*, Paris: OECD, p.79, except diesel targets which are from ECMT (2001), *Vehicle Emission Reductions*, Paris: OECD, p.82. The 2010 target is based on 1995 weight class sales is from JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.41.

Table 4.5 presents Japan's passenger car fuel economy targets for 1985, 2000 and 2010. As can be seen, targets are set for nine weight classes and have been progressively tightened since they were first set for 1985. For the sake of comparison with the EU and US average fuel economy standards for cars under and over 2,015kg have been calculated, on the basis that most passenger cars weigh under 2,015kg and light trucks tend to be heavier than this.[33] An average value for the 2010 target calculated on the basis of the fuel economy of cars in their respective weight classes sold in 1995 is also shown. For petrol cars, average fuel economy targets for cars under 2,015kg of 7.9 l/100 km were set for 2000, and 7.19 l/100km for 2010. Cars over 2,015kg have significantly weaker standards, in fact much weaker than for US light trucks. The targets for diesel cars are less stringent than for petrol vehicles but must be met five years earlier. Whatever the mix of heavy and lighter vehicles sold, on the basis of 1995 weight class sales this equates to an overall target of 6.62 l/100km for 2010.

Table 4.6: Summary of Passenger Car CO_2 Emission/Fuel Economy Standards

Territory	Year Proposed (rank)	Year Effective (rank)	Passenger Petrol Car Target, 1990-present (rank)	Passenger Diesel Car Target, 1990-present (rank)
EU	1995 (3)	2000-2012 (3)	5.8 (1)	5.25 (1)
US **Passenger Cars** **Average Passenger Cars Plus Light Trucks**	1975 (1)	1978 (1)	 8.55 10.16-9.96 (3)	 8.55 10.16-9.96 (3)
Japan	1979 (2)	1985 (2)	7.9-7.19[a] or 6.62[b](2)	7.85[a] or 6.62[b](2)

[a] The average for car categories below 2,015kg.
[b] 2010 average target based on 1995 weight class sales.

Table 4.6 summarises when CO_2 emission/fuel economy standards were introduced in each territory and their stringency. Japan had fuel economy regulations for passenger cars well before the EU, and the US was the first of the three with targets set for 1978. It must be conceded that the EU's Act of Political Union is largely responsible for the timing of its standards and that significant steps taken by individual member states prior to the 1990s are omitted here. Even so, for Europe as a whole the timing is accurate in the sense that on a regional basis regulations have been in place for a shorter period of time than the US or Japan. In addition, there is evidence that the voluntary approach to regulation exhibited in the setting of these standards is a phenomenon that has only come to the fore in the 1990s throughout the EU. This is because while it is true that variations between EU member states make it difficult to reach sweeping conclusions about policies and their implications before the 1990s, even for states such as the Netherlands and Germany where two thirds of voluntary environmental agreements originated prior to 1990, the majority of these were concluded after 1990.[34]

The US has clearly had the weakest standards for passenger cars since 1990, and the use of light trucks as passenger cars further reduces its effective fuel economy targets. Japan has significantly tougher standards for passenger cars less than 2,015kg than the US, but it is worth noting that fuel economy targets for vehicles over 2,015kg are far more lax than those in the US for light trucks. The Japanese standard for diesel cars over 2,015kg, while not as lax as that for petrol, is also reasonably close to the US equivalent. However, the average 2010 target on the basis of actual weight class sales is perhaps the most accurate reflection of the effective Japanese target and it is clearly tougher than the US

standard. While the EU is the latest starter it has easily the most stringent standards of the three.

Comparing Regulations with Actual CO_2 Emissions/Fuel Economy

The question of whether tougher regulations result in lower CO_2 emissions may now be considered. Table 4.7 presents average CO_2 emissions and equivalent fuel economy for vehicles produced by firms by territory and nationality based on 2002 sales. What is clearly demonstrated is that in each of the territories, US firms sell the least fuel efficient vehicles that produce the most CO_2. EU and Japanese firms sell more fuel efficient vehicles that produce less CO_2. This correlates with higher fuel prices and tougher standards in the EU and Japan, so what is interesting about this result is that firms appear to be exporting the regulatory requirements of their home territories to others in which their products are sold. Tougher regulations at home result in better environmental performance not just within the borders where regulations apply but also abroad. As a counter argument to this it must be conceded that Japanese and EU firms' products in the US are less fuel efficient than those they sell at home, so local conditions have an effect, but even so their products are still significantly more fuel efficient than the local US product. Similarly, while US cars sold in either Japan or the EU are far more fuel efficient than the ones they sell at home, they remain less fuel efficient than EU or Japanese cars.

The end result is very much an us (EU and Japan) versus them (US) market profile for car firms. However, although stronger regulations in the EU and Japan via higher fuel taxes and prices combined with more stringent standards correlate with the production and sale of more fuel efficient cars that produce fewer CO_2 emissions, *regardless of the territory in which they are sold*, a more detailed examination of each territory sheds more light on this finding that raises questions for drawing simple conclusions on these material factors alone. In fact, as we shall see, such an examination casts doubt on the material facts of regulations significantly changing industry behaviour at all in some cases.

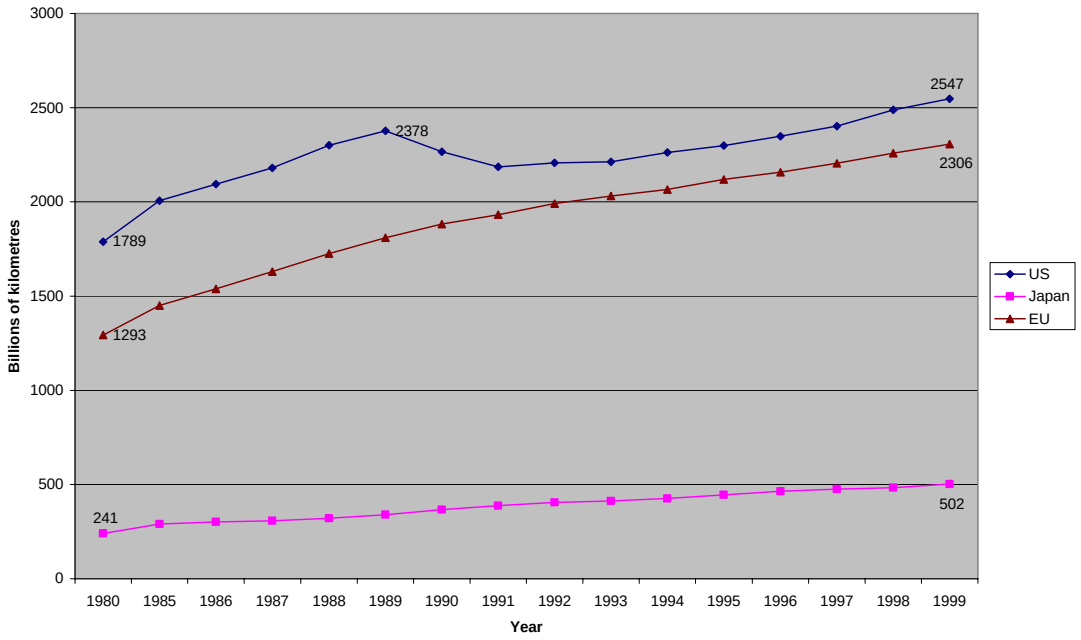
Table 4.7: Average CO_2 Emissions and Fuel Economy by Nationality and Territory based on 2002 Sales

	Territory where Cars are Sold					
Manufacturer Nationality	**US**		**EU**		**Japan**	
	g/km	**l/100km**	**g/km**	**l/100km**	**g/km**	**l/100km**
Average of EU manufacturers	237.67	10.13	177.00	7.55	185.00	7.89
Average of US manufacturers	290.00	12.36	203.67	8.66	195.00	8.31
Average of Japanese manufacturers	233.67	9.96	171.00	7.27	186.33	7.95
Average per territory	253.78	10.82	183.89	7.83	188.78	8.05

Source: D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004, p.31

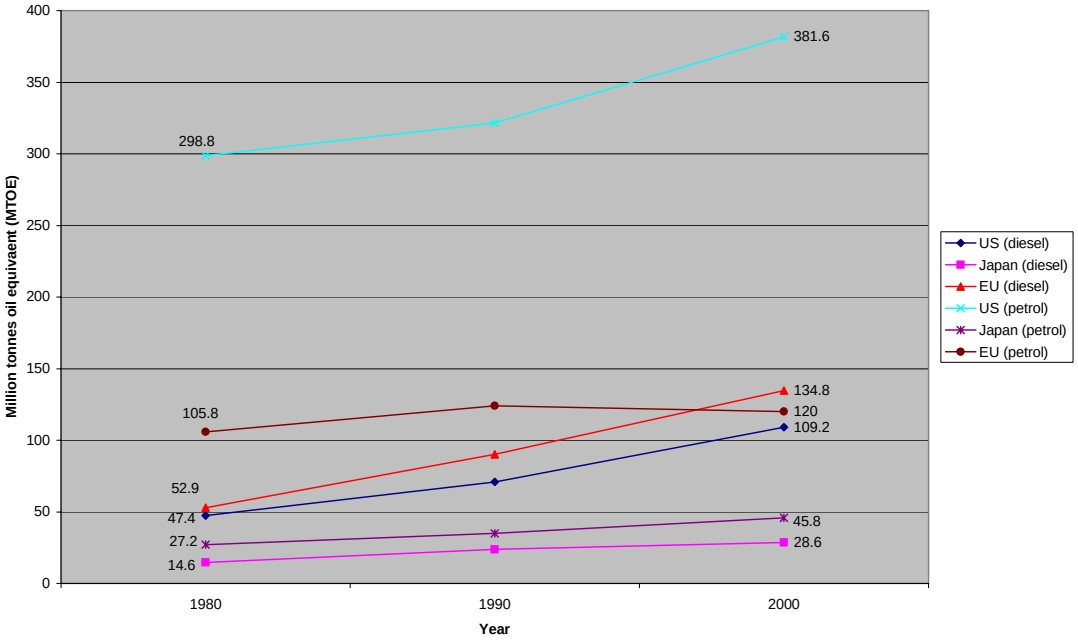
Turning to market mechanisms first, if these are to indirectly affect firms' decisions they must first directly affect consumers' behaviour in a way that leads them to demand cars with better fuel economy. Two observable changes in behaviour should be possible: using less fuel and driving shorter distances. Figure 4.1 shows total distance travelled by passenger vehicles and Figure 4.2 shows total consumption of road fuels. In order to adjust for the number of cars in use average distance travelled per passenger vehicle is shown in Figure 4.3 and average fuel consumption per vehicle is shown in Figure 4.4.[35]

Figure 4.1: Total Distance Travelled by Passenger Vehicles



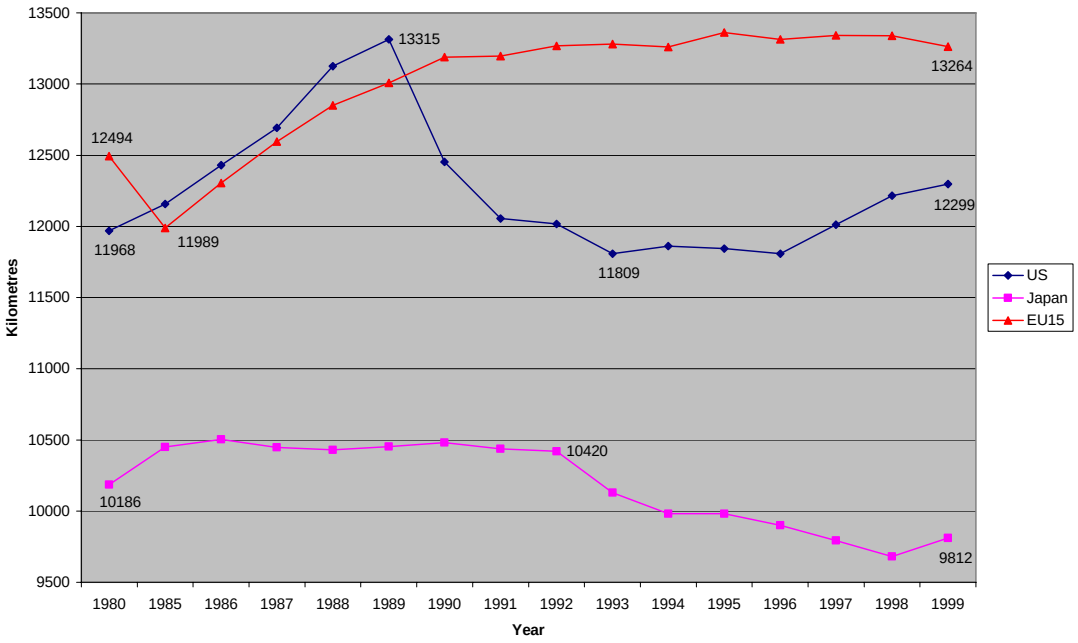
Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.15.

Figure 4.2: Total Consumption of Road Fuels



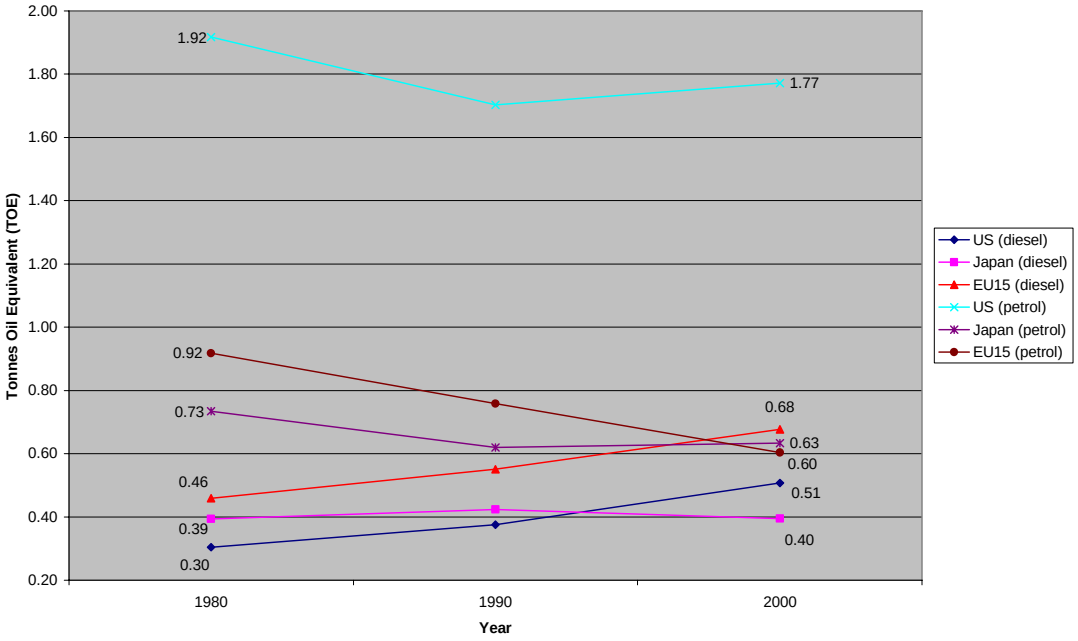
Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.22.

Figure 4.3: Average Distance Travelled per Passenger Vehicle



Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.11 and 15.

Figure 4.4: Average Fuel Consumption per Vehicle



Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.10 and 22. The calculation for 2000 for the EU and US uses 1999 vehicle stock data as OECD tables do not provide data for 2000.

What is striking about Figures 4.1-4.4 is that comparing distance travelled and fuel consumption with movements in taxes and prices[36] reveals *no obvious relationship*. Higher taxes and prices are not necessarily associated with less car usage. The fact that fuel has been taxed in all three territories over the entire period (i.e. this policy is not new) does not seem to matter either.

For distance travelled, unambiguously higher prices and taxes in the EU are associated with increases in total distance travelled over the entire period, rather than decreases as one might expect. The best that can be said is that distance travelled per vehicle plateaued somewhat in the 1990s. For the US, falling prices in the 1980s are associated with increases in total distance travelled and in distance travelled per vehicle. However, after this continued low prices are associated not with increased car usage as one might expect, but instead with a fall in total distance travelled in the early 1990s, and in the case of distance travelled per vehicle a sustained fall from a peak of 13,315km in 1989 to a distance of around 12,000km per annum for most of the 1990s. Even more incongruously,

falls in fuel prices in Japan are not reflected in any more dramatic increases in total distance travelled per annum than are seen in either the EU or US. In fact, the average distance travelled per passenger vehicle actually fell in the 1990s despite fuel continuing to become cheaper.

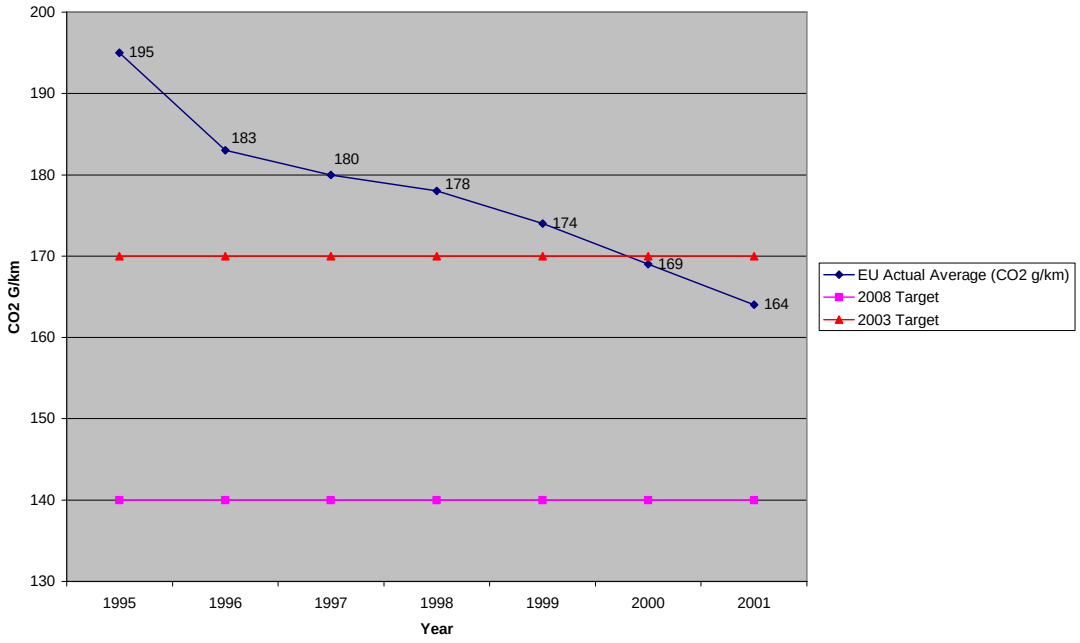
For fuel consumption, the EU's tax policies and the price differential between diesel and petrol have produced a clear increase in diesel use. Dramatic increases in total EU diesel use are mirrored in increases in diesel use on a per vehicle basis, while the opposite is true for petrol. But whatever the relative shifts in EU diesel and petrol consumption, high and increasing taxes and prices have not led to a fall in fuel consumption overall. This has still increased. For the US, petrol and diesel consumption has indeed increased as one would expect from its low taxes and falling fuel prices, but this cannot explain why petrol consumption per vehicle has fallen by around 8 percent. Although falling fuel prices in Japan are also associated with increased fuel usage, petrol consumed per vehicle has fallen by even more than in the US and diesel use per vehicle has remained static despite a similar price differential to the EU.

How can these equivocal and often anti-intuitive observations be explained? The answer is quite simple: fuel taxes and prices alone are not a determining factor in car use. Why should this be so? First, practical reasons associated with implementation mean that market mechanisms are less predictable due to the large number of individuals owning and driving cars which are the source of emissions. They have different preferences and face different situations that may not be easily generalisable. Secondly, while making fuel more expensive may initially make consumers use their cars less or desire more efficient cars, once these cars are made available they can drive further for the same price and the amount of CO_2 produced as a result of these longer trips will counteract the initial effects. Thirdly, the effect of higher prices depends on the price elasticity of demand for fuel. There is evidence that fuel purchase decisions are price inelastic in both the short and long term, and that other factors such as income levels in general are more important – e.g. estimates for the UK suggest that prices would have to rise more than incomes to affect fuel purchasing decisions, and that even if one holds income constant a substantial 10 percent rise in the price of fuel produces only a 3 percent fall in fuel consumption. Fourthly, the availability

of alternative travel modes is a factor. In the US where 90 percent of travel is by motor vehicle it may be argued that higher fuel prices only serve to increase costs faced by people on lower incomes who have little choice but to rely on car travel anyway.[37] In short, market mechanisms are unpredictable in the effects to which they give rise. There is simply too much going on besides them to isolate their effect. What is clear is that only mandating better fuel economy/reduced CO_2 emissions from new cars directly impacts on the problem and on the industry itself.

Turning to standards and starting with the EU, Figure 4.5 shows average actual CO_2 emissions of ACEA new cars from 1995 to 2001. What is shown is an unbroken downwards trend in CO_2 emissions with the 2003 target of 165-170g/km reached in 2000, three years ahead of schedule. On the basis of this performance the ECMT believes it highly likely that the 2008 target of 140g/km will be reached on schedule if not earlier. In fact, in 2001 2.8 million cars with CO_2 emissions of 140g/km or less were sold, representing 23 percent of all sales and an increase of 970 percent on 1995 figures! These impressive efforts were largely achieved by advances in conventional engine performance, particularly through the development and sale of technologically advanced diesel cars (the EU now accounts for 90 percent of global diesel sales).[38]

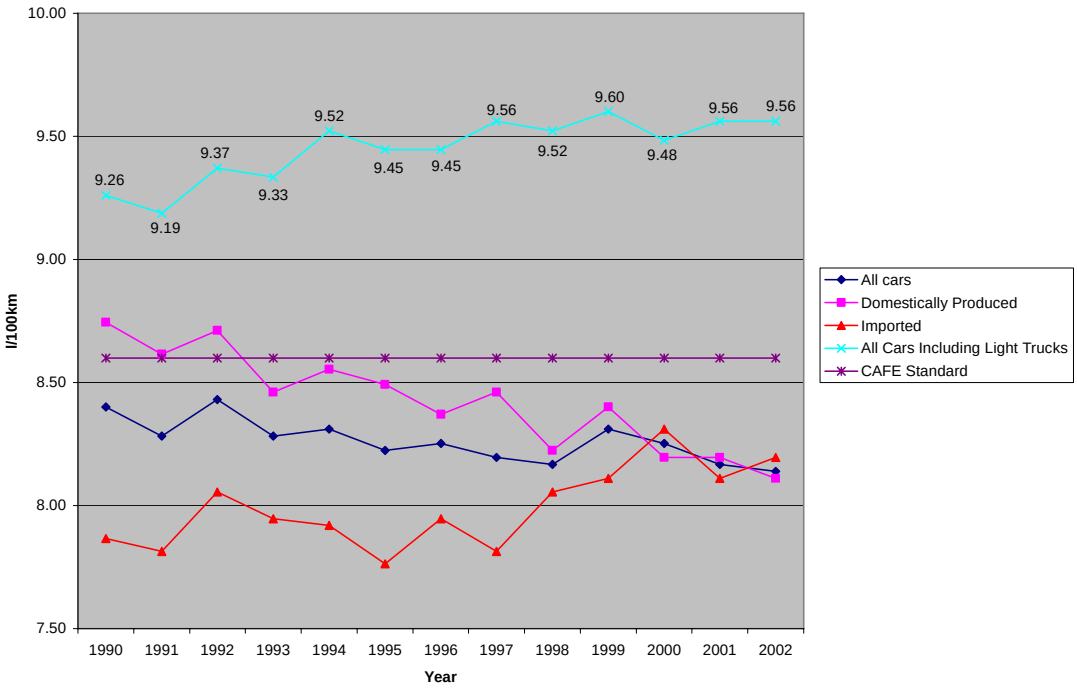
Figure 4.5: Average Actual Emissions of ACEA New Cars Weighted by Registrations



Source: ECMT (2003), *Monitoring of CO_2 Emissions from New Cars*, CEMT/CM(2003)10, provided by the ECMT on request, p.6.

For the US, the increasing popularity of light trucks as passenger cars goes a long way to explaining the worsening fuel economy of all cars shown in Figures 4.6 and 4.7. But even leaving light trucks aside and focussing on passenger cars, Figure 4.6 shows that there is only limited evidence for the standard improving fuel efficiency. Despite the CAFE standard being the same as in 1985, and unchanged at 8.55 l/100km from 1990 onwards, US manufacturers did not manage to meet it until 1993. While they did meet it after this, the downward trend in fuel consumption was not unbroken, with worsening fuel economy in 1992, 1994, 1997 and 1999. Furthermore, until 2000 imported vehicles were consistently more fuel efficient, although even for these fuel economy has been worsening since 1997. The reason for this, as we shall see below, lies with the structure of the CAFE standards themselves, but overall it is clear from this data that state-imposed standards in the US have had a far less dramatic role in bringing about fuel economy improvements for domestically produced vehicles. Not only are the regulations weaker, but US firms do not meet them as well as their European counterparts meet EU standards nor with an unbroken downward trend in fuel consumption.

Figure 4.6: US New Passenger Car Actual Average Fuel Economy as Measured Under CAFE Regulations

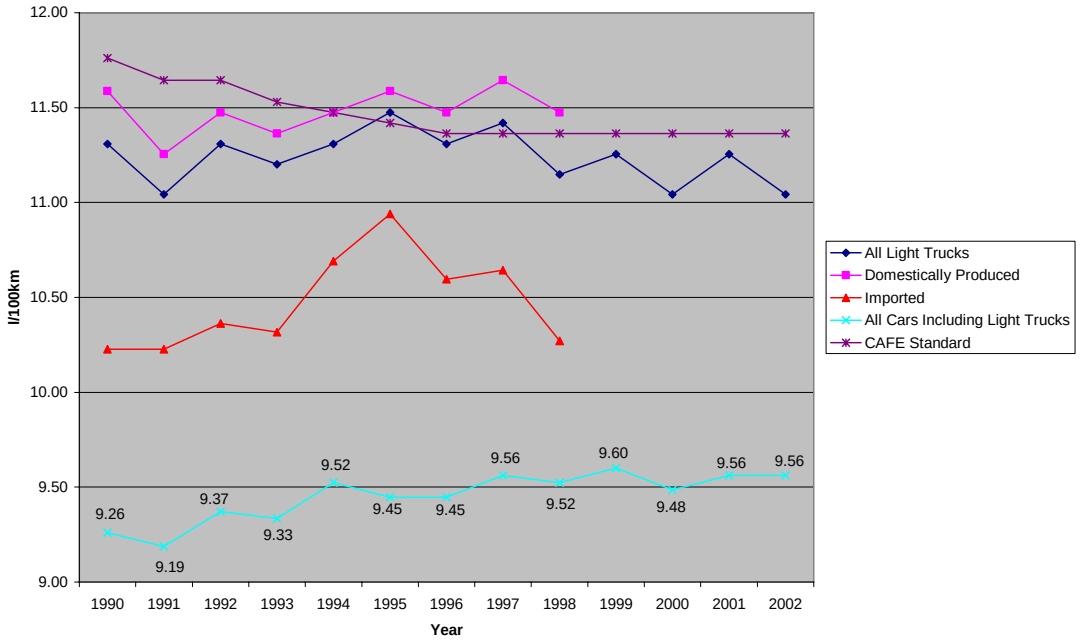


Source: NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calender Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.21.

For light trucks the situation is worse. Although long-standing weaker standards for light trucks may have encouraged US manufacturers to build SUVs as passenger vehicles, Figure 4.7 shows they have increasingly had trouble meeting the standard. In fact, they have been unable to meet it since 1994. Imported light trucks have consistently out-performed them, and their fuel economy has been improving since 1995. Despite the fact that light trucks are most popular in the US, it would appear that a culture of making more fuel efficient vehicles in this class exists to a far greater degree outside the US. Indeed, one might surmise that the only reason why the actual average fuel economy for all light trucks has remained around 11.1 l/100km after 1998 is because of improvements in the fuel economy of imported vehicles. This is hard to prove though because the US National Highway Traffic and Safety Administration (NHTSA), which is responsible for

administering the CAFE standards, decided to cease classifying light trucks based on whether they were domestically produced or imported after 1998.[39]

Figure 4.7: US New Light Truck Actual Average Fuel Economy as Measured Under CAFE Regulations



Source: NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calender Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.21.

While the observation has been made that the US has preferred to impose what, by comparison to the EU and Japan, are weaker and somewhat static fuel economy standards, and that the US industry has not met these standards or had trouble meeting them in the 1990s, it is also true that there are ways for firms to distort fuel economy results. One way is by carrying forward the amount they exceed the CAFE standard in one model year into future model years to offset failures to meet the CAFE standard in the latter.[40] In the case of passenger cars this has put US manufacturers at a disadvantage on their home territory due to keen competition from more fuel efficient Japanese brands which have increased their market share. As Crandall notes:

> Japanese companies have large carry-forward credits, while GM and Ford have deficits to make up from future surpluses. This situation has encouraged the Japanese companies to compete in the US market for large cars, because US manufacturers have to compromise on their large car designs in

> order to meet and even exceed CAFE, while the Japanese do not even have to meet the standard for three years because of their accumulated credits.[41]

Similarly, the NHTSA notes that for passenger cars "the disparity between the average CAFEs of the import and domestic manufacturers has declined in recent years as domestic manufacturers have maintained relatively stable CAFE values and vehicle offerings, while the import manufacturers have introduced new vehicle offerings that feature larger passenger cars and light trucks to the market".[42] The decline in imported passenger cars' fuel economy supports these observations. It means that Japanese firms in particular recognise that in the US it is feasible to sell small import runs of big, heavy, powerful vehicles with poor fuel economy with little concern about overshooting CAFE standards due to the greater efficiency overall of their passenger car fleets in previous years.

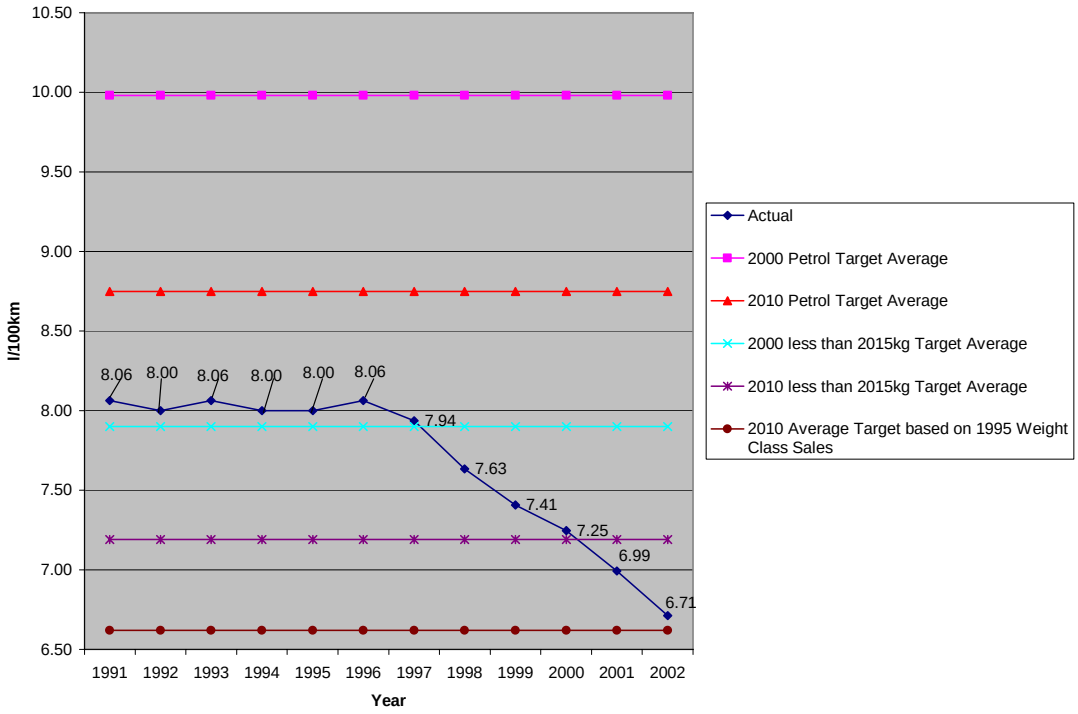
Another way that CAFE fuel economy figures are distorted is through concessions from the sale of alternative fuel vehicles. For example, a dual fuel vehicle that can run on petrol or ethanol has its fuel economy calculated as the average of the fuel economy on each fuel.[43] But the reality is that in 2002 alternative fuel accounted for less than 0.2 percent of all transport fuels used in the US.[44] Dual fuel vehicles almost never run on alternative fuels because even if their owners know this is possible it is very hard to buy and more expensive.[45] At the same time as manufacturers receive concessions for selling such vehicles, they may still sell gas guzzlers as long as these sales are offset by enough vehicles of higher efficiency to meet the *average* fuel economy for fleets under CAFE. The situation is even worse because the most fuel inefficient vehicles such as Ford's Excursion or General Motors' Hummer which weigh over 3,855kg are not counted because they are so big and heavy that they do not fit the definition of *any* vehicle under CAFE regulations.[46]

It does indeed seem likely that CAFE standards have been largely responsible for fuel economy improvements in the US, such as they are, because despite the stability of the standards over the last decade the industry is still having trouble meeting them. One wonders what US firms' fuel economy would be like without them, because even with them the US Environment Protection Agency (EPA) finds that in reality the fuel economy of cars and light trucks in 2002 was at its worst for two decades, at 9.64 l/100km and 13.60

l/100km respectively. The EPA finds that the best year for fuel economy for all passenger vehicles was actually 1988.[47]

Japan presents a dramatic case of easily exceeding standards. Figure 4.8 shows that the average fuel economy Japanese firms have achieved is almost as good as that of EU firms in 2001 and identical by 2002. This is despite Japanese targets being weaker and fuel prices lower than in the EU. Fuel economy improvements have also not been met via a shift to diesel cars as in the EU, because nearly 100 percent of Japanese cars sold are petrol-powered.[48] On any comparison Japanese firms not just met targets early, they have always been well ahead of them. If one compares average fuel economy with the derived under 2,015kg average targets, they met the 2000 target three years ahead of schedule and the 2010 target 10 years ahead of schedule. Therefore, the 2010 target had already virtually been reached in 2000, the target date that preceded it. If one compares average fuel economy with the 2010 average target based on 1995 weight class sales, the target was almost met in 2002 eight years ahead of schedule. The industry appears to continuously improve the fuel economy of its cars even in the absence of increasingly strict government regulation. In a sense, it has barely been regulated by standards because fuel economy is generally better than the standard.

Figure 4.8: Average Actual Fuel Economy for Japanese Petrol Cars



Sources: JAMA (2003), *The Motor Industry of Japan*, Tokyo: JAMA, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, accessed 18 January 2004; and JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.43.

The evidence presented in this section suggests that more stringent regulations explain differences in the industry's CO_2 emissions/fuel economy performance to some extent. EU and Japanese firms, which face stronger market mechanisms in the form of higher fuel taxes and prices plus stronger standards, perform better than US firms. Furthermore, they do so in each of the three territories, suggesting that regulations have ramifications beyond the borders within which they apply. Thus, the empirical evidence supports a view that the regulatory environment of firms' home countries is at least as important as local market conditions. Even if less fuel efficient cars are sold in the US and more fuel efficient cars are sold in the EU and Japan, the relative efficiencies of EU vs US vs Japanese brands tends to remain the same. Thus, firms' adherence to their home territories' regulations are to a large extent 'exported' to others in which their products are sold, further supporting the point made in the introduction that car firms are strongly affected by their home countries' environments.

However, the evidence on the effect of market mechanisms is inconclusive. These do not appear to be a determining factor in car use. They therefore cannot be said to be a determining factor in changing firm strategies. Furthermore the Japanese industry, with weaker standards than the industry in the EU and falling fuel prices, has performed as well if not better. In fact, the Japanese industry is up to a decade ahead of the standards it faces, as opposed to the industry in the EU which is meeting its standards more modestly ahead of schedule. Based on the evidence presented here, the length of time regulations have been in place seems largely irrelevant, strikingly so in the case of the US where firms are having increasing trouble meeting the longest-standing standards of the three.

The institutional implications of these observations are discussed further in the following section.

Institutional Explanations for the Empirical Evidence

The US has primarily employed a command-and-control approach via CAFE standards rather than market mechanisms. The results are less effective by comparison to the EU and Japan. Tougher standards have proved politically intractable because "the US Congress has repeatedly rejected bills proposing higher fuel economy standards and has shown no willingness to take action on climate change".[49] This is to be expected because, as an LME, market forces and competition are the main drivers in the US and so this should favour regulation based on market mechanisms. And, LME-style, regulators have caved in to industry lobbying and relaxed the standard at times.[50] However, we have seen that market mechanisms in the form of fuel taxes are generally less successful as a means of reducing car CO_2 emissions due to a range of factors that make them a blunter instrument. This puts the US at a real disadvantage because, being an LME and more favourably disposed to market mechanisms, in this case even if they could be used more their effect would be less predictable and efficient than standards.

The result is that there has been far less internalisation of environmental externalities through regulation in the US than in the EU or Japan. Rather than being

involved in a more structural way in the setting of regulations, the car industry in the US has instead played more of a lobbying-type role and, in the face of regulations it has not liked, resorted to bitter challenge through litigation. US government signals have not been consistent either as in addition to not toughening CAFE standards for over a decade, Ford and General Motors successfully lobbied for a relaxation of the standards in the 1980s. The industry does not comply easily with CAFE standards, exceeds them in many instances and has used the loopholes available to avoid complying with the spirit of them in favour of the letter.[51]

A large part of the problem may lie with the original rationale for CAFE standards. Although in place since 1978, their aim was not originally environmental. Instead, their aim was the protection of the US economy against vulnerability to rising fuel prices after the OPEC oil shocks of the 1970s. Unlike EU and Japanese standards, no norm of environmental protection, let alone CO_2 emission reductions, was intended by them, and as the US has failed to ratify the Kyoto Protocol one cannot even say that such standards are now a mechanism for meeting targets under it, as is the case for EU and Japanese standards.[52] As the price of oil has never accelerated to the same degree as occurred in the 1970s and early 1980s (although this may yet occur) the US industry now views these standards as an unfair burden. It contends, LME-style, that consumer demand should be the key determinant of fuel economy rather than such regulations.[53]

Although primarily comprised of CMEs, the EU has relied on market mechanisms via fuel taxes more heavily than either Japan or the US. And the EU has used the price differential between diesel and petrol to encourage the use of diesel cars as a way of reducing CO_2 emissions due to their greater efficiency. This is certainly working. Even so, the lack of correlation between high fuel prices and car usage, plus the steady level of taxes in the EU as a proportion of fuel prices in the 1990s, cannot explain why firms committed to 25 percent reductions in CO_2 emissions on 1995 levels. These were proposed by the industry itself, not imposed by the EC. Instead, in keeping with the CME nature of EU institutions for environmental regulation, a better explanation is that EU states and firms prefer a cooperative approach to car CO_2 emission standards, based on voluntary agreements between industry and regulators. Indeed, this is increasingly the case in other

aspects of environmental regulation for which there are now over 300 voluntary agreements.[54]

Voluntary agreements are not uncontroversial due to the lack of coercion via the threat of sanctions.[55] While this concern is valid, it is still the case that the conditions underpinning the EU industry's commitments are very much those one would expect of a CME, namely a strong industry association that represents a large share of the market, higher levels of trust between government and industry and a concern that regulations not impact adversely on economic competitiveness.[56] The industry has coordinated its actions to head-off competitive bargaining by presenting a united front to cooperate with public regulatory bodies in a manner that has not occurred in the US. In addition, commitment to the imperative of reducing CO_2 emissions is stronger because only the EU specifically targets CO_2 reductions in g/km rather than focussing on fuel economy. In other words, while fuel economy and CO_2 emissions are linked and regulations for either largely serve the same purpose, the focus for the EU is *specifically* on climate change.

It has been shown that Japanese firms are acting well in advance of imposed standards, and that these to a large degree follow rather than lead changes in firm behaviour. Fuel taxes provide less of an imperative than in the EU, but in any case falling fuel prices are associated with highly fuel efficient cars. Therefore, it is in the institutional framework for standard setting that answers are to be found. In this regard, the top runner method of setting fuel efficiency/ CO_2 emission standards effectively enshrines competition on the basis of fuel efficiency in the Japanese industry. This is because the top runner method sets standards based on manufacturers who are producers of the most efficient cars. Less efficient firms must catch up with them so those who are in the lead effectively set the regulatory pace. Therefore, rather than setting an ambitious target to achieve the Japanese system is based more on a minimum floor as the standard is based on what is already attainable by the most efficient producers. In so doing, competitive pressures have been built into the industry that see firms producing vehicles with ever higher fuel efficiency well in advance and excess of government standards. The industry has internalised fuel efficiency as a norm because of the institutional structure of government-business relations and the reflection of this in the manner in which standards are set.

The observation that the institutional framework of Japanese standard setting means that firms are asked to do no more than meet what is already industry best practice is consistent with the general observation of the CME-nature of Japanese regulation: the government rarely imposes unattainable targets and rarely resorts to coercion. In turn, business rarely resorts to litigation or other forms of direct confrontation to avoid regulations. Instead, the approach taken is one characterised by the state suggesting the strategic direction to which industry responds as a challenge. The following observation by Arima is worth noting:

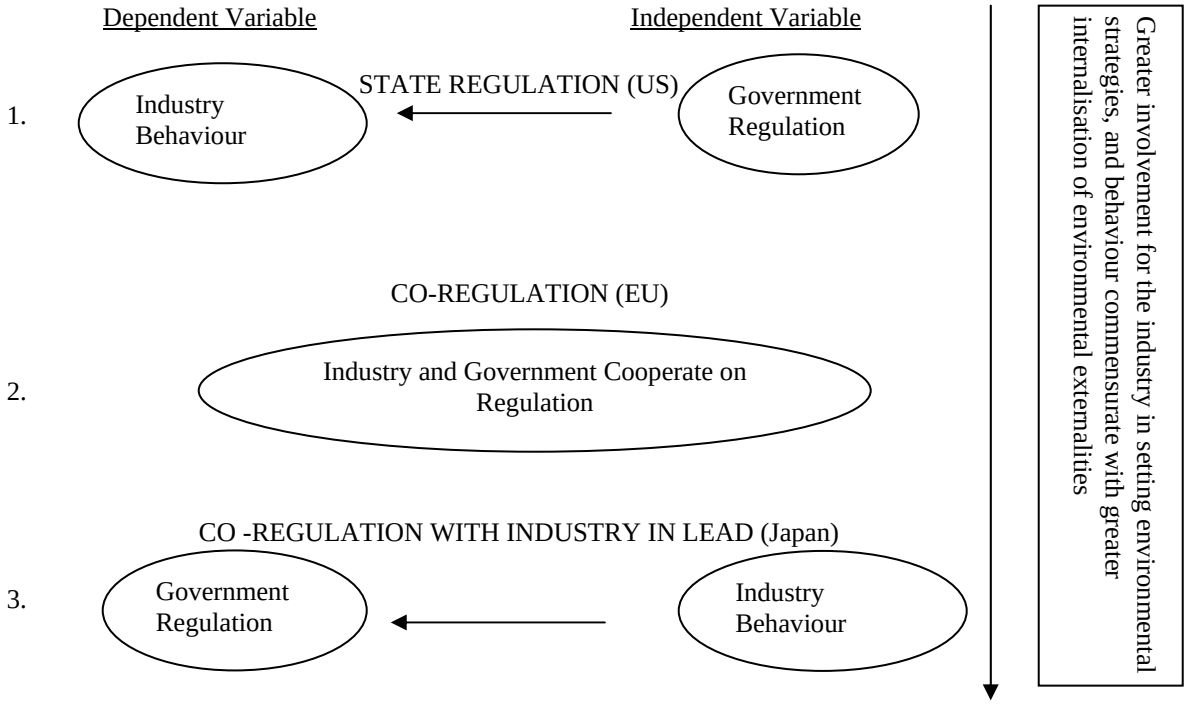
> If a certain manufacturer or importer cannot comply with the target by the target year, the MITI Minister will issue (sic) recommendation to it, and if it fails to abide by the recommendation, its name will be made public or (sic) administrative order will be issued. This provides a very strong incentive for manufacturers and importers to comply with the Top Runner targets.[57]

In other words, rather than stressing legal or financial penalties for non-compliance, the Japanese system focuses on damage to reputation and relationships. As one would expect of a CME, these are highly important and damage to them is a major concern of the industry.

The Institutional Basis for Internalising Environmental Externalities

If one was to summarise the effect of state-business relations in causal terms, it would thus look something like Figure 4.9. Three levels are proposed: self-regulation (US), co-regulation (EU) and co-regulation where firms have to some extent taken the lead (Japan).[58] These speak to the relationship between government and industry in terms of dependent and independent variables, in the sense of where environmental improvements are likely to be initiated. The implications are that firms in the EU and Japan are more likely to not just comply with regulations, but go beyond compliance to internalise environmental externalities to a greater degree than their counterparts in the US.

Figure 4.9: Regulation in Terms of Dependent and Independent Variables



The EU and Japan both take an approach based on co-regulation. The industry proposes solutions that are then backed with regulatory standards. In the EU a strong coalition of car manufacturers represented by the ACEA made commitments that were subsequently adopted as a Directive. These commitments were made in advance of any mandated by the EC. Although the negotiations on the commitment were tough and have been subject to criticism, the end result is a cooperative agreement on standards described by the ACEA as reflecting a "partnership based on mutual trust".[59] In other words, there is a shared norm between the industry and the EC for reducing CO_2 emissions based on consensus and cooperation. What exists is not so much a case of self-regulation by the industry, but co-regulation between its peak body and the EC: "a hybrid form between self and public regulation for, like self-regulation, the set of measures to achieve the environmental target is set by the industry whereas, like public regulation, the environmental objectives continue to be set by public authorities".[60] The result is that firms' collective action is more likely plus the chance of free riding is reduced because of regulatory involvement by authorities as well as the industry itself.[61] The ACEA and the

EC are working together in a relationship that is structural, rather than just a matter of good communications or lobbying by industry to government.

Japan tends to articulate targets or put policies 'out there': to signal to industry what is expected on the basis of current best practice with the industry responding before strong targets are set. In the case of CO_2 emissions, this amounts to fuel economy targets with long lead times.[62] This regulatory culture, enhanced by the top runner method of setting standards, has entrenched a norm of continuous improvement in fuel economy as part of doing business. In this vein, the point was made earlier that sustained fuel economy improvements commenced the year before the introduction of the top runner method of setting standards in 1998. This suggests that the *foreshadowing* of the introduction of the 2010 target on this basis, as well as its *actual* introduction, impacted on industry strategies. JAMA loudly proclaims the Japanese industry's successes and leadership in producing the cleanest and most efficient vehicles in the world. The organisation says that the Japanese car industry sees its challenge as producing the world's cleanest vehicles.[63] On CO_2 emissions specifically, JAMA says that "Japan's automobile manufacturers consider increased fuel economy a top-priority issue and are therefore committed to, and actively engaged in, research and development aimed at the achievement of this goal".[64] JAMA proudly reports that regardless of fuel economy targets set by government, "greater cuts in CO_2 emissions are on the way for the transport sector overall and the automobile industry is responding by voluntarily making a number of bold moves".[65] Clearly, there is an attitude present that the environmentally-friendly nature of the industry's product with respect to CO_2 emissions is a competitive strength to be loudly proclaimed, not a millstone around its neck. As such, Japanese firms seek to meet standards ahead of the target year as a way of improving their corporate image.[66]

For the US, there is no discernable norm of increasing fuel economy/reducing CO_2 emissions. Government neither taxes fuel sufficiently nor is proactive enough in demanding effective fuel economy improvements. The industry does not recommend improvements in its product's efficiency, but instead the relationship between state and industry is adversarial and the industry continues to oppose CAFE regulations. The industry's peak body, the Alliance of Automobile Manufacturers (AAM), is not supportive

in its position statements on CAFE and sees market forces as a more natural determinant of what cars should be offered. It asserts that US consumers demand less efficient cars, so the industry cannot be held responsible for worsening fuel economy:

> The only way to control carbon dioxide emissions is to reduce fuel combustion, which requires making the vehicle smaller, lighted and less powerful….We make more than 30 different models that get 30 miles per gallon or better. Very few consumers buy them.[67]

Rather than seeing fuel economy as its responsibility, the industry believes the US government should provide subsidies to consumers for the purchase of "advanced technology vehicles".[68] What is left in the absence of cooperation is instead a battle between regulators and the industry. If the industry seeks to do anything other than what is required by government, it is a matter of avoiding or weakening what already amount to comparatively weaker regulations. For the US the result is that CO_2 emission reductions are not taken as seriously or proactively in business strategies as in the EU or Japan.

At the end of the day, EU and Japanese firms are now in the position of having more environmentally-friendly products and facing lower adjustment costs in meeting any future regulations than US firms. The car industry's behaviour is becoming the independent variable that affects the dependent variable of government policy in the EU and Japan so that the need for strong government leadership on regulations is less necessary than in the US. Regulators in the EU and Japan are now following the industry in legislating for emission reductions rather than the other way around. This suggests greater internalisation of environmental externalities by the industry, and therefore a normative change in attitude about how business is to be conducted rather than just a change in behaviour in reaction to regulations.

Conclusion

It is easy to assume that the strictest and most enduring regulations must explain firm behaviour when considering environmental problems. Therefore, one is always tempted to ask who has the toughest standards, the highest prices, the strongest enforcement measures, and the toughest penalties for non-compliance. However, the evidence presented in this

chapter has demonstrated that only asking such material questions cannot answer questions such as the degree to which industry complies with regulations, its support for them, and whether it is leading or following such regulations. These are questions that ultimately relate to attitudes and interests, rather than just behaviour, because they do not only ask whether firms comply with regulations, but go beyond this to seek answers to qualitative questions of how well they comply, whether they are likely to continue doing so, and whether they are likely to lead change in future or only respond to what is demanded of them.

The evidence presented has shown that the institutional nature of state-firm relations is the determining factor for the car industry's CO_2 emission reductions, rather than the material factors of the longest-standing or most stringent regulations. It has been shown that although the timing of regulatory standards is less important than their stringency, even the latter is not necessarily a determining factor for firm behaviour (e.g. Japan's weaker regulations produce at least as strong results as the EU's). The argument that market mechanisms in the form of point-of-sale fuel taxes and higher fuel prices change consumer, and ultimately firm, behaviour has also been shown to be false. The different institutional factors underpinning regulation in the EU, US and Japan better explain the car industry's approach to, and thence outcome of, regulations.

Even in an age of globalisation, different institutional arrangements have ramifications beyond the borders of states. While investment and production are increasingly international and trade freer, the importance of the regulatory environment in car firm's home states has been shown to override any notions of the 'stateless' corporation. Institutional features in firms' home territories remain important in explaining industry performance. To a large extent car firms 'export' the institutional features of their home states' regulations in the products they sell. In all the territories in which they operate Japanese and European firms are more likely to sell cars that are more fuel efficient and produce less CO_2 emissions than US firms. The institutional features of firms' home territories in terms of whether they have attributes more closely associated with LMEs (the US) or CMEs (the EU and Japan), which result in a less or greater co-regulatory approach to setting regulations, mean that US firms are behind EU and Japanese firms when it comes

to addressing CO_2 emissions not just in their home territory but internationally. Institutional differences mean that EU and Japanese firms are more likely to be proactive in suggesting and implementing initiatives to further reduce CO_2 emissions because the CME-nature of their home territories means that regulation is based more on co-regulation.

The implications of these results may go beyond environmental concerns alone. It may also be true that US firms are at a disadvantage in a competitive sense if consumer demand is increasingly informed by environmental performance, or if one accepts the view that there is a positive relationship between environmental protection and economic prosperity.[69] Neither regulations nor the LME institutional framework in which they have been developed in the US have helped to change its industry's behaviour, nor created an environment in which more efficient vehicles are regarded more favourably.

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[1] P. Hall and D. Soskice (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, p.52.

[2] O. Fioretos (2001), 'The Domestic Sources of Multilateral Preferences: Varieties of Capitalism in the European Community', in P. Hall and D. Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, p.213.

[3] In terms of industrial policy, see also P. Hall (1999), 'The Political Economy of Europe in an Era of Interdependence', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press. In terms of environmental policy, see F. Leveque (1996), *Environmental Policy in Europe*, Cheltenham: Edward Elgar.

[4] See Chapter 1, especially Table 1.3 which demonstrates that the German car industry has a 46 percent share of the European Union (EU) market, of which the European industry has a 63 percent market share. Not only does this mean that nearly half of all cars registered in the EU are German cars, German brands outsell other European brands by a ratio in excess of 2:1.

[5] L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation', *International Organization*, Vol.51, No.1, p.6.

[6] The problem is one of conceptual stretching, as well as different levels of analysis. See D. Collier and J. Mahon (1993), 'Conceptual Stretching Revisited: Adapting Categories in Comparative Analysis', *American Political Science Review*, Vol.87, No.4, pp.845-855; and G. Sartori (1970), 'Concept Misformation in Comparative Politics', *American Political Science Review*, Vol.6, No.4, pp.1033-1053.

[7] V. Schmidt (2002), *The Futures of European Capitalism*, Oxford: Oxford University Press. She argues that while there have been pressures from 'Europeanisation' as well as globalisation, there are actually three varieties of capitalism present in Europe. She uses the distinctive attributes present in the cases of Germany, France and the United Kingdom to illustrate her point.

[8] L. Scruggs (2003), *Sustaining Abundance: Environmental Performance in Industrial Democracies*, Cambridge: Cambridge University Press. For example, on pp.222-223 he notes that state-business relations are characterised by a corporatist/cooperative approach on managing the environment. Ministries tend to tell firms to communicate with them via their peak bodies, and standards tend to be set that industry has agreed on. In respect of environmental issues specifically, there is a strong role for industry and industry associations in

making and then implementing environmental policies. However, French policy making has tended to be more centralised in the hands of small powerful groups of bureaucrats. The distance between the state and industry that results means that while regulations developed may be strict and well-specified, they are often not well-enforced. This is not to say that industry is not consulted, nor that there are not close relationships between the industry ministry and firms, but rather that the policy making and implementation processes have tended to be somewhat more arms-length. See also Leveque, *op. cit.*, p.23.

[9] Leveque, *op. cit.*

[10] U. Desai (2002a), 'Institutions and Environmental Policy in Developed Countries', in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press, p.17. See also N. Haigh (1996), 'Climate Change Policies and Politics in the European Community', in T. O'Riordan and J. Jager eds., *Politics of Climate Chang: A European Perspective*, London and New York: Routledge; R. Macroy and M. Hession (1996), 'The European Community and Climate Change: the Role of Law and Legal Competence', in T. O'Riordan and J. Jager eds., *Politics of Climate Change: A European Perspective*, London and New York: Routledge.

[11] Leveque, *op. cit.*, p.22. See also P. Schnitter (1997), 'The Emerging Europolity and its Impact Upon National Systems of Production', in J. Hollingsworth and R. Boyer eds., *Contemporary Capitalism: The Embeddedness of Institutions*, Cambridge: Cambridge University Press.

[12] Leveque, *op. cit.*, pp.3-5, p.9 and pp.48-49. See also Haigh, *op. cit.*; and Macroy and Hession, *op. cit.*

[13] One of the most entertaining is M. Toner, C. White and L. Rotherham (1999), *The Bluffer's Guide to the EU*, London: Oval Books.

[14] M. Kraft (2002), 'Environmental Policy and Politics in the United States: Toward Environmental Sustainability?' in Uday Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press.

[15] Litigation is seen as a feature of US society generally in OECD (1996), *Environmental Performance Reviews: United States*, Paris: OECD, chapter 1.

[16] *Ibid.*, with quotations on p.35 and p.122. See also Kraft, *op. cit.*

[17] J. Braithwaite and P. Drahos (2000), *Global Business Regulation*, Cambridge: Cambridge University Press, p.271.

[18] M. Schreurs (2002), *Environmental Politics in Japan, Germany and the United States*, Cambridge: Cambridge University Press, p.12 and p.72; and OECD (2002a), *Environmental Performance Reviews: Japan*, Paris: OECD.

[19] Scruggs, *op. cit.*, especially p.224

[20] *Ibid.*, p.10.

[21] Schreurs, *op. cit.*, p.11. See also U. Desai (2002a), *op. cit.*, pp.11-14; and U. Desai (2002b), 'Institutional Profiles and Policy Performance: Summary and Conclusion', in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press, p.357.

[22] W. Harrington and V. McConnell (2003), *Motor Vehicles and the Environment*, Washington: Resources for the Future, http://www.rff.org/Documents/RFF-RPT-carsenviron.pdf, accessed 2 January 2004, p.52.

[23] The bewildering array of taxes for the EU, US and Japan are available on the taxation page of the OECD's website at OECD (no date), *Taxation*, http://www.oecd.org/statisticsdata/0,2643,en_2649_37427_1_119656_1_1_37427,00.html, accessed 24 March 2004.

[24] It has the lowest fuel prices in the OECD according to OECD (2002d), 'Air', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/8/62/2958142.pdf, accessed 12 January 2004, p.23.

[25] ADB (no date), *Vehicle Emissions Reduction: European Union*, http://www.adb.org/vehicle-emissions/General/Standards-eu.asp, accessed 7 January 2004; and Leveque, *op. cit.*, pp.9-19. For example, since June 1991 all emissions standards have been harmonised through the Consolidated Emissions Directive which is binding on all EU member states.

[26] ACEA (2002), *ACEA's CO_2 Commitment*, http://www.acea.be/ACEA/brochure_co2.pdf, accessed 11 June 2003, p.5 and p.21; ECMT (2003), *Monitoring of CO_2 Emissions from New Cars*, CEMT/CM(2003)10, provided by the ECMT on request; and ECMT (2001), *Vehicle Emission Reductions*, Paris: OECD, p.35.

[27] ECMT (2001), *op. cit.*, pp.2-3; and Europa (no date), *Objectives of the Agreement Concluded with the Automobile Industry*, http://europa.eu.int/comm/environment/co2/co2_agreements.htm, accessed 6 January 2004.

[28] Since 1983, car firms have paid more than US$500 million in penalties. See NHTSA (no date), *CAFE Overview: Frequently Asked Questions*, http://www.nhtsa.dot.gov/cars/rules/CAFE/overview.htm, accessed 15 January 2004.

[29] IEA (1991), *Fuel Efficiency of Passenger Cars*, Paris: OECD, chapter 3.

[30] Light trucks as passenger vehicles have been growing in dominance since the late 1970s when they only accounted for around 10 percent of total sales. They accounted for 48.9 percent of new car sales by 2002. See NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calendar Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.21; and DOT (2003), *Summary of Fuel Economy Performance*, http://www.nhtsa.dot.gov/cars/rules/CAFE/docs/242873_web.pdf, accessed 15 January 2004.

[31] It should be pointed out that at a sub-national level the state of California has always had much stricter regulations for non-CO_2 emissions that have foreshadowed national regulations. In 2002, California passed a law requiring "maximum feasible reductions" in greenhouse gas emissions from cars and light trucks. However, given that no specific standards are mandated under this law and that manufacturers are not required to take any action to reduce emissions until 2009, plus the fact that it is currently subject to litigation via a court challenge, this may effectively be ruled out in terms of the comparison being undertaken here. See D. Austin, N. Rosinki, A. Sauer, and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004, p.6; and OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD, pp.110-112.

[32] OECD (2002a), *op. cit.*, pp.79-80; JAMA (2003), *2003: The Motor Industry of Japan*, Tokyo: Japan, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, accessed 18 January 2004, p.24; ECMT (2001), *op. cit.*, p.37 and p.81; B. Stempeck (2003), 'DOT Proposes Revamp of Fuel Economy Regulations', *Greenwire*, 23 December, http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/docs/51AE2D33EC82E2AD85256E0500839744?opendocument&CurrentCategory=Other%20Transportation%20and%20Air%20Quality%20Technical%20Assistance, accessed 28 January 2004; J. Arima (2000), 'Top Runner Program', *Workshop on Best Practices in Policy and Measures*, Copenhagen, 11-13 April, http://unfccc.int/sessions/workshop/000411/jpnja.pdf, accessed 28 April 2004.

[33] The OECD says SUVs now weigh around 2,000kg. See OECD (2004), *op. cit.*, p.51.

[34] A. Mol, D. Liefferink and V. Lauber (2000a), 'Introduction', in A. Mol, V. Lauber and D. Liefferink eds., *The Voluntary Approach to Environmental Policy: Joint Environmental Policy-making in Europe*, Oxford: Oxford University Press, especially pp.4-5; D. Liefferink, M. Andersen and M. Enevoldsen (2000), 'Interpreting Joint Environmental Policy-making: Between Deregulation and Political Modernisation', in A. Mol, V. Lauber and D. Liefferink eds., *The Voluntary Approach to Environmental Policy: Joint*

Environmental Policy-making in Europe, Oxford: Oxford University Press; and A. Mol, D. Liefferink and V. Lauber (2000b), 'Epilogue: Conclusions and Policy Implications', in A. Mol, V. Lauber and D. Liefferink eds., *The Voluntary Approach to Environmental Policy: Joint Environmental Policy-making in Europe*, Oxford: Oxford University Press.

[35] In these figures, for distance travelled passenger vehicles are defined as cars seating not more than nine persons (including the driver), including rental cars, taxis, jeeps, estate cars/station wagons and similar light, dual-purpose vehicles. For consumption of road fuels, the data presented is for all autonomous road vehicles with four or more wheels, excluding caravans and trailers, military vehicles, special vehicles (for emergency services, construction machinery etc.) and agricultural tractors.

[36] See Table 4.2 earlier.

[37] See IEA (1997), *Transport, Energy and Climate Change* Paris: OECD, particularly chapters 5 and 6, for an expansion on these points and others relating to the imprecision of fuel taxes and market mechanisms generally. On the third point see D. Graham and S. Glaister (2002), 'The Demand for Automobile Fuel: A Survey of Elasticities', *Journal of Transport Economics and Policy*, Vol.36, Part 1, pp.1-26; and D. Graham and S. Glaister (2004), 'Road Traffic Demand Elasticity Estimates: A Review', *Transport Reviews*, Vol.24, No.3, pp.261-274. On the fourth point see Harrington and McConnell, *op. cit.*, p.53 and OECD (1996), *op. cit.*, p.157.

[38] ECMT (2003), *op. cit.*, pp.7-8; and Austin et. al., *op. cit.*, p.20.

[39] NHTSA (2003), *op. cit.*, p.21.

[40] See NHTSA (no date), *op. cit.*

[41] R. Crandall (2003), 'The Changing Rationale for Motor Vehicle Fuel-Economy Regulation', *Regulation: the Cato Review of Business and Government*, http://www.cato.org/pubs/regulation/reg13n3-crandall.html, accessed 13 January 2004.

[42] NHTSA (2003), *op. cit.*, p.22.

[43] NHTSA (no date), *op.cit.*

[44] Austin et. al., *op. cit.*, p.14. Alternative fuels include ethanol, methanol, liquid propane gas (LPG), compressed natural gas (CNG) and biofuels.

[45] Harrington and McConnell, *op.cit.*, p.75. See also Bradsher, *op. cit.*

[46] Harrington and McConnell, *op.cit.*, p.54.

[47] K. Hellman, and R. Heavenrich (2003a), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/r03006.pdf, accessed 17 February 2004, pp.iii-vi.

[48] JAMA (2004c), *Motor Vehicle Statistics of Japan 2004*, Tokyo: JAMA, p.12.

[49] Austin et. al., *op. cit.*, p.6.

[50] There is an obvious qualitative difference in the role played by the industry in the US versus the role it plays in the EU and Japan. By contrast, in the latter firms have worked cooperatively with regulators to set standards that are ambitious, and then have set out to achieve them.

[51] A similar point is made in Crandall, *op. cit.*

[52] The industry in the EU and Japan clearly sees regulations as a necessary way of meeting Kyoto Protocol emission targets. See, for example, ACEA (2002), *op. cit.*; and JAMA (no date a), *A Better Environment for Future Generations*, http://www.jama.or.jp/eco/eco_car/en/en/, accessed 13 January 2004.

[53] Crandall, *op. cit.* For the industry's position on CAFE see for example AAM (no date), *What is Corporate Average Fuel Economy (CAFE)?*, http://autoalliance.org/archives/fact2.pdf, accessed 24 March 2004.

[54] G. Volpi and S. Singer (2000), *Will Voluntary Agreements at EU Level Deliver on Environmental Objectives? Lessons from the Agreement with the Automotive Industry*, WWF Discussion Paper, Brussels: World Wide Fund for Nature, http://www.panda.org/downloads/europe/agreementonfueleconomy.pdf, accessed 12 December 2003, p.3.

[55] These are the views of the World Wide Fund for Nature which sees many industries as having captured the environmental agenda and weakened the regulatory function of the EC and EU member states. See Volpi and Singer, *op. cit.*, especially p.6. See also Leveque, *op. cit.*

[56] Volpi and Singer, *op. cit.*, p.10.

[57] Arima, *op. cit.*, p.3.

[58] The three are discussed in more detail in Leveque, *op. cit.*

[59] ACEA (2002), *op. cit.*, p.11.

[60] Leveque, *op. cit.*, p.48.

[61] *Ibid.*, pp.48-49.

[62] Energy Conservation Centre (no date), *What is the Top Runner Program?*, http://www.eccj.or.jp/top_runner/chapter2-4.html, accessed 28 April 2004.

[63] JAMA (no date b), 'Controlling Exhaust Emissions', *A Better Environment for Future Generations*, http://www.jama.or.jp/eco/eco_car/en/en_1_08a.html, accessed 13 January 2004.

[64] JAMA (no date c), 'Curbing Global Warming', *A Better Environment for Future Generations*, http://www.jama.or.jp/eco/eco_car/en/en_1_06a.html, accessed 13 January 2004.

[65] JAMA (2003), *op. cit.*, p.24.

[66] Arima, *op. cit.*, p.4.

[67] J. Newton-Small (2003), 'Detroit's Fuel Economy Woes', *Global Exchange*, (http://www.globalexchange.org/campaigns/oil/1217.html, accessed 13 January 2004. See also the AAM's CAFE position statement at AAM (no date a), *op. cit.*; and AAM (no date b), 'Our Position on CAFE', *Fuel Economy*, http://autoalliance.org/fuel/cafe101_position.php, accessed 24 March 2004.

[68] AAM (no date b), *op. cit.*; and AAM (no date c), *Consumers and Fuel Economy*, http://autoalliance.org/archives/CAFE9.pdf, accessed 23 July 2004.

[69] Desai (2002a), *op. cit.*; Desai (2002b), *op. cit.*; C. Holliday Jr, S. Schmidheiny and P. Watts (2002), *Walking the Talk*, Sheffield: Greenleaf; M. Porter and C. van der Linde (1995a), 'Towards a New Conception of the Environment – Competitiveness Relationship', *Journal of Economic Perspectives*, Vol.9, No.4, pp. pp.97-118; M. Porter and C. van der Linde (1995b), 'Green and Competitive: Ending the Stalemate', *Harvard Business Review*, Vol. 73, No.5, pp.120-134; and M. Porter (1990), *The Competitive Advantage of Nations*, New York: The Free Press, especially p.648.

Chapter 5: Market Forces: Social Attitudes versus Consumer Demand

Introduction

Exogenous sources of change can broadly come from two directions: 'top-down' (the state) or 'bottom-up' (society). In Chapter 4 the former was considered in the form of state regulations. The conclusion reached was that the institutional basis for developing regulations, specifically whether state-business relations are more those one would find in a liberal market economy (LME) versus a coordinated market economy (CME), is more relevant than material factors such as the stringency and timing of regulations. Institutional factors were found to be the main determinant of the degree to which firms embrace change in respect of the carbon dioxide (CO_2) emissions/fuel economy of their products. The more CME institutional framework of the European Union (EU) and Japan results in a co-regulatory to self-regulatory relationship between business and regulators. The result is greater internalisation of environmental externalities via CO_2 emission/fuel economy improvements because firms' commitments are increasingly the independent variable, rather than being dependent on regulatory intervention. By contrast, state regulations remain very much the independent variable for the LME-based United States (US) industry. This has led to significantly less acceptance of the need to reduce CO_2 emissions/increase fuel economy.

Another pertinent finding of Chapter 4 was the relative ineffectiveness of market mechanisms in the form of taxes and prices as a determinant of consumer behaviour. While market mechanisms are a favoured solution by those who see environmental problems as the result of externalities, so that prices need to be altered to reflect costs to the environment arising from economic activity, the evidence presented in Chapter 4 showed that market mechanisms do not have the effects postulated: they are neither associated with reduced fuel consumption nor distance travelled and therefore cannot be said to (indirectly) affect firm strategies. Focussing on markets, apart from market mechanisms, the other

material explanation for firms' improved environmental-friendliness that is often promoted is that increased social concern for the environment finds expression in markets via consumers' revealed preferences. This represents a 'bottom-up' source of change because it is said that environmental externalities are being internalised as a result of the expression of consumers' increased environmental concerns. This is the focus of this chapter.

Commentators on corporations and ecological sustainability who believe increased concern for the environment within society is being materially manifested in markets include Korten, Hawken et al, and Karliner.[1] They identify an emerging shift towards more ecologically sustainable practices in international capitalism as a result. Therefore, capitalist relations are shifting away from a concern for simple profit maximisation to more holistic motivations for maximising sustainability in the use of the world's resources. Industry groups such as the World Business Council for Sustainable Development (WBCSD) also see increased environmental concern as offering commercial opportunities, as well as demanding more environmentally-responsible behaviour on the part of business for long term economic sustainability.[2] Similarly, commentators such as Porter and van der Linde see environmentally responsible behaviour as a way of business being more efficient and profitable. Others such as Florini and Prakash see this as part of the reason why 'private authority' is increasingly taking responsibility for the environmental effects of profit-motivated action.[3]

Such viewpoints reflect the perspective that there is a growing movement towards post-materialist values in industrialised societies. Post-materialism is used to describe an increased awareness and concern for issues of collective social concern, rather than individual economic wellbeing. This includes increased concern for the environment. Authors such as Inglehart and Desai see such a shift as meaning that politics is now less defined in terms of left versus right, and more in terms of materialism versus post-materialism. Thus, politics is increasingly defined in industrialised societies as a matter of material values such as the economy, standards of living and wealth creation versus concern for post-materialist values such as gender relations, racial harmony, human rights and the environment, with a shift in focus in progress towards the latter.[4]

A shift towards post-materialist values should lead to institutional change because, as O'Riordan and Jordan note in respect of the question of climate change, social attitudes need "neither structure nor regulation, but they are most certainly institutional arrangements".[5] Thus, commentators on the role of civil society such as Wapner perceive a "shift in the 'balance of legitimacy' in environmental issues" that started in the late 1980s and early 1990s which means that "environmental concern now enjoys a broad base of support" that represents a change in "values, attitudes and practices".[6] Indeed, Wapner sees the shift as so profound that he characterizes it as follows:

> When corporations, households, communities, and farmers take these [environmental] measures it is not because governments are breathing down their necks. They are pursuing environmentally sound practices because they are aware of the severity of environmental problems and want to contribute to alleviating such dangers. They are being 'stung', as it were, by an ecological sensibility. This sting is a type of governance. It represents a mechanism of authority that is able to shape human behaviour.[7]

In essence, a shift in social attitudes is said to have 'mainstreamed' the environment and led to a shift in behaviour by all social, political and economic groups.

This chapter examines such broad claims to see if they are true in practice for the car industry. The central question is whether growing social concern for the environment in the industry's three major hubs - Germany, the US and Japan - may be said to be a cause of change, making firms more conscious of the need to address the environmental impact of their products. In order to answer this question, answers will be sought to the following two questions. First, are social attitudes associated with consumer demand? This will involve a comparison of trends in social attitudes in Germany, the US and Japan versus trends in consumer demand for cars. Secondly, (depending on the answer to the first question) is it reasonable to say that social concern for the environment is likely to change corporate strategies and the products offered by the car industry? The answer, putting it simply, is found to be that social concern for the environment is not clearly related to consumer demand. Therefore, any changes in the environmental performance of car firms' products cannot be clearly said to be explained by changing social sentiments mediated through markets.

Data from the World Values Survey (WVS), a global survey of social attitudes, is used to comparatively analyse social concern for the environment in each territory. The social attitudes considered are respondents' stated concern for the environment, willingness to take direct action in markets and willingness to take non-market action in respect of their environmental concerns. Apart from a shared strong concern for the environment by respondents from Germany, the US and Japan, it is shown that there are significant variations in willingness to take action on the basis of this concern – e.g. German and US respondents are more willing to take direct market action than Japanese respondents. Detailed data on the CO_2 emissions of new passenger cars sold in Germany, the US and Japan is then examined. Fuel economy is considered, because of its direct relationship to CO_2 emissions of passenger cars in use, along with attributes of cars purchased that impact on it: sales of light trucks as passenger vehicles; engine size; car class; diesel-powered vehicles; and alternatively powered vehicles. It is found that there is no clear-cut relationship between social attitudes and actual market outcomes – e.g. good environmental outcomes through car sales in Japan are not clearly traceable back to social concern for the environment.

Looking at the results through an institutional lens, focussing on the role of market versus non-market forces, the effects of government regulations, the role of technology and the path dependence of established competitive advantages, leads to the following conclusions. Social concern for the environment is not a universal cause of change, because the effect of it is not necessarily related to its magnitude. Only in the case of Germany may it be said that the post-materialist values thesis is supported by the evidence, with social concern reflected in consumers' purchasing decisions and firms' product offerings. Although even in this case it will be shown that it is not clear that concern for the environment is what is driving actual consumer behaviour. In Japan, government regulations and industry strategic decisions seem to be leading rather than following such attitudes. In the US, despite strong social concern for the environment, a materialist analysis appears to remain most pertinent. This is because the industry is much more reactive to market forces which do not support a move to more environmentally-friendly vehicles. These conclusions are shown to support the predictions of the varieties of

capitalism (VOC) thesis, especially in the sense that LME-based firms are more predisposed to a materialist perspective than CME-based firms. In addition, path dependence plays a role as the US industry has a competitive advantage in the production of much less environmentally-friendly vehicles than those produced by German and Japanese firms, and government regulations are much less supportive of change.

Data Sources and Methodology

Two sources of data are employed to facilitate comparative analysis. The first is the WVS. The WVS has been conducted since 1981. Originally a survey of European values,[8] it now encompasses surveys of national samples of the populations of 80 countries. At least 1,000 people are surveyed in each country in each wave of the survey, with the intention of understanding the basic values and beliefs of people in each society and how these are changing over time. The WVS is coordinated by the Institute for Social Research of the University of Michigan under the direction of Ronald Inglehart, with surveys in individual countries carried out by an international network of social scientists.[9] Four waves of the WVS since the early 1980s have been conducted, and in this chapter questions asked on concern for the environment and willingness to take environmental action are analysed to compare social attitudes from the early 1990s to 2001 in Germany, the US and Japan.

The results of analysing responses to questions asked in the WVS are compared with the second source of data: actual information on the fuel economy and attributes of new cars purchased in Germany, the US and Japan. Average fuel economy data already presented in Chapter 4 is re-visited. In addition, data on vehicle attributes is analysed that demonstrates consumers' revealed preferences: proportion of sales accounted for by light trucks/four wheel drives, engine size, the class of vehicle purchased, the uptake of more efficient diesel technologies and the degree to which new technologies are being embraced. The results of the analysis of social attitudes revealed through the WVS, and consumers' revealed preferences as evidenced by the attributes of cars they purchase, is then interpreted

through an institutional lens that goes to the motivations of firms explained by the VOC approach.

Social Attitudes

Turning first to a comparative analysis of social attitudes in the three territories, responses by those surveyed through the WVS are considered. Questions asked in the last three waves of the WVS from 1990 to 2001 (wave two: 1990-1993; wave three: 1995-1997; and wave four: 1999-2001) that relate to environmental concerns were aggregated and put in three categories to facilitate analysis:

1. Concern for the environment. These are questions about the priority respondents accord environmental versus economic imperatives, and whether they believe we should master or coexist with nature.

2. Willingness to take direct action in markets. These are questions about action that potentially has a direct material impact on firms because they relate to respondents' willingness to act in markets via paying more for, or choosing, products that are better for the environment.

3. Willingness to take non-market action. These are questions relating to action with less material impact on firms, but which nevertheless may encourage a change in their behaviour. This includes civil action through environmental movements, non-market financial sacrifices, and non-market other action that is environmentally-friendly. The market implications of such action are less obvious than those in category 2., yet they indicate respondents' willingness to change the 'rules of the game' by tipping attitudes more in favour of environmentally-friendly behaviour. This may lead to changes in firms' behaviour if responding to such action is perceived as a more appropriate way to conduct business.[10]

It should be noted that, as with many global surveys, different questions were asked in different waves, and not all countries were included in the WVS in each wave. Therefore

data gaps exist and inconsistencies arise, details of which are provided in Appendix A. These are acknowledged and adjustments to take account of them made as much as possible. Response frequencies were analysed for questions asked in each of these categories, as well as cross tabulations between concern for the environment and environmental action.

Concern for the Environment

Two questions asked in waves three and four of the WVS target respondents' concern for the environment. They are:

- Whether priority should be given to protecting the environment or economic growth and creating jobs.

- Whether human beings should master or coexist with nature.

Table 5.1 presents a summary of the responses to these questions. Responses indicate that concern for the environment is significant in all territories. The majority of US and Japanese respondents gave priority to protecting the environment over economic growth and creating jobs (60 and 57 percent respectively). A sizeable minority of German respondents (45 percent) gave priority to protecting the environment. In addition, an overwhelming preference was expressed in all three territories for coexisting with nature rather than mastering it, particularly for Japan and Germany where almost all respondents said they believed in coexisting with nature (96 and 98 percent respectively). Although fewer respondents in the US believed in coexisting with nature, the preference for so doing was still very high at 86 percent of respondents.

The response frequencies show that the two questions were answered in different ways. It appears that respondents would like *both* environmental protection *and* economic growth. When forced to choose their responses flow close to half each way. This is not an insignificant result because it suggests that on balance the environment and economic growth are viewed as being of at least equal importance. Responses to mastering or coexisting with nature reflect more complex perceptions of humanity's *relationship* with nature. This question may pick up cultural traits favouring harmony and balance (e.g.

Japanese notions of 'wa' – harmony – and German preferences for negotiated consensus) versus individualistic achievement (e.g. US and other Anglo-Saxon cultures' belief in the virtues of competition).[11] Hence the differences in the responses for Germany and Japan on the one hand and the US on the other. But overall, concern for the environment in all three territories is high: highest in the US and Japan on the question of the environment versus the economy, and highest in Germany and Japan on the question of coexisting with nature rather than mastering it.

Willingness to Take Direct Action in Markets

Willingness to act on concern for the environment in a way that directly impacts on firms' bottom lines is indicated by responses to two questions asked in wave three. Respondents were asked:

- Whether they would strongly agree, agree, disagree or strongly disagree to buying things at 20 percent higher than usual prices if it would help protect the environment.

- Whether in the previous 12 months they had chosen household products that are better for the environment.

Table 5.2 presents a summary of the responses to these questions. On willingness to pay higher prices, there is a clear divide between US and Japanese respondents versus German respondents. Only around 35 percent of US and Japanese respondents agreed with paying higher prices, whereas German respondents were nearly twice as strong in their support for this (60 percent). Although not presented in Table 5.2, the WVS data also shows that German respondents who agreed with paying higher prices were twice as likely to *strongly* agree with so doing by comparison to US and Japanese respondents.[12] German and US respondents were most likely to choose household products that are better for the environment (88 and 73 percent respectively), but even though Japanese respondents were less likely to have done so a clear majority of them had as well (60 percent).

Willingness to take direction action in markets is therefore strongest in Germany, by paying both higher prices and choosing household products if this helps the environment. US respondents are willing to exercise a preference for household products that are better for the environment, but are not so willing to pay higher prices. Japanese respondents are the least willing to pay higher prices or choose household products that are better for the environment. Therefore, direct market signals as a result of social attitudes are likely to be strongest in Germany, followed by the US and then Japan.

Willingness to Take Non-Market Action

Respondents were asked questions on non-market action that they would be prepared to take/have taken that reflects their concern for the environment. The questions are put in three sub-categories here: civil action through environmental movements, non-market financial sacrifices, and non-market other action. The results are summarised in Table 5.3, and discussed below.

On civil action respondents were asked:

- How much confidence they have in the green/ecology/environmental movement (asked in waves three and four).
- Whether they are members of an environmental organisation (asked in all waves).
- Whether they are active members of the organisation (in waves two and three) or did unpaid work for it (in wave four).
- Whether in the last 12 months they had contributed to an environmental organisation (asked in wave three).
- Whether in the last 12 months they had attended a meeting or signed a letter or petition aimed at protecting the environment (asked in wave three).

Table 5.1: Summary of Concern for the Environment

Respondents' Nationality	Priority to protecting the environment (%)	Humans should coexist with nature (%)
Germany	45	96
US	60	86
Japan	57	98

Source: World Values Survey.

Table 5.2: Summary of Willingness to Take Direct Action in Markets

Respondents' Nationality	Agree to buying things at 20% higher than usual prices (%)	Have chosen household products that are better for the environment (%)
Germany	60	88
US	36	73
Japan	34	60

Source: World Values Survey.

Table 5.3: Summary of Willingness to Take Non-Market Action

Respondents' Nationality	CIVIL ACTION					NON-MARKET FINANCIAL SACRIFICES			NON-MARKET NON-FINANCIAL ACTION	
	Great deal of confidence or quite confident in the green/ecology/ environmental protection movement (%)	Membership of environmental organisation (%)	Have contributed to an environmental organisation (%)	Active member/ unpaid work for an environmental organisation (%)	Have attended a meeting or signed a letter or petition (%)	Agree to an increase in Taxes (%)	Agree to giving part of income (%)	Agree that the government should reduce environmental pollution but it should not cost me any money (%)	Have decided to reuse or recycle (%)	Have tried to reduce water consumption (%)
Germany	68	5	15	2	30	50	30	70	85	71
US	57	16	26	7	18	60	69	57	86	56
Japan	60	3	8	1	13	60	70	56	69	47

Source: World Values Survey.

Sixty eight percent of German respondents said they were confident in the green/ecology/ environmental movement, a higher percentage than of US and Japanese respondents (57 and 60 percent respectively). However, far more US respondents were actually members of environmental organisations (16 percent) compared to Germany and Japan (5 and 3 percent respectively). Indeed, actual membership of environmental organisations in Germany and Japan is so low as to be virtually insignificant. It is also worth noting, though not presented in Table 5.3, that of those who had confidence in the environmental movement, a higher proportion of US respondents had a *great deal* of confidence in it compared to Germany or Japan.[13] Therefore, although fewer US respondents were confident in the environmental movement than in Germany or Japan, if they were they were more likely to be *highly* confident and to be members of such organisations. US respondents were also most likely to contribute to environmental organisations (26 percent versus 15 percent for German and 8 percent for Japanese respondents) and be active members/do unpaid work for them (7 percent versus just 1 to 2 percent for German and Japanese respondents).

Civil action thus seems most likely in the US followed by Germany, and least likely in Japan. This appears to be at odds with the phenomenon of the Green Party in German politics, a former coalition partner in the German government, and the fact that environmental issues have entered mainstream politics there to an extent they probably have not in the US and Japan. The reason for this apparent paradox is suggested by German responses to the question of attending a meeting or signing a letter or petition aimed at protecting the environment. German respondents were around twice as likely to do so compared to US or Japanese respondents (30 percent as opposed to 18 and 13 percent for US and Japanese respondents respectively). This suggests that Germans are potentially as willing to take civil action as their US counterparts, just in a less formal manner. They are very supportive of the environmental movement, and will take action in respect of its goals, but they are simply less likely to *belong* to environmental organisations.

Overall, the conclusion is that civil action on environmental concerns is more likely in the US and Germany, and much less likely in Japan. In Germany there may be less willingness to do so via environmental organisations than in the US, but nevertheless civil action may occur on a less formalised basis via attending meetings and signing petitions.

On non-market financial sacrifices respondents were asked:

- Whether they would strongly agree, agree, disagree or strongly disagree to an increase in taxes if the extra money were used to prevent environmental damage (asked in all waves).

- Whether they would strongly agree, agree, disagree or strongly disagree to giving part of their income if they were certain the money would be used to prevent environmental pollution (asked in wave four).

- Whether they would strongly agree, agree, disagree or strongly disagree that the government should reduce environmental pollution but it should not cost them any money (asked in wave four).

Responses to these questions demonstrate a clear divide between US and Japanese respondents on the one hand and German respondents on the other. For the US and Japan, around 60 percent of respondents would support an increase in taxes, and commensurate with this around 70 percent were in favour of giving part of their income to prevent environmental pollution. German respondents were clearly less supportive of tax increases (50 percent) and giving part of their income (30 percent) than US and Japanese respondents. On the government reducing environmental pollution at no cost, the divide is reversed. 70 percent of German respondents said that they believed this should be the case, whereas only around 56 and 57 percent of Japanese and US respondents respectively thought that the government should take action without it costing them any money. Once again, more detailed data on the strength of feeling on this, although not presented in Table 5.3, is informative: of German respondents who agreed that the government should act in this manner at no cost to them, a much larger proportion *strongly* agreed that this should be the case than their US and Japanese counterparts.[14] Therefore, responses to these questions show that US and Japanese respondents are clearly more willing to make non-market financial sacrifices than Germans.

On non-market other action respondents were asked in wave three:

- Whether in the last 12 months they had decided for environmental reasons to reuse or recycle something rather than throw it away.

- Whether in the last 12 months they had tried to reduce water consumption for environmental reasons.

Responses to these questions show that Germans respondents were, on balance, most willing to reuse or recycle and reduce water consumption. Although US respondents were marginally more willing to reuse or recycle than Germans (86 versus 85 percent), Germans were much more likely to save water (71 versus 56 percent). Japanese respondents were less likely to either reuse or recycle (69 percent), or save water (47 percent), than German or US respondents. Therefore, German respondents are most willing to take non-market other action, followed by US and then Japanese respondents.

Cross Tabulations: Environmental Concern versus Environmental Action

Cross tabulations allow a determination to be made on the extent to which an association exists/does not exist between questions on concern for the environment and environmental action (either direct market or non-market action). The results demonstrate the extent to which attitudes to the environment are associated with willingness to take action that is environmentally-friendly. A chi square based coefficient that measures association, phi, was calculated for the cross tabulations on the basis that all variables are nominal and arranged in two by two tables. The test for statistical significance is applied at $p<0.01$. The cross tabulations and a discussion of them is provided at Appendix B with a summary of the findings presented in Table 5.4.

Although it is association rather than causality that is investigated here, the two questions on environmental concern were *assumed* to be independent variables and by convention are shown in the columns of tables in Appendix B and Table 5.4. They are:

- Whether priority should be given to protecting the environment or economic growth and creating jobs.

- Whether human beings should master or coexist with nature.

Responses to questions on environmental action that indicated a willingness to take direct action in markets or non-market action were assumed to be dependent on these two questions on the basis that concern for the environment over economic growth, or co-existing with nature rather than mastering it, should predict a greater willingness to take action that results in the protection of the environment. By convention, these are shown in the rows of tables in Appendix B and Table 5.4.

Overall, four major observations emerge:

- A 'no' response does not indicate that there is no association, but that it is not strong enough/the data is not sufficient to support a finding that the association is *statistically* significant. But even when a statistically significant association is indicated, concern for the environment is mostly only weakly associated with environmental action. The exceptions are protecting the environment and paying higher prices for the US and Japan; protecting the environment and increase in taxes for the US and Japan; and protecting the environment and giving part of income for Japan. In these three cases the association is weak to moderate.

- Therefore, only in the cases of Japan and the US are the associations ever stronger than 'weak'.

- Associations are more likely to be statistically significant when the independent variable is priority to protecting the environment rather than coexisting with nature. This reflects the small sample sizes for respondents who said they had priority for mastering nature, particularly in the cases of Germany and Japan where less than 10 percent of respondents indicated such a priority. It probably also reflects the complexities inherent in the mastering/coexisting with nature question flagged earlier.

- In the case of Japan it is striking to note that in seven cases statistically insignificant associations suggest a counter-intuitive relationship between the variables, as well

as in two cases where a statistically significant association exists. The statistically significant associations indicate that Japanese respondents' belief in mastering nature rather than coexisting with it is associated with greater willingness to act in environmentally-friendly ways through contributing to environmental organisations and trying to reduce water consumption!

Therefore, the association between concern for the environment and environmental action is mostly a weak one, particularly in the case of Germany. This suggests that for German respondents, willingness to act in environmentally-friendly ways is less associated with their concern for the environment than is the case for US and Japanese respondents. Environmental action is thus to some extent decoupled from concern for the environment in the German case. It may occur for other reasons that can only be speculated on here, such as concern to reduce financial outlays by buying more efficient products, security concerns to do with natural resource constraints, or perhaps just fashion.

Table 5.4: Cross Tabulations Concern for the Environment with Environmental Action

	CONCERN FOR THE ENVIRONMENT					
ENVIRONMENTAL ACTION	**Is a Preference for Coexisting with Nature Associated with Taking Action (statistically significant at p<0.01)?**			**Is a Priority for Protecting the Environment Associated with Taking Action (statistically significant at p<0.01)?**		
	Germany	**US**	**Japan**	**Germany**	**US**	**Japan**
WILLINGNESS TO TAKE DIRECT ACTION IN MARKETS						
Buy things at 20% higher than usual prices if it would help the environment	**No**	**No**	**No**	Yes (weak)	Yes (weak-moderate)	Yes (weak-moderate)
Have chosen household products that are better for the environment	Yes (very weak)	Yes (very weak)	**No (counter-intuitive)**	Yes (very weak)	Yes (weak)	Yes (weak)
WILLINGNESS TO TAKE NON-MARKET ACTION						
Civil Action Confidence in the green/ecology/environmental movement	Yes (very weak)	Yes (very weak to weak)	**No (counter-intuitive for wave 4)**	Yes (weak)	Yes (weak)	Yes (weak)
Member of an environmental organisation	**No**	**No**	**No (counter-intuitive for wave 4)**	Yes (very weak)	Yes (very weak to weak)	**No (counter-intuitive for wave 3)**
Active member/unpaid work for an environmental organisation	**No**	**No**	**No**	Yes (very weak)	Yes (very weak)	**No**
Have contributed to an environmental organisation	Yes (very weak)	Yes (very weak)	Yes (very weak and counter-intuitive)	Yes (weak)	Yes (weak)	**No**
Have attended a meeting or signed a letter or petition aimed at protecting the environment	**No**	**No**	**No**	Yes (weak)	Yes (weak)	**No**
Financial Sacrifice Increase in taxes if the extra money were used to prevent environmental damage	**No**	Yes (weak)	**No (counter-intuitive for wave 4)**	Yes (weak)	Yes (weak-moderate)	Yes (weak to weak-moderate)
Give part of your income if you were certain that the money would be used to prevent environmental pollution	Not available	Yes (very weak)	**No (counter-intuitive)**	Not available	Yes (weak)	Yes (weak-moderate)
The government should reduce environmental pollution but it should not cost me any money	Not available	Yes (very weak)	**No (counter-intuitive)**	Not available	Yes (weak)	Yes (weak)
Non-financial Action Have decided to reuse or recycle	**No**	Yes (weak)	**No**	**No**	Yes (very weak)	Yes (weak)
Have tried to reduce water consumption	Yes (very weak	**No**	Yes (very weak and counter-intuitive)	**No**	Yes (weak)	**No**

Source: Source: World Values Survey, waves two to four. Details are provided at Appendix B. The classification of the strength of the association is as follows: Phi<0.125=very weak; 0.125<phi<0.25=weak; 0.25<phi<0.375=weak-moderate; 0.375<phi<0.5=moderate; 0.5<phi<0.625=moderate-strong; 0.625<phi<0.75=strong; 0.75<phi<1=very strong.

Summary of the Findings from Analysing Social Attitudes

The only point of clear commonality between Germany, the US and Japan is a strong concern for the environment. Beyond this, there are considerable variations:

- German respondents exhibit the strongest willingness to take direct market action, followed by US respondents. Japanese respondents are least willing to do so.

- Japanese and US respondents are quite willing to make non-market financial sacrifices through paying higher taxes and giving part of their income with environmental concerns in mind. They expect government action on the environment to cost them money. German respondents are less willing to make such non-market financial sacrifices.

- The relevance of formal civil action can virtually be ruled out for Germany and Japan. Only in the US is the minority of respondents willing to engage in such action large enough to be considered significant. However, when it comes to informal civil action via attending a meeting or signing a letter or petition, German respondents are the most willing to do so. The significance of civil action, whether formal or informal, is much lower for Japanese respondents. The only observation that can be made is that Japanese respondents are reasonably confident in the environmental movement, such as it is.

- Other non-market action is most likely for German respondents, followed by US respondents. It is considerably less likely for Japanese respondents.

- For Germans, environmental action (both direct market and non-market) is more weakly associated with concern for the environment than is the case for US and Japanese respondents. These results suggest that Germans' willingness to take action is, to some extent, decoupled from their concern for the environment. Although environmental action is more likely than in the US and Japanese cases, it is taken less out of underlying environmental concerns than for other reasons.

- For the US and Japan, there are stronger associations between concern for the environment and environmental action. This suggests that environmentally-friendly action is more contingent on, or related to, concern for the environment.

- However, two of the statistically significant associations (and seven of the statistically insignificant ones) for Japanese respondents are counter-intuitive.

If one was to ask 'what's the bottom line', the answer would be that beyond significant concern for the environment in all territories, willingness to take environmental action is mostly stronger in Germany and the US than Japan. This is particularly so for Germany with respect to direct market action. For the US and Japan, there is greater willingness to make non-market financial sacrifices, but overall Japanese respondents' willingness to act in environmentally-friendly ways is the weakest of the three. Concern for the environment is more strongly associated with environmental action in the US and Japan than Germany. However, before being able to answer whether or not these differences in social attitudes are associated with differences in consumer behaviour, the trends in consumer demand for new cars must be considered. This is done in the following section.

Consumer Demand

The conclusion from Chapter 4 was that regulations and different institutional arrangements have ramifications beyond the borders of states. It was shown that in each of the territories, US firms sell the least fuel efficient vehicles that produce the most CO_2/have the worst fuel economy, and that EU and Japanese firms sell more fuel efficient vehicles that produce less CO_2/have better fuel economy. It was shown that although this correlates with higher fuel prices and tougher standards in the EU and Japan by comparison to the US, there were also institutional explanations for this in terms of state-business relations. The aim here is again to 'dig' further behind the overall fuel economy figures for each territory to examine in more detail the attributes of vehicles purchased by consumers, determine whether this

squares with social attitudes and therefore whether it is likely to provide the impetus for firms to focus their attentions on providing more fuel efficient products in future. The fuel economy of cars purchased in each territory is considered first, followed by an analysis of attributes of new cars purchased that impact on this: the proportion of light trucks in total sales, engine size, car class, the proportion of diesel powered vehicles in total sales and the take-up of alternative powered vehicles. The reason for the choice of these attributes as being indicative of consumer preferences is as follows:

- Light trucks in the form of sports utility vehicles (SUVs)/four wheel drives are bigger, heavier, less fuel efficient and more environmentally damaging than normal passenger cars. If consumers display a preference for such vehicles environmental concerns are unambiguously of less concern to them in practice.

- A preference for vehicles with larger engines over time cannot possibly indicate a growing concern for the environment in practice. Even if engines overall are becoming more efficient, bigger engines must use more fuel and are indicative of a desire for more power, acceleration and performance over lower fuel usage, lower CO_2 emissions and less impact on the environment.

- Definitions of car class vary between the three territories so directly comparable data is not available. Nevertheless, regardless of definitional differences smaller cars should have less environmental impact than bigger cars, so a preference for them indicates greater concern for environmental impacts. The definitions of car classes in each territory are explained in Appendix C.

- Diesel powered vehicles must always produce less CO_2 emissions and be more fuel efficient due to the higher density of diesel as opposed to petrol. As noted in Chapter 3, diesel provides 20 to 40 percent better fuel economy and produces 10 to 30 percent fewer CO_2 emissions. Consumers *who know this* and show a preference for diesel are therefore also showing a preference for reducing environmental damage, at least in terms of fuel efficiency and CO_2 emissions.[15]

- The take up of alternatively powered vehicles that have lower environmental impacts should indicate whether consumers are keen early-adopters of new environmentally-friendly technologies.

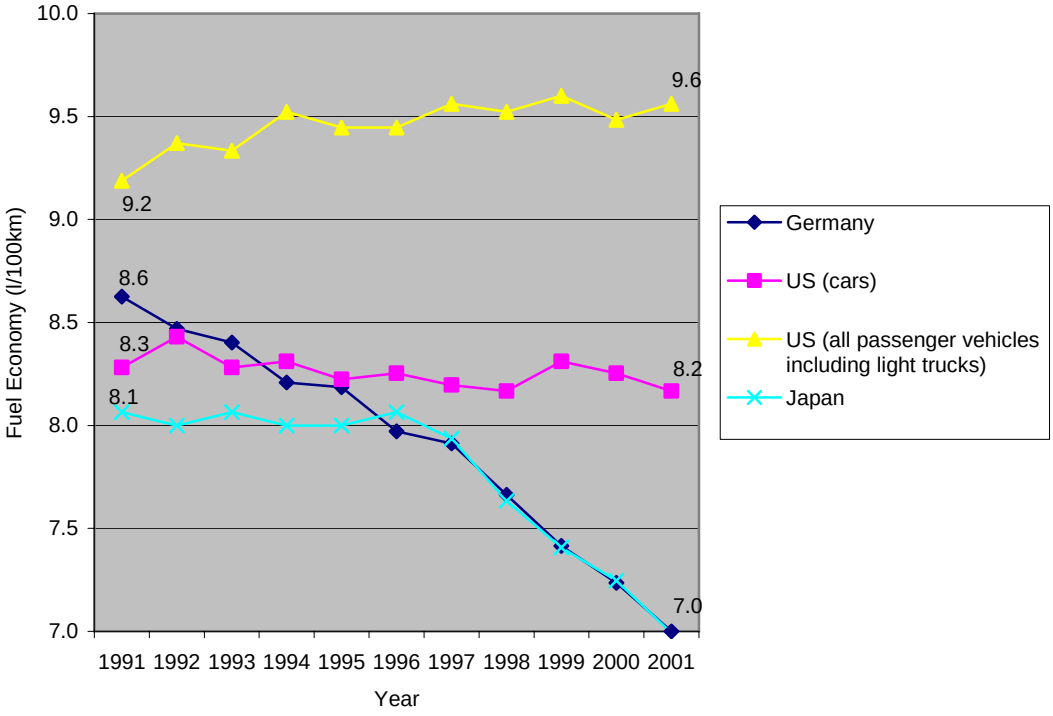
It should be noted that two other attributes were considered but rejected for analysis: vehicle weight and power. Although the Organisation for Economic Cooperation and Development (OECD) finds that preferences for cars that are heavier and more powerful has detrimental effects on their environmental performance in terms of CO_2 emissions, both these indicators were rejected due to a lack of specificity in what they might indicate. In the case of vehicle weight this arises because increases or decreases in the average weight of vehicles purchased do not conclusively indicate anything other than a "trend towards installing more equipment for safety, comfort and utility".[16] It does not indicate anything, on its own, about consumer preferences with respect to the environment. For example, it does not indicate whether increased weight is due to the purchase of larger cars and SUVs, or a rise in the proportion of mid-sized cars that might be greater than the fall in large cars. Similarly, advances in engine technologies mean that regardless of the size of an engine, all engines have become more powerful.[17] Therefore, smaller engines are now able to power heavier vehicles and vehicles in smaller classes are now more powerful than they were without having larger engines. In fact, it is possible that a more powerful engine of the same size in a small car gets better fuel economy because it does not have to work as hard to deliver the same performance. Therefore, increases in engine power on their own cannot indicate preferences for performance over the environment so much as advances which have simply made all engines more powerful ceteris paribus.

Fuel Economy

Figure 5.1 presents the average fuel economy of new cars sold in each territory from 1991 to 2001. Clearly, much less fuel efficient cars are sold in the US than in Germany and Japan. But more important than this are the changes over time. German and Japanese car sales exhibit dramatic fuel economy improvements (from around 8 to 7 l/100km), whereas

the fuel economy for US cars sold is virtually unchanged (around 8 l/100km). If light trucks are included in US figures, on the basis that these are increasingly sold in the US as passenger vehicles in the form four wheel drive SUVs and pickup trucks (discussed in the following section), the fuel economy of all passenger vehicles in the US has actually worsened from 9.2 to 9.6 l/100km. Therefore, market signals for the sale of more fuel efficient cars only exist in Germany and Japan.

Figure 5.1: Average Fuel Economy of New Cars

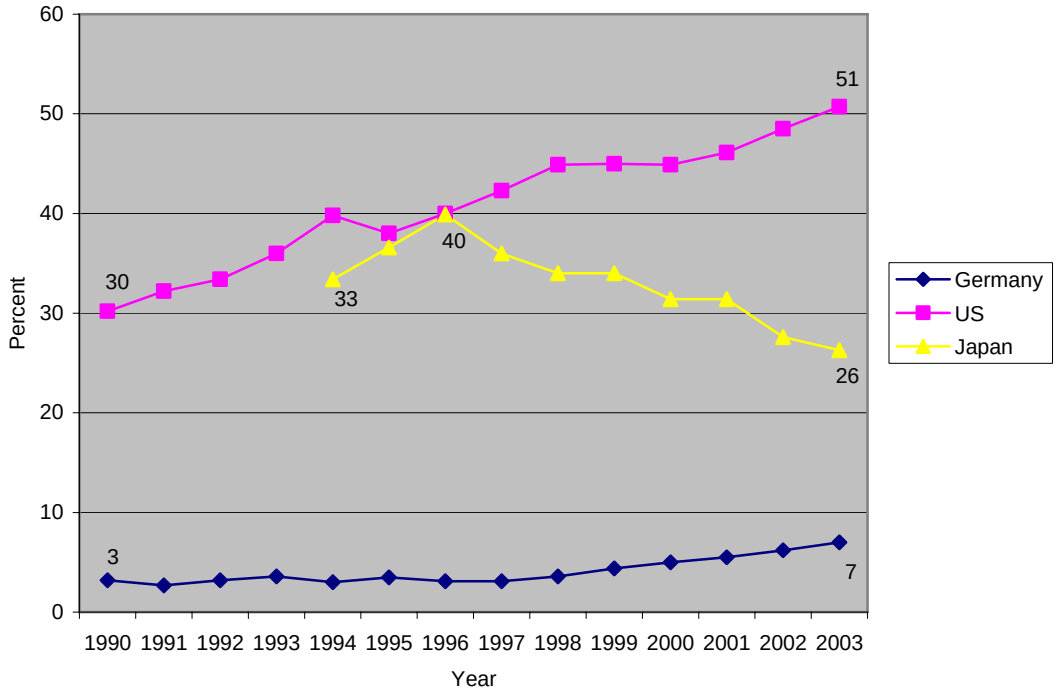


Sources: VDA (no date), *Fuel Consumption*, http://www.vda.de/en/aktuell/kraftstoffverbrauch/marktgewichtet.html, accessed 29 July 2005; NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calender Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.21; JAMA (2003), *2003: The Motor Industry of Japan*, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, accessed 18 January 2004, p.24; and JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.43.

Light Trucks

Light trucks are increasingly being purchased as passenger vehicles in the US, and such a trend clearly represents environmentally-unfriendly behaviour. Figure 5.2, which presents the share of light trucks in total passenger car registrations from 1990 to 2003, shows that only in the US has the percentage of light trucks in total passenger car registrations increased markedly throughout the period with little sign of abating, to the point where over half of passenger vehicle sales in the US are now light trucks. Purchasing light trucks as passenger vehicles occurs in Germany and Japan as well. However, although the growth in the share of light trucks in passenger car registrations has been greatest in Germany, especially after 1997, the change exaggerates the significance. This is because for Germany the share of four wheel drives (4wds) in total registrations remains very small by comparison to the US and Japan. In fact, despite increases in most EU markets they remain very much niche vehicles, and in Germany where their popularity has increased more than in most EU markets, they have increased their market share from 3 to only 7 percent. For Japan, the share of light trucks peaked in 1996 at nearly 40 percent. Since then it has declined to 26 percent. Thus, only in the US has growth in the sale of light trucks occurred to such an extent that they now account for the majority of new passenger vehicle sales.

Figure 5.2: Percentage Share of Light Trucks in Total Passenger Car Registrations



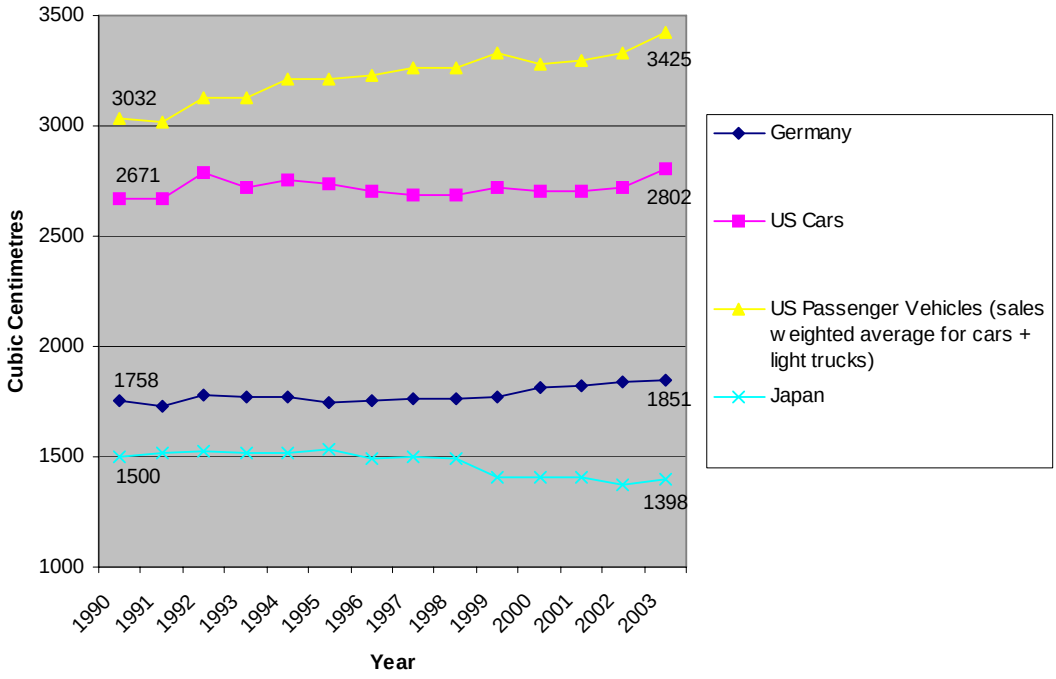
Sources: ACEA (no date d), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications: Share of 4x4*, http://www.acea.be/ACEA/4x4-PC-90-02.pdf, accessed 9 June 2004, except 2003 figure which is from ACEA (2004b), *EU15 Economic Report*, http://www.acea.be/ACEA/ER-0204-Internet.pdf, accessed 9 June 2004; K. Hellman and R. Heavenrich (2004), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001.pdf, accessed 13 May 2004, pp.7-9 and 14-16; and JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.9. Data presented for Japan and Germany is for 4wds. For Japan, there is a 'Recreational Vehicles' class but this is not used as it includes station wagons, van-type SUVs, off-road 4wds and minivans (i.e. not all of these are light trucks). Data for the US is for light trucks, which include SUVs, pickup trucks and minivans used as passenger vehicles.

Engine Size

Engine size is a key measure of environmental concern. Smaller engines tend to use less fuel, and technological advances mean that engines of the same size increasingly produce more power. Therefore, if an engine the same size can now deliver more power in a car that is the same size, or be placed in a car that is larger/heavier with similar performance compared to that delivered by a larger engine previously, then a preference for larger engines must clearly indicate that environmental concerns are secondary. A preference for smaller engines indicates the converse.[18] Figure 5.3 shows average engine size of new cars

from 1990 to 2003. US consumers buy cars with the biggest engines. For cars alone (i.e. excluding light trucks), in 2003 US car engines were around 50 percent larger than German cars and twice the size of Japanese cars. In addition, engine sizes in the US have risen significantly, for all passenger vehicles by 13 percent and for cars alone by 5 percent. German car engines have also increased in size by 5 percent. Only in Japan's case have engines become smaller, by 7 percent.

Figure 5.3: Average Engine Size of New Cars



Sources: ACEA (no date b), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications: Average Cubic Capacity*, http://www.acea.be/ACEA/Average_CC-PC-90-02.pdf, accessed 9 June 2004; ACEA (2004b), *EU15 Economic Report*, http://www.acea.be/ACEA/ER-0204-Internet.pdf, accessed 9 June 2004; K. Hellman and R. Heavenrich (2004), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001.pdf, accessed 13 May 2004, pp14-16; and JAMA (2004c), *Motor Vehicle Statistics of Japan 2004*, Tokyo: JAMA, p.12.

Car class

Data on car class is available for each market. Although the class definitions are slightly different in each,[19] what is of interest for comparative purposes is whether, over time,

consumers are buying smaller, lighter, more compact cars, which would tend to indicate they are making more environmentally conscious purchasing decisions, or larger, heavier cars which would suggest the converse. Given the magnitude of the market share of light trucks in the US and Japan, the class of these is also considered here.

Figure 5.4 presents German passenger car sales by class from 1999 to 2003. It shows that the share of small cars has grown from 16 to 20 percent. This trend is accompanied by a contraction in the share of lower-medium cars and steady share of medium cars. The share of other classes was relatively constant, with the exception of vans which increased their market share from 6 to 10 percent, and are largely responsible for the rise in the 'others' class. Again, the increase in share of 4wds is relatively marginal.[20]

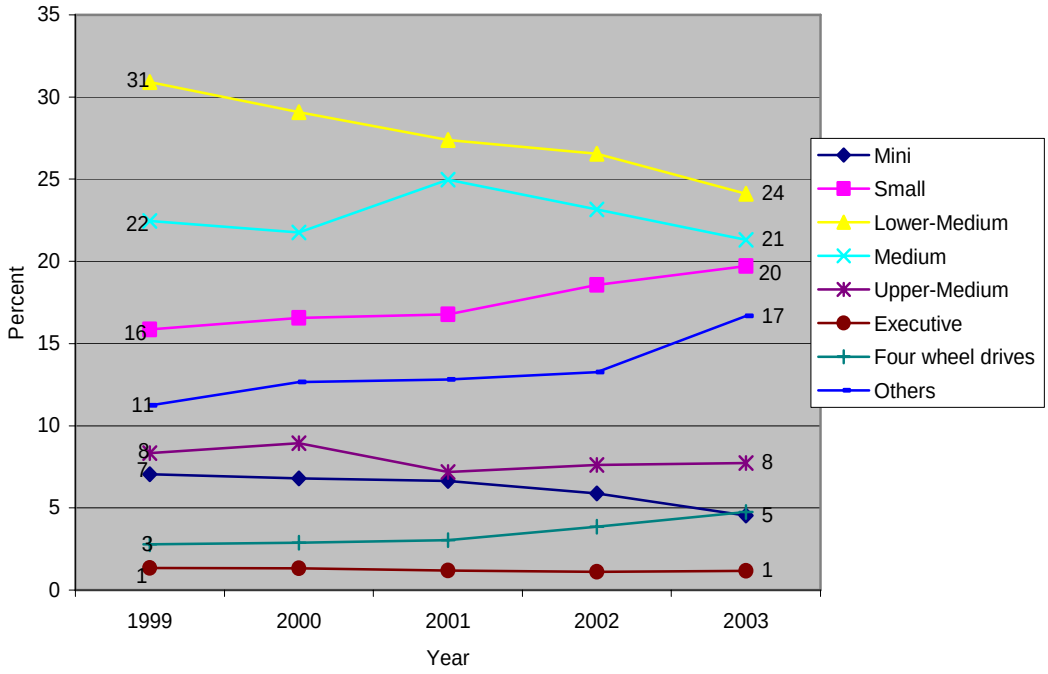
Figure 5.5 presents US passenger car sales by class from 1990 to 2004. It shows that for passenger cars, the small car class has suffered sustained falls in market share from around 60 percent to under 50 percent, while gains have been made in the mid-size and large classes. The largest gains have been made in the large car class where the share has grown from 13 to 18 percent. Figure 5.6 presents a breakdown of US light trucks sales by class from 1990 to 2003. It shows similar trends to those for cars in that in addition to the observation that light trucks now make up just over 50 percent of all new passenger vehicle sales in the US, there has been a huge rise in the share of large light trucks in total US light truck sales over the period, from 30 to 49 percent. In fact, by 2004 more large light trucks were sold than either medium or small light trucks, and almost as many as small and medium light trucks combined. Therefore, not only has there been a shift to the purchase of light trucks on the part of consumers, but they are increasingly buying bigger light trucks and bigger cars.

Figure 5.7 presents Japanese passenger car sales by class from 1990 to 2004. It shows that the small car class has been squeezed with more sales flowing to larger standard and smaller mini cars. However, standard cars' market share peaked in 1995 at 20 percent and has receded to around 17 percent since then, whereas sales of mini cars increased steadily up to 2000. Since then they have held a steady 29 to 30 percent share of the market. Over the entire period around 80 percent of car sales in Japan have been either small or

mini cars, but the share of mini cars has almost doubled over the period. Figure 5.8 presents a breakdown of Japanese 4wd sales by class from 1994 to 2003. It shows similar trends to those for cars. Larger 4wds have declined as a proportion of total 4wd sales from a peak of 28 percent in 1996 to 15 percent in 2003, while the share of mini 4wd drives has remained around 11 percent. Thus, in addition to 4wds declining as a market segment in Japan, those that are sold are getting smaller and therefore less environmentally damaging, as are cars.

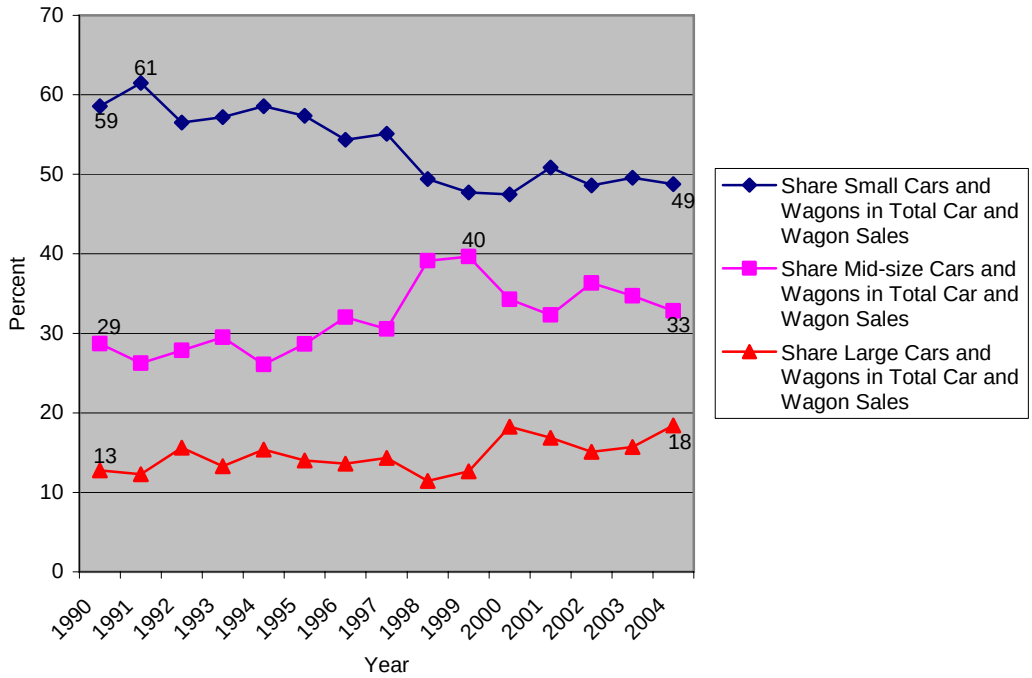
A lot of data has been presented in this section. The trends may be summarised as follows. For Germany, cars are getting smaller with the share of sales in the small class growing at the expense of the larger lower-medium and medium classes. While 4wds have increased their share of sales, they remain niche vehicles. For Japan, the overall trend is also for smaller cars. Mini cars have increased their share of sales. So have larger standard cars. However, overall the market is dominated by mini and small cars. 4wds, while popular in Japan, exhibit sales trends very different from their US equivalent, with sales increasingly in the mini 4wd class. The US is moving in the opposite direction to Germany and Japan with cars and light trucks both getting bigger. Mid-size and large cars have increased their share of sales at the expense of small cars, and burgeoning sales of light trucks as passenger cars have been led by sales of large vehicles.

Figure 5.4: German Passenger Car Sales by Class



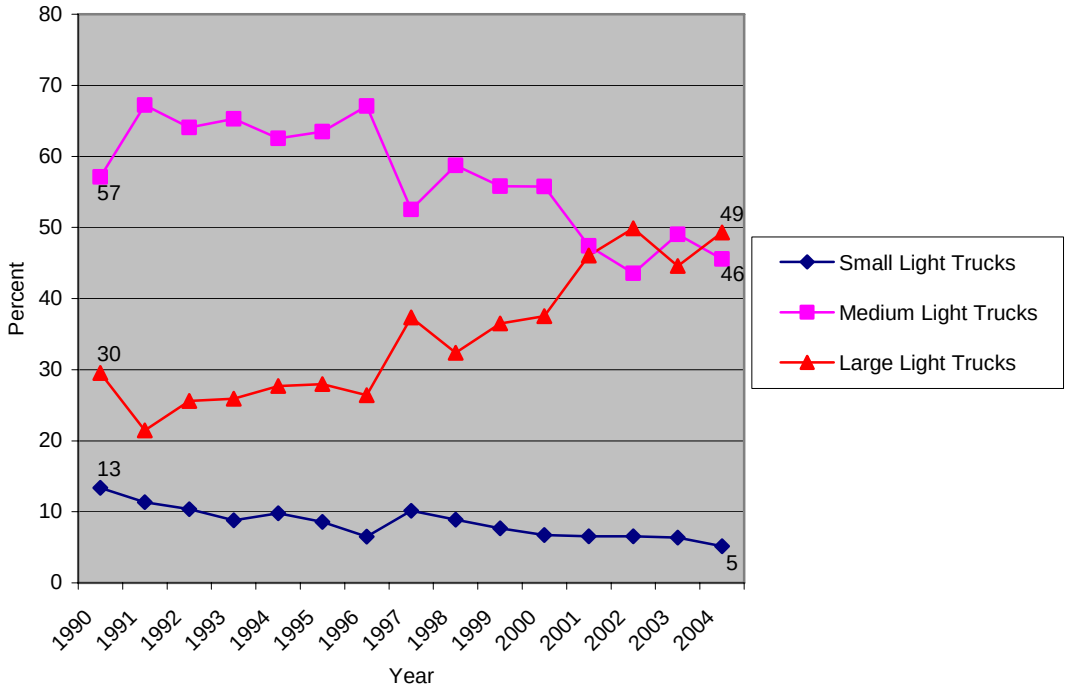
Source: VDA, provided on request 6 January 2005. 'Others' includes cabriolets, vans, utilities and other vehicles. Aggregated data by class is unavailable prior to 1999.

Figure 5.5: US Passenger Car Sales by Class



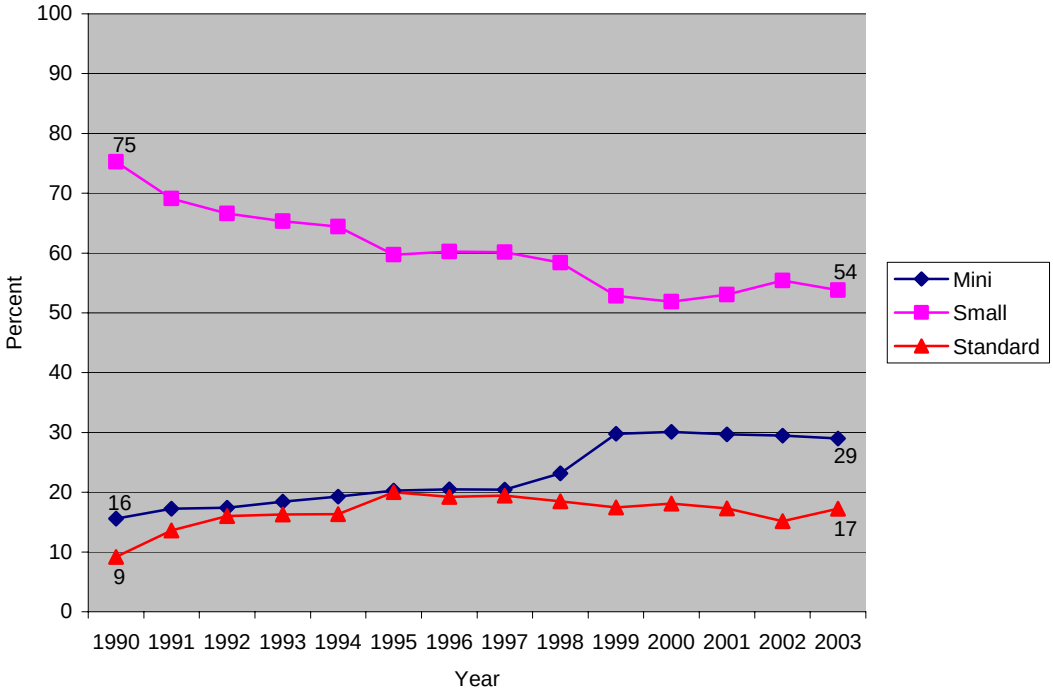
Source: K. Hellman and R. Heavenrich (2004), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004, Appendix F*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001-f.pdf, accessed 13 May 2004; Hellman, K.H., and Heavenrich, R.M. (2004), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001.pdf, accessed 13 May 2004, p.9 and p.16.

Figure 5.6: US Light Truck Sales Broken Down by Class



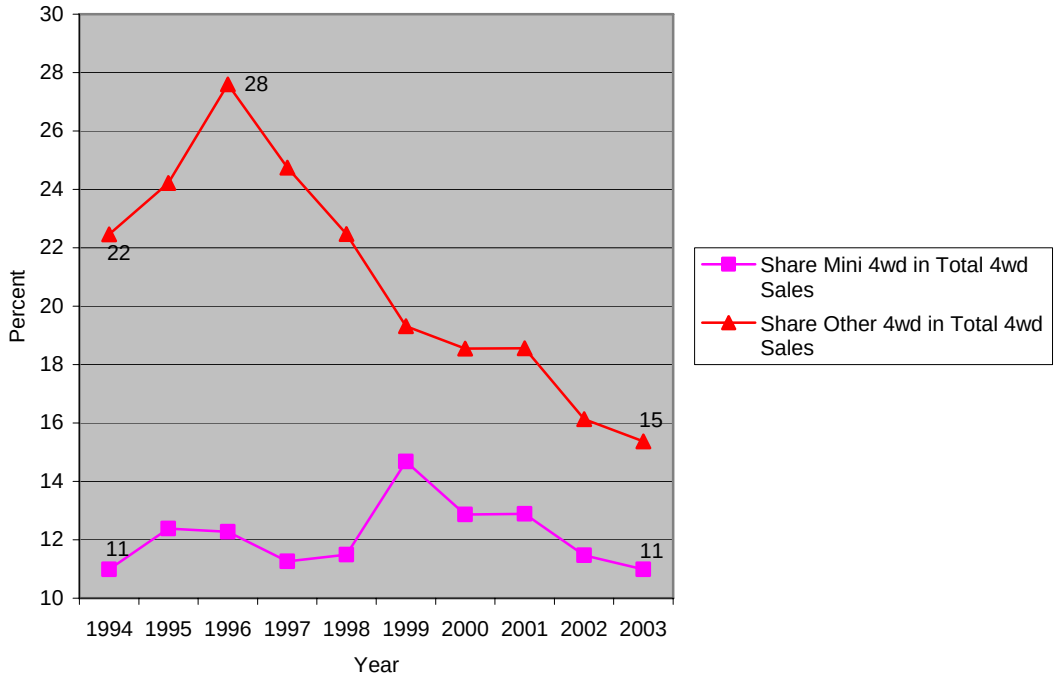
Source: Hellman, K.H., and Heavenrich, R.M. (2004), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004, Appendix F*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001-f.pdf, accessed 13 May 2004.

Figure 5.7: Japanese Passenger Car Sales by Class



Source: JAMA (2004b), *World Motor Vehicle Statistics Vol.3 2004*, Tokyo: JAMA, p.168.

Figure 5.8: Japanese 4wd Sales Broken Down by Class



Source: JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.9.

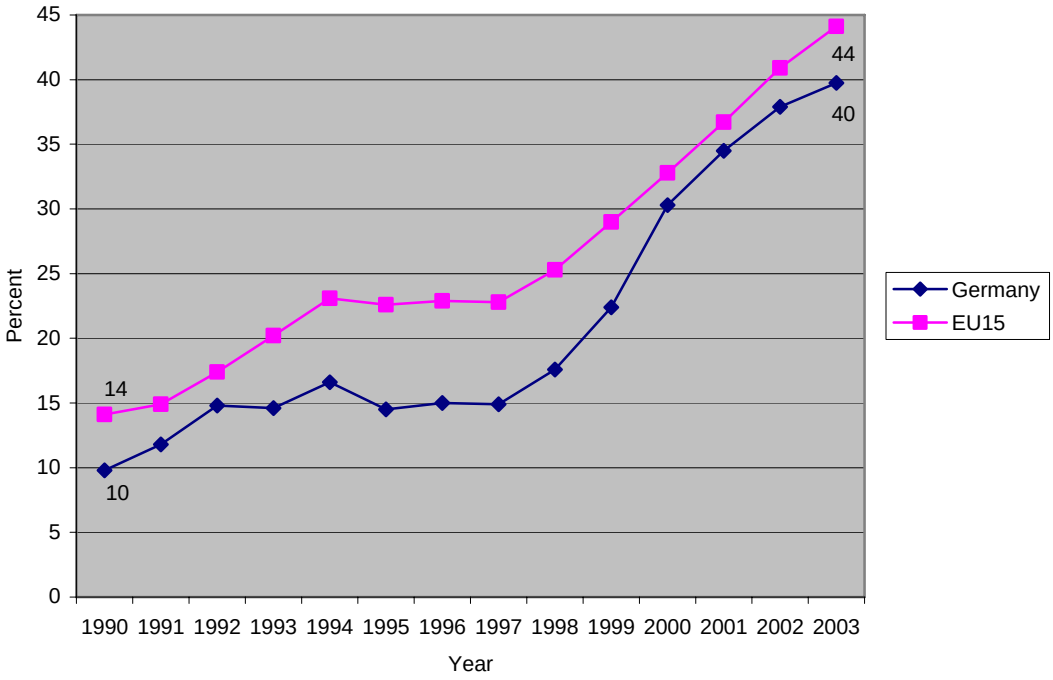
Diesel Powered Vehicles

If consumers know the fuel efficiency and CO_2 emission benefits of diesel powered vehicles, then purchasing them suggests motivations based on environmental concerns for using less fuel and producing lower CO_2 emissions. However, diesel cars are insignificant anywhere but the EU. In the US and Japan, diesel cars account for *less than 1 percent* of all new car registrations.[21] A large part of the explanation is that the industry in Germany, and the EU more broadly, has promoted small diesel cars as a clean and technologically advanced solution to the environmental effects of car use. Thus, perceptions of diesel are different there. This is supported by the literature of the European and German peak industry bodies, as well as firms' environmental reports.[22]

Figure 5.9 presents diesel sales as a percentage of total car sales in the EU and Germany from 1990 to 2003. It shows that diesel's share of EU car sales increased from 14 to 44 percent, and similarly for German car sales from 10 to 40 percent. These trends put

the 5 percent increase in engine size for German cars shown in Figure 5.3 in perspective: consumers have purchased smaller vehicles with marginally larger diesel engines and reduced their cars' environmental impacts.

Figure 5.9: Diesel Sales as a Percentage of Total Car Sales in the EU and Germany



Source: ACEA (no date c), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications: Share of Diesel Cars*, http://www.acea.be/ACEA/DIESEL-PC-90-02.pdf, accessed 9 June 2004; and ACEA (2004b), *EU15 Economic Report*, http://www.acea.be/ACEA/ER-0204-Internet.pdf, accessed 9 June 2004.

Alternatively Powered Vehicles

It seems that almost everywhere one looks there are exciting stories about alternatively powered vehicles, especially petrol-electric hybrid vehicles and the long term potential for fuel cell technologies which will allow cars to run on hydrogen.[23] Japanese firms are the world leaders in the commercial production of such cars, particularly Toyota and Honda which commercially released petrol-electric hybrids in the late 1990s. Demand for the second generation petrol-electric hybrid Toyota Prius is growing so much that Toyota had

to increase production to 130,000 cars for 2004 in order to meet international demand, with an eight month waiting list for the model in the US.[24]

Table 5.5 presents sales data on alternatively powered vehicles from 1995 to 2002. Although at first glance sales of such vehicles appear significant, the share of alternatively powered vehicles in total passenger vehicles provides a more realistic perspective. The OECD estimates the total stock of passenger cars in 1999 at 174 million in the EU, 207 million in the US and 51 million in Japan.[25] Combining these figures with those for alternatively-powered vehicles in use in 2002, the proportion of alternatively powered vehicles in the total stock of passenger cars is greatest in Japan (0.26 percent), followed by the US (0.24 percent) and lastly the EU (0.04 percent).[26] For Germany, 0.1 percent of new car registrations in 2002 were alternatively powered vehicles.[27] These percentages hardly represent a consumer-led stampede to alternatively powered vehicles of the same proportions as, say, diesel in the EU and Germany or light trucks in the US.

Table 5.5: Sales of Alternatively Powered Vehicles

Vehicle Type	1995	1996	1997	1998	1999	2000	2001	2002
EU Sales of Passenger Vehicles	481	1,265	5,271	20,559	13,013	17,823	18,080	18,641 TOTAL 1995-2002: 76,492
US Vehicles in Use	246,855	265,006	280,205	295,037	322,355	406,615	445,300	505,787
Japan Vehicles in Use	11,018	12,208	17,481	38,769	56,429	74,770	106,409	130,329

Source: JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.52; US Department of Energy (no date a), http://www.eia.doe.gov/cneaf/alternate/page/datatables/afvtable1_03.xls, accessed 6 October 2004 for alternatively-powered vehicles in use; US Department of Energy (no date b), http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf14-20_02.html, accessed 6 October 2004 for petrol-electric hybrids made available by manufacturers for sale; ACEA (2003), *Monitoring of ACEA's Commitment to CO_2 Emission Reductions from Passenger Cars 2002*, Final Report, http://www.acea.be/ACEA/20040317PublicationEmissions.pdf, accessed 14 May 2004, p.7

Although sales of alternatively-powered vehicles have been minimal to date, the trends are of interest. Sales of them are increasing in all territories except the EU. In contrast to the US and Japan, sales of alternatively powered vehicles in the EU peaked in 1998, and have levelled out since then at under 20,000 units a year. The lack of penetration by alternatively powered vehicles in the EU is underscored by the European Commission noting that the influence on fleet average CO_2 emissions of alternatively powered vehicles remains negligible, so that until 2002 member states were not required to include them in

reports on CO_2 emission reductions.[28] A word of caution is warranted on the US data too, as many vehicles counted in the data are light trucks that are able to run on alternative fuels such as ethanol. However, they probably never do. This is because it is more expensive and often hard to purchase, apart from the fact that many owners of such vehicles do not realise that it is possible for them to run on alternative fuels.[29] The data given here includes estimates by the US Department of Energy of the number of dual-fuel capable vehicles in the US that actually do run on alternative fuels, but even so this is just an estimate. And if one looks at the figures for alternatively powered vehicles in the US in private hands (as opposed to public authorities) that are not heavy trucks or buses, the figures for 2001 and 2002 are reduced to around 200,000 vehicles (i.e. less than half the figure shown in Table 5.5).[30]

Overall, there remains far more hype and hope around the potential for alternatively powered vehicles than actual market penetration. At this early stage, the data available does not suggest consumer demand is instrumental in encouraging the provision of such vehicles. The trend, such as it is, is strongest in Japan, but even there preferences remain very much with more conventionally-powered vehicles. Until the trends become clearer all that can be said is that the emerging *potential* for sales growth of alternative powered vehicles looks most promising in Japan, and to a lesser extent the US, but consumer demand for them is hardly in the driver's seat.

Social Attitudes and Consumer Demand: Institutional Explanations for a Puzzle

The evidence suggests anything but a clear-cut relationship. In fact, it appears that social concern for the environment is not clearly related to consumer demand. The relationship is contingent on the territory considered. Therefore, any changes in the environmental performance of car firms' products cannot be clearly said to be universally explained by changing social sentiments mediated through markets. As such, an answer is possible to the question of whether social attitudes are associated with consumer behaviour.

For Germany, the answer is a qualified yes. Concern for the environment in Germany is supported by a strong willingness to pay higher prices and choose household products that are better for the environment. There is also a willingness to take non-market action, apart from making financial sacrifices. Consumer behaviour demonstrates a growing preference for more environmentally-friendly vehicles through the dramatic uptake of diesel cars and a preference for smaller cars, albeit with larger (diesel) engines. The result is that fuel economy is improving. Germany does generally have all the signs pointing in the 'right' direction in that one can say social concern for the environment and willingness to act in environmentally-friendly ways is reflected in consumer demand for more environmentally-friendly vehicles. The only qualification is that the link between concern for the environment and environmental action is weaker than in the US and Japan, suggesting that the willingness to act and the action itself via revealed preferences may not necessarily reflect environmental concern. In other words, *it may not reflect post-materialist values*.

For the US, the answer is no. There is strong concern for the environment, as in Germany. There is a strong willingness to purchase environmentally-friendly household products (potentially offsetting less willingness to pay higher prices) plus reasonably strong non-market signals exist for environmental change based on social attitudes, especially via civil action. There is also a strong association between concern for the environment and environmental action. However, the reality is that US consumers are purchasing ever more environmentally damaging vehicles. Perhaps the clearest illustration of this is that their uptake of light trucks as passenger cars is similar to the uptake of diesels in Germany.

For Japan, a clear answer is not possible. Concern for the environment, while as high as in Germany and the US, is somewhat counterpoised by the weakest willingness to take environmentally-friendly action of the three territories. The only exception is in willingness to make non-market financial sacrifices. In addition, despite a stronger association between concern for the environment and environmental action than for Germany, the association is also puzzlingly counter-intuitive at times. Yet Japanese consumers appear to exhibit a strong preference for smaller, more environmentally-

friendly vehicles, and the industry is a pioneer in the development and commercial marketing of petrol-electric hybrids.

What is to be made of these results? For example, why do strong social concerns and a reasonably strong willingness to act in the US have no discernable impact on actual car sales? Why are good environmental outcomes through car sales in Japan not clearly traceable back to social attitudes and a willingness to act on them? Exploration of the institutional implications of these results is required, and explanations are suggested in terms of market versus non-market forces, the effects of government regulations and the role of technology, and the path dependence of established competitive advantages.

Market versus Non-Market Forces

Firms in LMEs coordinate their activities via hierarchies and competition in markets, whereas firms in CMEs are characterised by more non-market cooperative relationships, so that it is not primarily the market and its price signals that determines firms' behaviour, but relationships based on cooperative networks between them, the state and society. Therefore, institutional support for responses to social attitudes should be most acute in CMEs, in this case Germany and Japan. This is because firms in these CMEs are likely to give higher priority to non-market forms of coordination. In LMEs, the archetypal version of which is the US, material market forces (i.e. consumer demand) are the main drivers. The market is given primacy and short term profits are more the aim.[31]

For Germany, social attitudes favour the environment and people are willing to take market and non-market environmental action. However, it cannot be said that there is a strong association between the two, so the environmental action that Germans are willing to take may be for other reasons. Whatever the association though, the result is that in terms of both market and non-market action there are strong incentives for the car industry to sell more environmentally-friendly products, and it has. Indeed, with social and market signals pointing in the 'right' direction, one is tempted to say that good environmental results would have been achieved regardless of whether Germany was a CME or LME.

Nevertheless, it may be said that firms' product offerings reflect social environmental concerns and willingness to take environmental action (even if not necessarily for environmental reasons), and therefore that positive environmental market outcomes have resulted.

A shift to more environmentally-friendly products is more problematic for US car producers. As LME firms, they give priority to market signals and opportunities for shorter-term profitability suggested by such signals. As long as they can sell big, gas guzzling light trucks social attitudes are unlikely to flow through to changes in the products offered by US firms. Therefore, the outcome is a feedback loop of incentives and outcomes that militate against them producing more environmentally-friendly products. On the one hand consumers are concerned about the environment and their concern is associated with their willingness to act on it. However, it is possible that they are not demonstrating strong enough demand in markets on the basis of this concern. They might be willing to do so if only firms would offer products that reflected their concern, but this is unlikely to happen because firms are unwilling to offer vehicles for sale that will attract purchasers on the basis of their environmental concerns because the market signals for so doing are not strong enough. Car firms are therefore more *reactive* to material market pressures, and without a more apparent direct relationship between social attitudes and material market outcomes, and thence short term profitability, firms are unlikely to drive environmental change. Even if US social concerns for the environment are reasonably high, firms are happy for consumers to feel guilty while they sell them more light trucks![32]

Despite reasonably strong social concern for the environment in Japan, willingness to act is weaker than for Germany or the US. This is true of market and non-market action, with the exception of a willingness to make financial sacrifices. Even though a stronger association exists between environmental concern and action than for Germany, it is sometimes counter-intuitive. Therefore, the Japanese impetus for change through social attitudes might be thought to be the weakest of the three territories due to less willingness to act and confused associations between concern and action. However, there is the puzzling fact that more environmentally-friendly vehicles are being sold. It is possible to draw the conclusion that the relationship between social attitudes and actual market

outcomes is tenuous in Japan's case, unless the fact of their existence has more *impact* due to the greater importance accorded to social attitudes by firms in a CME like Japan. This idea is supported by Katzenstein who notes that "visibility characterizes Japan's social order" and that this reinforces the importance of public and published opinion which can give rise to "social sanctions".[33] Thus, the fact of the existence of a social concern for the environment may mean that being *seen* to be environmentally-friendly is very important to firms. This results in firms offering more environmentally-friendly products for sale on the basis of the existence of social concern and *leading* the market even though willingness to take environmental action is lower than in the US or Germany.

The Effects of Government Regulations

There are fuel economy regulations in place in Germany, the US and Japan, but it was shown in Chapter 4 that these differ considerably in how they are constructed.

The EU car industry's peak body, the Association des Constructeurs Europeens d'Automobiles (ACEA), came forward in the 1990s to make voluntary commitments to reduce new car CO_2 emissions/fuel consumption for cars produced in the EU. This commitment was submitted to the European Commission (EC) in July 1998, and was subsequently made a Directive of the EC. As a result of it more than 15 percent of total CO_2 emission savings being sought under the EU's Kyoto Protocol targets will be met. It is thus, de facto, also the German regulation in respect of fuel economy.[34]

The US introduced fuel economy standards in the 1970s via its Corporate Average Fuel Economy (CAFE) program. CAFE was launched through the 1975 Energy Policy Conservation Act with standards coming into force in 1978. It applies to all cars manufactured for sale in the US, whether produced domestically or imported, and is a sales weighted average fuel economy of a manufacturer's passenger car fleet in any given model year. Unlike the EU's voluntary industry commitments, CAFE standards have always been state-mandated with long-standing stiff penalties in the form of fines for firms failing to meet the standards for new car fleets.[35] There has been no change in the CAFE standard

for passenger cars since 1990, nor for light trucks since 1996. Before this the standard actually regulated for *worsening* fuel economy in the late 1980s for passenger cars before being strengthened again in 1989. For light trucks, there is a similar story with the standard little changed from 1987 levels. It is also at significantly weaker levels than for passenger cars.[36]

In Japan, fuel economy targets were introduced in the 1970s under the Energy Conservation Act. Since 1998 targets have been set on the basis of the 'Top Runner Method'. Rather than setting ambitious targets for firms to achieve, this method sets standards based on the most efficient model in a given weight class and then all manufacturers are given time to match it.[37]

The main observation, explored in detail in Chapter 4, is that there are strong voluntaristic components in the EU/German and Japanese regulations. For the US, weaker and externally-imposed standards are the case. Thus, CME-style, the institutional form of regulations in the EU/Germany and Japan is more favourable to the industry taking the lead on environmental advances for their products than in the LME US case. German and Japanese firms are therefore less likely to await market signals and react to them. They are more likely to be proactive in driving environmental change on the basis of social attitudes in advance of such market signals or externally imposed regulations that alter market conditions.

The Role of Technology

Many commentators note that the CME features of Germany and Japan are expressed in different ways. An important difference that has relevance here is the idea that state involvement in the Japanese economy has 'techno-nationalist' aims – i.e. technological leadership is the goal. As noted in Chapter 2, while Japanese corporations aim for technological leadership, German firms are more likely to incorporate technological advances more incrementally and conservatively to improve the quality of existing products.

US firms exhibit an LME-propensity for radical technological change, but only in response to market forces, and then more in emerging industries rather than established ones.

The shift to diesel cars in Germany (and the EU) represents a shift to a technology that is more environmentally-friendly, in a technologically incremental manner. Petrol and diesel are existing well-defined technologies, and what German firms have done is to switch their focus to diesel and improve the efficiency and performance of engines so that they exceed the environmental performance of existing petrol engines.[38] In contrast, the techno-nationalist nature of Japanese CME institutional arrangements means there is an emerging shift on a more radical technological front to, in particular, petrol-electric hybrid vehicles. Although such new technologies are very much at a nascent stage, Japanese companies are the pioneers in commercially releasing them on the market. The Japanese Energy Conservation Centre sees the development of such technologically advanced alternatively powered vehicles, combined with Japan's Top Runner Method of setting fuel economy standards, as a way for firms to "strengthen their international competitiveness, because manufacturers who possess advanced energy-saving technologies can develop new business opportunities that respond to consumer needs by applying their basic technology [because] consumers' preference for equipment with higher energy efficiency is expected to increase".[39]

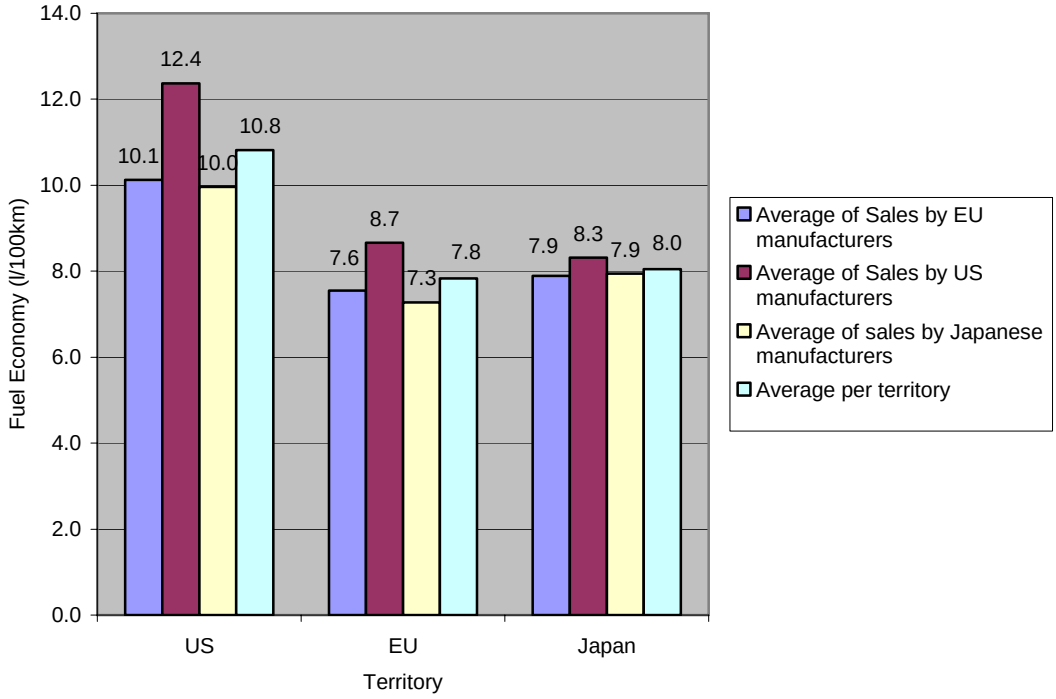
A word of caution is warranted though, in the sense that perhaps the point should not be too overstated. There is no doubt that most of the improvement in the fuel economy/CO_2 emissions of new Japanese cars is related to other factors (e.g. buying smaller cars). Even so, it is possible that techno-nationalist features of Japan's CME mean that petrol-electric hybrid technologies are an emerging strategy for revitalising a mature industry and seeking new markets. This, combined with the possibility that social attitudes on the environment are taken more 'seriously' by firms than in an LME like the US, provides greater incentives for commercializing investment in such radical new technologies. Following from this line of argument is the suggestion, again, that Japanese firms are leading the market. Rather than following it, as one would expect in the case of LME firms, Japanese firms are investing in the development of the latest technologically-advanced products that they believe consumers *should* buy.

The point has already been made that in the US a shift to more environmentally-friendly products is unlikely without clear market signals. US car firms continue to produce and sell ever bigger light trucks as passenger vehicles. It is hardly surprising then, that when US firms think of technological advances they think in terms of equipping their largest and most fuel-thirsty SUVs with the capacity to run on alternative fuels like ethanol, or purchase the technology from Japanese firms to equip them with petrol-electric hybrid drivetrains.[40] Neither represents the technological shift evident in German and Japanese firms' product line-ups.

The Path Dependence of Established Competitive Advantages

Figure 5.10 (derived from Table 4.7 in Chapter 4) shows that US firms sell the least fuel efficient vehicles while EU and Japanese firms sell more fuel efficient vehicles, regardless of the market profile in each territory. Although it is also the case that Japanese and EU firms' products in the US are less fuel efficient than those they sell at home, their products are still significantly more fuel efficient than the local US product. Similarly, while US cars sold in either Japan or the EU are far more fuel efficient than the ones they sell at home, they remain less fuel efficient than EU or Japanese cars. This would seem to reflect firms' production profiles that indicate that US firms are skewed towards the production of larger vehicles, particularly light trucks. Indeed, production data for 1998 to 2004 indicates that 30 to 50 percent of the output of the two major US producers, Ford and General Motors, is accounted for by 'light commercial vehicles' by comparison to 3 to 6 percent for Volkswagen and 6 to 21 percent for Toyota, the largest German and Japanese firms. These production results have implications for firms' profit sources. Ford and General Motors rely on light trucks for over 70 percent of their profits and they therefore face a much more significant re-design of their product portfolios than German and Japanese firms in order to be more environmentally-friendly.[41]

Figure 5.10: Average Fuel Economy for the EU, US and Japan by Firm Nationality, based on 2002 Sales



Source: D. Austin, N. Rosinki, A. Sauer C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004, p.31.[42]

While not directly related to the institutional insights of the VOC approach, there are clear institutional implications nonetheless that speak to the power these firms have to influence the shape of markets. As noted in Chapter 1, not only is the car industry concentrated in a small number of industrialised states, it is then concentrated in a handful of firms from each of these. The implications are that the path dependent effects of entrenched competitive advantages, in terms of production and profits from producing larger vehicles, outweigh the signals provided by social attitudes. This could certainly be the case in the US, but it may equally be true that a competitive advantage in the production of smaller, more fuel efficient vehicles on the part of German, Japanese (and European) manufacturers has the opposite effect. Thus, consumers are not so much 'in charge' of

products offered for sale as firms, because they must accept the products firms produce regardless of their attitudes or demand preferences.

Conclusion

Three conclusions have been reached. First, concern for the environment is not necessarily reflected in willingness to act take environmental action. German WVS respondents are more likely than US or Japanese respondents to be willing to take environmental action, despite concern for the environment being higher in the US and Japan. Secondly, environmental concern is not necessarily associated with environmental action. It is at best weakly to moderately associated. In the case of Japan it is sometimes counter-intuitively associated. In the case of Germany it is weakly associated despite willingness to take environmental action being stronger than in the case of the US and Japan. This suggests that other non-environmental factors may be driving German respondents to desire to take environmental action, so that they are willing to act in environmentally-friendly ways for non-environmental reasons. Thirdly, concern for the environment and willingness to take environmental action do not necessarily find expression in market outcomes. This is only clearly the case for Germany, albeit possibly for non-environmental reasons. Overall, these conclusions indicate that social concern for the environment is not clearly related to consumer demand. Therefore, any changes in the environmental performance of car firms' products cannot be clearly said to be universally explained by changing social sentiments mediated through markets.

The evidence disproves the idea that post-materialist values (concerning the environment and the car industry at least) are a universal source of behavioural change. The hypothesis that social attitudes are reflected in willingness to take action that is subsequently manifested in markets via consumer preferences, and that this then alters firm strategies, must be rejected. Although such a clear causal path is intuitively appealing and logically reasonable, the evidence does not support it as a universal phenomenon. Therefore, the traditional (simplistic) rendering of firms acting in more environmentally-friendly ways as a consequence of them being instrumental profit-maximising entities is

insufficient.[43] However, explanations for the findings are suggested utilising the insights of the VOC approach, on the basis that the different institutional settings faced by firms in their home states have implications for their corporate strategies.

For German firms, embedded in a CME with an institutional willingness to look beyond market forces to other motivating factors for action, there are clear incentives from social concern for the environment and willingness to take environmental action for firms to pursue more environmentally-friendly product strategies. Even if the two are only weakly linked, and environmental action may be for non-environmental reasons, the incentives are present. Overall, there are clear incentives for German firms to act either to lead the market or respond to its signals, and they have done so via the development of smaller diesel vehicles that have been enthusiastically embraced by consumers. Given their LME institutional setting, a lack of market signals for US firms that favour environmental improvements in vehicles offered would appear to override significant social concern for the environment. Therefore, for the US a materialist analysis, even in the face of increasing post-materialist values, remains appropriate. Japanese firms may be in the lead, ahead of market signals, offering products on the basis of social environmental concerns that consumers then purchase. Even if social concerns are weaker and their association with environmental action unclear at times, Japan's techno-nationalist CME version of capitalism supports its firms behaving in this manner, and to offer more radical technological solutions than is the case for German firms which have acted more incrementally to improve the environmental performance of more traditional products. The manner in which fuel economy regulations are constructed also places the onus on Japanese and German firms to lead the market more than is the case in the US.

Ultimately, what we have is a case of 'chickens and eggs'. It is hard to clearly determine whether German firms are reacting to social concerns and leading the market, or reacting to consumer preferences expressed in the market. For institutional reasons, they and Japanese firms are more likely than US firms to lead the market (on the basis of social concerns) than react to its signals. This is true for German firms even if they are likely to be acting less for post-materialist reasons than firms in the other territories. But regardless of their home state, in an industry where production is concentrated in a handful of

enormous corporations and less than two or three of these dominate their home territories, to some extent consumer choice will always be defined by these firms. Their established competitive advantages produce a path dependence in their product offerings that may override shifts in social attitudes, at least in the short term. Thus, if consumers are buying more environmentally-friendly vehicles in Japan and Germany maybe this is because this is where their production expertise lies. Similarly in the US, despite an expressed willingness to act on environmental concerns, it may be that the industry offers less environmentally-friendly vehicles than German or Japanese firms because their production structures mean that these products are instrumental to their ongoing profitability.

One final observation is that the institutional factors considered in this chapter are largely exogenous ones. What is required is an examination of firms' endogenous institutional factors (i.e. their internal cultures), as it is the interplay of both exogenous and endogenous factors that completes what remains a more complex picture than that presented here (and indeed a more complex than that presented by more optimistic commentators). This is the focus of Chapters 6 and 7 which examine firms' rationales for environmental product development expressed in their environmental reports and in interviews with key personnel.

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[1] D. Korten (1999), *The Post-Corporate World*, San Francisco: Berrett-Koehler Publishers; P. Hawken, A. Lovins and H. Lovins (1999), *Natural Capitalism: Creating the Next Industrial Revolution*, New York: Little Brown and Co; and J. Karliner (1997), *The Corporate Planet*, San Francisco: Sierra Club Books.

[2] For example, see C. Holliday Jr, S. Schmidheiny and P. Watts (2002), *Walking the Talk*, Sheffield: Greenleaf.

[3] M. Porter (1990), *The Competitive Advantage of Nations*, New York: The Free Press; M. Porter and C. van der Linde (1995a), 'Towards a New Conception of the Environment – Competitiveness Relationship', *Journal of Economic Perspectives*, Vol.9, No.4, pp.97-118; A. Florini (2003b), *The Coming Democracy: New Rules for Running a New World*, Washington: Island Press; and A. Prakash (2000), *Greening the Firm: The Politics of Corporate Environmentalism*, Cambridge: Cambridge University Press.

[4] U. Desai (2002a), 'Institutions and Environmental Policy in Developed Countries' in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press; and R. Inglehart (1997), *Modernisation and Postmodernisation: Cultural, Economic and Political Change in 43 Societies*, Princeton: Princeton University Press.

[5] T. O'Riordan and A. Jordan (1996), 'Social Institutions and Climate Change', in T. O'Riordan and J. Jager eds., *Politics of Climate Change: A European Perspective*, London and New York: Routledge, p.67. This perspective would seem to agree with, and flow from, the definition given for institutions in Chapter 1 as "a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive, or material

reasons". See P. Hall and D. Soskice (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice eds., *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press, p.9.

[6] P. Wapner (1996), *Environmental Activism and World Civic Culture*, Albany: State University NY Press, p.62.

[7] *Ibid.*, pp.64-65.

[8] It was originally known as the European Values Survey.

[9] For details, see World Values Survey (no date), http://www.worldvaluessurvey.org, accessed 15 January 2004.

[10] The questions in category 3. go to March and Olsen's 'logic of appropriateness'. See J. March and J. Olsen (1998), 'The Institutional Dynamics of International Political Orders', *International Organization*, Vol. 52 No.4, pp.943-969; and J. March and J. Olsen (1989), *Rediscovering Institutions: The Organizational Basis of Politics*, New York: The Free Press. They are also very much at the heart of comparative political economy approaches, and the normative basis for institutions in the VOC approach. The 'rules of the game' reference is from R. Whitley (1999), *Divergent Capitalisms: the Social Structuring and Change of Business Systems*, Oxford: Oxford University Press, p.5.

[11] There is an extensive literature that discusses such cultural traits. An excellent and succinct summary is provided in S. Wilks (1990), 'The Embodiment of Industrial Culture in Bureaucracy and Management', in S. Clegg and S. Redding eds., *Capitalism in Contrasting Cultures*, Berlin: Walter de Gruyter. See also C. Hampden-Turner and A. Trompenaars (1993), *The Seven Cultures of Capitalism: Value Systems for Creating Wealth in the United States, Japan, Germany, France, Britain, Sweden and the Netherlands*, New York: Currency Doubleday.

[12] The percentages for respondents who strongly agreed with paying higher prices was: Germany 9 percent; US 5 percent; and Japan 4 percent.

[13] In wave three, 10 percent of US respondents in the US had a great deal of confidence in the environmental movement by comparison to 8 percent in Germany and 6 percent in Japan. In wave four, the question was not asked of German respondents, but the gap between US and Japanese respondents was even greater: while again only 6 percent of Japanese respondents had a great deal of confidence in the environmental movement, 16 percent of US respondents did.

[14] 33 percent of German respondents strongly agreed that the government should reduce environmental pollution but it should not cost them anything, by comparison to 25 percent in the US and 13 percent in Japan.

[15] See K. Bradsher, (2002), *High and Mighty – SUVs: The World's Most Dangerous Vehicles and How they Got That Way*, New York: Public Affairs, p.246 and p.451; W. Harrington and V. McConnell (2003), *Motor Vehicles and the Environment*, Washington: Resources for the Future, http://www.rff.org/Documents/RFF-RPT-carsenviron.pdf, accessed 2 January 2004, p.52; OECD (2002b), *Strategies to Reduce Greenhouse Gas Emissions from Transport*, Paris: OECD, p.17; and D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004, p.20. It is also true that other emissions from diesels, such as particulate matter, tend to be much higher than from equivalent petrol engines. However, tougher regulations for such emissions in all three territories in recent years, along with technical advances by manufacturers, mean that such environmental concerns are increasingly being addressed. For example, see ECMT (2001), *Vehicle Emission Reductions*, Paris: OECD.

[16] OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD, p.15.

[17] Examples of technological advances in engine technologies include twin overhead cams, multiple-valve cylinders, variable cam intake timing and multiple point fuel injection.

[18] A similar point is made in OECD (2004), *op. cit.* The OECD says that consumers are purchasing heavier and more powerful vehicles with higher power to weight ratios. But given that vehicle weight can be due to a number of factors (e.g. more safety features), and that engines have got more powerful in general, the only way it can clearly be concluded that a lack of concern for the environment is behind such behaviour is if larger engines are being put in all cars generally.

[19] This is the reason why they cannot be represented on the same graph. As noted earlier, the exact car class definitions are provided in Appendix C.

[20] There is a slight discrepancy in the data by comparison to Figure 5.2. The reason for this appears to be that the data is from different sources, and therefore reflects different criteria for allocating sales to particular classes. Even so, comfort may be taken from the observation that in either case the point that 4wds represent a very small niche market still stands.

[21] K. Hellman and R. Heavenrich (2004a), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001.pdf, accessed 13 May 2004, pp.14-16; JAMA (2004c), *Motor Vehicle Statistics of Japan 2004*, Tokyo: JAMA, p.12; and ACEA (no date c), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications : Share of Diesel Cars*, http://www.acea.be/ACEA/DIESEL-PC-90-02.pdf, accessed 9 June 2004. The 2003 figure the EU is from ACEA (2004b), *EU15 Economic Report*, http://www.acea.be/ACEA/ER-0204-Internet.pdf, accessed 9 June 2004.

[22] For example see ACEA (2004a), *Why Diesel ?*, http://www.acea.be/ACEA/20040212PublicationsWhyDiesel.pdf, accessed 5 July 2004. The annual report of the German peak industry body is liberally sprinkled with references to the environmental benefits of diesel, especially vis a vis climate change. See VDA (2004), *Annual Report 2004*, Frankfurt: VDA, http://www.vda.de/en/service/jahresbericht/files/VDA_2004_en.pdf, accessed 20 March 2005. German firms' environmental reports also highlight diesel technologies as central to their environmental strategies, but this is not the case for US and Japanese firms.

[23] A search on *Factiva* on 29 July 2005 for the specific term "petrol-electric hybrid" alone produced 336 hits for the preceding 12 months. Petrol-electric hybrids are driven by a combination of two power sources, one a traditional internal combustion engine and the other an electric motor. The Toyota Prius and Honda Insight are examples of such cars. Cars that run on hydrogen, when available, will produce nothing but water vapour as exhaust gases. Depending on the source of the hydrogen they thus have the potential to have minimal environmental impact by comparison to cars today. Other alternatively powered vehicles include those that can run on other fuels such as ethanol, liquid propane gas (LPG) and compressed natural gas (CNG).

[24] N. McDonald (2004), 'Green Hybrids Clean Up in Local Market', *The Australian*, 29 January, p.7; and no author (2004), 'Driven by the Oil Price', *The Economist*, 26 August.

[25] OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.11.

[26] The EU calculation is an overly-optimistic one calculated on the basis that all vehicles sold reman in use.

[27] ACEA (2003), *Monitoring of ACEA's Commitment to CO_2 Emission Reductions from Passenger Cars 2002*, Final Report, http://www.acea.be/ACEA/20040317PublicationEmissions.pdf, accessed 14 May 2004, p15.

[28] Commission of the European Communities (2002), *Monitoring of ACEA's Commitment on CO_2 Emission Reductions from Passenger Cars (2001)*, Joint Report of the European Automobile Manufacturers Association and the Commission Services, SEC(2002) 1338, http://europa.eu.int/comm/environment/co2/co2_monitoring.htm, accessed 1 June 2004, p.11.

[29] Harrington and McConnell, *op. cit.*, p.75. See also Bradsher, *op. cit.* The reality is that in 2002, alternative fuel accounted for less than 0.2 percent of all transport fuels used in the US. See Austin et. al., *op. cit.*, p.14.

[30] This is based on 197,284 light duty vehicles in use in 2001 and 221,542 in 2002, exclusive of petrol-electric hybrids of which only 34,689 and 19,843 were offered respectively in 2001and 2002. Data is based on that presented at US Department of Energy (no date c), *Renewable and Alternative Fuels*, http://www.eia.doe.gov/fuelalternate.html, accessed 11 October 2004.

[31] Again, for a detailed analysis see authors such as Hall and Soskice, *op. cit.*; L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation', *International Organization*, Vol.51, No.1, pp.1-30; L. Weiss (1998), *The Myth of the Powerless State: Governing the Economy in a Global Era*, Ithaca: Cornell University Press; L. Weiss and J. Hobson (1995), *States and Economic Development, a Comparative Economic Analysis*, Cambridge: Polity Press; R. Dore (2000a), *Stock Market Capitalism: Welfare Capitalism: Japan and Germany versus the Anglo Saxons*, Oxford and New York: Oxford University Press; D. Held, A. McGrew, D. Goldblatt and J. Perraton (1999), *Global Transformations: Politics, Economics, Culture*, Cambridge: Polity Press; J. Hollingsworth (1997a), 'Continuities and Changes in Social Systems of Production: the Cases of Japan, Germany and the United States', in J. Hollingsworth and R. Boyer eds., *Contemporary Capitalism: The Embeddedness of Institutions*, Cambridge: Cambridge University Press; C. Crouch and W. Streeck (1997), 'Introduction: the Future of Capitalist Diversity', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications; and Whitley (1999), *op. cit*.

[32] The Alliance of Automobile Manufacturers (AAM), the US industry's peak body, supports such a conclusion when it says that US firms could be more proactive in developing more environmentally friendly vehicles but consumers simply will not buy them. See the AAM's CAFE position statement at AAM (no date a), *What is Corporate Average Fuel Economy (CAFE)?*, http://autoalliance.org/archives/fact2.pdf, accessed 24 March 2004. See also J. Newton-Small (2003), 'Detroit's Fuel Economy Woes', *Global Exchange*, http://www.globalexchange.org/campaigns/oil/1217.html, accessed 13 January 2004.

[33] P. Katzenstein (1996), *Cultural Norms and National Security: Police and Military in Postwar Japan*, Ithaca: Cornell University Press, pp25-26.

[34] ACEA (2002), *ACEA's CO_2 Commitment*, http://www.acea.be/ACEA/brochure_co2.pdf, accessed 11 June 2003, p.5 and p.21; and ECMT (2003), *Monitoring of CO_2 Emissions from New Cars*, CEMT/CM(2003)10, provided by the ECMT on request, p.35.

[35] Since 1983, car firms have paid more than US$500 million in penalties. See NHTSA (no date), *CAFE Overview: Frequently Asked Questions*, http://www.nhtsa.dot.gov/cars/rules/CAFE/overview.htm, accessed 15 January 2004.

[36] ECMT (2001), *op. cit.*, p.79; and NHTSA (2003), *Automotive Fuel Economy Program Annual Update Calender Year 2002*, http://www.nhtsa.dot.gov/cars/rules/CAFE/FuelEconUpdates/2002/2002AnnualUpdate.pdf, accessed 15 January 2004, p.4

[37] OECD (2002a), *Environmental Performance Reviews: Japan*, Paris: OECD, p.79-80; JAMA (2003), *The Motor Industry of Japan*, Tokyo: JAMA, http://www.jama.or.jp/eng/pdf/MIJ2003.pdf, accessed 18 January 2004, p.24; B. Stempeck (2003), 'DOT Proposes Revamp of Fuel Economy Regulations', *Greenwire*, 23 December, http://knowledge.fhwa.dot.gov/cops/italladdsup.nsf/docs/51AE2D33EC82E2AD85256E0500839744?opendocument&CurrentCategory=Other%20Transportation%20and%20Air%20Quality%20Technical%20Assistance, accessed 28 January 2004; J. Arima (2000), 'Top Runner Program', *Workshop on Best Practices in Policy and Measures*, Copenhagen, 11-13 April, http://unfccc.int/sessions/workshop/000411/jpnja.pdf, accessed 28 April 2004; and ECMT (2001), *op. cit.*, p.37 and p.81

[38] This is exactly what German firms themselves say in their environmental reports. For example, see Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Responsibility*, Wolfsburg: Volkswagen AG; DaimlerChrysler AG (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM. The last of

these in particular, on pages 32-35, stresses its history of expertise in diesel dating back to 1936, and its developments of the technology as a process dating from its first pioneering efforts.

[39] Energy Conservation Centre (no date), *Effects of the Top Runner Program*, http://www.eccj.or.jp/top_runner/chapter4-2.html, accessed 28 April 2004.

[40] This is clear from the strategies that firms such as General Motors and Ford outline in their environmental reports, as discussed in Chapter 3. For example, see Ford (2004), *2003/4 Corporate Citizenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company; and General Motors (2004), *2004 Corporate Responsibility Report*, General Motors.

[41] Production data is from OICA (no date), *Production Statistics*, http://www.oica.net/htdocs/Main, accessed 25 July 2005. Data on firms' profit and the 'carbon intensity' of the products from which they derive it is from Austin et. al., *op. cit.*, p.32 and pp.63-64

[42] The careful reader will note that the fuel economy figures quoted here are slightly higher than those indicated in Figure 5.1. I am unable to account for this other than to say that the data comes from different sources, but comfort may be taken in the fact that the relative differences between territories appear consistent.

[43] This was the hypothesis raised in Chapter 1 where it was noted that constructing firms in this manner is overly simplistic because it suffers from what Katzenstein terms "vulgar rationalism" as it "infers the motives of actors from behaviourally revealed preferences". In this case, vulgar rationalism would hold that if firms are taking a course of action that sees them as more concerned for the environment, this must be because consumer demand indicates that it is profitable for them to do so. See Katzenstein, *op. cit.*, p.27.

Chapter 6: Firms' Rationales for Environmental Product Development Initiatives: Environmental Reporting

Introduction

In Chapters 4 and 5, state regulations and market forces were considered as the key material factors impacting on the car industry. In Chapter 4, it was shown that institutional factors determine the environmental performance of the industry in the European Union (EU), United States (US) and Japan more than actual regulations. Specifically, market mechanisms do not necessarily encourage consumers to use their cars less, nor purchase less fuel. Therefore, it cannot be said that they are clearly a mechanism for encouraging firms to change their product strategies. In addition, neither the timing nor stringency of standards is as important as the institutional manner in which state-business relations inform their development. In Chapter 5 it was shown that although social concern for the environment exists in Germany, the US and Japan, willingness to act on such concerns is by no means universal, and social attitudes are not necessarily reflected in consumer demand. While in the case of Germany there is a clear link between social concern for the environment, willingness to act on this concern, and actual consumer demand, the relationship between these variables is far more tenuous in the US and Japan. In the US, there is a reasonably strong willingness to act on environmental concerns, but little demonstration of this in markets. For Japan the opposite situation to the US is the case: concern for the environment and willingness to act on this concern are the weakest of the three, yet ever more environmentally-friendly vehicles is the market outcome.

The results so far go against the grain of the 'accepted' wisdom of liberal economic perspectives: that rational firms with instrumental material goals aim to maximise profits in markets, while being bound by state regulations. Instead, institutional factors provide more compelling explanations for the empirical evidence. Specifically, the extent to which a car firm's home state variety of capitalism (VOC) is characterised more by a liberal or coordinated market economy (LME versus CME) better explains variations in the outcomes. Only in the case of US firms is the materialist liberal economic view somewhat sufficient to explain their behaviour.

However, this is to be expected because the LME of the US institutionally mirrors the value system of that very approach.[1] For example, US firms appear to be adopting a reactive, and barely sufficient, approach to fuel economy standards, and are responding more to consumer demand than social attitudes. The environmental action they take (or do not take) is primarily the result of market forces and state regulation. By contrast, CME-based German and Japanese firms focus less on material factors and more on normative ones. German firms, as part of the European car industry, take a more cooperative approach to setting regulations and appear to be acting on the basis of social attitudes as much as actual consumer demand. In addressing their carbon dioxide (CO_2) emission commitments they are promoting diesel vehicles, commensurate with a CME preference for incremental technological advances in established industries. Japanese firms are taking a more radical technology-driven approach befitting their technonationalist version of a CME. Proactively acting in concert with, and possibly ahead of, the state and certainly ahead of consumer demand, they appear to be more internally driven in their environmental initiatives, and possibly more concerned with social attitudes than actual consumer demand.

These insights from the empirical evidence presented so far at a national level are examined in more detail in this chapter, and Chapter 7, which evaluate individual German, US and Japanese firms' rationales for their environmental product developments. Two major questions are posed. First, what do car firms say is driving them to make environmentally positive changes to how they do business? This includes an assessment of whether they highlight reacting to material factors (e.g. market forces and public policy/regulation) or proactively taking steps for more normative reasons (e.g. social concerns and internal company strategies). Secondly, what are the implications of this for how action on environmental concerns occurs within the industry in each territory? Answering this will involve seeing whether firms' nationality matters and whether firms of different nationality are key drivers of change and why.

There is a problem in seeking to identify rationales. The problem is that implicitly one is examining attitudes and beliefs, but these cannot be directly observed. They must be inferred on the basis of other indicators.[2] While recognising this, the objective of Chapters 6 and 7 is to attempt to get inside the 'heads' of firms to 'observe'

such attitudes and beliefs via first-hand perspectives derived from what individual firms say in their environmental reports, and the views offered by key personnel in interviews. The nature of the perspectives expressed, whether in writing or verbally, are informative because, in the words of Finnemore and Sikkink, "norms prompt justification for action and leave an extensive trail of communication among actors that we can study",[3] particularly in the light of hard evidence and data. The two go together: conclusions based solely on hard evidence and data without knowledge of norms that express justification for action may produce misleading conclusions based on a priori assumptions.

In this chapter, a 'snapshot' is taken of firms' latest environmental reports.[4] These are qualitatively analysed via applying codes for references to material versus normative factors, and then for codes in sub-categories below these – e.g. material factors include sub-categories such as market forces in the former of consumer demand, as well as state regulation; normative factors include social attitudes and internal company strategies. Coding on these and deciding what makes them up was a complex endeavour. It is explained in the first section on methodology. This is followed by a quantitative summary of coding on material versus normative factors, before a largely qualitative discussion of the codes on sub-categories within them. In addition, coding for the over-arching concern of 'sustainability' as a concept referred to in firms' environmental reports is considered, before conclusions are reached on the different rationales for action offered and the strategies these suggest.

What is found is that material factors, especially market forces, are stressed by US firms. Normative factors are stressed more by German and Japanese firms, especially social attitudes for German firms and internal company strategies for Japanese firms. Therefore, it becomes clear that the institutional basis of capitalist relations in their home states, outlined via the VOC approach, illuminates how firms themselves perceive and communicate their environmental product development initiatives. The findings therefore also support the insights of the VOC approach in that institutional explanations are found to be important for understanding the rationales firms themselves see as most important to highlight when presenting their environmental product development initiatives.

Methodology: Analysing Firms' Environmental Reports

There are two important reasons for examining environmental reports. First, what is of interest is what firms from different states, and indeed the same state, perceive as constituting 'the best possible light' in which their environmental initiatives may be cast. What do they see as most convincing and brand-enhancing for their readerships? What do they think will inspire confidence? What do they think will convince readers that they are a firm committed to environmental concerns and acting on them? Therefore, these reports present firms' understanding of how their environmental strategies should be 'best' presented. Secondly, because considerable effort goes into publishing a written report, it presents what each company believes to be its *key* messages. While all the firms examined have websites that contain environmental information, these are updated regularly and evolve over time. However, a written report endures and presents, in one comprehensive document, the activities a firm believes are most important to communicate for the period it covers.[5]

The sections of the environmental reports analysed, the codes applied to statements in these sections and the manner in which these are to be analysed are described before presenting the findings of the analysis.

Sections of Firms' Environmental Reports Analysed

Three sections of car firms' environmental reports were analysed. First, executive statements presenting the view of the Chief Executive Officer (CEO) and other board members that appear at the front of reports were examined. These 'set the scene' of the report by presenting the view of its contents by the highest office holder/s. Secondly, environmental 'vision' statements were examined. These relate to the section/s presenting the firm's vision with respect to environmental performance. The executive and vision statements articulate *why* the firm is taking environmental action, as opposed to simply reporting on actions already taken. Thirdly, the firms' environmental policy guidelines were examined. These guidelines operationalise the company's vision by setting concise, clear rules for all employees for action on environmental issues. Although these three sections account for a small proportion of the reports in total,

focussing on them permits a comparative analysis on an as-near-as-equal basis between what are otherwise often stylistically dissimilar reports. They are also where one would most expect to find *rationales* for action rather than descriptions of action undertaken.

The text to which codes were applied for each firm is provided in Appendix D. All quotations from the text of firms' reports that follow are referenced to the relevant sections in Appendix D, rather than the page number in the original report, so that the reader may easily find them in their context.

Codes Applied

The executive statements, environmental vision statements and environmental policy guidelines were coded for material versus normative factors. Coding was done using QSR NVivo 2.0 qualitative analysis software. The definitions of the factors to which codes were applied, and their sub-categories, are defined below.

Material factors are split between the sub-categories of market forces and state regulation. These are largely the material factors already examined in Chapters 4 and 5. For the sake of coding, market forces are defined in material terms as statements that identify forces that affect the firm's financial bottom line and its economic performance as a result of the products it sells. Therefore, codes applied within this sub-category related to the following concepts:

- Competition, in terms of:
    - Consumer demand: The need to take account of consumer preferences or demand – e.g. tying efforts on the environment to demand for these, or saying that market forces temper what can be done.
    - Competitive pressure from other firms: Competitive pressures from other firms in markets or within the industry as a whole.
- Safeguarding financial returns, in terms of:
    - Profits and sales: References to profits and sales, whether associated with environmental concerns or otherwise.

- Shareholder value: Providing value to shareholders, or stock performance generally.
- Risk management: Identification of environmental factors as a significant business risk factor that needs to be addressed.

- Proactive action, in terms of:
  - Market share/leadership: Being first to market with products, or leading in them, as a business strategy that drives environmental product development initiatives.
  - Business opportunity: The idea that being environmentally responsible and producing products that reflect this represents a business opportunity.

State regulation is defined as references to regulations, including complying with them, exceeding them, acting on the future likelihood of them etc. Codes applied within this sub-category related to the following concepts:

- International regulation: Internationally agreed conventions, protocols etc. on environmental issues, including:
  - International meetings: Meetings convened by international organisations such as the United Nations Conference on Environment and Development (UNCED), the United Nations Environment Programme (UNEP) etc., or participation in international forums where environmental performance is addressed including meetings held by industry groups such as the World Business Council for Sustainable Development (WBCSD).
  - International protocols: Ratified international agreements that states have decided to adopt (e.g. the Montreal Protocol and Kyoto Protocol).
  - International voluntary agreements: Adherence to, or participation in, international non-binding international agreements, such as the Global Reporting Initiative (GRI), Coalition of Environmentally Responsible Economies (CERES) Principles etc.

- National regulation: National regulations, policies, agreements etc. on environmental issues, in terms of:
    - National legislation: Meeting or exceeding the requirements of national legislation.
        - Exceeding legislative targets: Exceeding the requirements of state legislation.
        - Achieving legislative targets: Meeting the requirements of state legislation.
    - National voluntary agreements: National voluntary agreements agreed and supported jointly between the industry and regulatory authorities.
    - Input to policy/regulations: Input to/the provision of advice on national regulations and regulatory settings.
- Legislation-general: Meeting or exceeding regulatory requirements generally.
    - Exceeding regulations: Exceeding the requirements of regulations generally,
    - Complying with regulations: Complying with the requirements of regulations generally.

Normative factors are split between the sub-categories of social attitudes and internal company strategies. Social attitudes were considered in Chapter 5. However, internal company strategies, which are endogenous to individual firms, have not been considered so far because the analysis in Chapters 4 and 5 has been at a national, rather than individual firm, level. Social attitudes are defined as non-market forces to do with social perceptions of environmental concerns, and the way this indirectly affects perceptions of the firm's business or the firm's reaction to them for other reasons. Codes applied within this sub-category related to the following concepts:

- General social concern/raised awareness of environmental issues: A recognition of increased social concern for the environment and a response to this.
- Firm image, in terms of:

- Brand value: The value of the name of the company and what it represents, especially in terms of loyalty and price premiums that it can extract for its products.
- Building trust: References to trust, respect and generally high standing in a more general sense than brand value.

- Responsibility to society on various levels, including:
  - Responsibility to society – unspecified: The firm has a responsibility to society generally.
  - Responsibility to society – global: The firm has a responsibility to society globally.
  - Responsibility to society – nation: The firm has a responsibility to society nationally.
  - Responsibility to stakeholders: The firm has a responsibility to those directly affected by the company's operations, specifically customers, suppliers, employees and government.

Internal company strategies are defined simply as endogenous factors that lead firms to take the environment seriously. Codes applied within this sub-category related to the following concepts:

- Corporate Policy: A statement that indicates not just that environmental impact is something for which the firm must take responsibility, and take action in respect of it, but that it is a:
  - Corporate Belief: Environmentally responsible behaviour is a clear strategic commitment, or corporate goal. In a sense, everything done by a company is because it believes it is a 'good thing' to do/is in its interest, but this code relates to statements that represent a clear belief company-wide that the environmental impact of its products is important. It is a statement along the lines that 'we do this because we believe it is a good/right thing to do'.
  - Guiding principle: Not just a statement of belief, but reference to actual internal guiding principles, or guidelines for operation, or policies that codify

or implement the environmental performance of the company. To some extent this represents a rationale based on circular reasoning (e.g. along the lines that 'we do it because we have guideline that says we do it') but it still indicates a rationale for action based on internal company strategies that in this case are clearly codified.

- History/path dependence: The firm characterises itself as one that takes the environmental impacts of its actions seriously, and thus continues to be one where concern for the environment is part of how it does business. This is not a change in direction but a continuation of a commitment and strategy.[6]

- Leader's vision: The leader her/himself identifies, or is identified as having, a commitment to the environment and action that is aimed at reducing the environmental impacts of the company's products.

No preconceived notions of what codes might be applied within the sub-categories were established a priori. The idea was that the reports 'speak for themselves'. Therefore, codes under the sub-categories emerged in the course of reading and re-reading the reports over a period of six months in 2005. In so doing, it was also realised that another category of coding was required due to the fact that the theme of 'sustainability' recurred in the texts. This occurred in two ways. First, the over-arching concern of the concept of sustainability was mentioned. Secondly, the link between environmental and economic sustainability was made by several firms and given as the reason behind their environmental product development initiatives. Coding was applied in respect of both these concepts, which are defined as follows:

- Environmental sustainability: Specific reference to the concept in terms of environmental sustainability itself, or sustainable development, environmentally sustainable economic development, sustainable mobility or similar. Any use of the word 'sustainable' in an environmental context.

- Environmental and economic sustainability linked: An expressed belief that environmental sustainability is connected with economic sustainability. This may be the idea that there is a double dividend in looking after the environment: not only does the environment benefit, but the business benefits through being

more economically sustainable as a result. Or it may be that the two are linked and need to be balanced.

The following analysis of the codes applied is both quantitative and qualitative. The relative percentages of codes on material and normative rationales are examined first. A qualitative analysis is then applied to investigate the underlying reasons for variations in the distribution of material and normative rationales for action. Therefore, the analysis aims to highlight the actual proportional differences in codes between firms (i.e. relative emphasis), as well as the qualitative nature of the statements codes represent (i.e. how motivations are ascribed). The coding rules applied and detailed results of coding are provided in Appendix E.

Material versus Normative Factors

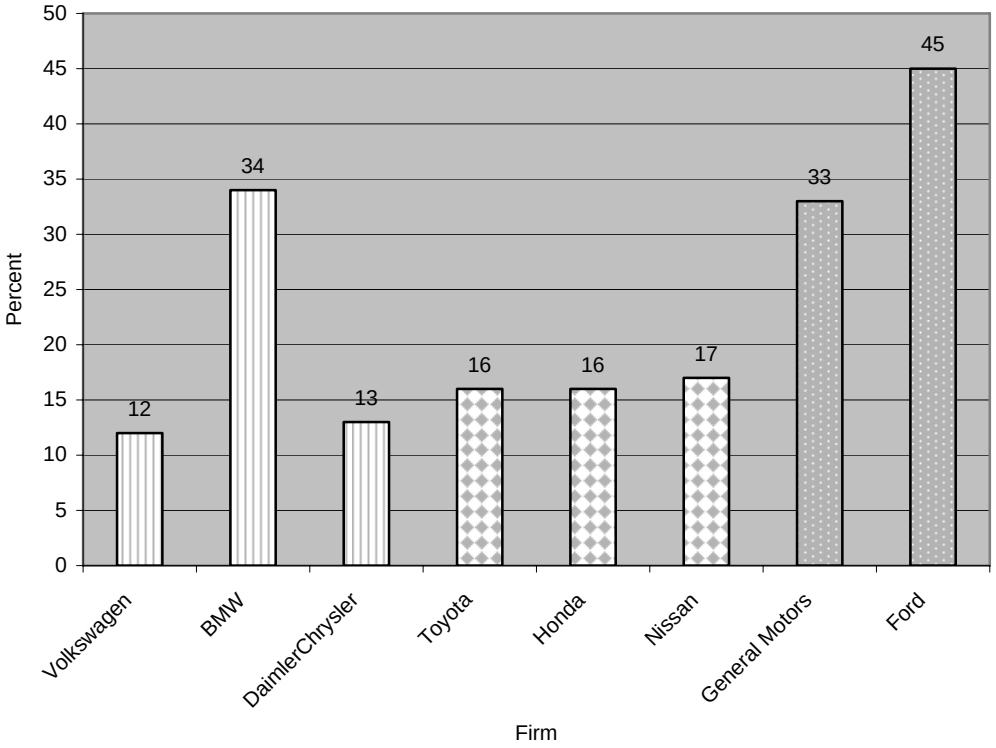
The VOC approach predicts that material factors should be of greater importance for LME-based US firms than CME-based German and Japanese firms. The latter should focus more on normative rationales for action (i.e. a logic of appropriateness rather than consequentialism). This prediction is borne out by the rationales presented by firms themselves in their environmental reports. Table 6.1 summarises the results of coding the environmental reports for material and normative factors, and their sub-categories, on a national average basis. Figures 6.1 to 6.4 show the relative coding proportions on a firm by firm basis for each of the sub-categories within material and normative factors.

Table 6.1: Summary Totals of Material versus Normative Factors

	Market Forces (%)	**State Regulation (%)**	**TOTAL MATERIAL (%)**	**Social Attitudes (%)**	**Internal Company Strategies (%)**	**TOTAL NORMATIVE (%)**	**ALL CODES (%)**	**ALL CODES (No.)**
GERMAN AVERAGE	18	23	41	37	22	59	100	227
JAPAN AVERAGE	16	16	32	32	36	68	100	177
US AVERAGE	40	10	51	28	21	49	100	124

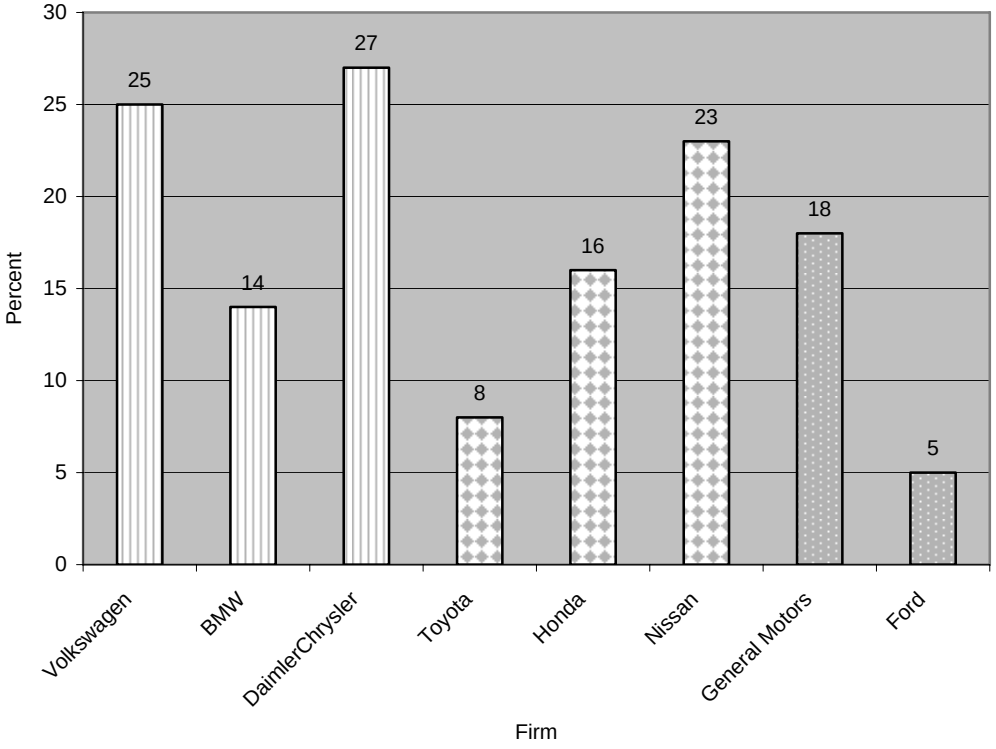
Source: Company Environmental Reports.

Figure 6.1: Proportion of all Codes on Market Forces by Firm



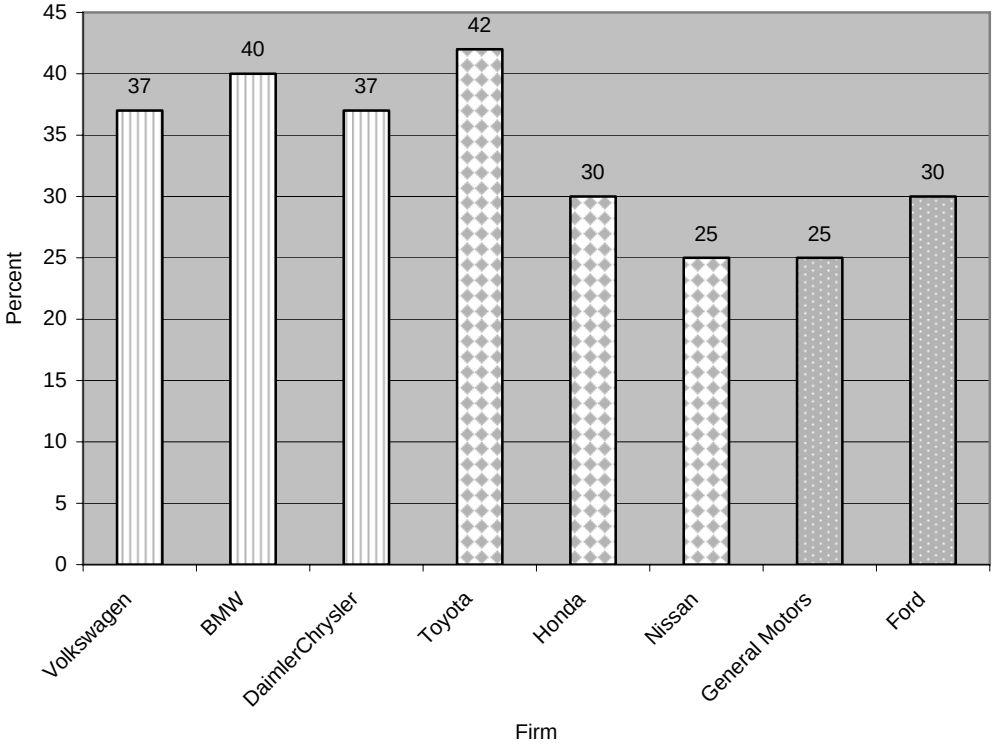
Source: Company Environmental Reports.

Figure 6.2: Proportion of all Codes on State Regulation by Firm



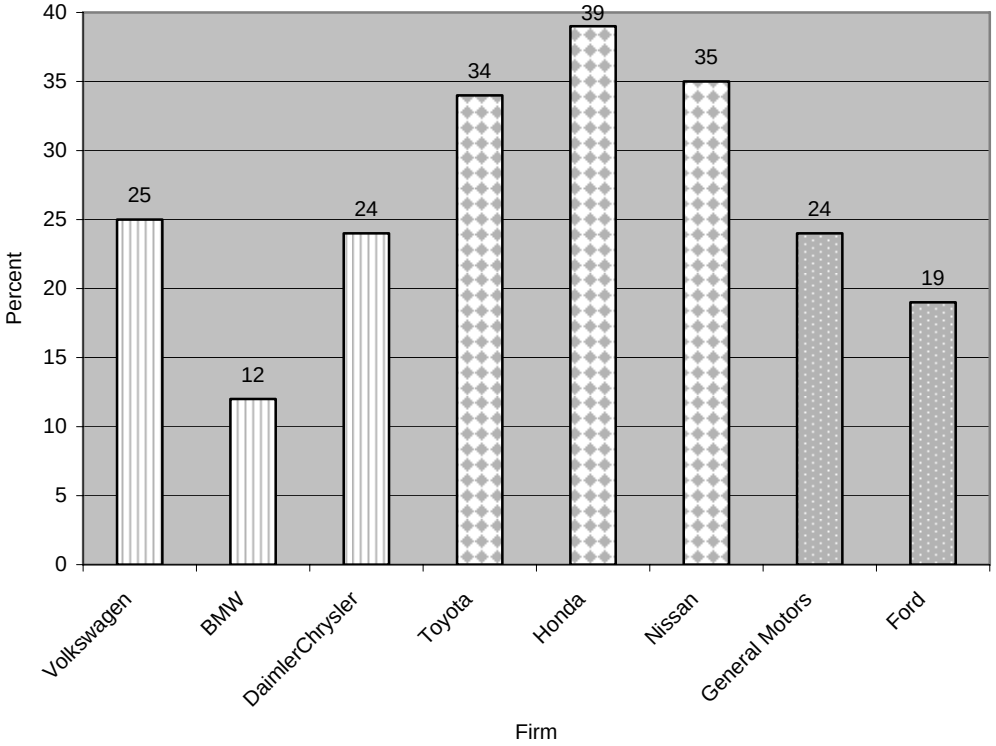
Source: Company Environmental Reports.

Figure 6.3: Proportion of all Codes on Social Attitudes by Firm



Source: Company Environmental Reports.

Figure 6.4: Proportion of all Codes on Internal Company Strategies by Firm



Source: Company Environmental Reports.

There is almost a 50:50 split on average[7] in material versus normative factors for US firms. Both are offered as rationales for action. However, for German and Japanese firms there is a clear bias towards normative factors: on average 59 percent of German and 68 percent of Japanese firms' codes are on these. This confirms the VOC prediction that US firms should be more motivated on the basis of exogenous material factors than German and Japanese firms.

Examining the sub-categories of material and normative factors, reveals that the material component in US firms' rationales that loomed largest was their coding on market forces. They do so more than twice as much as German or Japanese firms (40 percent on average by comparison to 18 and 16 percent for German and Japanese firms respectively). Ford outstrips all other firms by having 45 percent of its codes on market forces, around three times the proportion for most German and Japanese firms. German firms code more for state regulation on average than US and Japanese firms, although there is a large spread of coding percentages between firms of the same nationality.

The reason for normative factors' importance for Japanese firms is their focus on internal company strategies. On average, 36 percent of codes applied to Japanese firms' reports relate to these, versus just over 20 percent of codes on average for German and US firms. The reason for normative factors' importance for German firms is that they are more inclined than Japanese or US firms to code for social attitudes. On average, they have 37 percent of their codes on these, while US and Japanese firms have around 30 percent. The exception to the rule is Toyota which codes more than any other firm for social attitudes (42 percent). However, like its Japanese counterparts Toyota still skews more to internal company strategies than US or German firms. Therefore, it is still true to say that rather than having an internal rationale for action like Japanese firms, German firms are more likely to code for social attitudes.

BMW deserves special mention. While other individual firms may be somewhat at odds with their national counterparts on sub-categories within material versus normative factors, BMW skews towards material factors to the extent that it has a profile more like a US firm than a German one. Indeed, it codes for market forces similarly to General Motors. BMW also has the lowest coding of any firm on internal company strategies (12 percent). However, while BMW is somewhat at odds with the other German firms in these regards, on social attitudes its coding is comparable to that

of other German firms (40 percent by comparison to 37 percent of Volkswagen and DaimlerChrysler). Therefore, while sharing a German focus on social attitudes, BMW also shares US firms' interest in market forces.

Overall, although normative factors are not insignificant for US car firms, it is clear that, as LME-based firms, they are most concerned with material factors, especially market forces. This relates to LME firms' preference for market coordination of economic activity. If one excludes BMW from the German average, the difference is even greater with Volkswagen and DaimlerChrysler having only 12-13 percent of their codes on market forces. Therefore, excepting BMW, the CME-based German and Japanese firms cite normative factors more than their US counterparts. As per their CME differences, Japanese firms code strongest for internal company strategies, while German firms code strongest for social attitudes, reflecting the different stakeholder focus in each of their home states.

Material Factors in Detail

The material factors of market forces and state regulation are considered in detail in this section. The way in which codes within these sub-categories influence firms' rationales for environmental action is investigated to more clearly contextualise the observations made above. For example, market forces are more important for US firms than German and Japanese firms, but just *how* are they important? Are they more important from the point of view of responding to competitive pressures such as consumer demand, or taking proactive action to increase market share?

Within the sub-category of market forces, codes were applied for competition in the form of consumer demand or competitive pressure from other firms; safeguarding financial returns in the form of profits and sales, promoting shareholder value or minimising risks; and proactive action aimed at increasing market share/leadership or exploiting business opportunities. Within the sub-category of state regulation, codes were applied for national and international voluntary agreements; national and international legislation; and input to the policy process. Given that sub-categories of sub-categories are considered,[8] the frequency of responses is often quite low. Therefore, in the following analysis qualitative differences in the actual statements made are often

brought to the fore. Subsequent to discussing these, the key observations are related to the VOC approach in relation to each of the sub-categories.

Market Forces

Only US firms and BMW have a large proportion of their codes in the sub-category of market forces (i.e. 33-45 percent of all material and normative factor codes by comparison to 12-17 percent for Japanese and other German firms – see Figure 6.1). With this in mind, Table 6.2 shows the composition of firms' codes on market forces. The three codes within the sub-category of market forces - consumer demand and competitive pressure from other firms; safeguarding financial returns; and proactive action - are considered in turn.

Competition: Consumer Demand and Competitive Pressure from Other Firms

Competition in the form of consumer demand or competitive pressures from other firms accounts for over 40 percent of US firms' market forces codes. In addition, around a third of their market forces codes come from a drive to respond to consumer demand. Clearly, competition in markets is a key driver for US firms, as one would expect of their LME heritage. The statements they make are also qualitatively strong. For example, on consumer demand Ford says:

> It's not that our customers want these environmental benefits at any expense. Quite the opposite. They're saying they want it all at little additional cost. They don't want tradeoffs between environmental performance and the power, comfort and safety they've grown to expect. Our products must reflect this "no compromises" attitude.[9]

Indeed, the "no compromises" approach to consumer demand is reflected in the primacy accorded it in Ford's executive statement where its Chairman declares that "the fastest way to bring about the [environmental] transition we are seeking is through the market and competition".[10]

General Motors' statements about competition, particularly responding to consumer demand, are similarly strong. The firm outlines its commitment to giving customers "gotta have" products[11] and states from the outset that "a report on our behaviour must start with delivery on our promise to design, build and offer great cars

and trucks that meet the full range of consumer needs and preferences in the markets where we compete".[12] Thus, consumer demand, and responding to market forces generally, are the firm's number one priority. Its bottom line is that it must "offer vehicles that people want to buy" because "if no one buys the product, the new technology has no real impact.[13] Like Ford, competition in the market via consumer demand is General Motors' primary strategic driver.

Although BMW exhibits US firms' focus on market forces, this is not in terms of competition in markets. It, like two of the Japanese firms (Honda and Nissan), does not code for responding to competitive pressure from other firms at all, and has only 5 percent of its material factors codes on consumer demand. Therefore, despite sharing US firms' concern for market forces, BMW does not share their concern for responding to competitive pressures. While it would be a stretch to say this indicates a CME preference for cooperation/coordination between firms, it certainly does not indicate an LME-like preference for market competition.

Of the other German firms, not only do they code less in proportional terms on market forces, the statements they make are qualitatively different. Volkswagen says that "companies are obliged to act in line with economic considerations" and that "their primary function is to create value and satisfy the needs of their customers"[14], and echoes General Motors in saying that "eco cars which fail to find buyers are of no use to us or the environment".[15] However, Volkswagen additionally notes that:

> The negative associations - in the automotive industry and elsewhere - which in the past have linked environmental protection with self-sacrifice or scaremongering have already put off far too many customers.[16]

Unlike US firms, this is a statement embracing environmental factors as a way of *encouraging* customers, rather than simply responding to consumer demand. Of the other German firms, which have a very small proportion of their market forces codes on either consumer demand or competitive pressure from other firms, statements are made along the lines that they must manage to "satisfy"[17] their customers and develop products and technologies that "take account of and drive the market trends of the future"[18] in order to be competitive. Not only are these quite restrained statements, but the latter statement of DaimlerChrysler's actually indicates the firm sees its role as a mixture of responding to and leading the market, rather than primarily reacting to the

demands of consumers. Like Volkswagen, consumer demand is seen as more of a 'two-way street', in the sense that it may be influenced as well as responded to.

Japanese firms' statements on competition in markets are quite weak. Honda simply says that it wishes "to meet the expectations of customers"[19] and "provide customers with products that totally satisfy them".[20] Toyota talks of providing "products and services that fulfil the needs of customers worldwide"[21], dealing mainly with the need to be mindful of market forces, then strike a balance between them and environmental goals. Nissan makes similar statements, but also declares that "customers want environmentally friendly cars, but they expect a sound value proposition, so we have to find solutions".[22] Therefore, environmental product development initiatives are not as contingent on consumer demand, as for US firms. Instead, consumer demand is more a consideration given the firm's *prior* commitment to the development of environmentally-friendly products. Concomitant with Japanese CME firms' internal drivers for strategic decisions, the decision to undertake environmental initiatives comes first, or is at least balanced with, consumer demand.

Safeguarding Financial Returns: Profits and Sales, Shareholder Value and Risk Management

There is one clear observation on firms' coding for safeguarding financial returns. It is the strength with which BMW codes on it, with 75 percent of its market forces codes are in this sub-category. Therefore, although BMW stresses material factors, especially market forces, to a similar degree to US firms, the reason is not so much a preoccupation with being competitive in markets as safeguarding its financial returns. The reason would seem to be that it knows it has a good product and a significant share of the prestige car market, and it wants to make sure it keeps it. It makes statements along the lines that "by consistently serving the premium segments of the car market, the BMW Group creates the right conditions for profitable, long term growth".[23] BMW is playing a different game as a prestige car maker. It is not so much competing in markets as maintaining its position as a niche prestige car maker.

For the other firms, there is the observation that in addition to coding less on market forces generally, Japanese firms and DaimlerChrysler do not mention

shareholder value at all. This reflects the less stockmarket-focussed nature of financial markets in CMEs. Beyond quantitative coding variations, firms' statements about safeguarding financial returns are qualitatively rather similar. The clearest differences are that Toyota, when mentioning sales, refers specifically to sales of its petrol-electric hybrid Prius rather than sales in general – i.e. the spotlight is clearly on its environmental initiatives. However, when US firms mention profits and sales, they refer to "razor thin profit margins"[24] and action in the face of "difficult economic conditions".[25] This can be contrasted with the German firms which note their "excellent sales, revenues and profits"[26] and the need to remain profitable generally over the long term. The difference in emphasis for US and German firms no doubt reflects differences in their underlying profitability.

Proactive Action: Gaining Market Share and Exploiting Business Opportunities

As a proportion of their codes on market forces, DaimlerChrysler, Toyota, Honda and General Motors code more than the other firms on proactive action, particularly in respect of acting to increase market share/leadership. But given the small number of codes involved for firms other than BMW and US firms, and their smaller proportion of codes on market forces generally, it would be dangerous to draw conclusions on the basis of these coding proportions alone (e.g. DaimlerChrysler has 75 percent of its market forces codes on proactive action, but this only relates to eight codes). However, examining the qualitative differences in statements made does reveal some key differences, in that it is more a matter of material concerns for German and US firms versus more 'poetic' visions by Japanese firms.

US firms are clearly materialist in their approach, with statements about seizing opportunities to ensure they remain competitive, often couched in terms of market leadership. A typical statement by General Motors is: "we are committed to leading not only with our products and business results, but economically, socially and environmentally, as well".[27] For General Motors, it is a matter of "product leadership", being an "industry leader" and indeed "being the world leader in transportation products and related services".[28] Ford similarly sees environmental action in terms of a "leadership choice" based on "sound business drivers" on which the company "must

Table 6.2: Material Factors – Market Forces in Detail

		Competition			Safeguarding Financial Returns				Proactive Action			TOTAL (%)	TOTAL (No.)
		Consumer Demand (%)	Competitive Pressure from Other Firms (%)	TOTAL (no multiple coding) (%)	Profits and Sales (%)	Shareholder Value (%)	Risk Management (%)	TOTAL (no multiple coding) (%)	Market Share/ Leadership (%)	Business Opportunity (%)	TOTAL (no multiple coding) (%)		
GERMANY	**Volkswagen**	54	8	**62**	8	8	0	**15**	15	8	**23**	100	13
	BMW	5	0	**5**	19	33	24	**75**	14	5	**20**	100	20
	DaimlerChrysler	0	13	**13**	13	0	0	**13**	50	25	**75**	100	8
JAPAN	**Toyota**	10	10	**20**	20	0	10	**30**	50	0	**50**	100	10
	Honda	33	0	**29**	17	0	0	**14**	50	0	**57**	100	7
	Nissan	58	0	**58**	8	0	17	**25**	0	17	**17**	100	12
US	**General Motors**	35	6	**41**	6	6	0	**12**	47	0	**47**	100	17
	Ford	31	9	**42**	14	9	3	**24**	17	17	**33**	100	33
TOTAL		28	6	**35**	13	10	7	**29**	26	10	**36**	100	120

Source: Company Environmental Reports.

Table 6.3: Material Factors – State Regulation in Detail

		National and International Voluntary Agreements (%)	National and International Legislation (%)	Input to the Policy Process (%)	TOTAL (%)	TOTAL (No.)
GERMANY	**Volkswagen**	44	15	41	100	27
	BMW	63	25	13	100	8
	DaimlerChrysler	41	29	29	100	17
JAPAN	**Toyota**	0	100	0	100	5
	Honda	14	57	29	100	7
	Nissan	13	63	25	100	16
US	**General Motors**	56	22	22	100	9
	Ford	50	25	25	100	3
TOTAL		37	35	28	100	92

Source: Company Environmental Reports.

deliver".[29] Environmental sustainability is described in materialist terms as "a tremendous business opportunity".[30]

German firms' take a similarly materialist approach. DaimlerChrysler says its "aim is to safeguard future mobility and secure a competitive edge by developing innovations and future-oriented technologies that benefit the environment, safety, and comfort".[31] Thus, being proactive on environmental matters is a matter of being competitive in markets and creating opportunities from a position of leadership. The other German manufacturers echo DaimlerChrysler's position. BMW talks about ensuring it remains "the most successful premium manufacturer…with a comprehensive product range in all the relevant segments of the automobile market"[32] and taking action to "expand on new markets".[33] Volkswagen also sees its environmental commitments as opening up "additional scope for the company to break new ground on its own initiative and at its own responsibility"[34] because "together, commercial success, far-sighted environmental protection and social competence enhance the global competitiveness of the Volkswagen Group".[35]

The language of Japanese firms, in contrast to their German and US counterparts, is less materialistic. They have visions of their roles that can only be described as a matter of the *heart*. Honda wants to act to increase its market share, and talks about its efforts in being a market leader, but sums its efforts up as acting "to share our dreams and joys with more customers".[36] When the firm talks of being a leader it mentions its successes in fuel economy and the like, but also says "we continuously strive to be a leader in bringing forth new values and creating joy".[37] Although Toyota reports on its product leadership aspirations in material terms, it goes further to note the need to "strive to become a leader and driving force in global regeneration by implementing the most advanced environmental technologies".[38] As part of its policy guidelines, Toyota states that it desires to "be at the vanguard of the times through endless creativity, inquisitiveness and pursuit of improvement".[39] Nissan makes a similarly strong statement that:

> As we face global environmental issues, we will act with a sense of volition. We will turn every issue we face into a motivating force for improvement as we aspire for a society with a symbiosis of people, vehicles, and nature.[40]

Such statements suggest more normative rationales to do with how Japanese firms conceive their raison d'etres are to the fore. They also suggest that, in Japanese CME fashion, they are more internally driven for their strategic decisions.

Market Forces and the Varieties of Capitalism Approach

The analysis of the coding on market forces produces the following three observations in respect of the VOC approach.

First, the US firms not only stress market forces more than the other firms, but only they stress responding to consumer demand as a leading consideration in environmental product development initiatives. For the rest, consumer demand, and competition more broadly, is more an underlying concern to be balanced against environmental initiatives, rather than one that drives or constrains them. This is consistent with the importance of market forces in the US LME variety of capitalism, as opposed to one factor among many, and more an underlying than primary concern, in CMEs.

Secondly, on safeguarding financial returns, the main observation is that this is a major strategic driver for BMW, though not by virtue of its home state's VOC as much as it being a prestige car producer. This explains why BMW appears more like a US firm in its coding for market forces overall. In addition, there were no references to shareholder value for Japanese firms and DaimlerChrysler. This reflects the lower priority accorded stockmarkets in CMEs. Qualitatively, the main observation is that Toyota stresses sales of its petrol-electric hybrid Prius, whereas the other firms are not so environmentally-focussed in their statements about profits and sales, and US firms face financial pressures that German firms do not.

Thirdly, when it comes to taking proactive action in markets, qualitative differences come to the fore. US firms see market leadership and business opportunities in LME material terms. German firms' statements are similar. However, Japanese firms express their leadership aspirations and identification of business opportunities in language that implies something more than market success and winning a competitive battle is the driving force. In CME-style, broader strategic goals are the aim, and in the

Japanese CME tradition these are based more on an internal vision, rather than external motivations.

State Regulation

German firms are generally more likely to cite state regulation as a rationale for environmental action than US and Japanese firms, but the variation between firms of the same nationality is considerable (see Figure 6.2). Therefore, no strong quantitative statements have been made so far on coding for state regulation overall. Table 6.3 shows the composition of firms' codes on state regulation. The three codes within the sub-category of state regulation - national and international voluntary agreements; national and international legislation; and input to the policy process (in terms of attending international meetings and input to national policy/regulations) - are considered in turn.

National and International Voluntary Agreements

The major observation on voluntary agreements is that US and German firms are far more likely to cite them as a rationale for environmental action (41-63 percent of state regulation codes) than Japanese firms (0-14 percent of state regulation codes). It is also notable that Japanese firms, in addition to a low proportion of their codes on voluntary agreements generally, have no codes at all applied for national voluntary agreements.[41] Beyond these quantitative differences, there is a qualitative similarity about the statements made by all firms. When mentioned, voluntary agreements are noted as existing along with the firm's support for/adherence to them. Firms cite international agreements/guidelines such as Agenda 21, the Global Compact, Coalition of Environmentally Responsible Economies (CERES) guidelines, the Global reporting Initiative (GRI), the Organisation for Economic Cooperation and Development 's (OECD) 'Guidelines for Multinational Enterprises' and the International Chamber of Commerce (ICC) 'Charta of Sustainable Development' internationally. German firms also cite national voluntary agreements, particularly the initiatives of the Forum for

Sustainable Development of German Business, known as 'Econsense', founded in 2001 by 19 major German corporations. Ford mentions that voluntary carbon trading schemes are emerging that mean it will need to develop appropriate strategies. Therefore, the major observation is the lack of Japanese firms' coding on voluntary agreements, particularly national voluntary agreements.

National and International Legislation

In contrast to voluntary agreements, the overriding observation on national and international legislation is the degree to which Japanese firms code for them by comparison to German and US firms. At least 57 percent of Japanese firms' codes for state regulation are accounted for by codes on legislation specifically (100 percent in the case of Toyota), versus 15-29 percent of US and German firms' codes. Therefore, although US and German firms are more likely to cite voluntary agreements, and German firms are most likely to cite national voluntary agreements, Japanese firms are most likely to cite adherence to national and international legislation.

When Japanese firms mention adherence to such legislation, they are also more likely to refer to national, rather than international, legislation.[42] By contrast, US firms make no mention of complying with national legislation at all, and Volkswagen is the only German firm that does, mentioning "Euro 4 exhaust emissions" and "bringing to market alternative products with the highest energy efficiency without waiting for the state to introduce new legislation".[43] This is not to say that performance against specific national regulations is not contained elsewhere in all firms' environmental reports, but it is only Japanese firms who mention them specifically in executive, vision and policy statements, citing examples of how they meet or exceed national regulatory requirements. The following statement by Nissan is typical of how Japanese firms do this:

> Approximately 90% of new Nissan vehicles sold in Japan and, increasingly, in other parts of the world, are certified as ultra-low emission vehicles (ULEV), and we are pushing our lead further with super ultra-low emission vehicles (SU-LEV). Our Bluebird Sylphy was the first car ever to be certified as a SU-LEV.[44]

Thus, they mention specific Japanese regulatory targets and how they meet or exceed them. [45]

Input to the Policy Process

Excepting Toyota and BMW, all firms are quite likely to note the policy process and sometimes allude to their role in it. Volkswagen does so the most, with 41 percent of its state regulation codes on input to the policy process. The other firms have around 20-30 percent of their codes on this. There are no striking national patterns in their coding proportions. However, there is a clear qualitative split between US and Japanese firms on the one hand, and German firms on the other. The former talk in terms of being aware of and attending meetings, providing input to discussions etc., but German firms demonstrate a more proactive stance.

Of the US firms, Ford notes that "pension fund managers and administrators globally, including a number of US state and local treasurers convened by CERES, have joined together to discuss the financial risks they may face because of investments in companies whose products and services have an adverse effect on climate change".[46] Ford is a participant among many in such discussions. General Motors also talks about participating in discussions, the overarching rationale for which, expressed in its policy statement, is that it "will continue to work with all governmental entities for the development of technically sound and financially responsible environmental laws and regulations".[47] The key point is that for both firms the purpose of being 'at the table' is not so much to promote the cause of environmentalism, as to ensure that financial outcomes are protected and the technical challenges more manageable. Japanese firms are simply happy participants in the policy process – e.g. Nissan which notes that it is a "participant in the WBCSD Sustainable Mobility Project".[48]

However, German firms go a step further to describe how they intend to *shape* the policy process, rather than just participating in it. BMW declares that "by jointly planning and cooperating with all areas of politics, society and government administration, the BMW Group is able to offer perspectives for the future where mobility and responsibility for the environment no longer represent a contradiction in terms".[49] DaimlerChrysler says it "contributes its expertise to non-corporate scientific, technical and governmental activities designed to improve the environment".[50] To stress the proactive role it plays in making this contribution it further declares that "companies need to play a proactive part [and] to this end, DaimlerChrysler is

committed to a process of dialogue with politicians, trade associations and social interest groups".[51] Volkswagen makes a number of similar proactive statements, one of which is that "Volkswagen works hand-in-hand with society and policy-makers to shape a development process that will bring sustainable social and ecological benefits".[52] In short, German firms do not simply indicate that they are aware of and participating in policy discussions. They want to help drive the process for better environmental outcomes.

State Regulation and the Varieties of Capitalism Approach

The analysis of coding on state regulation produces the following three observations in respect of the VOC approach.

First, in addition to coding proportionally slightly more for state regulation by comparison to US and Japanese firms, the German firms share a preference with US firms for a more voluntaristic approach to state regulation. In addition to preferring a voluntaristic approach, German firms also stress providing input to government on regulations and driving the policy development process. These observations fit with the CME-style of regulation setting and implementation in Germany and Europe: a voluntaristic approach based on extensive state-firm discussion and consensus building, in the context of a belief that private firms have public responsibilities to fulfill.

Secondly, the LME-based US firms would rather avoid regulations. If US firms are involved in discussions on policy development it is not so much to proactively shape them as to ensure their material interests are not infringed.

Thirdly, Japanese firms stress compliance with, or exceeding legislation, more than their US and German counterparts. And they refer more to national legislation rather than legislation in general, suggesting they are more focussed on their home country regulatory settings than US or German firms. Not only does this support the notion of national regulatory structures and 'home country' conditions mattering, but it supports the CME-nature of Japanese state-firm relations: Japanese firms are focussed on regulations they have agreed (often informally) with regulators, particularly at the national level, and then set about achieving and exceeding compliance with such regulations.

Normative Factors in Detail

The normative factors of social attitudes and internal company strategies are considered in detail in this section. The way in which codes within these sub-categories influence firms' rationales for environmental action is investigated in a similar manner to those for the sub-category of material factors. While it has been shown that social attitudes are more important for German firms and internal company strategies for Japanese firms, in their environmental reports firms refer to these normative factors in different ways. Within the sub-category of social attitudes, they mention general social concern and raised awareness of environmental issues, the importance of environmental considerations from the perspective of the firm's image, a responsibility to society (generally) and a responsibility to stakeholders (those directly affected by the firm's activities) in different degrees. Within the sub-category of internal company strategies, firms cite environmental action on the basis of corporate policy, the importance of the firm's history and therefore path dependence in its actions, and leaders' vision to varying degrees. Not only are these mentioned by all firms in different degrees, they are also addressed in qualitatively different ways. As with material factors, both quantitative and qualitative differences in coding are analysed, subsequent to which the key observations are related to the VOC approach for both sub-categories.

Social Attitudes

German firms, and Toyota, stress social attitudes more than US and other Japanese firms (see Figure 6.3). With this in mind, Table 6.4 shows the composition of firms' codes on social attitudes. The four codes within the sub-category of social attitudes - responding to general social concern/raised awareness of environmental issues; firm image (as perceived by society in terms of trust, or in terms of brand loyalty stemming from its actions and products); a belief in responsibility to society; and a belief in responsibility to stakeholders - are considered in turn.

General Social Concern/Raised Awareness of Environmental Issues

There is one key quantitative observation on responding to general social concern/raised awareness of environmental issues. It is that while Honda and Nissan code less than other firms on social attitudes overall, only they have more than 20 percent of their codes for social attitudes on responding to general social concern/raised awareness of environmental issues. These are not identified as a driving force for action on the environment by the other firms.

Honda and Nissan are also the only firms to make qualitatively strong statements in this regard. Honda talks of environmental problems being "recognised as common problems for everyone in the 1990s",[53] and that they developed their environmental guidelines "amid the increasing momentum toward environmental conservation and the acceleration of environmental measures all over the world."[54] Nissan similarly cites "strong interest in the world today about how to balance economic development with environmental protection"[55] and "demands from society regarding exhaust emissions".[56] Indeed, Nissan sees "society demanding a shift from conventional environmental management to consolidated environmental management, to include our consolidated subsidiaries".[57] Even though the other Japanese firm, Toyota, does not quantitatively code as strongly, its earlier quoted statement that only firms that respond to environmental problems "will be acceptable to society" connotes that social concern on the environment require a response if the firm is to endure in future.[58] Therefore, for the Japanese firms, particularly Honda and Nissan, social concerns are highly significant motivators for environmental action. This is a key finding because it resolves (or at least illuminates) the conundrum of Chapter 5 that Japanese firms' market profiles are at odds with Japanese social concern for the environment by comparison to Germany and the US, and it supports the hypothesis suggested in Chapter 5 that the fact of such concern, as much as its degree, is taken more seriously by Japanese corporations.

Volkswagen makes similarly strong statements to the Japanese firms, such as the following:

> Social interest groups including consumer and environmental associations, and thus the political sphere, set the bar high for companies, be it at national or international level. As a result, large international companies with prominent global brands are today caught more firmly in the

> spotlight of public attention than ever before. It is a challenge which, like other major international players, we at Volkswagen have taken up from the outset not least by making a voluntary commitment to enter into target agreements and reduce the fuel consumption of our cars.[59]

Like Japanese firms, Volkswagen sees the "challenge" posed by social interest groups as one that must be met. However, this is not the case for the other German firms. BMW does not mention general social concern at all, and DaimlerChrysler merely notes that "corporate governance issues have rightly attracted considerable attention and are now the subject of wide-ranging public debate",[60] so that environmental concerns are subsumed within the wider question of corporate governance generally, and then only referred to in the context that a lot of debate is going on.

US firms refer to general social concern in similarly oblique terms. General Motors merely notes the increased "visibility as the public, government, and nongovernmental organisations (NGOs) have looked to corporations and the private sector to play a leading role in addressing the impact of globalisation on living standards, economic development and environmental improvement ".[61] Ford too notes that "times are changing", "questions about fuel economy" are being asked, and that fuel economy is recognised by people as a "quality issue".[62] On climate change, Ford notes that "customers are demanding accountability".[63] However, these statements of recognition of changing social attitudes do not quite amount to the 'call to arms' that Nissan, Honda and Volkswagen imply.

Firm Image

Firm image relates to statements about how firms wish to be perceived for their environmental credentials and why. Quantitatively, Toyota and Honda code strongly for acting to boost firm image, as do US firms, but only BMW does so of the German firms. However, as one would expect of a concept such as 'image', the qualitative rather than proportional differences in the coded passages reveal clearer national trends. What is noticeable is that image is about material success in markets for LME-based US firms, rather than a more holistic vision in the case of the CME-based German and Japanese firms.

US firms take the attitude that building trust and brand image is part of doing business. Ford's Chairman says "transparency and open dialogue can be uncomfortable at times, but I believe these are prerequisites for building the trust required to move forward".[64] But along with statements about the importance of behaving with integrity, Ford says that the reason for so doing is building trust and respect with "investors, customers, dealers, employees, unions, business partners and society".[65] Underlying such statements are material goals: "focusing on customer satisfaction and loyalty and keeping our promises"[66] and "seeking enhanced stakeholder loyalty as a route to competitive advantage and long term growth".[67] General Motors' statements are similar. Although it talks of doing business the "right way" and being "measured" by its conduct,[68] the reason for behaving responsibly towards the environment (and in general) is to "earn our customers' enthusiasm through continuous improvement driven by the integrity, teamwork and innovation of GM people".[69] Clearly, a desire for ongoing material success is a significant part of why firm image is important to the US firms.

At the other extreme, Japanese firms (excepting Nissan) want to be seen virtually as social leaders, commanding respect and standing in the community for what they do. Rather like their statements on being market leaders, one finds highly emotive and 'organic' statements in their reports. Thus, Honda is "striving to become a company that people will want to exist"[70] and that "all people can look up to".[71] It wants to "share its joys"[72] with its customers and people generally. In its policy statement, Honda declares it "will consider the influence that [its] corporate activities have on the regional environment and society, and endeavour to improve the social standing of the company".[73]

For Toyota, image is similarly a matter of social standing and respect "by all peoples around the world".[74] The firm talks of "good faith":

> Toyota places great importance on the idea of "good faith." Good faith means acting with sincerity and without betraying the confidence and expectations of others, keeping one's promises, and fulfilling one's duties, and this is embodied in the following way in the Guiding Principles at Toyota Motor Corporation: "undertake open and fair corporate activities to be a good corporate citizen around the world."[75]

Therefore, image is not just a matter of selling more cars at higher prices,[76] but also of sincerity, confidence, keeping promises and fulfilling duties. Toyota virtually wants to

be a member of the family, being "kind and generous", and with a desire to "strive to create a warm, homelike atmosphere".[77] For Honda and Toyota, firm image is not just a matter of material benefits, but their social standing in society in terms of trust and respect.

Where Japanese firms are emotive, German firms make the most logically holistic statements in relation to image. For example, DaimlerChrysler says:

> We believe that only a policy of openly providing information on environmental protection measures and reporting on achievements and problems in the implementation of these measures will motivate employees and create credibility in the general public.[78]

Thus, "credibility in the general public" goes beyond economic success alone, although the firm links the two in saying "in order to safeguard the future of the company and increase its acceptance in society at large, we have committed ourselves to the principle of sustainable development", and that impressing people with products is also a matter of convincing them with your "philosophy".[79] Volkswagen too takes a similarly holistic view in which "reputation among clients and the general public" is tied up with the broad goal of "access to - and the long term safeguarding of - resources at all levels".[80] The over-arching aim is that "the name Volkswagen is inseparably linked with [sustainability] principles",[81] and there is a recognition at a policy level too that, as one would expect of Germany's CME state-business relations, "cooperation with policy-makers and the authorities is based on a fundamentally proactive approach founded on mutual trust".[82]

BMW, which codes proportionally more than any firm on the factor of firm image, exemplifies the German holistic perspective on this from the viewpoint of a premium producer. It makes many statements, but perhaps the best illustration of this perspective is found in the following:

> The BMW Group's commitment to social, economic and ecological responsibility as an international company is in keeping with its performance as a corporate citizen. Thus, reputation management serves to develop the company as a responsible partner in the global community. A company that is firmly anchored in society as a reliable partner creates acceptance for its products. This acceptance is particularly important for a premium supplier, such as the BMW Group.[83]

For BMW, firm image is about selling cars and material success, but also about a broader aim of being a good corporate citizen more broadly and "a partner in the global community".

Responsibility to Society

There is considerable variation in coding proportions on responsibility to society in all territories, although on average Japanese and German firms code more on this than US firms. But the low percentage of codes for Honda and BMW, and the particularly noticeable range in coding between General Motors and Ford, make it difficult to reach clear conclusions about national differences on a quantitative basis. The qualitative nature of firms' statements is more illuminating. These show that while all firms refer to their responsibility to society, some German and Japanese firms see themselves as *part* of society and enmeshed in it, as opposed to US firms which see themselves as outside society with responsibility *to* it.

Of the German firms, BMW, despite coding significantly less than its German counterparts, nevertheless sees itself as "anchored in society as a reliable partner", the result being that it "creates acceptance for its products".[84] This anchoring in society is mirrored in DaimlerChrysler's language. It sees itself as "bound up in an intricate web of relationships" that mean "over and above our commercial status as an automaker, we are very much a part of the society in which we operate".[85] Volkswagen stops short of saying it is part of society but comes close when it says it is a "partner to society", and "hand-in-hand with society".[86] If Volkswagen and society are not of the same entity, it is at least 'married' to, or a good 'friend' of society.

Of the Japanese firms, Nissan does not quite make the link, stopping short in the manner of Volkswagen. It is close to being part of society but still primarily sees itself as "contributing" and "collaborating" rather than a society member. Honda does make the link in saying it is "a responsible member of society".[87] But Toyota waxes most lyrical in declaring that "as a member of society [it will] actively participate in social actions".[88] In its policy statements it says it will "be contributive to the development and welfare of the country by working together, regardless of position, in faithfully fulfilling your duties",[89] and "pursue growth in harmony with the global community through innovative management".[90]

There should be no mistake that US firms' statements on their responsibility to society are strong. Their actions have an acknowledged effect on it, and this is where their rationale for action lies. As such, Ford identifies the need for "a public

commitment to strengthen our connection with society" and wishes to bring about a transition to a more environmentally sustainable society in this context.[91] Ford seeks to "contribute to the communities around the world in which we work".[92] General Motors too seeks to be a "constructive influence"[93] and wants to "meet the needs of both our customers and society as a whole".[94] There is nothing weak about these sentiments, but they clearly make the firms 'us' and society 'them'. German and Japanese firms make as strong, if not stronger links, but in some cases also bridge the gap between the two.

Responsibility to Stakeholders

The main difference in codes between responsibility to society and responsibility to stakeholders is that the former refers more to social responsibility generally (e.g. local communities, national and global society etc.) while the latter refers to those directly impacted by the firm's business (i.e. customers, suppliers, employees and government). US firms clearly have a higher proportion of social attitudes codes on responsibility to stakeholders. General Motors and Ford have 38 and 36 percent of their codes respectively on responsibility to stakeholders, whereas German firms have around 30 percent, and Japanese firms code in a range from 15-33 percent. Given that Ford and General Motors are LME-based firms, it is perhaps not surprising that they code more on responsibility to those directly affected by their business, rather than society more generally. Indeed, this is commensurate with the point made in the previous section that their statements separate them somewhat more from 'society' than is the case for German and Japanese firms. Yet, concern for stakeholder relations in addition to short term market outcomes should also hold weight for CME-based firms.

Qualitative differences shed light on this puzzle. The key difference between German and Japanese firms on the one hand and US firms on the other is the degree to which material versus normative motivations are stressed. Somewhat unsurprisingly, US firms see responsibility more in instrumental materialist terms. For example, Ford talks of "seeking enhanced stakeholder loyalty as a route to competitive advantage and long term growth",[95] and "actively pursuing the benefits derived from a diverse workforce, as well as those from the diversity of perspectives provided by our stakeholders".[96] Similarly, General Motors notes that it has "long recognised the

importance of government policies, international relations, environmental performance and labour and community responsibilities to our business.[97] Responsibility to stakeholders is not always stressed for environmental reasons as much as it is beneficial to firms' material interests. Therefore, although responsibility to stakeholders is highlighted for its importance by US firms (a motivation not predicted by the VOC approach), it is for material reasons (a motivation very much supported by the VOC approach).

By contrast, German and Japanese firms see acting responsibility to stakeholders as valuable *in and of itself*. Although DaimlerChrysler notes that "we consider our commitment to the interests of our employees and of society at large not an obligation but an investment in the future of DaimlerChrysler",[98] and Toyota mentions "work with business partners in research and creation to achieve stable, long term growth and mutual benefits",[99] Japanese and German firms tend to go beyond seeing responsibility to stakeholders in purely material terms. The following statement by Toyota illustrates the point:

> Toyota hopes that the 21st century will be truly prosperous for society, and aims to grow as a company together with its stakeholders, including customers, shareholders, business partners, and employees, through making things and making automobiles, while seeking harmony with people, society, the global environment and the world economy.[100]

Therefore, responsibility to stakeholders is coupled with concern for a prosperous society and the interests of all people generally. These concerns go well beyond material market outcomes. In fact, Volkswagen and BMW reverse causality by saying that acting responsibly is actually in the material interests of their stakeholders. The other Japanese firms make no mention material interests in the context of responsibility to stakeholders *at all*. They talk in terms of acting environmentally responsibly with respect to them without mentioning material benefits from so doing.

Table 6.4: Normative Factors – Social Attitudes

		General Social Concern/Raised Awareness (%)	Firm Image (%)	Responsibility to Society (%)	Responsibility to Stakeholders (%)	TOTAL (%)	TOTAL (No.)
GERMANY	**Volkswagen**	13	13	41	33	100	39
	BMW	0	52	17	30	100	23
	DaimlerChrysler	4	13	52	30	100	23
JAPAN	**Toyota**	4	35	38	23	100	26
	Honda	23	46	15	15	100	13
	Nissan	28	6	33	33	100	18
US	**General Motors**	8	23	31	38	100	13
	Ford	14	41	9	36	100	22
TOTAL		11	27	32	31	100	177

Source: Company Environmental Reports.

Table 6.5: Normative Factors – Internal Company Strategies

		Corporate Policy (%)	History/Path Dependence (%)	Leader's Vision (%)	TOTAL (%)	TOTAL (No.)
GERMANY	**Volkswagen**	78	22	0	100	27
	BMW	86	14	0	100	7
	DaimlerChrysler	93	7	0	100	15
JAPAN	**Toyota**	81	14	5	100	21
	Honda	65	35	0	100	17
	Nissan	64	32	4	100	25
US	**General Motors**	75	25	0	100	12
	Ford	50	7	43	100	14
TOTAL		73	21	6	100	138

Source: Company Environmental Reports.

Social Attitudes and the Varieties of Capitalism Approach

The analysis of coding on social attitudes produces the following clear observations in respect of the VOC approach that relate to the difference in emphasis accorded material factors in LMEs versus CMEs.

Honda, Nissan and Volkswagen (and Toyota to some extent qualitatively) are most likely to see changing social concerns generally as a cause for action of the highest order, or a demand that must be met for their firm's survival. Apart from the implications this has in terms of the post-materialism thesis analysed in Chapter 5 (i.e. that social attitudes are taken most seriously in Japan) it indicates that in most cases these firms are rather more proactive on social attitudes than reactive – i.e. they are anticipating rather than responding to them in terms of building their image and acting in a manner that they see as responsible to society or their stakeholders. It also indicates that CME-based firms can substantially alter their environmental actions on the basis of social concerns, not just on the basis of material market forces. Japanese (with the exception of Nissan) and German firms also see their image regarding the environment as very important. While the former code proportionally more than the latter, both make strong statements on image. And while there is considerable spread in proportional terms on responsibility to society, in qualitative terms Japanese and German firms make stronger statements on this too than their US counterparts. Only on responsibility to stakeholders do US firms quantitatively lead Japanese and German firms in coding proportions. However, in qualitative terms they remain more materially focussed.

The implications are clear and go to the CME/LME divide between firms. Not only do German firms and Toyota code most for social attitudes overall, the CME German and Japanese firms take a qualitatively more holistic approach, in some cases placing themselves *within* society and taking account of social responsibilities, their image and social concerns in a more holistic fashion than US firms. When US firms report their rationales in respect of social concerns they are clearly thinking more about their financial bottom line and material factors. Their focus is also somewhat more on the impact their business has on those most closely related to it, rather than on society generally.

Internal Company Strategies

The Japanese firms stress internal company strategies most (i.e. 34-39 percent of all material and normative factor codes by comparison to 12-25 percent for German and Japanese firms – see Figure 6.4). With this in mind, Table 6.5 shows the composition of firms' codes on internal company strategies. The three codes within the sub-category of internal company strategies - corporate policy; history/path dependence; and leader's vision - are considered in turn.

Corporate Policy

German firms and Japanese firms code more on corporate policy than their US counterparts (64-93 percent as opposed to 50-75 percent). This suggests they are more inner-directed on environmental matters, because they cite firm-wide guidelines or corporate beliefs and strategies in place, rather a belief of individuals in top management or an accident of history as internal rationales for environmental action. This is especially the case for Japanese firms, given that they code most for internal company strategies overall. It further suggests they have a stronger *commitment* to environmental considerations because they have internalised them as part of how they do business more than US firms. This is borne out in the analysis of the qualitative nature of the statements made as well.

Of the US firms, Ford's strongest statement of corporate policy (expressed as a "goal") is as follows:

> Our ultimate goal is to build great products, a strong business and a better world. As with the vehicles we create, this goal is evolving over time from initial concept to final product. We know that true leadership will require strong vision and values, as well as perseverance and patience. It also will require dedicated leaders and active partners.[101]

This is an aspirational statement focussed on the ends to be achieved (i.e. "great products, a strong business and a better world"), but one does not get a sense of *why* the company wants to do this other than it is a good thing to do. General Motors' strongest statement is similar:

> Integrity is one of our core values; we live it every day, with each decision we make and each action we take. Integrity transcends borders, language and culture; it's all about creating an

> environment that supports, and demands, proper business conduct. Doing the right thing is not always convenient, but it's essential to sustaining our culture of integrity and our leadership position in corporate responsibility. It means honest and accurate reporting of our performance, both internally and externally. It means competing - and succeeding - by the rules, whether they are laws, regulations, or simply GM policy. It means making our actions match our words.[102]

General Motors wants to "do the right thing" with "integrity" and be "honest" and declares its commitment to corporate responsibility. But like Ford exactly *why* this is left implicit, other than that it is a 'good thing' in and of itself.

DaimlerChrysler makes similar statements to the US firms, but the other German firms elaborate more. BMW and Volkswagen say that elevating the corporate priority of environmental concerns is good for business. For example, BMW says:

> Corporate governance is an all-embracing issue that affects all areas of the company. Taking responsibility for our actions, transparency and trust in others have long been the principles of our corporate culture. This corporate culture is essential for the success of the BMW Group both today and in the future.[103]

BMW further says that its "product and market offensive" incorporates environmental responsibility in order to "safeguard the future of the BMW Group on a sustainable basis".[104] Volkswagen makes similar statements, but in so doing notes that it has cultural reasons for adopting corporate environmental policies:

> Volkswagen is a company with German roots, European values and global responsibility. The rights, personal development, social security and economic participation of its employees are core elements of corporate policy.[105]

Thus, for Volkswagen there is something German and European about having a sense of responsibility, expressed as corporate policy, for the environment.

Where Volkswagen and BMW start, Japanese firms take off, waxing lyrical once again. Honda has its environmental policies because it "wishes to preserve the environment for future generations",[106] and to "pass on the beautiful natural environment"[107] to them. This is all part of the firm's desire "to pass on our joys to the next generation".[108] This view of the firm's role in ensuring inter-generational equity is said to flow through to its employees who adhere to company policies because they are "both a member of the company and of society".[109] Nissan, like Honda, has a corporate vision on the environment that is about more than the firm's material position. As

Honda want to create joy, Nissan says it has a "corporate vision of enriching people's lives",[110] and therefore is on a "social mission".[111] The reason is as follows:

> It is our view that the basis of environmental protection lies in the human capacity to show kindness and concern. Along with striving to understand the environment better, all of us at Nissan bring a shared concern for people, society, nature and the Earth to bear on our activities.[112]

Nissan's aim is to bring about "symbiosis of people, vehicles and nature".[113] Like Honda, Nissan's environmental policies are based on notions of inter-generational equity: "we will not accept short term gains if it means compromising our future needs or the ability of future generations to meet their own needs".[114] Toyota makes similar statements, going so far as to cite the precepts of its founding father, Sakichi Toyoda, as the reason why it has such policies. He enjoined Toyota as a company to "be at the vanguard of the times through endless creativity, inquisitiveness and pursuit of improvement" to be "practical and avoid frivolity", and as a result everyone at Toyota is required to "dedicate ourselves to providing clean and safe products and to enhancing the quality of life everywhere through all our activities".[115]

Qualitatively, it appears that statements on corporate policy fall into three categories: we do it because it's a good thing to do (i.e. no explicit reasons offered); we do it because it's good for us (i.e. instrumental material reasons); and we do it because of a higher vision (i.e. a strong statement of belief that goes above and beyond material concerns). US firms' statements are very much in the first category, German firms to some extent make it to the second category. But the third category goes to statements of belief based on firm culture and a higher principle than making money that Volkswagen hints at in its cultural references, but Japanese firms make explicit. Their statements of corporate policy demonstrate visions of inter-generational equity, and a concern for the wellbeing of society and the natural environment that goes beyond material motivations.

History/Path Dependence

Japanese firms code most on citing their histories, and thus the path dependence of previous action/concern/decisions in taking their current environmental initiatives. 17-35 percent of Japanese internal strategy codes relate to their history/path dependence, versus 7-25 percent for US and German firms. This suggests that in coding strongly for

internal company strategies, Japanese firms do so from the perspective of an enduring firm culture. It also suggests that they have a head start on their US and German counterparts by being more 'locked in' to embracing environmental initiatives.

A qualitative analysis of the statements made reveals further that only the Japanese firms, and Volkswagen, identify a history of environmental product development initiatives specifically. Thus, Volkswagen says its environmental policies date back to the 1970s when its Environmental Department was established, and cites its experience in environmental technologies. Of the Japanese firms, Toyota traces its environmental concern to the Toyoda Precepts handed down by its founder, Sakichi Toyoda, and the codifying of its environmental principles in 1992. Nissan presents a summary of its environmental efforts and achievements dating back to the 1960s as a way of demonstrating its commitment, noting that its current environmental initiatives are the result of "the accumulation of technology over the years" from historical environmental commitments.[116] Similarly, Honda discusses its environmental initiatives since the 1960s to highlight that it "has long been engaged in environmental conservation".[117] None of the other German and US firms specifically refer to a history of environmental commitments in the same manner. For example DaimlerChrysler says it has a "115 year tradition of technological leadership and innovation",[118] echoed by General Motors which notes its history of innovation as well, while BMW and General Motors say they have a long history of strong principles in terms of taking responsibility for their actions more generally – e.g. General Motors talks of a legacy of "doing business the right way".[119] Ford rather obtusely refers to "building on our heritage".[120]

Therefore, although path dependence is important for all firms, quantitatively it is most important for Japanese firms, and qualitatively only they and Volkswagen refer to path dependence in environmental product development initiatives specifically.

Leader's Vision

There is only one observation to make on this rationale for action, and that is its importance in the case of Ford. Although Nissan and Toyota's executives make statements of support for their firms' environmental initiatives, for the Chairman and CEO of Ford, Bill Ford, such support is more personal. For example, he declares:

"when I became Chairman of Ford Motor Company five years ago, I pledged that we would distinguish ourselves as a great company through our efforts to make the world a better place" and "one thing that has not changed is my belief that improved sustainability performance is not just a requirement, but a tremendous business opportunity".[121] He relates his beliefs to his place in the lineage of the firm's founding family:

> My family connects me to the automotive business in a unique way. I feel a special responsibility and pride in the contributions Ford makes to the quality of life of our employees, customers, business partners and neighbours worldwide. I am dedicated to ensuring that we are the best automotive company in the world, by any measure.[122]

These and other statements of Bill Ford reveal that environmental initiatives are not so much a case of corporate policy, or even path dependence in the sense of previous strategies, as personal beliefs and vision held by its Chairman who is ancestrally related to its founding father. In fact, the importance Ford leaders' visions is a feature of Ford's environmental report. There is no distinct 'vision' section, but rather Bill Ford says at the outset that he has:

> "asked a group of our senior leaders to develop a sensible approach to the issues of climate change, energy security and fuel economy. Some of their viewpoints are shared in this report. Their work will drive our product development.[123]

Their thoughts and views on the matter, sprinkled throughout the report as it provides evidence of the company's performance, thus largely constitute the firm's vision, and they are what was coded as the vision statement of the company in this analysis.

Internal Company Strategies and the Varieties of Capitalism Approach

There are three clear observations on internal company strategies that relate to the VOC approach.

First, the internally-driven nature of firm strategies under Japanese CME capitalism is evident. Quantitatively and qualitatively this is where their strategic drive for environmental initiatives lies. And having taken the internal decision early to focus on the environment as a strategic priority there is a path dependence about their ongoing environmental initiatives.

Secondly, for German and US firms, the internal drivers are not just quantitatively weaker, they are qualitatively less clear. German firms are a mixed bag, with only Volkswagen approaching the Japanese firms in the importance of internal company strategies. For the others, the more outwardly-driven stakeholder model of German CME capitalist relations would seem to explain their divergence from the Japanese firms. Even so, their statements indicate them to be more internally driven than US firms, which is to be expected as LME-based firms stress the endogenous forces of market forces and state regulations. This is possibly why when US firms highlight the corporate policy aspects of their environmental commitments, even though the language of their commitments is strong the rationale for the commitments is not.

This brings us to the third observation: the importance of the leader's vision in US-based LME firms. The greater unilateral power of top management in LMEs means that if environmental commitments are a management priority, they tend to be the firm's priority. Hence the importance of the views of a firm's leaders in whether environmental strategies are embraced. In the case of Ford, top management commitment is evident. In the case of General Motors it is not.

The Over-Arching Concern of the Concept of Sustainability

Although not specifically related to the VOC approach, the frequency with which the concept of 'sustainability' appears in the reports prompted coding for it as a separate category. Table 6.6 summarises the results of coding for the over-arching concern of sustainability: the degree to which environmental sustainability is stressed, and the degree to which it is seen as intertwined with the economic fortunes of the firm. It shows that firms are three to four times more likely to cite environmental sustainability as a rationale for action, than explicitly linking this with economic sustainability. When they do, Japanese firms are the most likely to make the connection, although Ford and BMW come close. But clearly, the concept of environmental sustainability occurs most in German firms' reports: Volkswagen mentions it 66 times, BMW 45 times and DaimlerChrysler 21 times. The frequency of codes also explains why the percentage proportion of codes linking environmental sustainability and economic sustainability appears slightly lower for German firms than Japanese firms. German firms code so

much more for the concept of environmental sustainability generally, that although they draw the link between it and economic sustainability, the sheer magnitude of coding on the former makes the percentage of coding on the latter seem proportionally smaller. There is no doubt that, based on the sheer *number* of times the concept of sustainability is mentioned, the German firms (especially Volkswagen) have comprehensively adopted the concept of sustainability as something to be cited and taken seriously in their environmental reporting.

Table 6.6: Summary Totals of Over-Arching Concern for Sustainability

		Environmental Sustainability (%)	Environmental and Economic Sustainability Linked (%)	ALL CODES (%)	ALL CODES (No.)
GERMANY	**Volkswagen**	88	12	100	66
	BMW	67	33	100	45
	DaimlerChrysler	81	19	100	21
	GERMAN AVERAGE(%)	**80**	**20**	100	**132**
JAPAN	**Toyota**	60	40	100	5
	Honda	57	43	100	7
	Nissan	67	33	100	18
	JAPAN AVERAGE(%)	**63**	**37**	100	**30**
US	**General Motors**	100	0	100	3
	Ford	69	31	100	16
	US AVERAGE(%)	**74**	**26**	100	**19**
TOTAL		76	24	100	181

Source: Company Environmental Reports

There are also qualitative differences that relate to the *way* in which the two concepts are linked. At one end of the spectrum are firms that see their future economic and environmental sustainability as inextricably intertwined. They make statements that elevate environmental concerns and sustainability not just to sit alongside, but to be part of economic sustainability. These firms include the Japanese firms of Toyota and Honda, the German firms of Volkswagen and DaimlerChrysler, and Ford. For example, Toyota says:

> If the automobile is to remain a beneficial tool in the twenty first century, environmental responses are essential. Without environmental responses, the automobile industry has no future, and Toyota is convinced that only automakers that succeed in this area will be acceptable to society.[124]

Honda similarly says that only through "preservation of the global environment…will we be able to count on a successful future not only for our company, but for the entire

world".[125] Of the German companies, Volkswagen makes statements such as "we can only achieve lasting economic success if our business activities are guided not only by social considerations but by ecological aspects as well",[126] and DaimlerChrysler expresses similar sentiments. Ford recognises that the task of "integrating" economic, social and environmental responsibilities is difficult, and that they can sometimes appear to be "at odds",[127] but that sustainable development must be elevated "to sit alongside other business imperatives".[128] It looks like more a question of balance for Ford, were it not for the firm's Chairman and CEO saying that environmental concerns are "a key element in building our company for the next 100 years" and that it is only through addressing environmental concerns that automobiles can "secure their role in providing mobility to a growing and changing world".[129]

Nissan and BMW conceive the link between economic and environmental sustainability more in terms of balance where both are, to some degree, competing aims. Nissan makes several statements to this end, such as the following:

> There is strong interest in the world today about how to balance economic development with environmental protection. Economic growth does not necessarily threaten the environment. To the contrary, investments in technology can greatly benefit our understanding of the world we live in and how to preserve it. Collaboration among corporations, civic organisations, governments, and society in general will help move the world towards an effective balance between a healthy environment and healthy growth.[130]

This statement clearly reflects a concern for balance between competing, or at least alternative, interests. It is reflected in others made by the company, along the lines that "continued innovation is crucial to achieve a balance between economic development and the protection of the natural environment".[131] However, there is also a sense in the Nissan reports that economic growth is dependent on environmental sustainability. The company says that "protecting the environment is the single most important aspect of sustainability", and it does so in the context of believing precautions on environmental issues are "needed to allow economic development to continue".[132] Perhaps the nuances are subtle, but while Nissan's statements on sustainability suggest that a balance needs to be struck, in the case of Toyota, for example, economic development and the very future of the automobile *depend* on environmental action.

The distinction is clearest in the case of BMW. Although the belief is expressed that "the company's economic success and the efficient use of resources in the entire

value added chain depend upon one another", this is coupled with the idea that "economic efficiency and sustainability can be compatible with one another".[133] It is not that they are/must be, but that it is possible that they *can* be, and then in rather a material sense of using resources efficiently. If the distinction is too subtle, then the firm's vision statements make it plainer:

> Economic success and responsibility. For the BMW Group, long term economic success provides the basis for its activities. It is only on this basis that the company can assume responsibility permanently and sustainably.

And:

> For the BMW Group, economic success is both the prime objective and stable basis for assuming responsibility for…the environment".[134]

Therefore, environmental sustainability is *contingent* on economic success. In BMW's environmental policy the focus then is on how to "reconcile the interests of people and nature, technology and progress with the right of future generations to an intact environment".[135]

All of this is not a matter of 'black and white', but more 'grey', as BMW, like Nissan, recognises the need to reconcile competing interests, whereas Toyota, Honda, DaimlerChrysler, Volkswagen and Ford see their economic future as depending on both. But one thing is clear: General Motors does not draw the link at all. The closest the company comes is in acknowledging that its operations have environmental impacts and recognising this it works to "continuously reduce the environmental impacts of our business in line with a commitment to contribute to sustainable development".[136] The idea that environmental and economic sustainability are linked, or that one is dependent on the other, is an association never explicitly made. It is also the case that General Motors' codes least on environmental sustainability, with its codes relating to a mere three statements.

In summary, with the exception of General Motors, all firms explicitly associate their economic fortunes with environmental sustainability. As a proportion of their codes on environmental sustainability, Japanese firms are most likely to do so and, with the possible exception of Nissan, to see the two as inextricably intertwined. German firms are less likely to code for the linkage than Japanese firms. BMW's statements, like Nissan's, are somewhat weaker as they refer more to balancing competing aims than ones that are mutually reinforcing. However, the German firms are most likely to

mention the concept of environmental sustainability in the first place. The only firm that does not make an explicit link between environmental and economic sustainability is General Motors. It also refers to the concept of environmental sustainability the least. The suspicion this raises is that without the strength of commitment of its Chairman and CEO to environmental strategies, Ford too, LME-style, would also downplay the importance of environmental concerns as a strategic business issue in favour of more material priorities.

Different Rationales for Action, Different Strategies

As an Australian author, predisposed to employing an LME 'lens', US firms' behaviour seems most 'rational' and 'believable'. This is because their environmental concerns are couched more in material terms of market forces. In taking action that is environmentally positive, the rationale they present is expressed in terms of what the market dictates: what consumers demand, what the competition imposes, what safeguards their financial returns. This reflects a preference for market modes of economic coordination in LMEs. In adhering to regulations, voluntary rather than imposed regulation is preferred, and the purpose of being involved in the policy process is to ensure their material interests are not overly compromised. This reflects a preference for arms-length government involvement in markets in LMEs. Although social concerns are important, these are seen more in terms of how they affect business interests, and the interests of stakeholders predominate (i.e. those with an interest in, and who are directly affected by, the firm's material interests). Again, the LME market model, based as it is on shareholder value and a resulting preoccupation with profits in the shorter term, supports such a perspective. In LME fashion, internal drivers for change are not as important as external (mainly market) imperatives unless, as in the case of Ford, individual leaders' perspectives result in them coming to the fore. This is because of management's more unilateral control over firm strategies in LMEs. Commensurate with this, sustainability as a concept is recognised, but not necessarily mutually supportive of economic interests, unless such top management commitment is present.

German and Japanese firms' look 'non-rational' when viewed through an LME lens. Indeed, their statements raise questions about whether they may be regarded as genuine at all - e.g. is Honda pulling our collective legs when it says it is motivated not by profits but "joy"? However when their statements are viewed through a CME lens, the analysis in this chapter comes more into focus.

German firms are more focussed on normative than material factors, particularly social concerns. This is commensurate with the German CME model which sees firms as bearing public responsibility for their actions and looking to social attitudes in upholding such responsibilities. Their image and standing matters to them from an economic perspective, but also in terms of their role in society. Market forces are more an underlying concern than one given primacy for action. Even if BMW is as concerned as US firms about safeguarding its financial interests, it remains otherwise less focussed on market forces in terms of consumer demand and competitive pressures than on social attitudes. While German firms share a US preference for voluntary agreements, they couple this with a desire to be proactive in the policy process in achieving consensus-based agreements that serve environmental as well as material/business focussed goals. Close and cooperative, consensus-based state-business relations, predicted by the VOC approach, are therefore central to their perspective on state regulation. They are thus likely to develop internal corporate policies to further their environmental goals in the light of social concerns and their close relations with the state, and the result is a commitment to environmental sustainability not just as a concept, but for its links to their future economic interests.

Japanese firms share similar drivers for action with German firms, including in respect of social attitudes. But while German firms exhibit traits of the German 'machine', in which a more integrated approach to the environment involving more than material factors pertains, the Japanese firms do so in a more 'organic' way that reflects the enterprise community aspects of Japanese CME capitalist relations. They have a tendency to be 'poetic' and wax lyrical. They are particularly driven by their internal cultures, as predicted by the importance ascribed to communitarian company group, consensus-based strategy development and implementation within CME-based Japanese firms. They thus are driven by internal corporate policies and a strong sense of history/firm culture that gives impetus to action. They too are focussed on social

concerns, but in terms of leading society, being respected and doing their social *duty*. They are most likely to see environmental and economic sustainability as linked, especially from the point of view of social acceptability. They are not so much focussed on voluntary regulations as German and US firms, but on achieving and exceeding the legislative requirements they have agreed with national regulators. As their CME variety of capitalism would suggest, a longer term view based on future benefits and market leadership, rather than shareholder value, is the result. Their aim is not just to get products on the market, but to lead the market in new and uncharted directions with more radical products. They want to lead not just in material competitive terms, but in meeting broader strategic (in this case environmental) goals.

Conclusion

In the above analysis, two caveats are worth bearing in mind. First, to some extent a caricature has been drawn. National similarities and points of difference have been emphasised rather than variations within them. However, this is necessary in any comparative analysis. One wishes to tease out the similarities and differences within and between groups/categories, whether in terms of absolutes or degree, and the resulting implications.[137] The second caveat is that the qualitative analysis of reports has focussed on distinct sections of them. All the rationales for action within these sections may be found to varying degrees throughout the reports. However, the intention was to compare similar report sections, and particularly those sections where rationales for environmental action would be most likely to be laid out.

Bearing these caveats in mind, clear differences in the rationales presented by firms themselves for their environmental product development initiatives have been revealed. Furthermore, these are national differences. However, despite the differences an important point emerges from this. It is that German, US and Japanese firm may all be on a journey that leads to the same destination: more environmentally responsible behaviour. It is just that they are taking a different path to it, largely based on the VOC of their home states. Where US firms are focussed on material factors, such as consumer demand and market forces generally, and see normative concerns in more materialist instrumental terms, German and Japanese firms are more focussed on social

attitudes and internal company strategies so that a more normative approach to their business interests is shifting them to more environmentally friendly behaviour. In the end both may arrive at the same point, but US firms will have got there with an eye on their bottom lines, whereas German and Japanese firms will have taken a course of action that they believe to be normatively 'right' and which at the end of the day has delivered material benefits. Thus, it is not so much a matter of 'greenwashing' versus real commitment, but considering different paths to that commitment, and the different drivers that facilitate it in different (institutional) contexts.

These conclusions have been derived via an analysis of firms' executive statements, vision statements and environmental policy guidelines in their environmental reports. They support the findings so far in Chapters 4 and 5, vis a vis state regulations and market forces, and add the perspectives of individual firms internal strategies. However, to build on the insights these environmental reports shed on individual firms' rationales for action, the views expressed by key personnel who were willing to be interviewed within them are the subject of analysis in Chapter 7.

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[1] A point also made by R. Dore (1997), 'The Distinctiveness of Japan', in C. Crouch and W. Streeck eds., *Political Economy of Modern Capitalism: Mapping Convergence and Diversity*, London: Sage Publications, p.31.

[2] A point well made in G. King, R. Keohane and S. Verba (1994), *Designing Social Inquiry: Scientific Inference in Social Research*, Princeton: Princeton University Press.

[3] M. Finnemore and K. Sikkink (1998), 'International Norm Dynamics and Political Change', *International Organization*, Vol.52, No.4, p.892.

[4] These were their most recent reports as at March 2005: Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG; BMW Group (2003), *Sustainable Value Report 2003/2004: Innovation. Efficiency. Responsibility.*, Munich: Bayerischen Motoren Werke; DaimlerChrysler (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM; Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation; Honda Motor Company (2004), *Honda Environmental Annual Report 2004*, Tokyo: Honda Motor Company; Nissan Motor Company (2004a), *Environmental Report 2004*, Tokyo: Nissan Motor Company; General Motors Corporation (2004), *2004 Corporate Responsibility Report*, Detroit: General Motors Corporation; Ford Motor Company (2004), *2003/4 Corporate Citizenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company. Two additional reports were coded for Honda and Nissan: Honda Motor Company (2002), *Honda Ecology*, Tokyo: Honda Motor Company; and Nissan Motor Company (2004b), *Sustainability Report 2004*, Tokyo: Nissan Motor Company. The reason for this is that while both produce specifically 'Environmental Reports', these are augmented with additional reports that put their initiatives in a broader perspective. In the case of Honda, its 'Ecology' report, produced every three years, presents an overview of the company's policy, vision and future directions in relation to the environment, as opposed to its 'Environmental Report' that covers performance in the past year. Nissan produced its 'Sustainability Report' for the first time in 2004 in addition to its 'Environmental Report'. In addition, Volkswagen's environmental policy guidelines were also coded because they are referred to and summarised in the 2003/4 report, but printed in full on the firm's website and in the firm's 2001-02 report. It was therefore thought prudent to include them. They

are available at: Volkswagen AG (2001) *Environmental Report 2001/2002: Mobility and Sustainability*, Wolfsburg: Volkswagen AG. Similarly, BMW's environmental policy guidelines were included from BMW Group (2003b), *Environmental Protection: BMW Group Environmental Guidelines*, http://www.bmwgroup.com/e/0_0_www_bmwgroup_com/5_verantwortung/5_4_publikationen/5_4_4_downloads/pdf/BMWGroup_Umweltleitlinen_E.pdf, accessed 13 January 2005. These are only available from the website, although the website address where they may be found is provided in the firm's written report.

[5] Ford acknowledges that what appears in its written report is what is most important. For example, Ford says the following in its report for 2003/04: "we have expanded our coverage of the environment and safety issues in the print report because of their importance to us and to our stakeholders". See Ford Motor Company (2004), *op. cit.*, p.11.

[6] This has undertones of path dependence as described in P. Pierson (2000), 'Increasing Returns, Path Dependence and the Study of Politics', *American Political Science Review*, Vol.94, No.2, pp.251-267; and also P. Pierson and T. Skocpol (2000), 'Historical Institutionalism in Contemporary Political Science', in I. Katznelson and H. Milner eds., *Political Science: The State of the Discipline*, New York: W.W. Norton and Company.

[7] The averages for each state are calculated as a weighted average of the codes for individual firms. For example. If one firm had 100 codes in total and 40 of these are for market forces, and another has 150 codes in total also with 40 on market forces, the average is calculated as (40+40)/(100+150)x100=53 percent.

[8] That is to say, market forces and state regulation are sub-categories of material factors, and the categories considered here fall below them.

[9] Ford Motor Company (2004), *op. cit.*, Vision Statement , Appendix D.

[10] *Ibid.*, Executive Statement , Appendix D.

[11] General Motors Corporation (2004), *op. cit.*, Vision Statement, Appendix D.

[12] *Ibid.*, Executive Statement, Appendix D.

[13] *Ibid.*, Vision Statement, Appendix D.

[14] Volkswagen AG (2003), *op. cit.*, Vision Statement, Appendix D.

[15] *Ibid.*, Vision Statement, Appendix D.

[16] *Ibid.*, Vision Statement, Appendix D.

[17] BMW Group (2003), *op. cit.*, Executive Statement , Appendix D.

[18] DaimlerChrysler (2004), *op. cit.*, Vision Statement, Appendix D.

[19] Honda Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[20] *Ibid.*, Executive Statement, Appendix D.

[21] Toyota Motor Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[22] Nissan Motor Company (2004b), *op. cit.*, Executive Statement, Appendix D.

[23] BMW Group (2003), *op. cit.*, Vision Statement, Appendix D.

[24] General Motors Corporation (2004), *op. cit.*, Vision Statement, Appendix D.

[25] Ford Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[26] BMW Group (2003), *op. cit.*, Executive Statement, Appendix D.

[27] General Motors Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[28] *Ibid.*, Executive and Vision Statements, Appendix D.

[29] Ford Motor Company (2004), *op. cit.*, Vision Statement, Appendix D.

[30] *Ibid.*, Executive Statement, Appendix D.

[31] DaimlerChrysler (2004), *op. cit.*, Executive Statement, Appendix D.

[32] BMW Group (2003), *op. cit.*, Vision Statement, Appendix D.

[33] *Ibid.*, Vision Statement, Appendix D.

[34] Volkswagen AG (2003), *op. cit.*, Vision Statement, Appendix D.

[35] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[36] Honda Motor Company (2002), *op. cit.*, Vision Statement, Appendix D.

[37] *Ibid.*, Vision Statement, Appendix D.

[38] Toyota Motor Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[39] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[40] Nissan Motor Company (2004a), *op. cit.*, Vision Statement, Appendix D.

[41] For details of the split between national and international voluntary agreements see Tables E25 and E26 in Appendix E.

[42] For details of the split between national and international voluntary agreements see Tables E25 and E26 in Appendix E.

[43] Volkswagen AG (2003), *op. cit.*, Executive and Vision Statements, Appendix D.

[44] Nissan Motor Company (2004a), *op. cit.*, Executive Statement, Appendix D.

[45] For details of the split between national regulations and regulations generally see Tables E5 and E6 in Appendix E.

[46] Ford Motor Company (2004), *op. cit.*, Vision Statement, Appendix D.

[47] General Motors Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[48] Nissan Motor Company (2004a), *op. cit.*, Vision Statement, Appendix D.

[49] BMW Group (2003), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[50] DaimlerChrysler (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[51] *Ibid.*, Vision Statement, Appendix D.

[52] Volkswagen AG (2003), *op. cit.*, Appendix D.

[53] Honda Motor Company (2002), *op. cit.*, Appendix D.

[54] *Ibid.*, Appendix D.

[55] Nissan Motor Company (2004a), *op. cit.*, Appendix D.

[56] *Ibid.*, Appendix D.

[57] *Ibid.*, Appendix D.

[58] Toyota Motor Corporation (2004), *op. cit.*, Appendix D.

[59] Volkswagen AG (2003), *op. cit.*, Appendix D.

[60] DaimlerChrysler (2004), *op. cit.*, Vision Statement, Appendix D.

[61] General Motors Corporation (2004), *op. cit.*, Appendix D.

[62] Ford Motor Company (2004),*op. cit.*, Vision Statement, Appendix D.

[63] *Ibid.*, Vision Statement, Appendix D.

[64] *Ibid.*, Executive Statement, Appendix D.

[65] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[66] *Ibid.*, Environmental Policy Guidelines , Appendix D.

[67] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[68] General Motors Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[69] *Ibid.*, Vision Statement, Appendix D.

[70] Honda Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[71] Honda Motor Company (2002), *op. cit.*, Executive and Vision Statements, Appendix D.

[72] *Ibid.*, Vision Statement, Appendix D.

[73] Honda Motor Company (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[74] Toyota Motor Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[75] *Ibid.*, Executive Statement, Appendix D.

[76] Although as a matter of policy the firm does say that it wants to "promote the appeal of cars throughout the world and strengthen the Toyota brand image". See *ibid.*, Vision Statement, Appendix D.

[77] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[78] DaimlerChrysler (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[79] *Ibid.*, Vision Statement and Environmental Policy Guidelines, Appendix D.

[80] Volkswagen AG (2003), *op. cit.*, Vision Statement, Appendix D.

[81] *Ibid.*, Executive Statement, Appendix D.

[82] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[83] BMW Group (2003), *op. cit.*, Vision Statement, Appendix D.

[84] *Ibid.*, Vision Statement, Appendix D.

[85] DaimlerChrysler (2004), *op. cit.*, Vision Statement, Appendix D.

[86] Volkswagen AG (2003), *op. cit.*, Vision Statement and Environmental Policy Guidelines, Appendix D.

[87] Honda Motor Company (2004), *op. cit.*, Appendix D.

[88] Toyota Motor Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[89] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[90] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[91] Ford Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[92] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[93] General Motors Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[94] *Ibid.*, Vision Statement, Appendix D.

[95] Ford Motor Company (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[96] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[97] General Motors Corporation (2004), *op. cit.*, Vision Statement, Appendix D.

[98] DaimlerChrysler (2004), *op. cit.*, Vision Statement, Appendix D.

[99] Toyota Motor Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[100] *Ibid.*, Vision Statement, Appendix D.

[101] Ford Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[102] General Motors Corporation (2004), *op. cit.*, Vision Statement, Appendix D.

[103] BMW Group (2003), *op. cit.*, Vision Statement, Appendix D.

[104] *Ibid.*, Executive Statement, Appendix D.

[105] Volkswagen AG (2003), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[106] Honda Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[107] Honda Motor Company (2002), *op. cit.*, Vision Statement, Appendix D.

[108] Honda Motor Company (2004), *op. cit.*, Vision Statement, Appendix D.

[109] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[110] Nissan Motor Company (2004a), *op. cit.*, Executive Statement, Appendix D.

[111] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[112] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[113] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[114] Nissan Motor Company (2004b), *op. cit.*, Executive Statement, Appendix D.

[115] Toyota Motor Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[116] Nissan Motor Company (2004a), *op. cit.*, Vision Statement, Appendix D.

[117] Honda Motor Company (2002), *op. cit.*, Vision Statement, Appendix D.

[118] DaimlerChrysler (2004), *op. cit.*, Executive Statement, Appendix D.

[119] General Motors Corporation (2004), *op. cit.*, Executive Statement, Appendix D.

[120] Ford Motor Company (2004), *op. cit.*, Executive Statement, Appendix D.

[121] *Ibid.*, Executive Statement, Appendix D.

[122] *Ibid.*, Executive Statement, Appendix D.

[123] *Ibid.*, Executive Statement, Appendix D.

[124] Toyota Motor Corporation (2004), *op. cit.*, Vision Statement, Appendix D.

[125] Honda Motor Company (2004), op. cit, Environmental Policy Guidelines, Appendix D.

[126] Volkswagen AG (2003), *op. cit.*, Executive Statement, Appendix D.

[127] Ford Motor Company (2004), *op. cit.*, Vision Statement, Appendix D.

[128] *Ibid.*, Vision Statement, Appendix D.

[129] *Ibid.*, Executive Statement, Appendix D.

[130] Nissan Motor Company (2004a), *op. cit.*, Executive Statement, Appendix D.

[131] Nissan Motor Company (2004b), *op. cit.*, Vision Statement, Appendix D.

[132] *Ibid.*, *op. cit.*, Executive Statement, Appendix D.

[133] BMW Group (2003), *op. cit.*, Executive Statement, Appendix D.

[134] *Ibid.*, Vision Statement, Appendix D.

[135] *Ibid.*, Environmental Policy Guidelines, Appendix D.

[136] General Motors Corporation (2004), *op. cit.*, Environmental Policy Guidelines, Appendix D.

[137] G. Sartori (1970), 'Concept Misformation in Comparative Politics', *American Political Science Review*, Vol.6, No.4, pp.1033-1053; D. Collier and J. Mahon (1993), 'Conceptual Stretching Revisited: Adapting Categories in Comparative Analysis', *American Political Science Review*, Vol.87, No.4, pp.845-55; R.

Adcock and D. Collier (2001), 'Measurement Validity: A Shared Standard for Qualitative and Quantitative Research', *American Political Science Review*, Vol. 95, No.3, pp.529-546; and D. Collier and R. Adcock (1999), 'Democracy and Dichotomies: A Pragmatic Approach to Choices about Concepts', *Annual Review of Political Science*, Vol. 2, pp.537-65.

Chapter 7: Firms' Commitment to Environmental Product Development Initiatives: Interviews

Introduction

Chapter 3 introduced the main environmental product development initiatives being undertaken by firms, prior to Chapters 4-6 which concentrated on the key material factors of state regulations and market forces, as well as normative factors relating to social attitudes/concerns and internal company strategies.[1] It was shown in these chapters that national institutional variations explain differences in the degree and nature of car firms' environmental initiatives. As per the varieties of capitalism (VOC) approach, the liberal economic model has been shown to only apply in the case of United States (US) firms based in the archetypal liberal market economy (LME). However, German and Japanese firms are based in coordinated market economies (CMEs) where the institutional basis of capitalist relations leads them to focus on more normative, rather than material, factors. For example, they are inclined to take a more holistic view in which their role in society occupies a more central strategic position, and internal corporate strategies proactively drive environmental product initiatives, rather than reacting to the material imperatives of state-imposed regulations and consumer demand in markets.

Therefore, firms' rationales for their environmental commitments reflect the institutional context of their home states where they are economically, politically, socially, culturally and historically embedded, as well as physically headquartered. The detailed qualitative analysis of the major German, US and Japanese firms environmental reports in Chapter 6 highlighted a further point. In addition to national institutional differences affecting the behaviour of firms, it also produces different perceptions of what they believe is important in addressing the environmental impact of their operations. The analysis also highlighted some key differences predicted by the VOC approach and related institutional perspectives at sub-national levels. For example, German firms are particularly mindful of consensual cooperation with regulators while taking account of social concerns, while

Japanese firms place more emphasis on leading society and being internally driven by their company policies.

To build on these findings, this chapter seeks to marry firms' stated rationales for environmental commitments examined in Chapter 6, with the results of interviews with key personnel drawn from Volkswagen, BMW, Ford and Toyota. The focus is again on individual firms, but first-hand perspectives are brought to bear in addition to the literature they produce. As well as inviting interviewees to speak generally on their firms' environmental product developments and motivations behind them, the interviews had a significantly semi-guided component through which interviewees were directed to comment specifically on state regulations, market forces (in terms of consumer demand versus social attitudes), and internal company strategies.[2]

The chapter proceeds by first describing the interview methodology. Mirroring the analysis in Chapters 4-6, interviewees' perceptions of state regulations, the role of market forces, including consumer demand versus social attitudes, and internal company strategies are considered in turn. For state regulations, interviewees' responses fell broadly into two categories: the role they see government playing, and the nature of state-business relations in the light of this. The key differences noted are that German and European Union (EU) regulations were identified as leading environmental strategies there, and even worldwide, to an extent not highlighted for Japan and the US. This was associated with a different causal relationship between business and government that interviewees identified. The state was seen as leading environmental strategies, or a partner in them with firms, in the case of German firms, Toyota personnel said that they were leading government, whereas Ford personnel said their company acts in a more reactive manner to state regulations. This supports the model proposed in Chapter 4.[3]

For market forces, the role ascribed to consumer demand versus social attitudes is highlighted, and the key point is made that, as suggested by the analysis in Chapter 5, social attitudes on the environment have not flowed though to consumer demand as clearly as some commentators might suggest. However, the role played by social attitudes in influencing company strategies is different. They are discounted in favour of material factors (i.e. consumer demand) in the case of Ford, but the German and Japanese

interviewees stressed the role of social attitudes more in shaping their environmental strategies.

For internal company strategies, interviewees made comments that went to identifying the main drivers for environmental attributes in the cars they produce, the way in which this is associated with their firms' desires to be 'leaders', the role played by senior management, and the role of path dependence. Analysing their comments in respect of these aspects demonstrates that, as suggested by the analysis in Chapter 6, Japanese firms such as Toyota are most internally-driven, while US firms are least internally-driven on environmental strategies. Indeed, when it came to 'leadership', the Japanese and German firm interviewees were prepared to identify their firms' environmental strategies as a key to their leadership positions, particularly in the case of Toyota interviewees, while Ford interviewees focussed more on market leadership and material factors associated with this – i.e. for them environmental leadership was contingent on other material factors. The exception for Ford was the key role played by senior management, in that the firm's Chairman and Chief Executive Officer (CEO), Bill Ford, was identified as a key driver of Ford's environmental strategies. This goes to the more unilateral control exerted by management in LME-based firms. Finally, the point is made that with all the various drivers for environmental strategies, interviewees identified what amounted to path dependence as a key factor, as indeed it is for the VOC approach more generally.[4]

Therefore, the aspects of their firms' rationales for environmental commitments highlighted by interviewees are related to the points made in previous chapters, and build on them. They support the insights of the VOC approach and conclusions reached in respect of it in the preceding chapters on the basis of the empirical evidence. In addition, the interviews also produced some key observations on the different timeframes under which firms operate that are related to the different VOCs of their home states (longer for CMEs and shorter for LMEs), the extent to which their perspectives represent a shift from materialist to post-materialist values (the shift being more in evidence for CMEs than LMEs), and finally some interesting observations in the light of the analysis on how they perceive future environmental challenges. It is shown that the future for Ford interviewees is still one based on the LME preoccupations of material factors and remaining competitive

in markets, whereas the German and Japanese firm interviewees, in CME-fashion, express longer-term perspectives and look beyond such material factors to how their firms will shape the environmental future of the industry

As in Chapter 6, a lot of ground is covered in the views expressed by interviewees that are analysed in this chapter. However, two clear conclusions are reached. First, interviewees' responses indicate that the rationales offered by firms in their environmental reports reflect attitudes that filter down to lower management levels worldwide. Therefore, the institutional context of a firm's home state VOC permeates its operations internationally. Secondly, and most importantly, the relative importance ascribed by interviewees to market forces versus social attitudes, state regulations and internal company strategies support the conclusions reached in the preceding chapters based on the empirical evidence at a national level, and individual firm rationales expressed in writing in their printed reports.

Interview Methodology

All firms whose environmental reports were analysed in Chapter 6 were invited to participate in interviews. They were sent Participant Information Statements describing the research and questions to be asked, subsequent to which phone calls were made seeking meetings. A copy of the Participant Information Statement and questions asked are provided at Appendix F. Volkswagen, BMW, Ford and Toyota accepted the invitation. General Motors, DaimlerChrysler and Honda declined. An interview with a Nissan employee was conducted, but at interview he repeatedly declared that he knew little about environmental matters. This was a curious response given the information he received and phone discussion prior to the interview. His responses have been omitted from the following analysis because analysing non-responses would be unproductive. In total, interviews with three personnel from Toyota, five from Ford, and one each from Volkswagen and BMW are the subject of analysis.

The firms involved are a reasonable sample of the industry in their home states. Volkswagen and Toyota dominate their home markets. Volkswagen also dominates the European market. Ford co-dominates its home market with General Motors. BMW dominates the prestige car segment of the market in Germany and internationally. A brief summary of these firms' operations, by way of additional background, is provided at Appendix G, but the key point is that in being granted interviews with personnel from these firms, access was given to first-hand perspectives from leading firms within the German, US and Japanese car industries.

All interviews were with senior Australian personnel, except for Volkswagen. There are three reasons for this. First, all the firms have Australian branch offices, so approaching these offices for interviews was the easiest course of action.[5] Secondly, their presence in Australia is not always purely of an import and distribution nature. Ford and Toyota have the full array of operations from research and product development, to manufacturing, distribution and sales. Therefore, strategic product development decisions for these firms go beyond simply 'shifting product'. Thirdly, interviewing Australian nationals working for these firms tested whether Australian as opposed to German, US or Japanese perspectives prevail. This revealed the relative importance of host versus home market conditions, and therefore the strength of the VOC thesis. Volkswagen is the exception to the rule because an interview was conducted with a senior office holder in its German head office. Volkswagen Group Australia recommended this course of action.

The interviews were recorded and transcribed in order to facilitate analysis. However, the full transcribed text of the interviews is not made available in this thesis. This was a condition of the University of Sydney Ethics Committee. Therefore, in the following analysis the interviewees' quotations and views are not referenced to these transcripts, which have been kept confidential as required. Instead, it is made clear to which firm's interviewee(s) the views expressed pertain. In addition, this is done anonymously. This was a decision taken by the author, despite the fact that all interviewees except two were happy for quotations to be attributed to them. However, I am mindful of the surprise expressed by John de Lorean, the late charismatic former General Motors executive, who noted in his reflections on the culture of the firm after his resignation that

however ‘pure’ the motivations of an employee commenting on his/her company’s strategies, there are always those within it who may draw their own conclusions based on personal prejudices and seek to attack that individual. Indeed, he says that during his time with General Motors the very act of airing any view in the public domain was often viewed negatively.[6]

One final point is worth noting before proceeding. When commenting on the environmental product development initiatives of their firms, all interviewees focused primarily on fuel economy and carbon dioxide (CO_2) emissions. This mirrors to a large extent the focus on these aspects in environmental reports. It also supports the focus on fuel economy, CO_2 emissions and the issue of climate change throughout the thesis.

State Regulations

All interviewees believed governments need to provide an agenda-setting role, informing and educating their citizens on environmental matters and acting in the interests of society. In practical terms, they all agreed with government support for research and development and for business generally (i.e. subsidies). Tax breaks to encourage consumers to purchase more environmentally friendly vehicles were also seen as constructive strategies. Beyond this, there were clear differences of opinion on the role of government regulations, the nature of state-business relations and, as a result of these relations, differences in the causal relationship between regulations and business strategies. These qualitative differences are clearly related to the VOC of firms’ home states. Ford interviewees, working for an LME-based firm, primarily conceived the government’s role as setting regulations to which the firm must adhere. Interviewees from the German and Japanese firms, based in CMEs, saw state-business relations in more partnership terms, desiring a closer relationship with regulators and, in the case of Toyota, greater state support. As noted in Chapter 4, the differing role ascribed to the state, and the resulting differences in state-business relations, have causal implications in the sense that US firms respond to regulations, whereas German and Japanese firms are instrumental in co-developing regulations or, in the case of Japanese

firms, lead governments in their development. Both the role of government and the resulting differing state-business relations are discussed in the following sections.

The Role of Government

Although all firms agreed that governments play a key role, some regulations were viewed negatively by Ford interviewees. LME-style, these were market interventions that penalise environmentally damaging behaviour, such as taxes, which were seen as "blunt instruments" because their effects cannot be clearly predicted.[7] Instead, a preference was expressed for research and development grants to "accelerate the commercialisation and introduction of new technologies" – i.e. market *enhancing* initiatives. However, CME-style, support for broader-based state intervention was given by Volkswagen and Toyota interviewees. The Volkswagen interviewee expressed strong support for technologically-neutral regulations based on environmental impact, including standards and excises. Toyota interviewees wanted governments to "come on board" more and cooperate with their firm, and they were not very proscriptive in how this should happen. Therefore, a greater range of state interventions were accepted, or even welcomed.

Raised awareness of environmental issues and the influence of the Kyoto Protocol were cited as reasons why governments are taking a tougher stand on issues like climate change. But when pressed, interviewees could not identify any dramatic changes in regulations that had impacted on their product development strategies. Instead, existing regulations were said to have been incrementally strengthened.[8] Therefore, environmental product development initiatives were not seen as driven by tougher state regulations. This included the petrol-electric hybrid Toyota Prius and Ford Escape, the latter of which was said by one Ford interviewee to be attributable to state regulations only in the broadest "directional" sense. Only the Volkswagen interviewee saw his firm's product development initiatives as being the result of state regulations, but then significant impetus was provided by the industry itself. He said:

> When we developed these hybrid cars and so on, and the diesel engine, that was a bit compelled by the agreement between the car industry in Europe and the governments and the European

> Commission in Europe, because Volkswagen is the largest mass producer here on this continent so we had to carry, I would say, most of the obligations we made there.

Therefore, Volkswagen developed advanced diesels in response to industry co-sponsored EU regulatory targets.

Concomitant with the Volkswagen interviewee's perspective, most interviewees cited the EU as a regulatory leader. The German firms' interviewees saw this as reflecting long-standing initiatives to address environmental concerns over the last 15 to 20 years in both Germany and Europe. Because of their stringency, Ford interviewees said European standards are now de facto global standards, as no firm wants to make a unique car just to meet European requirements. Therefore, there is an international trend to harmonise regulations with those of the EU. However, one Toyota interviewee noted that outside the EU, "pragmatism at the end of the day rules" with progress on environmental matters by the US government particularly slow (unless one counts Californian regulations),[9] and Japan "responding" to, and slightly lagging, the EU. Any regulatory changes impacting on the international industry were thus said to be largely the result of "substantial change over the last ten years driven largely by Europe".

This leads to the key point of difference between German firms and the others: the extent to which governments reflect or lead public opinion. The Volkswagen interviewee said the German government is the protagonist on environmental matters:

> Normally in most countries in the world the Greens are not in the government, so they are the public, so to speak, and they influence the government. Whereas here in Germany they are in the government and there they shape, in a way, public opinion because, of course, they are the strongest exponents for environmental action and the public is less environmentally-friendly than the government.

Therefore, the German government leads public opinion. The rise of the German Greens to coalition government, mirrored in the rise of similar parties as a political force in a handful of other European countries was said to mean that "the government quite often starts, or at least strengthens, the political debate or public debate on certain matters". One Toyota interviewee made similar comments on the German Greens' role. Even though the BMW interviewee noted that governments are generally "more responsive rather than proactive", and tend to react on the basis of "some external, dramatic, radical, unplanned for change"

or a change in public sentiment that affects their re-election chances, he still identified "a very high level of maturity and thinking about the environment" in Europe reflected in EU legislation and regulations.

Outside Germany and the EU, and agreeing with the BMW interviewee's view of governments generally, one Ford interviewee said that governments are "reflecting what society thinks or wants". He explained the reason why as follows:

> Governments want to be elected and how do they do that? Well, partly by being popular but partly by reflecting key stakeholder groups. You know, the average 'Joe'….might have a view about the environment, but he's not going to vote or un-vote a particular candidate because of environmental views. But government reflects the needs of the broad community, and I have no doubt there are huge changes in government's awareness and action. Just the whole business and debate about carbon trading and carbon emissions in Australia and globally: Kyoto.

Therefore, governments reflect environmental concerns not because of any grand leadership vision, but because growing environmental awareness affects their re-election chances. One Toyota interviewee was particularly dismissive of government policies saying "we see a lot of, I suppose, fairly cynical policy statements put out and a lot of window dressing" at worst, or at best "the ideas and the willingness are there, but they're just not implemented".

Overall, all interviews saw governments playing an important role. Government intervention was expected and desired, although Ford interviewees expressed dislike for governments extensively constraining market forces, as one would expect of their LME view of the primacy of markets and market forces as organisers of economic activity. Although government regulations were not seen having dramatically changed, there was the feeling that they have incrementally been made more stringent. This is especially the case for Germany and the EU, to the point where the EU was seen as a regulatory leader because the concept of environmental sustainability has been most deeply and strategically institutionalised. The result is that for Germany and the EU, government regulations are playing a leading role in driving environmental sustainability, whereas elsewhere they tend to reflect broader social concerns. Such comments on the role of governments suggest differences in state-business relations, and the causal relationship between the two. This is the subject of the following section.

State-Business Relations

All interviewees' said their firms worked with government in setting and meeting environmental regulations, but the reason for so doing varied. LME perceptions of the state intervening only to correct market failure were reflected in Ford interviewees seeing government imposing environmental regulations to which the firm must adhere to remain in business. CME preferences for greater coordination and partnership between the state and business were reflected in the Volkswagen interviewee perceiving state regulations as complementing firm strategies, while Toyota interviewees desired greater state action to support their firm's environmental initiatives. The BMW interviewee was relatively silent on the firm's relationship with government other than to stress that BMW always exceeds regulations.

Ford interviewees saw state regulations in the most adversarial terms. This is not to say that the government was somehow the 'enemy'. After all, in an Australian context, Ford interviewees cited their firm's voluntary commitments under programs such as the "Greenhouse Challenge".[10] Even so, because state regulations temper market forces one Ford interviewee noted that they can be "unnecessarily stringent", because "if the customer preference is for high powered thirsty vehicles but the individual company has a particular target to meet, that means they may need to produce unprofitable product to balance that out which doesn't really do anyone any good". The implication is that regulations are too stringent if they work against market forces too excessively. Another Ford interviewee noted that his firm "would comply with the regulations in order that [it is] involved in establishing those regulations". The implication is that involvement in negotiations about regulations is important in order to limit their impact on market outcomes.

Why sign up to voluntary agreements then? Ford interviewees said the reason was more to *demonstrate* that the company is a good corporate citizen. In respect of the Greenhouse Challenge, one Ford interviewee said:

> There's no regulation associated with it but it simply says, well, here's something the government thinks is important to reduce greenhouse gas emissions and big companies have gone and set the example. Here's an opportunity to do it. Well, it's sort of like, they'd be silly not to wouldn't they? You know, it's not legislation but it's a strong encouragement to demonstrate that you're doing some

> good things to the rest of the community. So, why are 500 companies already signed up to the Greenhouse Challenge? Well, because we all think we're good corporate citizens and we want to be able to demonstrate that.

Apart from meeting regulations and trying to temper their stringency, a key reason for voluntary commitments is thus to be *seen* to be setting a good example. Indeed, the same interviewee followed up the above statement with the observation that such initiatives are a matter of "an indirect carrot and stick that says, well, if you don't do these things there'll be a penalty further out, not today, but further out". The motivation implied is an instrumental desire to reduce the interference of government in future product development strategies.

It is important that this finding on Ford not be taken too negatively, because although they might not always like how the state intervenes, Ford interviewees also saw the government as having "a critical role to play" in "setting a vision where we need to go". It was all part of "the fine balance between industry going forward and progressing, and the government setting a vision and finding that fine balance between the economic reality of it and the fact that, yes, we have to progress". In addition, one Ford interviewee stressed constructive consultation with government as the key to achieving good regulatory outcomes. Interestingly though, and in line with the confrontational tendencies of such interactions in the US LME variety of capitalism, the same interviewee conceded he did not "see that in the US [where] it seems much more confrontational". All Ford interviewees also stressed that part of being a responsible corporation and legitimately remaining in business involved regulatory compliance. As one Ford interviewee put it, you have to "hit those regulatory targets otherwise you literally can't sell your vehicles….so the regulatory environment has a huge role to play in terms of shaping outcomes".

For Ford, meeting environmental regulations is therefore important because these constrain how the firm responds to consumer demand. One interviewee said: "what we'll look at is what does the customer want, and what are the corporate and regulatory requirements that are there as well" because "the regulatory environment will mandate that we deliver certain things". In other words, business is about reacting to consumer demands and meeting government regulations. Indeed "if there weren't set targets that had to be achieved then [environmental] progress would be made but knowing you have to hit certain

targets naturally makes them more evident and helps shape outcomes and resource allocation". The result is that for Ford regulations are seen more as a 'ceiling' to be "hit" than a 'floor' the company is well above.[11]

Although the Volkswagen interviewee shared the belief that the government plays a crucial role, his perception was not so much one of the government intervening to stipulate regulatory targets that must be hit, as one where the industry and government move forward together in *strategic harmony*. As he put it, while the government in Germany and the EU is leading society on the environment, industry and government "actually wants to go in the same direction". Although Volkswagen is obliged to comply with government regulations, he said compliance is less important than the "space" in which consensus positions are reached:

> There's not so much that one leads and the other follows. It's more the space that grows because companies will of course look more to costs and competitiveness, whereas the government sees more of the health aspects and environmental aspects purely without looking so much at costs and the international competitiveness of their companies.

In other words, Volkswagen does not so much respond to state regulations as share a similar strategic agenda. The emphasis might be different, but the agenda is shared between industry and government. It is less a mater of action (by government) and reaction (by industry) as a "space" in which consensus is reached. This is very much what one would expect of the negotiated consensus attributes of Germany's CME.

Although one Toyota interviewee agreed that "regulations and the forecasted regulations introduction scenario will definitely shape what we do", all Toyota interviewees stressed that the firm is well ahead of regulations anyway. Indeed, the point was made that Toyota has a corporate policy of certifying all its vehicles in excess of current regulatory requirements. But going beyond this policy, Toyota interviewees actually saw state leadership on environmental issues as a thing of the past. Two Toyota interviewees described the visit of a senior environmental director from Toyota's head office and his message to staff to illustrate this point. One said:

> Somebody asked that question: how do you think government can help Toyota move forward? He basically said we don't think you can because 20 years ago a lot of the legislation and guidelines helped direct us, gave us direction, but now we're waiting for government to catch up because

> they've already surpassed every form of legislation. They already meet or exceed the 2010 emission and fuel economy guidelines for virtually all their range in Japan. He basically said the benchmarks aren't high enough.

His reply, indicating the company does not take its strategic direction on environmental matters from government any more, was summed up in the following terms: "he wasn't trying to be smug, but he basically said that 20 years ago we needed you but now we're waiting for you to give us more direction and work with us". In fact, the view was expressed that companies that just meet government regulations do not occupy a position of leadership as Toyota does.

The BMW interviewee made similar points to Ford in saying the firm was always "mindful of where government policies are going to go" and recognised that "most legislative criteria are the result of negotiation and compromise", but like Toyota he also stressed that BMW always seeks to exceed government regulations as a matter of corporate strategy. However, unlike Toyota, it was not so much a matter of leading government as being aware of regulations and designing products to meet forecast *future* regulations. The reason for this was explained as BMW's ethos of leadership in everything it does as a premium producer. The BMW interviewee said:

> Our focus [is] on being innovative and not just being responsive to proposed or existing legislation. We take that into account in our planning. I mean, we wouldn't say that we're only going to do this because it's required by government. We'd say no, let's go a bit further.

Regulations for BMW thus establish a 'floor' to be above, rather than a ceiling to be hit. The BMW interviewee summed up this outlook saying "we'd probably be looking well beyond (current regulations) to make sure that at our lowest base we were well past it so there is no chance of running into any legislative issues down the track, but also to make sure that we remain ahead of the pack".

State regulations were thus seen very differently by interviewees from each firm. Ford interviewees, in true LME fashion, saw them as a constraint on reacting to market forces, but necessary because the government's role is to act in the public interest and drive the agenda on environmental matters. The German and Japanese interviewees did not see government regulations as setting their environmental agendas as much, although for Volkswagen it can be said that, in CME fashion, working *with* government is a key reason

why environmental initiatives have been undertaken. Toyota interviewees went a step further in desiring more government involvement to assist in its environmental strategies, being ahead of regulations and government policies. Toyota and BMW also shared a strategy of always exceeding regulations.

These findings also suggest clear differences in the causal relationship between state regulations and business strategies. Ford reacts to and meets current regulations. Volkswagen travels the same path as government in a cooperative manner. BMW aims to be aware of proposed future regulations in order to ensure the firm's products always exceed rather than respond to regulatory requirements. For Toyota, governments lag the company on environmental initiatives and a desire was expressed for them to catch up. The causal relationship this suggests supports the model hypothesised in Figure 4.9 in Chapter 4: US firms react to regulations, German/European firms have a more co-regulatory relationship with government (or, in the case of BMW, exceed regulations as a matter of corporate policy) and Japanese firms go beyond the co-regulatory model of Germany/Europe to lead the government on environmental issues rather than the converse.

Market Forces

All interviewees saw market forces as important, in the sense that their firms are driven by economic imperatives to maintain/increase their market share and be profitable. However, perceptions of the strategic role played by social attitudes versus consumer demand differed markedly. This led to them impacting in different ways on the environmental attributes of the cars firms produce. Concomitant with the findings of Chapter 5, the analysis of environmental reports in Chapter 6 and the insights of the VOC approach, Ford interviewees stressed the importance of consumer demand above all other factors, while interviewees from the CME-based firms stressed normative factors relating to consumer *attitudes* more. The result is that different forces are driving firms' environmental product developments based on different perceptions of just what the market is: consumer demand as money 'on the table' for purchases in the case of LME-based Ford, versus a range of

more intangible attitudinal factors for the CME-based firms. The distinction is important because all interviewees identified a clear disconnect between the attitudes of consumers versus the cars they actually purchase. This disconnect is discussed first, before the other observations are expanded on below.

Social Attitudes versus Consumer Demand

All interviewees agreed that concern for the environment has increased. A major reason cited was the media exposure given to global environmental issues, especially the issue of climate change. There was general agreement that concern for the environment will continue to increase, although the Volkswagen interviewee noted that it has actually waned slightly in Germany and Europe in recent years because of "social problems, mostly labour problems" in Europe that have shifted public attention away from the environment. Even so, he said that Volkswagen expects concern to rise again in future as there remains a strong underlying awareness of environmental issues as a legacy of the emergence and growth of the German/European environmental movement over the last 20 years.

If concern for the environment is present, the key question is the one asked in Chapter 5: does it flow through to market outcomes via consumer demand? All interviewees agreed that for the most part it does not. Environmental features do not encourage consumers to purchase a vehicle, nor will they pay a premium for them. Other attributes such as comfort, reliability and performance remain higher priorities. Even though Toyota is the market leader in petrol-electric hybrids, one Toyota interviewee admitted that "the attributes customers are looking for remain 'grunt, comfort and space'". Ford interviewees did note an increase in consumers' expectations of all car attributes, so that "the value people place on everything….has gone up, or their expectation on all attributes has gone up, and as a result environmental has gone up, but not necessarily in its relative weighting versus the others".[12] Therefore, consumer demand incentives to develop more environmentally friendly products were seen as lacking.

If good environmental performance does not impact positively on sales, the Volkswagen interviewee did note that bad environmental performance can impact negatively. This is because Volkswagen customers expect their cars to meet environmental standards and will not buy cars that fail to do so. Similarly, the BMW interviewee said that environmental performance is an attribute BMW customers expect as a matter of course because they conceive environmental attributes as intrinsic to a product that is the latest, the best, the most efficient and highest performing. He said:

> The focus is on efficiency rather than merely economy, because we are in the prestige or luxury part of the market where from customers' perspective they're not totally driven to BMW by the amount of petrol they'll save by driving economically in one of our cars, but they want to know whether it is efficient, and they want to know they're getting the most performance they can out of their engines.

Therefore, environmental performance appears to be a *quality* attribute for BMW.

The only way in which all interviewees agreed consumer demand positively affects environmental outcomes is in the area of fuel economy, but then primarily from the perspective of operating cost. Therefore, the Volkswagen interviewee described this as a "financial problem" with consumers driven by a desire "to have smaller cars, cheaper cars, and cars that do not need so much fuel". Ford interviewees strongly echoed this argument, and one Toyota interviewee noted that while the environmental aspects of the Prius may have brought customers into showrooms, customer surveys indicated that the number one reason why they purchased the car was fuel economy. So, from a consumer demand perspective, material concerns remain very much to the fore.

On such material concerns, it was noted in Chapter 4 that many analyses attribute the greater fuel efficiency of European and Japanese cars to higher fuel prices, and the success of diesels in Europe to the price differential with higher petrol prices.[13] The fuel economy point made by interviewees also tends to support such a view. However, the Volkswagen interviewee made three points to refute such arguments that, he said, he had mostly heard "in the American discussion".[14] First, he said the higher purchase price of a diesel car is more important, because they tend to have larger engines than petrol cars and in Germany there is a purchase tax based on engine size.[15] This means that despite cheaper fuel, diesel car owners do not "break even" with petrol car owners until they have driven approximately 100,000km. Secondly, he noted that the price differential between petrol

and diesel has narrowed over time, providing less financial incentive for favouring diesel cars. Thirdly, he suggested that substantial variation in the price differential across EU member states means that there is no clear correlation between the price differential and the percentage of diesel cars purchased.

Table 7.1: Diesel to Petrol Price Differential

	Percentage by which Petrol is more Expensive than Diesel (2000)	Share of Diesels in Total Car Sales (2000)
Austria	44	62
Belgium	61	56
Denmark	51	13
Finland	63	17[a]
France	54	49
Germany	46	30
Greece	36	1
Ireland	30	10
Italy	44	34
Luxembourg	38	50
Netherlands	61	23
Portugal	43	24
Spain	37	53
Sweden	41	6
UK	15	14
EU average	43	33

Source: OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.23; ACEA (no date c), *New Passenger Car Registrations in W.Europe, Breakdown by Specifications : Share of Diesel Cars*, http://www.acea.be/ACEA/DIESEL-PC-90-02.pdf, accessed 9 June 2004.
[a] No data provided for 2000. The percentage provided is for 2001.

From a liberal economic perspective these are bold claims, so evidence was sought for them. His point on the higher purchase price of diesel cars is corroborated by the fact that ownership taxes as a percentage of the price of a new car in Germany are, on average 32 percent for a diesel versus only 22 percent for a petrol powered car.[16] His point about the narrowing price differential is supported by Organisation for Economic Cooperation and Development (OECD) data. Table 4.1 in Chapter 4 demonstrated that across EU member states the average per litre price of diesel increased from 56 to 69 percent of the petrol price over 1980 to 2000.[17] His point about price differential variations across EU

member states is supported by the data presented in Table 7.1 which shows that the percentage petrol is more expensive than diesel varies from 15 to 61 percent, and that the percentage difference is not clearly correlated with the share of diesels in total car sales (e.g. petrol is approximately 50 percent more expensive than diesel in Germany, France and Denmark, yet the share of diesels in total car sales is 30, 49 and 13 percent respectively).

The alternative explanation offered by the Volkswagen interviewee was that it is more "an image question" and based on "emotional aspects":

> I think people quite often have an idea of what in the long range is better for them, and it's quite often based on how much fuel they need, and of course questions always of how expensive it will be, and whether I will be able to get diesel anyhow, or will I get the fuel anyhow. Since there are a few uncertainties right now, it is better to have diesel where I need five litres per hundred kilometres, rather than petrol where I need seven or eight or nine litres per hundred kilometres.

Therefore, he said that although consumers value lower operating costs, the security afforded by greater fuel economy is another material aspect that is favoured because conventional fossil fuel sources are running out.

If social attitudes on the environment have not flowed through to consumer demand, except in a quality sense in the case of Germany and the EU, or in an operating cost and fuel economy sense more generally (i.e. not environmental reasons) what role do market forces play in encouraging environmental attributes in cars? This is considered in the following section.

Market Forces and the Environmental Attributes of Cars

A clear division was evident between Ford interviewees and the others on the extent to which consumer demand drives product development versus social attitudes. In LME fashion, Ford bases its product development on actual consumer demand expressed via revealed preferences in markets. In CME fashion, social attitudes were of more concern for the German and Japanese firms whose interviewees stressed a broader understanding of market forces beyond short term profits. The extent to which firms respond to consumer demand versus leading it was a related point of difference. Again, the division was

between Ford which seeks to respond to consumer demand, and the other firms which seek to lead it on the basis of social attitudes. Therefore, the interviewees from the German and Japanese CME-based firms said that their companies are more willing to look beyond short term market imperatives in their product development strategies.

In highlighting the primacy of consumer demand in product development planning, one Ford interviewee explained that:

> The majority of our product work, all of our product planning, is driven by what the market needs. So, what trends and customer feedback are we seeing in the marketplace? Because ultimately we want to design and develop vehicles and promote and sell them that respond to market demand.

The view was also expressed that, "what the customer wants absolutely shapes [Ford's] outcomes". Consumer demand was highlighted as the most powerful incentive for investment in environmental product initiatives because "the easiest way to generate a business case for any new concepts and technologies [is] if there are strong consumer forces".[18] But the interviewee who made this point went on to note that "in reality, consumer forces don't always work on this subject". Weak consumer demand for environmental attributes therefore constrains Ford's environmental product development. The result is that environmental initiatives are "largely driven by the regulatory environment".

Social attitudes were clearly discounted in favour of consumer demand by all Ford interviewees. Although the rationale for introducing the petrol-electric hybrid Escape SUV was said by one Ford interviewee to be "either being smart, saying this is where the consumer is going to head, or just us doing the right thing and reflecting society's unstated want, or stated maybe only through specialist groups like NGOs", in comparing consumer demand versus attitudes, another said:

> Both are important but developing a car is a very expensive business and it's a very sophisticated product, and there's always limitations on the amount of funds that you have available to you no matter what you'd like to do. So, when it comes to trade offs we will always be biased towards the consumer preference in terms of how it translates to purchase. So, that is what we are all about. We're about producing cars that our customers will be excited about and want to buy.

Thus, for Ford what matters most is what happens "when it comes down to outlaying $20,000". The clear message was that consumer demand is the primary strategic driver for Ford.

Toyota's decision to produce its petrol-electric hybrid Prius, and to take environmental product development initiatives generally, was said to be based on a belief that a car with good environmental credentials will be seen as a superior product for its quality and lower operating cost benefits. Even if not directly demanded by consumers, environmental product attributes were said to be "good for the brand". One Toyota interviewee said it was a matter of acting on "latent consumer desires", which he described as follows:

> I think people understood that provided that there is no compromising the operation of the vehicle and it was a benefit to society, then I think there were people looking out for that kind of creative solution. And that's what Prius has done. That's what I mean by there was a latent desire for that kind of product and we just tapped into it.

If this amounts to responding to consumer demand, it is a very nuanced understanding of the concept indeed. It also suggests that consumer *attitudes* are more important. Indeed, the same interviewee went on to say that "listening to [consumers'] attitudes will give you the edge in terms of providing products that will suit them in five to ten years time".

Ultimately, in listening to consumer attitudes over demand Toyota seeks to lead the market. If one was to sum up the firm's thinking on the environment expressed by its interviewees, it would be that it has a future-focussed way of conceiving consumer demand. The following explanation by one interviewee sums this thinking up best:

> Global warming, I mean, it's in newspapers all the time. I think people are concerned about that. You watch little campaigns that are being promoted at the moment, say for example recycling. Recycling, not taking plastic bags from the supermarket and taking your own canvass bags etc., these are all little things but they're slowly building a level of consciousness about the environment that makes us rush to introduce a vehicle like Prius into the market. It doesn't take a lot of convincing people that a vehicle like this will provide a benefit to them. At the beginning in 1997 when we first introduced the vehicle that 'latentness' was quite small and the thing that we had to appeal to people with was technology: look at the amazing technology in this car, and by the way it gives you environmental benefits. With this new generation, sure there's an awareness that's grown through the previous model, but I think just general awareness of the environment has grown as well so that

> when you introduce this vehicle you could go out there on the front foot and say this is an environmentally friendly drivetrain called hybrid, and by the way it's got this 'whizzo' technology. You totally swap the story around that gets the hook into people because they understand the importance of the environment.

As such, Toyota develops products for the future, and markets them in a way acceptable to present market preferences. The focus is on convincing, educating and *shaping* consumer preferences, rather than providing a product that accurately reflects them now. It is the possibility of latent consumer desires that make the firm "rush" to develop products rather than the existence of actual demand. Therefore, Toyota seeks to influence and lead demand.

For the German firms, consumer demand appears to be the *least* important consideration in product development. Instead, the Volkswagen interviewee said a range of other factors take greater precedence. He said:

> Consumer preferences are mostly a bit later than the internal strategic considerations of the company or the government and NGO positions. In that respect, I think the consumer is the slowest.

When asked specifically about attitudes versus demand, like Toyota there was a clear preferencing of attitudes. According to the Volkswagen interviewee, if "attitudes are kind of stable propositions of consumers whereas consumer demand is something of today…in any case it's consumer attitudes".

For the BMW interviewee, the market and consumer demand were referred to in stronger terms than Volkswagen. However, the firm's relationship with the market was seen in two-way terms: the firm responds to *and* influences the market. He said:

> We want to supply the market with vehicles that they want to buy. And we want to stimulate the market to buy our vehicles, which is two sides of the same thing.

Like Volkswagen and Toyota, the BMW interviewee said his firm desired to be ahead of consumer demand by producing products to stimulate the market. Although no strong view on social attitudes versus demand was expressed, reacting to consumer demand was seen as less important than acting on a 'vision' of what a car *should* be, especially for a prestige car firm like BMW:

> Consumer demand in terms of long term planning is being met by continually developing exciting cars. We're not in the 'whitegoods on wheels' type of market. In terms of style or performance or features we are very strong on providing stuff that excites and makes people intrigued, to have an air

> of intrigue about the cars so they do standout and are not the same as everyone else on the road. And that to a certain extent massages the demand. You create a car that looks sensational and people are just going to run to it. We're not just sitting there saying, well, we'll build a car because we think people [want it]. We want to actually show them something and make them want it after they've seen it.

Like Toyota, BMW seeks to define what the market is.

Overall, Ford interviewees' responses indicated a predilection for *responding* to consumer demand. This is predicted by the VOC approach, as LME-based firms prefer market competition over cooperative coordination. They are materially motivated to make profits in the short term. However, for the CME-based firm, there was greater emphasis on the relationship between firms and markets as a two-way street, in which they often sought to *lead* markets. This point was clearly made for environmental reasons in the case of Toyota, whereas for Volkswagen and BMW it was more a general point about corporate strategy. In terms of consumer attitudes versus demand, Toyota rushes to introduce products that it believes consumers only latently desire, and then attempts to convince them of their product's desirability. Volkswagen acts in a similar manner, but one in which a broader range of stakeholders is involved in the process. BMW is a "massager" of the market and environmental aspects of its products' performance are one of many ways it seeks to excel as a prestige car maker commanding price premiums for its products. For each, a CME focus on factors beyond what will drive consumers to put their money on the table is evident.

In environmental terms, the implications are that perceived weak consumer demand for environmental attributes reduces the material pressure for Ford to produce more environmentally friendly products. This supports the findings of Chapter 5 where it was shown that the US market is characterised by increasingly environmentally damaging vehicles despite increased social environmental concerns. By contrast, in Germany and Japan environmental concerns are taken more seriously by the industry as a sign of "latent" demand. In fact, echoing the point on voluntary commitments made with governments, the main way in which social attitudes affect Ford's behaviour were said by one interviewee to be how the company is *perceived*, rather than how it acts, because it wants to be *seen* as a

good corporate citizen. It is not surprising that this same interviewee concluded that for Ford "it's a very difficult path to tread".

Internal Company Strategies

The observation that German and Japanese firms seek to lead the market more than follow it has implications for internal company strategies. It suggests, as noted in Chapter 2, they are potentially driven more by endogenous than exogenous forces. That is to say, hailing from CME states they focus less on exogenous material factors and more on internal visions of what their business stands for. This should be especially the case for Japanese firms whose internal stakeholders within the enterprise community are key drivers of their business strategies.

But the line between exogenous and endogenous factors is blurred. Interviewees noted that internal company strategies are affected by state regulations and market forces. Conversely, all firms have strategies that aim to affect these exogenous factors. The causality flows both ways, so determining what is exogenous versus endogenous is problematic. Nevertheless, interviewees' responses demonstrated that the environmental impact of firms' products was perceived in different ways, and the drive for environmental attributes came from within them to varying degrees. In particular, all interviewees mentioned the concept of 'leadership', but just what this meant differed between firms, and it certainly produced differences with respect to the environmental attributes of their products. The role of senior management was stressed more by Ford and Toyota interviewees, and the insight of the VOC approach that top management has more 'unilateral control' than in CMEs appears crucial in the case of Ford (a point also highlighted in Chapter 6). All interviewees also made statements concerning the path dependence of the products their firms produced, and the capabilities and constraints flowing from this. As before, these points are expanded on below.

The Drive for Environmental Attributes

The drive for environmental attributes emanates more from within Toyota, Volkswagen and BMW than Ford. This is to be expected, given that their CME home states encourage them to focus less on external material factors than Ford which hails from an LME. Commensurate with the greater focus on internal stakeholders for Japanese CME-based firms, this was most clearly the case for Toyota. Its interviewees noted that protecting the environment is a matter of corporate "philosophy" which says that "if you don't look after the environment now, whatever business you currently have will not be protected and you won't have a business in the future." In other words, business and environmental interests are seen as one and the same. Given this philosophy, the ultimate goal of the company was said to be "the search of the ultimate 'eco car'". The petrol-electric hybrid Prius is obviously the clearest expression of this philosophy, but more broadly the belief was expressed that "it's important to say we're going to strive to make the most efficient vehicle we can in each segment." A key reason for such a philosophy was said to be 'kaizen', the Japanese term for continuous improvement. Kaizen and the environment were linked by one Toyota interviewee because "where you can make a more fuel efficient car and then make it for less, what you've actually got is a better environmental outcome: you've got less waste, less emissions, all those other things". Therefore, the kaizen principle coupled with Toyota's corporate environmental philosophy leads to the environmental attributes of its vehicles occupying a central strategic position.

The result of Toyota's corporate environmental philosophy is that hybrid technologies and working on environmentally-friendly vehicles are now "prestigious" areas within the company. One Toyota interviewee said: "I've been talking to engineers [and] the place to be is in the hybrid and alternative fuel area: that's the 'gun' job". In fact, hybrid technologies were now said to be seen by Toyota personnel as "sexy" and "cutting edge" so that "everybody wants to put hybrid in their next generation car". The resulting esprit de corps means that Toyota employees "have a real sense that what they're doing has a real impact on the environment and society as a whole".

Similar, albeit more muted, internal company strategies were said to drive BMW and Volkswagen's environmental strategies. The BMW interviewee said his firm generally pays less heed to exogenous factors because "the imperative for development comes from inside BMW rather than government or consumers". The Volkswagen interviewee made a similar point in saying:

> It's more the company, the people in the company's strategy and the company saying OK, first we have to avoid environmental problems, and second our expectations of the next ten to twenty years are such that we have to do it before the consumer really knows it.

Therefore, in a similar manner to Toyota, the German firms' interviewees saw environmental attributes of their firm's cars as being more internally driven than exogenously imposed. For example, the BMW interviewee said his firm possessed "a very strongly environmentally aware mindset [that] permeates through all the layers of engineering, the engine manufacturers, the drivetrain manufacturers, right down to the body manufacturers, the people who design bodies and all that sort of stuff". As such, BMW's performance, technological innovation and prestige objectives are always tempered by an internal commitment to minimising environmental impacts. He said there is "an environmentally conscious brake" even on the development of large-engined performance vehicles.

Where does this leave Ford, given its LME preference for responding to exogenous material factors? Ford interviewees said their firm wishes to take environmental initiatives because it is the "right thing to do", and probably good for business in the longer term. However, future developments for Ford were seen more as "product evolution", and "realistic evolution of technology rather than radical steps in technology". In this vein, one Ford interviewee explained the following:

> We're very concerned about corporate citizenship, recognising we're in an industry which some may view as not necessarily in the best interest of the planet. We don't agree with that. We're really talking about benefits to society as a whole, and trying to do whatever we can to have vehicles which are fun to drive and are still sustainable. But it doesn't do anybody any good if we produce a radical product that's unaffordable because people won't buy it, we go out of business and noone wins.

Therefore, there are conflicting exogenous forces (especially consumer demand) versus endogenous desires at work for Ford. In this light, the introduction of the Ford Escape

petrol-electric hybrid is a phenomenon that interviewees struggled to explain. It was said to probably be due to "an internal company desire to be a good corporate citizen and to be seen as such". It was also described as a "foray into the market to see how it's received". After all, "you have to get your feet wet somewhere and the learning from that can build to newer technologies down the track". Therefore, it represents an attempt to marry the imperatives of consumer demand with a desire to be a good corporate citizen and improve the brand's image.

Overall, Toyota, as a Japanese firm, exhibits the Japanese CME trait of being more internally strategically driven, but the German firms are also more internally driven on environmental matters than Ford. Headquartered in the US, and desiring to be a good corporate citizen and seen as such, it struggles with its LME predilection for market forces, especially consumer demand, and securing material financial returns in the shorter term.

Leadership and the Environment

All interviewees saw their firms as motivated by a desire to 'lead'. However, just what constituted 'leadership' differed considerably. Notions of leadership were more likely to be defined in corporate philosophical terms by the Japanese and German firms, than in the case of Ford where leadership was more narrowly defined, LME style, as primarily a matter of market leadership.

Toyota and BMW interviewees stressed leadership and innovation in everything they did. BMW did this from the perspective of a prestige car maker less bound by pricing constraints than volume producers, and therefore with more leverage to invest in new technologies. The BMW interviewee stressed that his company perceives itself as "a technological leader" that tries "not to be bound by conventional thinking". This was said to be BMW's "point of difference" that distinguishes BMW as a brand. The way BMW's technological leadership branding impacts on environmental outcomes is that environmental performance is seen a key factor in this. BMW's pre-eminence in hydrogen technologies was given by way of a practical example. The firm plans to introduce a dual

fuel petrol-hydrogen V12 internal combustion engine 7-series model in Europe within the next three years. The intention is to "help spread the message that it's feasible and it's workable and it's then up to governments and/or the oil and petroleum industry as to how they're going to work out the refuelling systems in the future". BMW is not sacrificing performance in so doing, and is seeking to lead technologically by being ahead of the market, ahead of the oil industry, and ahead of government and infrastructure. Fundamentally, the BMW interviewee said "it's probably up to companies like BMW, and other people in this market, to expose the decision makers in society to whom we sell our cars to the reality of cleaner energy, which we have for our cars". The result is that BMW has a holistic vision of leading governments, society and markets via the environmental attributes of the cars it sells.

Toyota interviewees discussed technological leadership in a thematically similar way. However, in keeping with the firm's environmental philosophy, Toyota interviewees said it is now branding itself as *the* environmental car firm. Like the latest technology is BMW's "point of difference" (and related to performance and prestige), this is what gives Toyota its distinctive image. For example, the launch of the Prius was said to come from "a strategic decision to take a leadership role" in hybrid vehicles, not required by regulation and not expecting immediate financial benefits. It was described as "totally our own initiative", "not driven very strongly by demand" and "regardless of any government direction". Also, like BMW, Toyota interviewees saw their firm as leading debate on the environment and performing an educative role. One Toyota interview described this role as a matter of "putting ourselves forward and trying to lift that level of consciousness", and noted that since launching the Prius the firm is regularly invited to participate in environmental conferences/discussions on sustainable development. Therefore, Toyota exercises a leadership role not just in respect of markets or government, but in shaping the environmental agenda more broadly in society through its educative role.

The Volkswagen interviewee talked not so much of leadership, as cooperatively reaching consensus positions with a range of stakeholders on environmental issues that require addressing. He said:

> I would normally think that internal strategies are the result of government regulations and consumer preferences. We might add too one aspect. At least in Central Europe or in Germany, there is the system of co-determination here that means that there is a certain influence of the workers on company policies too.

Therefore, internal strategies were said to be the result of consensus between a variety of internal and external stakeholders. This is clearly the 'negotiated consensus' model of German CME capitalism. Commensurate with this model, rather than one exogenous factor being more important than the other, or internal strategies taking precedence in environmental matters, it is the environmental *issue* in question that was said to be most important:

> It depends very much on the individual aspect of environmental improvement or environmental performance. So, for example, the recycling discussion has been mainly a discussion put forward by the government, whereas the CO_2 climate discussion is mainly put forward by the NGOs, and the cost of fuels, and that means the amount of fuel, the fuel efficiency, is mainly put forward by the market. So, it depends very much on the environmental aspect where we see which one is the strong force.

Therefore, addressing environmental concerns is about balancing stakeholder concerns to effectively address particular issues.

For Ford, no strong internal drivers for environmental initiatives were mentioned in a leadership sense, unless one counts leadership in markets on the basis of consumer demand. The environment was seen as important by all Ford interviewees (i.e. in the sense of doing the "right thing", being a good corporate citizen, meeting government regulations etc.), but in market terms it is one of a range of consumer demands and regulatory requirements to which the firm must react. Environmental concerns were described as part of the never-ending challenge to continually make better products in order to remain profitable, but one Ford interviewee declared that "there's not green flowing through our veins, we're a car company after all!" The implication is that materialist, market-driven considerations take precedence.

Overall, Toyota interviewees saw their firm as a leader of the environmental debate in society, and a leader in producing environmentally friendly cars. Given such an environmental 'philosophy', launching a vehicle like the Prius was primarily an internally-driven strategy. This 'fits' with the Japanese CME variety of capitalism which gives

strongest priority to internal motivators for firm strategies. The BMW interviewee also saw his firm as a leader, especially technologically, and this encompasses environmental attributes. In BMW's case, the CME-basis for looking beyond exogenous material factors turns to internal motivations due to the premium nature of its products. However, the Volkswagen interviewee, in typical German CME fashion, saw a balance between stakeholders internal and external to the company as the aim, with the goal of reaching consensus positions that effectively address particular environmental issues. Ford, in typical LME fashion, must be more focussed on its bottom line with strategies guided by material factors. However, the main caveat to such a summary of Ford's position is the role of its Chairman and CEO, Bill Ford, and his position as a member of the founding family of the company that retains a significant stake in its fortunes. His concern for the environment and personal belief that his company has a heritage of corporate responsibility in addition to being economically profitable, elevates environmental aspects more than they might otherwise feature in a company predisposed to focusing on material factors. This is discussed in the following section and contrasted with the more embedded role of senior management in Toyota.

The Role of Senior Management: Ford versus Toyota

The role of senior management was stressed by interviewees from two firms: Ford and Toyota. For Ford, it is a matter of a single individual exercising an agenda-setting role, whereas for Toyota it is more that senior management reflects and supports company-wide strategies. This agrees with the organising principles of Japanese CME-based firms versus US LME-based firms outlined in Chapter 2. The enterprise community and company-wide strategising is more important for the former, whereas more unilateral control is vested in top management in the latter.

All Ford interviewees stressed the role of their Chairman and CEO, Bill Ford. in driving the firm's environmental agenda. The interviewee who expressed it most articulately said:

> Certainly a lot of it stems from an unstated desire on the part of the company to be sustainable, in Bill Ford's words, harking back to the heritage of his great grandfather, that we're a company that's here to improve society. We want to be profitable, but we also want to contribute to society, and we want to do it in an environmentally sustainable fashion as well. I think there's an unstated theme there.

There was thus a definite sense of the legacy of the Ford family. It is hard to underestimate the importance of this in cultural terms as the "unstated" (unofficial) environmental and social responsibility theme that permeates the company's culture is tightly interwoven with its founding family's heritage. This agrees with the analysis of Ford' environmental reporting in Chapter 6, where it was noted that Bill Ford's personal views were conspicuous for the manner in which they were highlighted more than for any other firm's CEO.

Apart from his association with the cultural heritage of the firm, Bill Ford was said to have almost single-handedly raised environmental issues to be a key company strategic priority. His role in doing this was expressed as follows:

> Within this company I think one of the most significant drivers has been Bill Ford personally….I would say his personal standard of 'greenness', if you want to use that term, on the company is quite significant. I don't think we would be where we are now if he hadn't pushed that. So, arguably a lot of our unique driver is Bill Ford.

Bill Ford was thus identified by the same interviewee as a key driver of the firm's environmental initiatives. He further noted that Bill Ford and Ford's Chief Operating Officer spent half a day of the 2005 annual meeting of senior management at the firm's headquarters discussing sustainability. The result, in practical terms, is that he can discuss environmental matters with other senior Ford personnel because the firm's Chairman has elevated their strategic priority.

Like Ford, Toyota interviewees recognised the role played by senior management who, as one noted, "for many years have had this sustainability agenda and they're focusing on it because they've got a long term vision for the company". The continuing focus on environmental sustainability by the current senior management of Toyota therefore means that it is "one of [its] number one management issues". The impetus for the commercial launch of the Prius was said to come from the President of Toyota who directed his staff

two years before the Kyoto Protocol meeting "to have a car that's massed produced, on sale, ready at that meeting". While this looks like opportunistic behaviour as well as enlightened environmental concern, the point is nevertheless clear. While other firms saw the importance of the Kyoto Protocol in regulatory terms, Toyota management saw it as an opportunity for a new product launch given the firm's branding focus, and investment in research and development on hybrid technologies.

Overall, it is clear that Ford faces a balancing act. It has an LME market-focus and preference for material factors in setting its strategic goals, yet also has an LME preference for more unilateral top management control. In this case the latter results in the elevation of environmental factors in the firm's strategic focus. For Toyota, management commitments are important too, but less a unilateral force and more in harmony with the environmental corporate philosophy of the company generally.

Path Dependence

Finally, in terms of internal strategies, all interviews discussed their firms' environmental initiatives as part of a historical process that enables and constrains their current initiatives. They used this to explain why German firms had opted for advanced diesels, Japanese firms for petrol-electric hybrids, and why Ford faces significant challenges in improving the environmental performance of its products. The points interviewees' made support the observation of Chapter 6 that path dependence in environmental initiatives enable the German and Japanese firms rather than US firms such as Ford. The technonationalist versus incremental technological divide between Japanese and German firms was also evident.[19]

German firms' shift to advanced diesels was explained in terms of their existing expertise and technological capabilities. The Volkswagen interviewee cited a history of expertise in diesel technology, plus the view that hybrids are not seen as an "elegant technical solution" because they require drivetrains with two engines rather than one. The BMW interviewee echoed the sentiments of Volkswagen, saying that "our view on hybrid

is that we can't see the value in two power sources in the vehicle". Commensurate with the German CME role of technology, he also said they were keener to incrementally develop existing technologies rather than introduce new ones. He elaborated on this as follows:

> Car companies have invested a hundred years worth of know-how into building and producing internal combustion engines. That's a reasonably efficient process and to abandon all that investment and go off into a completely different type of technology would be very difficult and quite a lot of goodwill, heritage and brand reputation is tied up in the engine systems. Our aim is to make our petrol engines as efficient and clean as they can be….. So, we think there's still more life left in the current technology, and maybe by the time hydrogen is more practical we'll be ready to "push the button" on that as well.

On hydrogen power, the BMW interviewee also noted that it was a better "fit" with BMW's image than hybrids because "one of BMW's core elements is driving excitement and driving pleasure", and hydrogen is believed to confer such attributes. In short, a belief in the "elegance" of diesels, a history of expertise in them and petrol internal combustion engines, and their ability to deliver performance attributes (in the case of BMW) were all reasons why German firms have taken the diesel route in Europe.

Toyota has a history of producing efficient, smaller cars, so to some extent its drive to develop more environmentally friendly cars is the natural progression of an establish product development path. One Toyota interviewee explained this as follows:

> Most of the cars Toyota has made over the years have been smaller cars rather than larger cars. We make Land Cruisers of course at the heavier end, but most of the cars have tended to be small four and six cylinder cars, so just by the virtue of having good fuel economy you actually have low emissions. But as engine technology advanced I think the company saw an opportunity to give themselves a bit of a leadership role.

Toyota's drive for further environmental efficiencies are therefore the continuation of a path it has been following over many decades in seeking *technologically* driven efficiencies in mostly smaller cars. The result is petrol-electric hybrids.

Given that Ford relies on sales of light trucks and luxury cars, largely sold in North American markets, this places strong economic sustainability constraints on the company in dealing with environmental concerns. One Ford interviewee therefore said:

> The challenge for us is to be able to continue to produce [large cars with larger engines] in a sustainable way that meets customer expectations, what we call the 'DNA' of the product, and at the

> same time recognise that we are in an organisation that wants to be responsible for corporate citizenship.

Apart from the path dependence of the firm's products' "DNA", there are the barriers that exist due to consumer demand (or lack of it) for environmentally-friendly vehicles. The lunch of hybrid vehicles such as the Escape SUV was seen as a way around the conundrum, yet even though such vehicles "show a lot of promise [they] still fundamentally have barriers to consumers which relate to the cost of the product". Ford's material limitations mean that Bill Ford is probably doing all he can given a strong LME-driven market focus, and the inescapable fact that the short to medium term success of his family business is dependent on Ford continuing to produce and sell larger vehicles.

Some Key Implications

Interviewees' opinions on the role of market forces, state regulations and internal company strategies have some further key implications relevant to the VOC approach. These relate to timeframes, and the debate about post-materialist values highlighted in Chapter 5. Specifically, interviewees' responses demonstrated that the CME firms have longer-term perspectives than LME-based Ford. Interviewees' responses also indicated clear differences in the extent to which post-materialist values are/are not being embraced.

Timeframes

The VOC approach suggests that CME firms have longer perspectives less dictated by short term market outcomes and shareholder-driven profit imperatives. There are clear differences in the timeframes over which interviewees indicated their firms make environmental product development decisions that correspond to the VOC of firms' home states.

As seen already, Volkswagen and BMW interviewees expressed a preference for either being ahead of state regulations (the BMW interviewee said his firm did so as a matter of policy) or acting in concert with them (Volkswagen interviewee spoke in terms of

partnership with government). They both also expressed a preference for being ahead of, rather than responding to, markets. Therefore, in both cases, there was a timeframe dictated by likely future regulatory requirements and future consumer demand (or shaping it), rather than responding to market forces and selling product in the short term. In regulatory and competitive terms, both firms aim to be ahead of what is required.

Even if Volkswagen and BMW interviewees were not specific about their timeframes, their focus gives them a longer term perspective than Ford. This is because for Ford, current consumer demand and the product cycle over the next 3-5 years were stressed. Such a timeframe was seen by one interviewee as crucial for product development because what is in showrooms in 3-5 years time has to *sell*. He said:

> We would look at those sort of trends [in consumer attitudes] across the board and then reflect those. Now, whether its actual trends in something you can physically see today or just an intuitive notion from market surveys, it all adds up to what we think the consumer will want in 3-5 years, and that's what we'll provide.

Of course, this is not to say that the other firms are unconcerned about selling what is in their showrooms! However, it is fair to say that they did not identify such an immediate sales imperative in their responses.

The longest timeframe belongs to Toyota. In respect of the firm's senior executives it was said "they don't focus on next year or the next five, they've got 20 and 50 year visions because the company is part of the society, the fabric of society, in places particularly like Japan". Therefore, where Ford looks out 3-5 years, and Volkswagen and BMW look out somewhat further than this, Toyota has a 20-50 year vision based on a desire to lead both markets and government regulations, in the belief that it bears long term responsibility for its actions as a member of society. As one Toyota interviewee put it:

> There is a hint of a trend within the community that forces you to do the research. And I think that's what probably happened with Toyota. We could anticipate that, yes, this sense and this concern in the community would continue to grow and if we don't have something to address this issue when it becomes a critical mass we're not going to have a business in the future. I think that's how this technology was born out of that thinking.

A "hint of a trend" thus "forces" Toyota to do the research and market the results. Therefore, as noted earlier, a product like the Prius is developed for the future and marketed

in a way palatable in the present. As one Toyota interviewee saw it, it was "not just philosophy" but a vision "now being translated into hard, fast, actionable activity". This is what interviewees said led to the *sale* of the Prius rather than a research and development program: a desire to make the future a current reality.

Materialist versus Post-Materialist Values

Materialist versus post-materialist values are not concepts that specifically relate to varieties of capitalism. Yet there is an implicit link between materialist values and LMEs with their focus on markets, competition, and shorter term profits driven by shareholder imperatives. As seen in Chapter 5, whatever the post-materialist environmental concerns of American society, a materialist analysis is still most pertinent because US firms appear willing to discount them for material benefits. At the other end of the spectrum, in CME Japan concern for the environment is given greater weight, with a more environmentally enlightened response the result. There is no doubt that based on interviews all firms are to some degree driven by both materialist and post-materialist values, but there are clear differences in degree.

The environment appeared to be a real concern for the German firms' interviewees for two reasons. First, resource constraints make environmental concerns important. The *primary* market force cited by the Volkswagen interviewee was not consumer attitude or demand, but finite conventional energy sources. He said: "starting with the energy crisis, and then going on with the price rises for energy, I think you see the nature of the force coming from the market". Similarly, the BMW interviewee said his firm has invested heavily in hydrogen-powered vehicles because "eventually at some stage the oil will run out, or the emissions that internal combustion engines emit may be deemed to be too unfriendly to the atmosphere, and it will be a lot harder for car makers to continue to turn out dirty engines". This leads to the second factor, namely the greater institutionalisation of environmental concerns at all levels of society and government in a way rarely seen outside of Europe. Although a very real concern for the environment is suggested as a result of

these two factors, perhaps it is not so much a matter of post-materialist values as a recognition that environmental concerns have material effects. Then again, whatever the impetus for changed company strategies, it is clear that post-materialist values are having a normative outcome by altering how business is conducted. A shift to more post-materialist perspectives is a matter of material rationality – i.e. post materialist values are affecting material perspectives.

Something similar appears to be the case for Toyota. In material terms, being environmentally friendly was said to be good business because less waste, and less environmental pollution, means greater efficiency. Therefore, Toyota opportunistically recognises the double dividend of improved environmental performance. Yet, interviewees made other statements, which suggest a more post-materialist perspective, such as the following:

> Car companies have a social responsibility. You are creating vehicles that are polluting, and apart from regulations that come along and stipulate that you need to meet a specific requirement I think some companies are embracing their social responsibility. That's one market force. Maybe it's not a market force but it's something that's maybe one of those things that you'd describe that's outside of the market forces that are changing consumer behaviour.

Therefore, social responsibility is virtually seen as a "market force", or there is at least a blurred line between social obligations and market forces. One interviewee noted that Toyota potentially places itself at a material disadvantage because "some of these [environmental initiatives] add cost and if our competitors aren't trying to meet the same goals as we've set ourselves, they could potentially have cheaper products on the market". This again strongly suggests a post-materialist perspective. At the end of the day, one Toyota interviewee saw both materialist and post-materialist values strategically driving Toyota:

> I suppose there's two aspects to that. One is there is a commercial benefit in, I guess in my mind, certainly the market is going to move towards production of vehicles at some stage that are more environmentally friendly. That's going to change. It has to change. Whether that's in five years, ten years, or 25 years, there will be some environmental 'crunch'. Probably before then, but it's going to happen. It might happen when the government starts putting things in place such as a carbon tax or something else in place: changing the settings. And I guess we're better positioned to respond to that change because of what we do. But as well as that our incoming president is taking on the issue. His

> dream is to make vehicles that actually make the air we breathe cleaner. Cars that you drive on smoggy roads and clean air comes out of the exhaust. It's a dream, it's somewhat an aspirational statement to say that's what we're striving for.

Therefore, for both materialist and post-materialist reasons, Toyota is branding itself as the environmental car firm. This suggests it is in transition from materialist to post-materialist values.

Ford interviewees clearly had the most materialist account of environmental product development efforts. The company seeks to meet consumer demand, is constrained by government regulations, and takes a shorter term view based on selling cars that will be in its showrooms in 3-5 year's time. This is not to say that environmental advances are not seen as beneficial. It is just that, rather in the vein of Palmer et. al.,[20] it was stated that environmental initiatives entail a financial burden. One Ford interviewee very clearly expressed this viewpoint in saying the following:

> We're a cost competitive business as I'm sure you'd appreciate. We look for 10 cents out of the cost of a car, and people say, well, a car costs $30,000, why do you worry about 10 cents? Because there's a lot of 10 cents's. So, internally, we'll walk over hot coals to take a variable ten cents out of a car, as well as capital investment obviously. So, something that's going to cost us 10 cents a car we'll look hard at. Not so much in the environmental field, but the related, say, the safety field is probably easier where you get the same sort of analogy: what do regulations say, what do we do and why do we do it? We could be having the same discussion with safety and probably ultimately maybe draw the same conclusions.

The future environmental benefits of environmental technologies are thus heavily discounted in the present, and regarded as a cost to be minimised. Another Ford interviewee noted that the firm "would be the first to jump on some technology if it was clean and green and didn't cost us a lot of money, because the customers are going to go for that because it saves them money in terms of fuel and so on". This contrasts starkly with the perspective of Toyota interviewees who said their firm was eager to make the investment despite the assurance of reaping a short to medium term financial return.

However, Ford interviewees stressed the role played by Bill Ford in driving the firm to embrace hybrid technologies and move the company down the path to greater environmental sustainability. He was also said to have been able to do so quite rapidly after his promotion to CEO in 2001. Could Toyota have achieved such a rapid change in

company focus as the result of one individual taking up the firm's top position? Perhaps the LME attribute of responding in a rapid and dynamic way to changes in market sentiments also pays dividends when a senior individual supports certain values beyond the bottom line and injects these into the culture of the firm's operations. By being the first US firm to offer a hybrid SUV, Ford has certainly also gained a potential market lead on its competitors, albeit by licensing Japanese technology. It has done so in a more rapid way than a German firm that relies on more incremental improvements in existing technologies in which it has a history of knowledge and expertise (i.e. diesel).

The Future

The interviews concluded with a question about the major challenges facing firms over the next 10-20 years. An invitation to 'crystal ball-gaze' it was answered in remarkably different ways, because although all firms' interviewees saw a hydrogen-powered future for their vehicles eventually, probably in 20 years time, the path to this and the motivations for it were quite different.

The future for Ford was seen in terms of responding to a range of challenges in much the same way as the firm has in the past. The challenges were seen neither as radical as for Toyota, nor as far-sighted in terms of the implication of environmental concerns as for Volkswagen and BMW. Growing concern for the environment was seen as something to be factored into product developments in the same way as increased consumer demand for other features such as performance and handling. As one interviewee put it (and they all did in one form or another):

> The eternal struggle of the laws of physics. Customers want more power and performance and handling and quietness, but there's basic issues of physics that our brilliant engineers work to tackle and overcome every day. How do you get more performance but less fuel? How do you meet ever increasing, whether it be regulatory or just socially acceptable, levels of environmental impact in terms of fuel economy and emissions? So, I think that continual striving of getting better, better, better on emissions and fuel economy are two big ones. Noise is another one: the drive by noise and setting better targets for those all the time and getting better on that. So, I just think that overall

> thing of technological advancement, continually getting better, using less, being quicker: the eternal struggle. Is there one particular stand out? I don't think so.

The future was therefore primarily conceptualised in terms of continuing to meet consumer demand and tougher regulatory standards. Corporate responsibility imperatives for improved environmental performance were also cited, but again a gradual, incremental process was envisaged. One interviewee summed up Ford's perspective as not necessarily more environmentally friendly products but generally "more of everything".

For the German firms, real challenges in the form of environmental constraints and threats were identified that require a response. The Volkswagen interviewee said that the pre-eminence of the issue of climate change in Germany and Europe means that it *must* be addressed. As such, the future environmental challenges of the company were very much seen in terms of the political and social concerns of its home state, and the region where it has its major markets. Volkswagen sees the answer as moving to advanced biofuels and hydrogen in the next 20 years. The BMW interviewee's responses were similar. For BMW the future entails the eventual move to a hydrogen-based economy, while always having such advanced products that it can continue to succeed in business no matter what regulatory constraints or market forces may arise. A shift to alternative drivetrains was seen as inevitable because "there has to be an answer to petroleum internal combustion engine cars for the long term future". The environment is a key problem they *must* address. There is no alternative.

One Toyota interviewee envisaged a "multi-fuel future" in a similar manner to the German firms, with hydrogen the ultimate outcome. But for Toyota, there was a sense in which the future is here now. Toyota sees its role as *creating* the future of passenger cars. In particular, the challenge for the future is not reacting to, or addressing the challenges, but getting governments to catch up with where Toyota is already going:

> If you want a paradigm shift you're going to have to come on board and work as a team rather than separate and, yes, in this case I think industry will need to lead government and government will have to understand where we're at and help.

Government and business are a team, but with business in the lead because in Toyota's eyes it is the industry that has the long term vision necessary to lead. Toyota was also the only

firm that envisaged competing in markets on the basis of environmental attributes specifically with the endpoint being "the ultimate eco car".

If one was to summarise their perspectives, it would be that Ford interviewees again exhibited an LME preoccupation with material factors and remaining competitive in markets. German and Japanese firms, with longer-term perspectives, are in CME fashion looking beyond immediate material factors to shape the future of their industry in response to real environmental constraints that must be addressed. In Toyota's case, this is occurring regardless, and ahead of, regulations.

The International Implications of National Variations in Capitalist Relations

It is clear that not only do interviewees' responses support the insights of the VOC approach, but that the impact of national institutional variations filter down to lower management levels within companies worldwide. This is because firms are institutionally embedded in the home states where they have their headquarters, and this is where their policy and strategic decisions are taken. These decisions, expressed in respect of the environment in their environmental reports, and exhibited in their product development strategies, permeate their operations internationally.

The evidence speaks for itself, but so do the views expressed by interviewees. For example, one Ford interviewee said that despite designing unique cars for Australia and manufacturing them here, the firm still did so given the constraints and overall corporate policy settings of head office. On environmental technologies, the role of Ford Australia in setting such policies was said to be relatively minimal. He said :

> Ford Australia is unlikely to initiate some of those things. We're too small. We're a bit operator. This technology is going to be driven globally.

Therefore, he said that "typically, at the local level we would not initiate new technology". In a similar vein, the Volkswagen interviewee noted that "the culture of a company is quite often the culture of the place where their headquarters is". One Toyota interviewee noted quite colourfully that what might seem "airy fairy" and more peripherally related to core

business from an Australian perspective is very much central to the way the firm operates from a Japanese perspective. In relation to Toyota's reports he said:

> There are a lot of words in there about our commitment to living in harmony with the environment and so forth. That's not just rhetoric. It's a Japanese company so it's a commitment that's believed in, and our product designs reflect it.

Therefore, there is something *Japanese* about the firm's holistic view of its business and its desire for harmony.

The fact that these points were made by Australian branch office personnel (with the exception of Volkswagen) lends even greater weight to the idea that national varieties of capitalism have implications beyond their borders. The evidence itself further supports the insights of the VOC approach. The analysis of the interviews has been quite detailed, but if one were to draw broad brushstrokes on the viewpoints offered by interviewees one could summarise them as shown in Table 7.2.

The German firms exhibit German CME traits, albeit from different perspectives given that one is a volume producer (Volkswagen) and the other a premium producer (BMW). They both do not react to consumer demand, so much as attempt to be ahead of it, and then social attitudes are more important than actual demand. They do not meet government regulations, so much as exceed them (BMW) or move in the same direction as government in a spirit of partnership (Volkswagen). Being based in Germany and the EU, the role of government is stronger for them because of the political mainstreaming of environmental regulations, leading to the EU's international regulatory leadership. BMW, as a prestige car firm, is more internally driven than reactive to exogenous factors, whereas in true German CME fashion a balance of stakeholder viewpoints internal and external to the company is what shapes Volkswagen's approach to environmental strategies. Overall, this means that for Volkswagen there is no clear strong driver for environmental initiatives, but a balance between exogenous and endogenous forces, whereas although BMW shares similar viewpoints to its German volume counterpart, its prestige perspective skews its focus more to internal company strategies.

Table 7.2: Summary of Findings

	Importance of Market Forces	**Importance of State Regulations**	**Importance of Internal Company Strategies**	**Timeframes**	**Materialist versus Post-Materialist Values**	**The Future**
Volkswagen	Social attitudes: Medium, respond and lead Consumer demand: Low, respond and lead	Medium: German/EU regulatory leadership and embedding of environmental principles, partnership approach	Medium to high: A balance of exogenous and endogenous factors through a stakeholder approach	Medium term	Post materialism driven by materialist rationality.	Environmental factors are a key challenge to be addressed.
BMW	Social attitudes: Medium, lead Consumer demand: Low, lead	Medium: German/EU regulatory leadership and embedding of environmental principles, design for future regulations	High: Product development driven by an internal vision	Medium term	Post materialism driven by materialist rationality.	Environmental factors are a key challenge to be addressed.
Ford	Social attitudes: Low to medium, respond Consumer demand: High, respond	High: Constraint on responding to market forces	Low, except for the role of senior executives: Vision of the Chairman/CEO	Short term	Materialist	More of the same – the environment is one of a range of product attributes to be addressed and balanced.
Toyota	Social attitudes: Medium, lead and respond Consumer demand: Low, lead	Low: Firm leads government	High: Corporate philosophy drives environmental initiatives.	Long term	Transition to post-materialism	Shaping the future of environmental car attributes is a key factor. Competition on the basis of environmental attributes is envisaged.

Similar sentiments are evident for Toyota. As a Japanese CME firm, it sees itself as very much part of the fabric of society with resulting social obligations to lead environmental debate and educate society. It leads markets (on the basis of social attitudes, or "nascent consumer demand"). However, it goes beyond cooperating with government to assume a leadership position, and desires greater government cooperation. As a firm based in a techno-nationalist CME with a philosophical commitment to the environment, it is technologically driven to produce petrol-electric hybrids such as the Prius. Toyota's distinguishing feature is one that characterises Japanese CME firms more generally: a high importance placed on internal drivers. The result is it is now branding itself as an environmental car firm with environmental leadership a core management objective.

Ford, with its headquarters in the archetypal LME, is more focussed on reacting to weak environmental consumer demand than addressing stronger social attitudes. Similarly, it meets government regulations rather than exceeds them. Its main objectives are profitability and economic success, and therefore the firm is more exogenously materially driven. The 'wildcard' in the case of Ford is the role of the company's Chairman and CEO given his environmental awareness, and the family heritage he brings to his firm of a concern for corporate citizenship. This forms the foundation for Ford's internal drive to address environmental concerns, despite market forces exerting contrary material incentives. Given the greater power of top management to make decisions and set strategy in LME-based firms, this is primarily where the impetus for Ford's environmental initiatives comes from.

These findings confirm the analysis of environmental reports which showed, in broad terms, that German firms are more driven by social concerns and a more balanced approach than simply responding to market forces, and that Japanese firms are more internally driven for their strategies. US firms are more predisposed to approach environmental initiatives from a market perspective. There are further implications of these observations that relate to the timeframes and attitudes to post-materialism that come from different emphases related to firms' home state VOC: a tendency to longer timeframes and greater weight to post-materialist values for CME firms by comparison to those based in LMEs. Ford has a shorter term timeframe than the other firms, being more focussed on

current market conditions, current regulatory requirements, and profitability within the current product cycle. It remains the most materialist in its perspective on environmental product developments. The German firms have a more medium term perspective based on being ahead of markets and regulatory requirements, and being more stakeholder, rather than market, driven in how these exogenous factors are addressed. Toyota has the longest timeframe, being so strongly internally driven on environmental matters that this significantly overrides exogenous factors. It is also the case that in the case of Toyota, this is associated with a shift to post-materialist values in how it conducts its business, whereas for the German firms such a shift is occurring for more materialist reasons – i.e. post-materialism is good for business.

Conclusion

When you have something positive to say, you are not afraid to say it, and indeed grasp opportunities to do so. All the firms that participated in interviews are committed to enhancing the environmental performance of their products. Volkswagen and BMW are doing so with advanced diesels in the short term and alternative fuels in the longer-term. Ford is the first non-Japanese company to launch a petrol-electric hybrid vehicle, and the first in the world to do so in the form of an SUV. Toyota is a pioneer in petrol-electric hybrids and has committed to applying the technology across its model range. It is possible that these firms self-selected themselves for participation in interviews because of commitments they have made such as these. However, whether this is the case or not, what has clearly emerged is that far from a global perspective on the environment being the case, or even an Australian perspective in the case of Australian interviewees, interviewees from each firm had very distinct 'lenses' through which they saw the environmental performance of the cars their firms produce.

It is also important to concede that there are no absolutes, that these are complex issues, firms are complex organisations, and the intersection of various factors and the forces they exert on firm strategies are not straightforward. For example, it should not be

assumed that these firms in no way tailor their operations for the different jurisdictions in which they operate, such as to suit Australia's VOC. Similarly, beyond the national distinctions highlighted by the insights of the VOC approach, a firm such as Ford is obviously concerned about consumer attitudes and Toyota is obviously concerned about making profits. And characterising German firms' embrace of advanced diesels as an incremental rather than radical step like hybrids was challenged by the Volkswagen interviewee who made the point that the research and development that went into advanced diesels is not dissimilar to that for hybrids. A complex mixture of national and specific firm traits are bound up in these conclusions.

Even so, the there are clear points of difference in emphasis between firms. These points of difference have implications for which firms are setting the environmental agenda and which are following. As a result, they also indicate which firms are likely to dominate future environmental initiatives, and thence which are likely to redefine the global market for passenger cars in a more environmentally sustainable manner. In a sense the answer is obvious: Japanese and German firms. In the course of undertaking research for this thesis, several people (although none from Toyota) expressed the view that Toyota developed its Prius opportunistically to take advantage of emerging attitudinal trends, the signing of the Kyoto protocol, and likely emerging market forces. They are still motivated by a desire to increase their market share. This may be true, but the question has to be asked if this is the case why were there not a whole range of Priuses introduced in the late 1990s, or cars with similar environmental pretensions? Similarly, it might be expedient to explain the move of European producers to advanced diesels in terms of the price differential between petrol and diesel. But there are internal corporate technological advantages for European firms in so doing, and specific market factors, particularly in terms of social attitudes, that tend to get overlooked in such a simple rationalist explanation for the shift to diesels. Clearly, the result of different national and corporate perspectives is that Toyota is leading the industry in the commercialisation of hybrid technologies, and the German firms are doing likewise with diesels and alternative fuels. Ford is attempting to catch up, yet may still have considerable success in market terms because it is attempting to marry the more internally-driven (in the case of Toyota) or consensus driven (in the case Volkswagen) strategies of

the others with market forces and the commitment of its Chairman and CEO to environmental initiatives.

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[1] The reader will note that for the sake of analytical tractability, in Chapter 5 social attitudes and consumer demand are considered together as 'market forces' because they are the focus for cross-state comparative analysis in this chapter (in the sense of what exactly might constitute 'market forces' for firms of different nationality). However, in Chapter 6 and this chapter, social attitudes and consumer demand are split more along the lines of normative versus material factors. This reflects the broader purview of analysis in these latter chapters.

[2] In constructing the interviews this way, the intention was not to get authors to answer in a 'yes' or 'no' manner, but to engage in reflective and critical thinking about their firm's operations, and motivations, in respect of the key areas of interest. Therefore, they were guided in terms of what they should comment on, but only semi-guided in the sense that there was much scope for them to answer the questions in different ways. The literature informing such an approach includes M. Denscombe (1998) *The Good Research Guide for small scaled social research projects*, Buckingham: Open University Press, especially Chapter 7; T. May (2001) *Social Research*, 3rd edition, Buckingham: Open University Press, especially chapter 6; H. Arksey and P. Knight (1999) *Interviewing for Social Scientists*, London: Sage Publications; R. Yin (2003a), *Case Study Research: Design and Methods*, 3rd edition, Thousand Oaks: Sage Publications; R. Yin (2003b), *Applications of Case Study Research*, 2nd edition, Thousand Oaks: Sage Publications; F. Peavey (1995), 'Strategic Questioning, an Approach to Creating Personal and Social Change', *In Context*, Spring, No.40, pp.36-38; F. Peavey (no date), *Strategic Questioning, an Approach to Creating Personal and Social Change*, http://www/jobsletter.org.nz/pdf/stratq97.pdf, accessed 12 May 2004; S. Kvale (1996), *Interviews: An Introduction to Qualitative Research Interviewing*, Thousand Oaks: Sage Publications; B. Stanfield (2000), *The Art of Focused Conversation: 100 Ways to Access Group Wisdom in the Workplace*, Gabriola Island: New Society Publishers and Toronto: The Canadian Institute of Cultural Affairs.

[3] See Figure 4.9

[4] That is to say, as stressed in Chapter 2, the VOC approach is fundamentally a historical approach.

[5] The author is Australian and the Australian Productivity Commission dubs the Australian market a "microcosm" of the international market. Productivity Commission (2002), *Review of Automotive Assistance*, Inquiry Report, Report No.25, Melbourne: Productivity Commission.

[6] See Wright, Patrick J. (1979), *On a Clear Day you can see General Motors: John Z. de Lorean's Look Inside the Automotive Giant*, Grosse Point: Wright Enterprises.

[7] The evidence on fuel taxes presented in Chapter 4 would tend to support such a view.

[8] Example given by interviewees included Euro 3 noxious emissions regulations being superseded by Euro 4 regulations, and more stringent fuel economy standards.

[9] For the US, this interviewee referred to the historically long-standing strict Californian noxious emissions regulations and recent Californian CO_2 emission regulations. However, on Californian regulations it was noted in a footnote in Chapter 3 that while the state of California has historically had much stricter regulations for non-CO_2 emissions than national regulations for the US as a whole, it actually lags national regulations when it comes to CO_2 emissions. This is because although California passed a law requiring "maximum feasible reductions" in greenhouse gas emissions from cars and light trucks in 2002, no specific standards were mandated under this law, and car manufacturers are not required to take any action to reduce emissions until 2009. Therefore this may effectively be ruled out in terms of any comparison being undertaken here on the basis of CO_2 emissions. See D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and Value Creation in the Automotive Industry*, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf,

accessed 10 January 2004, p.6; and OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD, pp.110-112.

[10] This is an Australian federal government program under which firms operating in Australia make voluntary commitments to reduce CO_2 emissions.

[11] The imagery is along the lines that Ford reaches for the ceiling, much the way that the US industry as a whole struggles to comply with CAFE regulations as demonstrated in Chapter 3. Therefore, regulations represent a maximum level of regulatory compliance that must be 'reached' for, rather than a minimum level of compliance easily exceeded.

[12] This point was weakened by two other Ford interviewees though, who saw the possibility that environmental attributes could actually have a negative effects on sales. One of them said that "market forces have worked in the reverse if anything [because] there's a focus on more features, quieter cars which result in more sound deadening material, safer cars which involve stiffer structures, and airbags which of course add weight". These factors were said to "act against [Ford] in producing environmental outcomes".

[13] For example, see Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG, p.72.

[14] This point was indeed mentioned by Ford interviewees.

[15] He did not mention that diesels are also more expensive to manufacture, but this would certainly be a related point in why their purchase price is higher.

[16] W. Harrington and V. McConnell, V. (2003), *Motor Vehicles and the Environment*, Washington: Resources for the Future, http://www.rff.org/Documents/RFF-RPT-carsenviron.pdf, accessed 2 January 2004, p.22.

[17] OECD (2002c), 'Transport', *OECD Environmental Data Compendium 2002*, Paris: OECD, http://www.oecd.org/dataoecd/52/59/2958321.pdf, accessed 12 January 2004, p.23.

[18] This echoes the sentiments of Ford's Chairman and CEO expressed in the firm's environmental reporting, as discussed in Chapter 6.

[19] As noted in endnote 6 of Chapter 6, this again has undertones of path dependence as described in P. Pierson (2000), 'Increasing Returns, Path Dependence and the Study of Politics', *American Political Science Review*, Vol.94 No.2, pp.251-267; and P. Paul and T. Skocpol (2000), 'Historical Institutionalism in Contemporary Political Science', in I. Katznelson and H. Milner eds., *Political Science: The State of the Discipline*, New York: W.W. Norton and Company.

[20] K. Palmer, W. Oates and P. Portney (1995), 'Tightening Environmental Standards: the Benefit-Cost or the No Cost Paradigm?', *Journal of Economic Perspectives*, Vol.9, No.4, pp.119-132.

Chapter 8: Conclusion

Introduction

This thesis opened with the observation that changing the behaviour of firms to internalise environmental externalities is usually seen as unlikely in the absence of changes in market forces or effective state regulation – i.e. material factors that alter the material incentives to economic actors. However, the thesis has sought to 'open up' the question of addressing environmental externalities by also focussing on normative factors that explain institutional differences in the capitalist relations of firms' home states. To empirically ground the analysis, the thesis has focussed on the car industry, the world's largest manufacturing sector dominated by a handful of large multinational corporations (MNCs). Not only is the car industry the world's dominant manufacturing sector, it is also a major contributor to environmental damage, particularly the pressing global issue of climate change.

By focussing on the industry's contribution to the problem of climate change through the carbon dioxide (CO_2) emissions of its products (passenger cars) in use, the central question asked was: what motivates car firms to actually make environmental commitments? More accurately, from an institutional perspective, what institutional factors are likely to motivate firms in the car industry to see environmental issues as central to their business interests? In seeking to answer this question, two related specifying questions were asked. The first of these, contingent on the answer to the first question, was: are the motivators for firms embracing environmental improvements universal, or specific to firms based on their nationality or, possibly, individual cultures? Depending on the answers to the first two questions, the third question was: why should the car industry be concerned about the environment, particularly given its global economic significance and resulting political power?

What has been found is that firm commitments are not happening equally (i.e. in terms of magnitude), nor in the same manner (i.e. there are qualitative differences). Firms' strategies are dependent on where they have their home bases, and in this thesis firms from three of the car industry's major hubs were considered: Germany (and

Europe to some extent), the United States (US) and Japan. In explaining the national differences, the institutional basis of capitalist relations in firms' home states revealed by the varieties of capitalism (VOC) approach has been shown to be crucial for explaining variations in car firms' responses to climate change. In fact, there is a two way relationship such that the insights of the VOC approach support the results of the empirical analysis conducted here, and in turn the results support the insights of the VOC approach.

This concluding chapter reprises the key insights of the VOC approach applied to the empirical analysis in the thesis, and their relation to firms' actions in respect of environmental product developments. It first summarises whether casting firms as rational economic actors (as per the liberal economic model) or seeing them as institutionally embedded in their home states (as per institutional models) is more appropriate. The way in which the insights of the VOC approach apply is summarised, in particular the idea that the material perspective of firms as rational economic actors is only really applicable to liberal market economy (LME)-based firms, whereas coordinated market economy (CME)-based firms are driven by less material imperatives. The main findings of the thesis are then summarised. What firms are actually doing, and the national differences in their environmental product developments, is considered first, particularly from the perspective of whether this represents radical or incremental change. The point is made that the national differences are a reflection of the LME versus CME divide of the major firms' home states. The role of state regulations is then considered, particularly the conclusion that the extent to which state regulations establish minimum floors (in the case of CMEs) versus maximum ceilings (in the case of LMEs) is a matter of firms' home state variety of capitalism. The role of market forces is then addressed, particular differences in the way market forces are perceived depending on firms' home state variety of capitalism. LME-based firms are most concerned with material factors, and therefore discount social attitudes in favour of focussing on the material impacts of factors such as consumer demand and short term profit motivations. However, CME-based firms give higher priority to social attitudes because of a greater focus on normative factors. The findings on internal strategic drivers are summarised. It is shown that the importance of these revolves around whether firms may be conceptualised more as rational business

calculators (LME-based firms) or motivated more by *beliefs* (CME-based firms). In the light of the findings, conclusions are also presented on materialist versus post-materialist values, again suggesting a split along LME/CME lines on the basis of firms' home states, and therefore the extent to which a shift in business attitudes is occurring as a result of a shift towards post-materialist attitudes or not (it is in the case of CME-based firms, it is not in the case of LME-based firms).

Finally, answers to the questions are stated. These are that the factors that motivate car firms to see environmental issues as central to their business interests are contingent on national institutional differences identified by the VOC approach. Therefore, car firms' primary motivators for embracing environmental improvements are specific to their nationalities, and to some extent their individual cultures (although individual cultures are themselves a reflection of nationalities). As such, there is the crucial finding that it is not sufficient to say that material factors such as state regulations or consumer demand are the primary motivators for all firms in the car industry, or at least they do not necessarily produce the same material outcomes. The reason why the car industry should be concerned about the environment is therefore best answered in terms of the institutionalised norms that lead car firms of different nationalities to perceive environmental issues in different ways. There is no single answer, but multiple ones to such a question because the VOC of nations has implications not just for the type of products that transnational economic actors produce, and the competitive advantages they develop, but also the way they address related issues arising as a result of their activities, such as environmental degradation.

The thesis concludes with suggestions for future research.

Rational Economic Actors or National Institutional Embedding?

To answer the questions posed in this thesis, two contrasting perspectives on addressing environmental externalities were considered: the liberal economic model versus institutional models.

The mainstream liberal economic model is based on a rationalist approach that sees firms as motivated by material concerns. They seek profits in markets, and act instrumentally to do so. They are motivated by a logic of consequentialism.[1] Based on

a priori assumed motivations of them as materially-driven profit seekers, a rationalist analysis is applied the result of which is that, ceteris paribus, environmental externalities can only be addressed by state intervention. Alternatively,[2] consumer preferences must change so that market signals provide incentives for them to alter their behaviour on the basis of their instrumental profit-seeking goals.

Institutional models do not make assumptions about actors' rationality, but instead focus on norms of behaviour and how these become institutionalised over time.[3] They are based not just on a logic of consequentialism defined in terms of a priori assumptions regarding actors' rationality, but on a logic of appropriateness based on norms.[4] The hypothesis of the thesis is that both logics are relevant, but that the relative importance of material, rationalist, instrumental motivations for action need to be weighed against normative rationales that become institutionalised over time. In order to do this, the VOC approach was adopted as the framework for analysis because both material and normative rationales for action are encompassed within it, and because it says that the degree to which firms conform to the liberal economic model, or alternatives, is actually a question of institutional embedding in their home states.[5]

Therefore, the VOC approach makes a series of observations on the institutional basis of firms' home state capitalist relations that should predict their motivations. Specifically, firms' motivations are ascribed on the basis of whether their home states lean more towards LMEs, as in the case of the US, versus CMEs, as in the case of Germany (and to some extent the Europe more broadly) and Japan. In Chapter 2 this was shown to mean:

1. Closer state-business relations in CMEs versus a separation of the state and markets in LMEs. For Germany, a coordinating role for the state is the case, while for Japan a more organic, symbiotic relationship is suggested based on mutual understanding.

2. A resulting priority for markets as organisers of economic activity in LMEs, in both the product and financial spheres, versus markets as one among a variety of mechanisms for organising economic activity in CMEs on a more relational, cooperative basis. In the case of Germany, the role of society and a feeling of responsibility towards it is particularly important, as well as negotiated

consensus between a range of stakeholders often prescribed by law. For Japan, the enterprise community, and the relationship between stakeholders within it, plays a stronger role.

3. The firm may be conceived of as a network of contracts with significant power invested in management in LMEs, that acts on market signals to make profits in the short term and pay dividends to shareholders, versus a collective (Germany) or community (Japan) in CMEs that acts to enhance its reputation through close relational ties with stakeholders. US firms are 'instruments' (of profit), German firms are 'well-oiled machines' and Japanese firms are 'organisms'.

4. US firms are likely to be more focussed on exogenous material factors, but with more power in the hands of management to act unilaterally in devising strategies to respond to these. Because Japanese firms are more internally driven strategically, endogenous factors have greater prominence. German firms are somewhere in between, but with prominence given to (exogenous) social responsibilities.

5. A preference for non-price competition via product innovation in established industries in CMEs via incremental technological change, versus price competition in established industries in LMEs. Radical technological change is favoured in new industries in LMEs, however in the case of Japan a preference for technonationalism may produce quite radical technological advances over time even in established industries.

It was found that, taken together, these drivers of firm strategies imply a shorter-term perspective for LMEs versus a longer-term perspective for CMEs. This is because in the latter there is less focus on markets, profits, paying shareholders dividends, and competing in established industries on the basis of price. This also implies a clear preference for materialist perspectives on the part of LME-based firms, versus less materialist perspectives for CME-based firms.

What Firms are Doing: Radical or Incremental Change?

A range of environmental product development initiatives being undertaken by car firms that address the contribution of their products in use to climate change were outlined in Chapter 3. These include incremental technologies, petrol and diesel-electric hybrid drivetrains, hydrogen fuel cell vehicles (FCVs) and alternative fuels.[6] Developments in these areas all aim to improve fuel economy and reduce passenger cars' contribution to CO_2 emissions.[7] However, an analysis of car firms' environmental reports and the relative focus of the industry and individual firms showed that divergent, rather than convergent, strategies are being employed by firms, and that their strategies diverge on the basis of their nationalities.[8]

Japanese firms are focussed on petrol-electric hybrids, and on introducing alternative vehicles more broadly as soon as possible. Not waiting for markets to mature, they are keen to introduce new, radical technologies *now*. By contrast, German firms are focussed on incremental technologies in the form of advanced diesels, largely to meet the requirements of their co-regulatory CO_2 emission reduction agreements with the European Commission. German and US firms are focussed on alternative fuels, but in different ways. For US firms, this is a strategy for addressing the fuel consumption of their larger light trucks, which have come to dominate sales for the US market and US-based firms. However, for German firms it is an across the board strategy for all vehicles. While FCVs are a relatively distant prospect for all firms, Japanese firms want to introduce them as soon as possible (in the manner of their technologically-driven environmental initiatives more generally), whereas German and US firms want to be ready to introduce them when market, regulatory and infrastructure conditions are conducive. A stronger emphasis on reacting to market forces generally and developing products to suit different markets was noticeable for US firms, but more 'in the background' for German and Japanese firms which have determined clear (and differentiated) technological strategies.

These divergent strategies appear related to firms' home state variety of capitalism in three ways. First, the technonationalist version of the Japanese CME is manifested in Japanese car firms' more radical embrace of hybrid technologies, and radical leading-edge technological advances generally. The focus is then on being first

on the market with such technologies. Secondly, LME-style, US firms appear to be more driven by market forces, hence their diversified strategy with different products for different markets, than CME-based Japanese and German firms for whom non-price, internally-driven innovation strategies are more the case. Thirdly, the time frame for the introduction of these technologies is commensurate with the divide between LME US-based firms on the one hand, and CME German and Japanese based firms on the other. The time frames for the latter are not as determined by market forces as they are for the former. Japanese firms in particular appear to be driven by a desire to be first on the market with new technologies and new products, regardless of market forces.

Such broad observations were supported and developed through a detailed analysis of the role of state regulations, the nature of market forces, and the internal strategic drivers of firms.

State Regulation: Floors or Ceilings?

The liberal economic model holds that well-targeted regulations, in the form of penalties or incentives, are required to internalise environmental externalities. These must be enforced by the appropriate authorities to ensure compliance. In Chapter 4, regulations in the form of market mechanisms and command-and-control standards were considered. Surprisingly, market mechanisms were found to be less important in determining industry behaviour in all cases than standards. In the case of the latter, the material facts of regulations – their stringency and timing – were found to be insufficient for explaining the degree to which industry complies with regulations, its support for them, and whether it is leading or following such regulations. These are normative questions, because they do not only ask whether firms comply with regulations, but go beyond this to seek answers to qualitative questions of how well they comply, whether they are likely to continue doing so and whether they are likely to lead change in future or only respond to what is demanded of them. In a nutshell, they go to illuminating the degree to which regulations are 'floors' that establish minimum requirements (for minimal behavioural change) that are easily exceeded by firms, versus 'ceilings' that establish the maximum effort they are inclined to make in addressing environmental externalities.

The VOC of firms' home states explains the extent to which regulations establish floors or ceilings. The nature of state-firm relations, and how this informs the development of regulations, was seen to be the determining factor in the industry's performance in respect of them. Closer state-business relations in CMEs were found to mean that firms based there are more likely to be proactive in suggesting and implementing initiatives to reduce CO_2 emissions. Regulation is based more on co to self-regulatory relations with the state, and the result is that the industry exceeds regulations which may be thought of as floors that they are well above. By contrast, LME-based US firms, more arm's length from the state in setting standards and therefore having standards imposed on them, act more as lobbyists in respect of the state against regulatory strengthening. They barely meet regulatory requirements. Therefore, regulations are ceilings that the US industry struggles to reach.

These findings were found to have an international dimension because of their ramifications beyond the borders of firms' home states. Firms export the institutional features of their home state's regulations in the products they sell. In all the territories in which they operate Japanese and German/European firms sell cars that are more fuel efficient and produce less CO_2 emissions than US firms. The institutional importance of national regulatory environments, in terms of state-business relations, how this informs the setting of regulatory standards, and the resulting floor versus ceiling conception of these standards, was shown to override any notions of the 'stateless' corporation.

Market Forces: Material Returns or Social Attitudes

In the absence of state regulatory intervention, the liberal economic model posits that internalisation of environmental externalities occurs when market forces in the form of consumer demand mean that such externalities are incorporated in the price mechanism. When they are, an 'invisible hand' efficiently takes environmental concerns into account. Combined with this view is the post-materialist values thesis that such an outcome is increasingly likely because of changing social attitudes.[9] However, the extent to which market forces drive corporate strategic change on the environment was shown to be institutionally dependent on whether markets (in LMEs) or more relational,

cooperative relations between economic actors and society (in CMEs) coordinate economic activity. It was found that because material concerns are most important to LME-based firms, social concern for the environment is discounted in favour of consumer demand and the short term profit motivations to which it gives rise. By contrast, German and Japanese CME-based firms give higher priority to social attitudes because of a greater focus on normative factors over material ones.

Therefore, mirroring the regulatory floors versus ceilings findings on state regulations, was the finding of the relative importance of material returns in LMEs versus social attitudes in CMEs. Social concern for the environment in Germany and Japan was found, in a manner similar to the way in which regulations are developed in these CMEs, to produce a willingness to lead markets that does not exist for US LME-based firms. Predisposed to react to the material facts (and returns from) consumer demand in markets, US firms discount social concerns. Echoing the findings of Chapter 4 on state regulations, states that have a co-regulatory approach, or one where regulations have highly voluntaristic components, are more likely to lead markets. For example, in addressing their CO_2 emission commitments, the German industry is promoting advanced diesel vehicles, which is also commensurate with a CME preference for incremental technological advances. Japanese firms are taking a more radical technology-driven approach befitting their technonationalist version of a CME. Proactively acting in concert with, and possibly ahead of, the state, and certainly ahead of consumer demand, they are more internally driven in their environmental initiatives, and more concerned with social attitudes than actual consumer demand.

Internal Strategic Drivers: Rational Business Calculations or Beliefs?

The analysis in Chapters 5 and 6 of individual firms' rationales for their environmental product development strategies expressed in their environmental reports and in interviews with key personnel further illuminated the industry-wide conclusions reached in respect of state regulations and market forces. LME-based US firms are focussed on material factors – i.e. the actual demands of state regulations and consumer demand in markets. In contrast, CME-based firms are more focussed on social attitudes (German firms) and internal strategies (Japanese firms). They have a more normative perspective

on their business interests. A key exception to the rule, yet possible under the VOC approach, is that while endogenous drivers for change are not as important as exogenous, material (mainly market) imperatives for LME-based firms, in the case of Ford the perspective of the firm's Chairman and Chief Executive Officer (CEO) results in environmental concerns coming to the fore. This is because of management's more unilateral control over firm strategies in LMEs. Commensurate with this, sustainability as a concept is recognised at Ford, even if not clearly supportive of immediate material economic interests, because management commitment is present.

Unpacking the German and Japanese firms' differences in approach to environmental product developments is further illuminated by the VOC approach. German firms are particularly mindful of consensual cooperation with regulators while taking account of social concerns, while Japanese firms place more emphasis on leading society and being internally driven by their company policies.

The German CME model sees firms as bearing public responsibility for their actions and looking to social attitudes in upholding such responsibilities. Their image and standing matters to them from an economic perspective, but also in terms of their role in society. They couple their concern for social attitudes with a desire to be proactive in the policy process to achieve consensus-based agreements that serve environmental as well as material/business focussed goals. Close and cooperative, consensus-based state-business relations are therefore central to their perspective on state regulation, and they are thus likely to develop internal corporate policies to further their environmental goals in the light of social concerns and their close relations with the state.

Japanese firms have similar drivers for action to German firms, but the enterprise community aspects of Japanese CME capitalist relations are more to the fore. This reflects the more 'organic' way in which Japanese firms conceive their relations with the state and society as opposed to the negotiated consensus, 'machine'-like modus operandi of German firms. Thus, Japanese firms are particularly driven by their internal cultures, as predicted by the importance ascribed to group, consensus-based strategy development and implementation within the Japanese CME model. They are internally driven by a belief in the importance of the environment and a company-specific vision of the strategies required to act on this belief. Less driven by the material imperatives

of market forces in the short term, they aim to lead the market in new and uncharted directions with more radical products. They want to lead not just in material competitive terms, but in meeting broader strategic (in this case environmental) goals.

Materialist versus Post-Materialist Values: Which Firms Believe Environmental Concerns are Important?

Taken together with the observations on state regulation and market forces, the findings on internal strategic drivers lead to key conclusions on the extent to which car firms are acting in a manner commensurate with materialist versus post-materialist values.

German firms do not meet government regulations, so much as exceed them or move forward with regulators in a spirit of partnership. They do not react to consumer demand, so much as attempt to be ahead of it, and social attitudes are more important than actual demand. They are more likely to seek a balance of stakeholder viewpoints external and internal to the company in developing environmental strategies, so that a balance between exogenous and endogenous forces is achieved.

Japanese firms go beyond cooperating with government to assume a leadership position. As firms based in a technonationalist CME with philosophical commitment to the environment, they are driven to produce technologically radical environmentally-friendly vehicles such as Toyota's Prius. In so doing, a high importance is placed on internal strategic drivers. The result for firms such as Toyota is that they are increasingly branding themselves as environmental firms as part of being technological leaders. In so doing, environmental leadership is becoming a core management objective.

US firms remain, LME-style, more focussed on reacting to weak (environmental) consumer demand than addressing stronger social attitudes. As well as reacting to market forces in the form of consumer demand, they are predisposed to reacting to and meeting state regulations, rather than exceeding them. With material motivators of profitability and economic success to the fore, they are more exogenously driven. However, in the case of Ford the role of the company's Chairman and CEO is important because of his environmental awareness, and family heritage of corporate citizenship values. This forms the foundation for Ford's internal drive to address

environmental concerns, despite market forces exerting contrary material incentives. Given the greater power of top management to make decisions and set strategy in LME-based firms, this is primarily where the impetus for Ford's environmental initiatives comes from.

In the end, and as made explicit in Chapter 7, there is no doubt that all firms are to some degree driven by both materialist and post-materialist values, but there are clear differences in degree and rationale. A shift to more post-materialist perspectives is a matter of material rationality for German firms – i.e. post materialist values are affecting materialist perspectives. Japanese firms are displaying their environmental credentials for both materialist and post-materialist reasons. They are in transition from materialist to post-materialist values as drivers of their business strategies. US firms clearly are predisposed, as a result of the LME variety of capitalism of their home state, to materialist approaches to the environment. The exception is the role of senior management in the case of Ford.

Answers to Questions

In finding an answer to what motivates car firms to make environmental commitments, three questions were asked. The first, stating this question more accurately, was: what institutional factors are likely to motivate firms in the car industry to see environmental issues as central to their business interests?

Japanese car firms are indeed potentially the "saviours of the environment"[10] because they have *chosen* as a matter of internal company strategy to embrace environmental technologies as a way of enhancing corporate performance. Parker sums this up neatly as follows:

> Rather than being 'lucky' as suggested by some commentators on the fast sale of hybrids when they were launched in North America at a time of rising gasoline prices (2000), the success of the new hybrid technology can be traced to the foresight and planning of firms that recognised mounting environmental pressures and responded. Supportive policies were created by government, industry associations and competing firms, with the end result being a race to deliver new technologies for cars in the 20th century that are less damaging to the environment.[11]

But Japanese firms' actions are, at their root, due more to their home state's CME variety of capitalism than an altruistic concern for environmental sustainability. First, the co to self-regulatory manner in which regulations are set means firms tend to lead the state and markets with their environmental product development initiatives. They have a longer-term strategic timescale. Secondly, the technonationalist CME model that typifies Japanese capitalist relations leads its car industry to apply the most radical technological solutions and commercially release them as soon as possible. Thirdly, the Japanese industry's leadership role on the environment is the least associated with changes in social attitudes and willingness to act on these of the three, but its CME variety of capitalism lead the fact of the existence of social concern to be more strategically important. Finally, internal strategic drivers are to the fore for Japanese firms. They are increasingly, as a result of the path dependence of previous actions and their core beliefs, internalising a concern for environmental sustainability in their business strategies.

The case is similar for German car firms. Advanced diesels are their focus, so a less technologically-radical approach has been the result. It is certainly true that diesel is cheaper and that diesel has been embraced by the industry and policy makers. But as the analysis in Chapter 4 and the opinions of the Volkswagen interviewee suggest, such market factors are not necessarily the driving force behind such developments. It is more a matter of path dependent expertise in such technologies, and a technologically incremental approach to addressing climate change that allows them to meet CO_2 emission regulations, voluntarily proposed, in the most cost-effective manner possible and to exceed the targets set. In addition, social concern, willingness to act on this concern and actual consumer behaviour also favour such a course of action. Again, the CME basis of capitalist relations is at the core of the strategies being adopted by the German industry, as it is acting more on social concern, in partnership with state regulators, and on a longer-term cooperative strategy to incrementally move towards more environmentally-friendly technologies for its products.

It therefore appears that it is Japanese and German firms that will capitalise on the inaction of US-based car firms. Waiting for, or reacting to, market conditions in the form of material returns as a result of consumer demand, or reacting to (and often opposing) state regulations, they are lagging the Japanese and German industry in

environmental product development initiatives. Without competitive pressures from Japanese and German firms, the VOC approach and the analysis in this thesis supports the finding that for institutional reasons they are unlikely to lead strategic change towards more environmentally responsible technologies, at least in terms of their introduction in cars commercially available for sale. If they do, as in the case of Ford with vehicles such as the petrol-electric hybrid Escape SUV, it is because of a commitment by senior management. But again, institutional factors that give management the power to act more unilaterally in LMEs are at the root of explaining why this should be the case.

Therefore, answering the question of what motivates car firms to make environmental commitments, or more specifically what institutional factors are likely to motivate firms in the car industry to see environmental issues as central to their business interests, hinges on the impact of differing national institutional factors. It is not so much a question of whether car firms are concerned about the environment and whether or not they have *real* environmental product development strategies (they are all interested in doing so to one degree or another), as what would drive them, or has driven them, to do so. The question of 'greenwashing' versus real commitment to reduce the environmental impact of the industry's products remains relevant, but so do nationally appropriate and conducive paths to environmental commitments. Although ensuring firms make credible environmental commitments is an important consideration, and that these commitments effectively address environmental problems, the question of nationally conducive paths to so doing is no less important.

The second question, contingent on the answer to the first one, was: are the motivators for firms to embrace environmental improvements universal, or are they specific to firms based on their nationality or, possibly, individual cultures? Clearly, the answer is that the motivators are both nationally specific, and firm-specific. It cannot be said that the motivators for firms to embrace environmental improvements are universal. Therefore, the crucial finding is that it is not sufficient to say that material factors, such as state regulations or consumer demand, are the primary motivators for all firms in the car industry. They cannot be said, by the fact of their existence, to even necessarily produce the same material outcomes.

These findings in respect of the second question are important because of their broader implications. The mainstream liberal economic perspective on economic actor's motivations is a somewhat cynical (although adherents might prefer 'realistic' or 'rational') one that any concern for the environment must be the result of materially-driven instrumental behaviour based on a logic of consequentialism. The aim is purely self-interested profit seeking on the part of firms. However, what has been shown is that far from a global perspective on the environment being the case, car firms have very distinct 'lenses' through which they see the environmental performance of the cars they produce. Employing the insights of the VOC approach, this thesis has presented empirical evidence for why the liberal economic model only approximates the behaviour and motivations of US-based car firms. This is because they are based in the archetypal LME. However, for CME-based German and Japanese firms, a different institutional basis for capitalist relations leads them to focus on more normative factors. In turn, such normative factors influence the way they view their material interests, and the consequences of their actions. They are inclined to take a more holistic view in which their role in society occupies a more central strategic position, internal corporate strategies proactively drive environmental product initiatives, and leadership over, or partnership with, regulators is a feature of their strategic planning.

The third question, contingent on answers to the first two and re-phrasing the central question more accurately, was: why should the car industry be concerned about the environment, particularly given its global economic significance and resulting political power?

Institutionalised norms have implications for the way in which firms of different nationalities approach important issues such as the environment and, specifically in this thesis, the issue of climate change. The VOC approach has been employed to demonstrate that it is the institutional basis of different capitalisms that is particularly relevant when one considers MNCs such as those in the car industry whose operations may be truly global, but whose 'spirit' remains rooted in the nation that gave them birth. It has been shown that the VOC of nations has implications not just for the type of products these transnational economic actors produce, and the competitive advantages they develop, but also the way they address related issues arising as a result of their activities, such as environmental degradation. Thus, while their attitude and actions

relating to environmental concerns have been the focus, non-environmental institutional factors relating to states' VOC have been shown to be salient for explaining their actions. Therefore, the VOC approach has implications for the way in which non-economic issues, such as environmental externalities, are addressed by these transnational actors.

Of course, there are no absolutes. Environmental issues are complex, firms are complex organisations, and the intersection of various factors and the forces they exert on firm strategies are not straightforward. To a large extent, this thesis has barely scratched the surface. Therefore, the conclusions reached need to be qualified by acknowledging that US firms are obviously normatively concerned about social attitudes and have internal strategic drivers for the actions they take (witness the commitment of Bill Ford to improving the environmental performance of his firm). Similarly, German and Japanese firms are obviously materialistically concerned about making profits. There are also a complex mixture of national and specific firm traits bound up in these conclusions. Even so, there are clear points of national difference in emphasis between firms. US firms have a materialist predilection for reacting to market forces in the form of consumer demand, and state regulations. German and Japanese firms take a more normative stakeholder-driven approach focussing on social concerns (especially German firms) and internal company strategies (especially Japanese firms). They lead, or coordinate their activities with, their governments rather than opposing or reacting to them. Therefore, strategies for addressing the environmental impacts of these firms should reflect their institutional preferences: markets and state regulation for US firms, close stakeholder consultation and cooperation for German firms in partnership with government, and a strategy that challenges Japanese firms to address the environmental impact of their actions via internally-driven corporate policies.

Finally, despite their institutional differences, an important point emerges from this that was stressed at the end of Chapter 6. It is that German, US and Japanese car firms may all be on a journey that leads to the same destination: more environmentally responsible behaviour. It is just that they are taking a different path to it, largely based on the VOC of their home states. Where US firms are focussed on material factors, such as consumer demand and market forces generally, and see normative concerns in more materialist instrumental terms, German and Japanese firms are more focussed on

social attitudes and internal strategies so that a more normative approach to their business interests is shifting them to more environmentally friendly behaviour. In the end both may arrive at the same point, but US firms will have got there with an eye on their bottom lines, whereas German and Japanese firms will have taken a course of action that they believe to be normatively 'right' and which at the end of the day has delivered material benefits.

Future Research

For future research, institutional factors beyond those covered by the VOC approach potentially require consideration. In the light of the demonstrated importance of institutional perspectives, including the insights of the VOC approach, future research arising from this thesis revolves around two related key themes. First, the global versus national/international debate. Secondly, the role of private versus public authority. Subsequent to some elucidation of the manner in which future research will need to be mindful of institutional factors beyond those covered by the VOC approach, my vision for a future research agenda with these two themes in mind is elaborated on below.

This thesis employed an institutional model based on the VOC approach. The VOC approach's use of the CME/LME divide was useful in undertaking the empirical analysis, and yielded significant conclusions. However, it is important to note there is a danger of making a caricature of states based on a simple dualistic categorisation of them as LMEs or CMEs.[12] This is a problem with the VOC approach in that while it has a lot to say about states at the extremes, it has much less salient insights for states that possess a mixture of LME and CME attributes. As a leading exponent of the VOC approach, Hall himself concedes that "there is still an implicit emphasis in [the VOC] literature on a few ideal-typical countries", even if "it has generated an important set of propositions of wide potential applicability.[13] This is basically a problem of concept intension and extension. Concept intension refers to "the set of meanings or attributes that define the category and determine membership", in this case what it takes to be classified as an LME or CME. The extension of a category "refers to the set of entities in the world to which it refers", in this case which countries are categorised as either CMEs or LMEs.[14] But if a country possesses attributes of both CMEs and LMEs, in

other words we are not at the extremes of the continuum, the VOC approach is not so useful and there is the danger of concept stretching (i.e. over-extension) in order to encompass states that do not fit the categories. Accepting these points, certain states are not handled well by the VOC approach, and treating regions like the EU as a homogenous unit has been acknowledged to be problematic. In future research, it will therefore be important to extend the insights of the VOC beyond the extreme cases of LMEs versus CMEs.

Turning to the first of the two themes for future research, at the outset this thesis noted that while being focussed on the environmental initiatives of a particular industry, and the importance of institutions that give rise to different capitalist relations in its firms' home states, the issues considered speak to a larger debate about the extent to which a shift in power has occurred from states to markets and the forces of transnational capital, versus the enduring relevance of states in international capitalist relations. The former may be thought of as a global perspective, the latter a more statist perspective that holds that international economic relations are more international (i.e. between states) than global (i.e. a borderless world).[15] This thesis sits within this broad debate. What has been shown is that the statist/international perspective remains relevant even in manufacturing sectors such as the car industry that are characterised by MNCs with globally integrated production networks and global sales. Therefore, at its broadest level, the thesis takes issue with arguments that the world is becoming homogenised because of the greater permeability of states' borders as a result of the globalisation of markets. The thesis instead tells a story of enduring and vital differences, arguing against isomorphism.

The analysis could be extended to other industrial sectors. This could be fruitful as the thesis has adopted a case-oriented methodology to inquire deeply into a small number of cases in a particular industry. Therefore, what has been uncovered is small 't' rather than large 'T' truth, in the sense that the insights gleaned may be applicable to the cases studied but not necessarily generalisable in all aspects of the conclusions they suggest.[16] It is also true that by adopting a normative theoretical framework, the research might be said to have been in what rationalists such as Goldstein and Keohane term "murky territory" where any explanation is a matter of probability.[17] In a similar vein, Hall notes that taking a normative approach means that "there is no neutral point

free of context, and universalism must accordingly be abandoned".[18] Although this point is worth conceding, it is also to some degree trivial, because the obverse would be to take a deterministic view, such as that inherent in rational choice-based theories, where the course and cause of action is 100 percent clear only by definition.[19] But at the end of the day, the response to these two drawbacks is best summarised by Lake (who it should be noted takes an approach very much in the positivist, rationalist tradition). He says:

> Significant theoretical work needs to be done. Empirical research can best aid this process not by seeking decisive disconfirmation, but by clarifying questions, describing patterns of behaviour in need of explanation, assessing the plausibility of new theoretical predictions, and identifying apparent anomalies.[20]

In other words, it is to be hoped that future research in other industrial sectors will add to a cumulative stock empirical research that will assist in proving or disproving the insights of the VOC approach, and institutional approaches more broadly.

However, it would perhaps be best to expand the field of inquiry to other non-economic (or perhaps more accurately, non-material) issues, such as human rights, corporate social responsibility and ethical business practice, and to examine these across industrial sectors. This would allow the insights gained in this thesis via studying one industrial sector in detail, to be applied more broadly to the role of MNCs in addressing such non-economic issues. This is because there are implications for whether the institutional basis of different states' capitalisms facilitates (or does not facilitate) addressing such aspects of economic activity, as well as how they are addressed. It means that studies at the level of the firm and individual industrial sectors may, to some extent, be set aside for an analysis that focuses on the institutional structures of states and the environment they provide for their flagship corporations to address such concerns. Far from being irrelevant, differences in states' capitalist relations are institutionally embedded in their MNCs (as MNCs are in turn institutionally embedded in their home states) that disseminate the norms of their home state's capitalist relations internationally with global effects.

Taking an international perspective has implications for the second debate on private versus public authority. Again, at the outset of the thesis it was noted that a significant implication of taking a normative institutional approach is that at some stage self-regulation may be effective for normative reasons, as opposed to the traditional

liberal economic view that it cannot for rationalist reasons.[21] While the OECD observes that firms themselves are the primary source of new codes of conduct, suggesting that responsibility for regulation is moving from the private to the public sphere, the important question to ask is whether or not this really represents a shift of power to markets.[22] The findings of this thesis would suggest that the institutional embedding of firms in their home states, and the manner in which this impacts on their strategic thinking, means that what we have is a case of "freer markets, more rules",[23] or perhaps that national institutional differences impact on the manner in which private authority is exercised for addressing the non-economic impacts of economic activity.[24] Either way, it appears that national institutional differences do matter. This means that it is important to investigate how they impact on firms when they develop their codes of conduct, what these contain, the relevance of national institutional differences which they may embody, and whether or not these differences mean that global codes of conduct can ever be effective. In addition, from a more nuanced perspective, it raises questions of whether the various global codes of conduct proposed by international organisations represent attempts to homogenise rules in a manner that reflects more one institutional perspective than another, especially LME versus CME perspectives.

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[1] On the logics of consequentialism versus appropriateness, see J. March and J. Olsen (1989), *Rediscovering Institutions: The Organizational Basis of Politics*, New York: The Free Press; and J. March and J. Olsen (1998), 'The Institutional Dynamics of International Political Orders', *International Organization*, Vol. 52 No.4, pp.943-969.

[2] That is to say, relaxing the ceteris paribus requirement.

[3] A key example given was the norm lifecycle proposed by M. Finnemore and K. Sikkink (1998), 'International Norm Dynamics and Political Change', *International Organization*, Vol.52, No.4, pp.887-917.

[4] Again, see March and Olsen (1989), *op. cit.*; and March and Olsen (1998), *op. cit.*

[5] On norms and institutions, see for example D. North (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press. On the VOC approach, see for example P. Hall and D. Soskice (2001), 'An Introduction to Varieties of Capitalism', in P. Hall and D. Soskice, *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, Oxford: Oxford University Press.

[6] The summary of the environmental product development initiatives they are undertaking was drawn primarily from OECD (2004), *Can Cars Come Clean? Strategies for Low-Emission Vehicles*, Paris: OECD; UNEP and ACEA (2002), *Industry as a Partner for Sustainable Development: Automotive*, http://www.unepti.e.org/outreach/wssd/docs/sectors/final/automotive.pdf, accessed 14 May 2003, especially the Summary and Conclusions section and Annex B; Deutsche Bank (2004), *The Drivers: How to Navigate the Auto Industry*, Frankfurt am Main: Deutsche Bank AG; and D. Austin, N. Rosinki, A. Sauer and C. le Duc (2003), *Changing Drivers: the Impact of Climate Change on Competitiveness and*

Value Creation in the Automotive Industry, Sustainable Asset Management and World Resources Institute, http://pdf.wri.org/changing_drivers_full_report.pdf, accessed 10 January 2004.

[7] These amount to the same thing. For example, a conversion chart of fuel economy to CO_2 emissions in grams per kilometre is provided in Austin et. al., *op. cit.*, p.74.

[8] The environmental reports considered were Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG; BMW Group (2003), *Sustainable Value Report 2003/2004: Innovation. Efficiency. Responsibility.*, Munich: Bayerischen Motoren Werke; DaimlerChrysler (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM; Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation; Honda Motor Company (2002), *Honda Ecology*, Tokyo: Honda Motor Company; Honda Motor Company (2004), *Honda Environmental Annual Report 2004*, Tokyo: Honda Motor Company; Nissan Motor Company (2004a), *Environmental Report 2004*, Tokyo: Nissan Motor Company; Nissan Motor Company (2004b), *Sustainability Report 2004*, Tokyo: Nissan Motor Company; General Motors Corporation (2004), *2004 Corporate Responsibility Report*, Detroit: General Motors Corporation; Ford Motor Company (2004), *2003/4 Corporate Citizenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company.

[9] So say authors such as D. Korten (1999), *The Post-Corporate World*, San Francisco: Berrett-Koehler Publishers; P. Hawken, A. Lovins and H. Lovins (1999), *Natural Capitalism: Creating the Next Industrial Revolution*, New York: Little Brown and Co; J. Karliner (1997), *The Corporate Planet*, San Francisco: Sierra Club Books; C. Holliday Jr, S. Schmidheiny and P. Watts (2002), *Walking the Talk*, Sheffield: Greenleaf; A. Florini (2003b), *The Coming Democracy: New Rules for Running a New World*, Washington: Island Press; A. Prakash (2000), *Greening the Firm: The Politics of Corporate Environmentalism*, Cambridge: Cambridge University Press; U. Desai (2002a), 'Institutions and Environmental Policy in Developed Countries' in U. Desai ed., *Environmental Politics and Policy in Industrialized Countries*, Cambridge: The MIT Press; and R. Inglehart (1997), *Modernisation and Postmodernisation: Cultural, Economic and Political Change in 43 Societies*, Princeton: Princeton University Press.

[10] T. Koshiba, P. Parker, T. Rutherford, D. Sanford and R. Olson (2001), 'Japanese Automakers and the NAFTA Environment: Global Context'. *Environments*, Vol.29, No.3, pp. 1–14. See also D. Bleviss (1990), 'Policy Options to Encourage Low Emission/Low Fuel Consumption Vehicles', *Low Consumption/Low Emission Automobile, Proceedings of an Expert Panel*, Rome, 14–15 February, International Energy Agency, OECD: Paris; P. Parker (1996), 'Japan and the Global Environment: Leadership in Environmental Technology', in D. Rumley, T. Chiba, A. Takagi and Y. Fukushima eds., *Global Geopolitical Change and the Asia-Pacific*, Aldershot: Avebury; and P. Parker (2001), 'Environmental Initiatives Among Japanese Automakers: New Technology, EMS, Recycling and Lifecycle Approaches', *Environments*, Vol.29, No.3, pp.91–113.

[11] Parker (2001), *op. cit.*, p.109.

[12] A point well made in C. Hay (2005), 'Two Can Play at That Game…or Can They? Varieties of Capitalism, Varieties of Institutionalism', in D. Coates ed., *Varieties of Capitalism, Varieties of Approaches*, Hampshire: Palgrave Macmillan. This is also the point made in respect of Europe by V. Schmidt (2002), *The Futures of European Capitalism*, Oxford: Oxford University Press.

[13] P. Hall (1999), 'The Political Economy of Europe in an Era of Interdependence', in H. Kitschelt, P. Lange, G. Marks and J. Stephens eds., *Continuity and Change in Contemporary Capitalism*, Cambridge: Cambridge University Press, p.145. This would seem to be the central problem with the VOC approach, or at least the one most central for extending it to future research of the nature conducted in this thesis. This problem, along with some of the other major limitations of the VOC approach, are discussed in further detail by contributors to Coates, D. ed. (2005), *Varieties of Capitalism, Varieties of Approaches*, Hampshire: Palgrave Macmillan.

[14] D. Collier and J. Mahon, (1993), 'Conceptual Stretching Revisited: Adapting Categories in Comparative Analysis', *American Political Science Review*, Vol.87, No.4, p.846; and G. Sartori (1970), 'Concept Misformation in Comparative Politics', *American Political Science Review*, Vol.6, No.4, pp.1033-1053.

[15] It was noted that the global perspective is held by authors such as S. Strange, (1996), *The Retreat of the State: The Diffusion of Power in the World Economy*, Cambridge: Cambridge University Press; K. Ohmae (1990), *The Borderless World: Power and Strategy in the Interlinked Economy*, London: Collins; and T. Friedman (1999), *The Lexus and the Olive Tree*, London: Harper Collins. The international perspective is a view that sits more comfortably with the VOC scholars and authors such as P. Doremus, W. Keller, L. Pauly and S. Reich (1999), *The Myth of the Global Corporation*, Princeton: Princeton University Press; L. Weiss (1998), *The Myth of the Powerless State: Governing the Economy in a Global Era*, Cambridge: Polity Press; L. Weiss and J. Hobson (1995), *States and Economic Development, a Comparative Economic Analysis*, Cambridge: Polity Press; R. Boyer (1996), 'The Convergence Hypothesis Revisited: Globalisation but Still the Century of Nations?', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press; R. Wade (1996), 'Globalisation and its Limits: Reports of the Death of the National Economy are Greatly Exaggerated', in S. Berger and R. Dore eds., *National Diversity and Global Capitalism*, Ithaca: Cornell University Press; and L. Pauly and S. Reich (1997), 'National Structures and Multinational Corporate Behaviour: Enduring Differences in the Age of Globalisation', *International Organization*, Vol.51, No.1, pp.1-30.

[16] For example, on case study findings of the positive effect on profits of environmental controls Palmer et al note that "with literally hundreds of thousands of firms ….it would be hard *not* to find instances where regulation has seemingly worked to a polluting firm's advantage" so this "in no way establishes a general presumption in favour of this outcome". See K. Palmer, W. Oates and P. Portney (1995), 'Tightening Environmental Standards: the Benefit-Cost or the No Cost Paradigm?', *Journal of Economic Perspectives*, Vol.9, No.4, p.120. They argue against the finding that firms must recognise the positive effect on profits of environmental initiatives, asserted on the basis of a selection of case studies by Porter, M., and van der Linde, C. (1995a), 'Towards a New Conception of the Environment – Competitiveness Relationship', *Journal of Economic Perspectives*, Vol.9, No.4, pp.97-118.

[17] J. Goldstein and R. Keohane (1993), 'Ideas and Foreign Policy: An Analytical Framework' in J. Goldstein and R. Keohane eds. *Ideas and Foreign Policy: Beliefs, Institutions and Political Change*, Ithaca: Cornell University Press, p.29.

[18] J. Hall (1993), 'Ideas and the Social Sciences', in J. Goldstein and R. Keohane eds. *Ideas and Foreign Policy: Beliefs, Institutions and Political Change*, Ithaca: Cornell University Press, pp.35-36.

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APPENDICES

Appendix A: Questions Asked in the World Values Survey

As a global survey, the World Values Survey (WVS) is useful for comparatively analysing attitudes to a range of social concerns across countries. For the purpose of the analysis in this thesis, questions relating to respondents' attitude to the environment are singled out for examination as they are of direct relevance to the questions asked in Chapter 5. The WVS is also useful because it covers all the countries examined in this thesis, as well as the timeframe for analysis: 1990 to the present. However, like any global survey conducted over time there are data gaps, and variations in questions asked and responses to them which cause problems. There is no such thing as the perfect survey or dataset, so one must acknowledge and work within the limitations of what is available.

Reponses to the second (1990-1993), third (1995-1997) and fourth (1999-2000) WVS waves are analysed given that this thesis is primarily concerned with developments from 1990 to 2004. All questions on the environment asked in the WVS that relate to the three concerns here (i.e. concern for the environment; willingness to take direct action in markets; and willingness to take non-market action) are analysed in Chapter 5. However, not all the questions were asked in all the waves of the WVS. German respondents were not asked certain questions in wave 4 that were asked of United States (US) and Japanese respondents. And in wave four one of the questions was asked in a different format to waves 3 and 4. The waves in which they were asked, and where applicable the countries that were covered, are shown in Table A1.

In addition, two categories of responses have been eliminated to enhance the clarity of the analysis:

- For many questions, some waves included a category 'don't know' as a possible response to the question posed, while in others such a category of response was not available. Furthermore, waves that did include such a category did not include it uniformly for all countries covered (e.g. in wave three 'don't know' was a possible response for Germany, but not for the US or Japan). For the sake of comparison, all 'don't know' responses have been eliminated in percentage calculations.

- ‘Other’ was a possible answer for the question on preferencing protecting the environment versus economic growth. ‘Other’ responses were eliminated, as it is not clear what answer was given when such a response is indicated. It therefore cannot be said with any certainty what such a response indicates. In addition, ‘other’ responses accounted for under 10 percent of all valid responses for the countries analysed.

The total number of ‘don’t know’ and ‘other’ responses has been subtracted from total responses and the calculation of response percentages made on the basis of this reduced total number of responses.

Table A1: Environmental Questions asked in the WVS

Question	Asked in Wave 2?	Asked in Wave 3?	Asked in Wave 4?
Now I am going to read off a list of voluntary organisations; for each one, could you tell me whether you are an active member, an inactive member or not a member of that type of organisation?			
Environmental organisation	YES	YES	YES, although the question was asked in two parts: respondents were asked whether they were a member, and then asked in another question if they had done unpaid work. For the sake of analysis, doing unpaid work was taken as being equivalent to being an active member of an organisation.
I am now going to read out some statements about the environment. For each one I read out, can you tell me whether you agree strongly, agree, disagree or disagree strongly?			
I would agree to an increase in taxes if the extra money were used to prevent environmental damage.	YES	YES	YES
I would buy things at 20% higher than usual prices if it would help protect the environment.	NO	YES	NO
I would give part of my income if I were certain that the money would be used to prevent environmental pollution	NO	NO	YES.
Government should reduce environmental pollution but it should not cost me any money	NO	NO	YES
Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view? 1. Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs. 2. Economic growth and creating jobs should be the top priority, even if the environment suffers to some extent 3. Other answer	NO	YES	YES
Which, if any, of these things have you done in the last 12 months, out of concern for the environment?			
Have you chosen household products that you think are better for the environment?	NO	YES	NO
Have you decided for environmental reasons to reuse or recycle something rather than throw it away?	NO	YES	NO

Question	Asked in Wave 2?	Asked in Wave 3?	Asked in Wave 4?
Have you tried to reduce water consumption for environmental reasons?	NO	YES	NO
Have you attended a meeting or signed a letter or petition aimed at protecting the environment?	NO	YES	NO
Have you contributed to an environmental organization?	NO	YES	NO
For each of the following pairs of statements, please tell me which one comes closest to your own views: 1. Human beings should master nature; or 2. Humans should coexist with nature.	NO	YES	YES, but not for Germany
Now I'd like you to look at this card. I'm going to read out some different forms of political action that people can take, and I'd like you to tell me, for each one, whether you have actually done any of these things, whether you might do it or would never, under any circumstances, do it.			
Signing a petition	YES	YES	YES
Joining in boycotts	YES	YES	YES
Attending lawful demonstrations	YES	YES	YES
Joining unofficial strikes	YES	YES	YES
Occupying buildings or factories	YES	YES	YES

Appendix B: Cross Tabulations for Social Attitudes

This appendix presents the detailed cross tabulations performed for social attitudes summarised in Table 5.4 in Chapter 5. The focus is on whether attitudes to the environment are associated with willingness to act in environmentally-friendly ways. To do this, phi was used as a statistical test of association. Phi was chosen as the appropriate test on the basis that all variables are nominal and the cross tabulations are in the form of two rows and two columns.

Each cross tabulation is presented as follows:

		Environment vs Economic Growth/ Master vs Coexist with Nature		
	Response to question on willingness to act	Environment/Master Nature	Economic Growth/Coexist with Nature	Total
Country	**Agree**	**a%**	**b%**	**c%**
WAVE	Disagree	d%	e%	f%
	Total	100%	100%	100%
		N=g%	N=h%	N=i%
		Difference in 'agree' responses: (difference between a% and b%) Phi: (Not) Statistically significant at p<0.01		

By convention, the assumed 'independent' variable is presented in columns and the assumed 'dependent' variable in rows. Given this layout, the cross tabulations are methodically analysed in three stages:

1. Willingness to act in environmentally friendly ways: The percentages in the rows pertaining to whether respondents have acted in environmentally friendly ways or would agree to are examined first (c% and f%). These will mostly be very similar to the frequencies already examined in Chapter 5. The analysis of them is reprised here to put the statistical tests of association in context and, where cross tabulations are possible over more than one wave of the WVS, to examine trends over time.

2. Willingness to act in environmentally friendly ways and attitude to the environment: The percentage of respondents who are willing to act in environmentally friendly ways and who give priority to the environment/believe in coexisting with nature

rather than economic growth/mastering nature is considered next (a% and b%). In particular, the magnitude of the difference between responses is considered (a% minus b% for environment versus economic growth and b% minus a% for master versus coexist with nature). This shows the extent of the difference in willingness to act associated with a preference for the environment via the 'independent' variable, and hence the likelihood of association. If the different between a% and b% is large, this suggests that an association is more likely. If the difference is positive, an intuitive association is suggested between attitude to the environment and willingness to act in environmentally friendly ways, because a higher percentage of respondents are willing to act in environmentally friendly ways when they give priority to the environment/coexisting with nature rather than when they give priority to economic growth/mastering nature. A counter intuitive association is suggested when the difference between a% and b% is negative because this suggests that respondents who give priority to economic growth/mastering nature are more willing to act in environmentally friendly ways. The sample size of each column (N=g%, h% and i%) is also presented to indicate the number of responses associated with the percentages presented, and highlighted where this would seem appropriate (e.g. if the sample size is extremely small it is less likely that a statistically significant association is indicated).

3. Statistical test of association: The results in 1. and 2. are then used as the basis for the analysis of the statistical test, phi. Despite ascribing 'dependent' and 'independent' variables, these are largely assumed for intuitive reasons and have no basis in statistical analysis. As noted in 2., a counter-intuitive association is possible. What is actually measured by phi is the extent of association between the two variables. This association is measured in light of the degree of statistical significance to be attached to it with the null hypothesis that there is no relationship rejected at a significance level of $p<0.01$. Chi square measures of association such as phi are difficult to interpret. They can show the relative strength of associations in different tables, but an absolute statement on how strong the association is difficult.[1] Accepting this, for the sake of comparison here an attempt is made to

classify the strength of the association suggested by phi, if statistically significant, as follows:

Value of phi, when statistically significant at p<0.01	**Strength of Association**
Phi<0.125	Very weak
0.125<phi<0.25	Weak
0.25<phi<0.375	Weak-moderate
0.375<phi<0.5	Moderate
0.5<phi<0.625	Moderate-strong
0.625<phi<0.75	Strong
0.75<phi<1	Very strong

Some repetition may arise across the discussion under each of the cross tabulations, but this is because it is the author's intention that each may stand alone and the reader may refer to each in isolation without the need to read the entire Appendix.

Willingness to Take Direct Action in Markets

Table B1: Buy Things at 20 Percent Higher Prices by Environment vs Economic Growth

		Environment vs Economic Growth		
	Buy things at 20% higher prices	Environment	Economic Growth	Total
Germany	**Agree**	**71%**	**53%**	**61%**
WAVE 3	Disagree	29%	47%	39%
	Total	100%	100%	100%
		N=751	N=909	N=1660
		Difference in 'agree' responses: 18% Phi: 0.186 Statistically significant at p<0.01		
US	**Agree**	**49%**	**24%**	**38%**
WAVE 3	Disagree	51%	76%	62%
	Total	100%	100%	100%
		N=708	N=568	N=1276
		Difference in 'agree' responses: 25% Phi: 0.256 Statistically significant at p<0.01		
Japan	**Agree**	**53%**	**24%**	**40%**
WAVE 3	Disagree	47%	76%	60%
	Total	100%	100%	100%
		N=284	N=250	N=534
		Difference in 'agree' responses: 29% Phi: 0.293 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Only a majority German respondents (61 percent) agree with buying things at 20 percent higher than usual prices if it would help protect the environment. A sizeable minority of United States (US) and Japanese respondents agree with so doing (38 percent and 40 percent respectively).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of German respondents (71 percent) who gave priority to protecting the environment agreed to paying higher prices, as opposed to those who gave priority to economic growth. This suggests that the two variables are intuitively associated. This is similarly the case for the US and Japan, although the percentages are lower at 49 and 53 percent respectively. However, the difference in the

'agree' to 'disagree' responses was significantly greater for the US and Japan than that for Germany at 25 percent (US) and 29 percent (Japan) by comparison to 18 percent for German respondents. This suggests that US and Japanese respondent's willingness to pay higher prices is more closely related to whether they give priority to protecting the environment than their German counterparts.

3. Statistical test of association: Phi is statistically significant in all cases and confirms what is suggested under 2., as it indicates a stronger association for the US and Japan than for Germany. Phi is highest for Japan (weak-moderate association) followed by the US (weak-moderate association) and then Germany (weak association).

Table B2: Buy Things at 20 Percent Higher Prices by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Buy things at 20% higher prices	Master	Coexist	Total
Germany	**Agree**	**48%**	**61%**	**60%**
WAVE 3	Disagree	52%	39%	40%
	Total	100%	100%	100%
		N=89	N=1876	N=1965
		Difference in 'agree' responses: 13% Phi: 0.053 **Not** statistically significant at p<0.01		
US	**Agree**	**32%**	**37%**	**36%**
WAVE 3	Disagree	68%	**63%**	64%
	Total	100%	100%	100%
		N=177	N=1242	N=1419
		Difference in 'agree' responses: 5 Phi: 0.035 **Not** statistically significant at p<0.01		
Japan	**Agree**	**30%**	**35%**	**35%**
WAVE 3	Disagree	70%	**65%**	65%
	Total	100%	100%	100%
		N=10	N=829	N=839
		Difference in 'agree' responses: 5 Phi: 0.011 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: As in Table B1, only a majority German respondents (60 percent) agree with buying things at 20 percent higher than

usual prices if it would help protect the environment. A sizeable minority of US and Japanese respondents agree with so doing (36 percent and 35 percent respectively).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of German respondents (61 percent) who believed in coexisting with nature agreed to paying higher prices, as opposed to those who believed in mastering nature. This suggests that the two variables are intuitively associated. This is similarly the case for the US and Japan, although the percentages are lower at 37 percent and 35 percent respectively. The difference in the 'agree' to 'disagree' responses was also significantly greater for Germany than for US or Japanese respondents (13 percent for Germany by comparison to 5 percent for both the US and Japan). This suggests German respondents' willingness to pay higher prices is more likely to be associated to a belief in coexisting with nature than their US and Japanese counterparts. However, the small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, suggest that the associations are less likely to be statistically significant.

3. Statistical test of association: Phi is not statistically significant in all cases and so the null hypothesis that there is no relationship cannot be rejected.

Table B3: Have Chosen Household Products by Environment vs Economic Growth

		Environment vs Economic Growth		
	Have chosen household products	Environment	Economic Growth	Total
Germany	**Done**	**91%**	**85%**	**88%**
WAVE 3	Not done	9%	15%	12%
	Total	100%	100%	100%
		N=747	N=907	N=1654
		Difference in 'done' responses: 6% Phi: 0.104 Statistically significant at p<0.01		
US	**Done**	**82%**	**64%**	**74%**
WAVE 3	Not done	18%	36%	26%
	Total	100%	100%	100%
		N=719	N=560	N=1279
		Difference in 'done' responses: 18% Phi: 0.200 Statistically significant at p<0.01		
Japan	**Done**	**69%**	**52%**	**61%**
WAVE 3	Not done	31%	48%	39%
	Total	100%	100%	100%
		N=290	N=248	N=538
		Difference in 'done' responses: 17% Phi: 0.177 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries have chosen household products that are better for the environment, with Germany having the highest percentage (88 percent) followed by the US (74 percent) and then Japan (61 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who gave priority to protecting the environment have chosen household products that are better for the environment, once again with Germany having the highest percentage (91 percent) followed by the US (82 percent) and then Japan (69 percent). This suggests that the two variables are intuitively associated. However, the difference in the 'done' to 'not done' responses was significantly greater for the US and Japan (18 and 17 percent respectively) than for Germany (6 percent). This suggests that the association is stronger for the US and Japan than for Germany.

3. Statistical test of association: Phi is statistically significant in all cases and confirms what is suggested under 2., as it indicates a stronger association for the US and Japan than for Germany. Phi is highest for the US (weak association) followed by Japan (weak association) and then Germany (very weak association).

Table B4: Have Chosen Household Products by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Have chosen household products	Master	Coexist	Total
Germany	**Done**	**73%**	**89%**	**88%**
WAVE 3	Not done	27%	11%	12%
	Total	100%	100%	100%
		N=90	N=1871	N=1961
		Difference in 'done' responses: 16% Phi: 0.l03 Statistically significant at p<0.01		
US	**Done**	**66%**	**76%**	**74%**
WAVE 3	Not done	34%	24%	26%
	Total	100%	100%	100%
		N=181	N=1245	N=1426
		Difference in 'done' responses: 10% Phi: 0.076 Statistically significant at p<0.01		
Japan	**Done**	**82%**	**60%**	**60%**
WAVE 3	Not done	18%	40%	40%
	Total	100%	100%	100%
		N=17	N=871	N=888
		Difference in 'done' responses: -22% Phi: 0.063 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: As in Table B3, a majority of respondents in all countries have chosen household products that are better for the environment, with Germany having the highest percentage (88 percent) followed by the US (74 percent) and then Japan (60 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of German respondents (89 percent) who believed in coexisting with nature had chosen household products that are better for the

environment, as had 76 percent of US respondents. This suggests that the two variables are intuitively associated. However, counter-intuitively, a higher percentage of Japanese respondents (82 percent) who believed in mastering nature had chosen household products that are better for the environment. The difference in 'done' to 'not done' responses is greatest for Japanese respondents (-22 percent) followed by Germany (16 percent) and then the US (10 percent). This suggests that the association is strongest for Japan, although the association is counter-intuitive, followed by Germany and then the US. However, the small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, suggests that the results are less likely to be statistically significant.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for Germany (very weak association) followed by the US (very weak association).

Willingness To Take Non-Market Action

Civil Action

Table B5: Confidence in Environmental Organisations by Environment vs Economic Growth

		Environ vs Economic Growth		
	Confidence in environmental organisations	Environment	Economic Growth	Total
Germany	**Confident**	**79%**	**59%**	**68%**
WAVE 3	Not confident	21%	41%	32%
	Total	100%	100%	100%
		N=748	N=896	N=1644
		Difference in 'confident' responses: 20% Phi: 0.215 Statistically significant at p<0.01		
US	**Confident**	**66%**	**41%**	**55%**
WAVE 3	Not confident	34%	59%	45%
	Total	100%	100%	100%
		N=626	N=472	N=1098
		Difference in 'confident' responses: 25% Phi: 0.248 Statistically significant at p<0.01		
US	**Confident**	**66%**	**52%**	**61%**
WAVE4	Not confident	34%	48%	39%
	Total	100%	100%	100%
		N=689	N=375	N=1064
		Difference in 'confident' responses: 14% Phi: 0.135 Statistically significant at p<0.01		
Japan	**Confident**	**72%**	**58%**	**65%**
WAVE 3	Not confident	28%	42%	35%
	Total	100%	100%	100%
		N=301	N=262	N=563
		Difference in 'confident' responses: 14% Phi: 0.148 Statistically significant at p<0.01		
Japan	**Confident**	**64%**	**46%**	**57%**
WAVE4	Not confident	36%	54%	43%
	Total	100%	100%	100%
		N=428	N=278	N=706
		Difference in 'confident' responses: 18% Phi: 0.183 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries are confident in environmental organisations, with Germany having the highest percentage (68 percent) followed by the US and Japan (around 60 percent on average for both over waves 3 and 4). The percentage of respondents with confidence in environmental organisations increased over waves three to four in the US (from 55 to 61 percent) but decreased in Japan (from 65 to 57 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who gave priority to protecting the environment are confident in environmental organisations, once again with Germany having the highest percentage (79 percent) followed by the US (66 percent for both waves three and four) and Japan (64 to 72 percent for waves three and four respectively). This suggests that the two variables are intuitively associated. The difference in the 'confident' to 'not confident' responses was also reasonably large at 14 to 25 percent across all countries, widening over waves three to four in the case of Japan and narrowing over waves three to four in the case of the US. This suggests that the is getting stronger over time in the case of Japan and weaker in the case of the US.

3. Statistical test of association: Phi is statistically significant in all cases and confirms what is suggested under 2., as in all cases it indicates a weak association at relatively comparable levels. The association is strengthening over time for Japan but weakening over time for the US.

Table B6: Confidence in Environmental Organisations by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Confidence in environmental organisations	Master	Coexist	Total
Germany	**Confident**	**48%**	**69%**	**68%**
WAVE 3	Not confident	52%	31%	32%
	Total	100%	100%	100%
		N=85	N=1851	N=1936
		Difference in 'confident' responses: 21% Phi: 0.092 Statistically significant at p<0.01		
US	**Confident**	**33%**	**56%**	**54%**
WAVE 3	Not confident	67%	44%	46%
	Total	100%	100%	100%
		N=141	N=1070	N=1211
		Difference in 'confident' responses: 23% Phi: 0.153 Statistically significant at p<0.01		
US	**Confident**	**46%**	**63%**	**60%**
WAVE 4	Not confident	54%	37%	40%
	Total	100%	100%	100%
		N=172	N=980	N=1152
		Difference in 'confident' responses: 17% Phi: 0.122 Statistically significant at p<0.01		
Japan				
WAVE 3	**Confident**	**62%**	**65%**	**65%**
	Not confident	39%	35%	35%
	Total	100%	100%	100%
		N=13	N=882	N=895
		Difference in 'confident' responses: 3% Phi: 0.009 **Not** statistically significant at p<0.01		
Japan				
WAVE 4	**Confident**	**69%**	**57%**	**58%**
	Not confident	31%	43%	42%
	Total	100%	100%	100%
		N=16	N=1151	N=1167
		Difference in 'confident' responses: -12% Phi: 0.027 **Not** statistically significant at p<0.01		

1. <u>Willingness to act in environmentally friendly ways</u>: As in Table B5, a majority of respondents in all countries are confident in environmental organisations, with

Germany having the highest percentage (68 percent) followed by Japan (just over 60 percent on average over waves 3 and 4) and the US (just under 60 percent on average over waves 3 and 4). The percentage of respondents with confidence in environmental organisations increased over waves three to four in the US (from 54 to 60 percent) but decreased in Japan (from 65 to 58 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who believed in coexisting with nature are confident in environmental organisations. This suggests that the two variables are intuitively associated. The exception is the Japanese wave four result which is counter-intuitive because a higher percentage of respondents who believed in mastering nature are confident in environmental organisations. Germany has the highest percentage of respondents who believed in coexisting with nature and are confident in environmental organisations (69 percent). Japan comes next with 65 to 57 percent for waves three and four respectively followed by the US with 56 and 53 percent for waves three and four respectively. The difference in the 'confident' to 'not confident' responses is smaller for Japan than for Germany and the US where it is around 20 percent, narrowing over waves three to four in the case of the US. This suggests that a closer association is likely between the two variables for Germany and the US than for Japan. The small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, suggests that the results are less likely to be statistically significant.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for Germany (very weak association) and the US (weak association in wave three and very weak association in wave four). The association is weakening over time for the US.

Table B7: Member of an Environmental Organisation by Environment vs Economic Growth

		Environ vs Economic Growth		
	Member of an environmental organisation	Environment	Economic Growth	Total
Germany	**Member**	**13%**	**5%**	**9%**
WAVE 3	Not member	87%	95%	91%
	Total	100%	100%	100%
		N=758	N=914	N=1672
		Difference in 'member' responses: 8% Phi: 0.143 Statistically significant at p<0.01		
US	**Member**	**29%**	**22%**	**26%**
WAVE 3	Not member	71%	78%	74%
	Total	100%	100%	100%
		N=730	N=578	N=1308
		Difference in 'member' responses: 7% Phi: 0.079 Statistically significant at p<0.01		
US	**Member**	**19%**	**10%**	**16%**
WAVE 4	Not member	81%	90%	84%
	Total	100%	100%	100%
		N=707	N=391	N=1098
		Difference in 'member' responses: 9% Phi: 0.130 Statistically significant at p<0.01		
Japan	**Member**	**2%**	**3%**	**3%**
WAVE 3	Not member	98%	97%	97%
	Total	100%	100%	100%
		N=321	N=282	N=603
		Difference in 'member' responses: -1% Phi: 0.031 **Not** statistically significant at p<0.01		
Japan	**Member**	**5%**	**2%**	**4%**
WAVE 4	Not member	95%	98%	96%
	Total	100%	100%	100%
		N=463	N=308	N=771
		Difference in 'member' responses: 3% Phi: 0.069 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries are *not* members of environmental organisations. This is particularly striking in the case of Japan where nearly all respondents are not members of such organisations

(96 to 97 percent), but even in the US where membership is most likely it fell from 26 to 18 percent over waves three to four.

2. Willingness to act in environmentally friendly ways and attitude to the environment: Given that such a small minority of respondents were members of environmental organisations in all countries, a higher percentage of respondents who gave priority to the environment are members of environmental organisations in the US (29 percent in wave three and 19 percent in wave four), Germany (13 percent) and Japan (5 percent in wave four). This suggests that the two variables are intuitively associated. The exception is the Japanese wave three result which is counter-intuitive because a higher percentage of respondents who gave priority to economic growth are members of environmental organisations. The difference in the 'member' to 'not member' responses is less than 10 percent for both the Germany and the US suggesting that the association between the two variables is probably quite weak. For Japan the difference is only 1 percent in wave three (and then in the opposite direction to what one would intuitively expect) and 3 percent in wave four, and given the small percentages highlighted above for membership of environmental organisations generally this suggests that an association may not exist at all.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for Germany (weak association) and the US (very weak association in wave three and weak association in wave four). The association is strengthening over time for the US.

Table B8: Member of an Environmental Organisation by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Member of an environmental organisation	Master	Coexist	Total
Germany	**Member**	**6%**	**8%**	**8%**
WAVE 3	Not member	94%	92%	92%
	Total	100%	100%	100%
		N=89	N=1890	N=1979
		Difference in 'member' responses: 2% Phi: 0.021 **Not** statistically significant at p<0.01		
US	**Member**	**23%**	**26%**	**26%**
WAVE 3	Not member	77%	74%	74%
	Total	100%	100%	100%
		N=185	N=1277	N=1462
		Difference in 'member' responses: 3% Phi: 0.026 **Not** statistically significant at p<0.01		
US	**Member**	**11%**	**17%**	**16%**
WAVE 4	Not member	89%	83%	84%
	Total	100%	100%	100%
		N=178	N=1010	N=1188
		Difference in 'member' responses: 6% Phi: 0.059 **Not** statistically significant at p<0.01		
Japan	**Member**	**0%**	**3%**	**3%**
WAVE 3	Not member	100%	97%	97%
	Total	100%	100%	100%
		N=17	N=981	N=998
		Difference in 'member' responses: 3% Phi: 0.023 **Not** statistically significant at p<0.01		
Japan	**Member**	**6%**	**3%**	**3%**
WAVE 4	Not member	94%	97%	97%
	Total	100%	100%	100%
		N=18	N=1309	N=1327
		Difference in 'member' responses: -3% Phi: 0.015 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: As in Table B7, a majority of respondents in all countries are *not* members of environmental organisations. Once again, this is particularly striking in the case of Japan where nearly all respondents are

not members of such organisations (97 percent for both waves), but even in the US where membership is most likely it fell from 26 to 16 percent over waves three to four.

2. Willingness to act in environmentally friendly ways and attitude to the environment: Given that such a small minority of respondents were members of environmental organisations in all countries, a slightly higher percentage of respondents who believed in coexisting with nature were members of environmental organisations in the US (26 percent in wave three and 17 percent in wave four), followed by Germany (8 percent) and Japan (3 percent in wave three). This suggests that the two variables are intuitively associated. The exception is the Japanese wave four result which is counter-intuitive because a higher percentage of respondents who believed in mastering nature are members of environmental organisations. The difference in the 'member' to 'not member' responses is less than 5 percent in nearly all cases (the exception is the US in wave four where it is 6 percent) suggesting that the association between the two variables is probably extremely weak. The small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, also suggests that the results are less likely to be statistically significant.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for all countries and so the null hypothesis that there is no relationship cannot be rejected.

Table B9: Active Member/Unpaid Work for an Environmental Organisation by Environment vs Economic Growth

		Environment vs Economic Growth		
	Active member/unpaid work for an environmental organisation	Environment	Economic Growth	Total
Germany	**Active/unpaid work**	**4%**	**0%**	**2%**
WAVE 3	Inactive/no unpaid work	96%	100%	98%
	Total	100%	100%	100%
		N=758	N=914	N=1672
		Difference in 'active/unpaid work' responses: 4% Phi: 0.121		
US	**Active/unpaid work**	**12%**	**6%**	**9%**
WAVE 3	Inactive/no unpaid work	88%	94%	91%
	Total	100%	100%	100%
		N=730	N=578	N=1308
		Difference in 'active/unpaid work' responses: 6% Phi: 0.100 Statistically significant at p<0.01		
US	**Active/unpaid work**	**10%**	**6%**	**9%**
WAVE 4	Inactive/no unpaid work	90%	94%	91%
	Total	100%	100%	100%
		N=707	N=391	N=1098
		Difference in 'active/unpaid work' responses: 4% Phi: 0.08 Statistically significant at p<0.01		
Japan	**Active/unpaid work**	**1%**	**1%**	**1%**
WAVE 3	Inactive/no unpaid work	99%	99%	99%
	Total	100%	100%	100%
		N=321	N=282	N=603
		Difference in 'active/unpaid work' responses: 0% Phi: 0.027 **Not** statistically significant at p<0.01		
Japan	**Active/unpaid work**	**2%**	**1%**	**1%**
WAVE 4	Inactive/no unpaid work	98%	99%	99%
	Total	100%	100%	100%
		N=463	N=308	N=771
		Difference in 'active/unpaid work' responses: 1% Phi: 0.053 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in B7 and B8, the vast majority of respondents in all countries are *not* active members of environmental organisations nor did unpaid work for them. This is particularly striking in the case of Japan where 99 percent of respondents were not active members nor did unpaid work, but also for Germany where the figure is 98 percent. Even in the US, where such civil action was most likely, only 9 percent of respondents had done so.

2. Willingness to act in environmentally friendly ways and attitude to the environment: Given that such a tiny minority of respondents were active in environmental organisations or did unpaid work for them, a higher percentage of respondents who gave priority to protecting the environment did so in Germany (4 percent) and the US (12 percent in wave three and 10 percent in wave four). This suggests that the two variables are intuitively associated but given the small percentages, the association appears very weak. There may not be any association at all in Japan's case where in wave four 2 percent of respondents were likely to undertake such activity given a preference for protecting the environment. In wave three there was an even 1 percent split each way for Japan in respondents who gave priority to protecting the environment or economic growth and were active/did unpaid work for environmental organisations. The difference in the 'active/unpaid work' to 'not active/no unpaid work' responses was also less than 6 percent in all cases. This suggests overall that the association between the two variables is probably extremely weak in all cases, and potentially not present at all in the case of Japan.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for Germany (very weak association) followed by the US (very weak association in waves three and four). The association is weakening over time for the US.

Table B10: Active Member/Unpaid Work for an Environmental Organisation by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Active member/unpaid work for an environmental organisation	Master	Coexist	Total
Germany	**Active/unpaid work**	**2%**	**2%**	**2%**
WAVE 3	Inactive/no unpaid work	98%	98%	98%
	Total	100%	100%	100%
		N=89	N=1890	N=1979
		Difference in 'active/unpaid work' responses: 0% Phi: 0.002 **Not** statistically significant at p<0.01		
US	**Active/unpaid work**	**4%**	**10%**	**9%**
WAVE 3	Inactive/no unpaid work	96%	90%	91%
	Total	100%	100%	100%
		N=185	N=1277	N=1462
		Difference in 'active/unpaid work' responses: 6% Phi: 0.064 **Not** statistically significant at p<0.01		
US	**Active/unpaid work**	**6%**	**9%**	**9%**
WAVE 4	Inactive/no unpaid work	94%	91%	91%
	Total	100%	100%	100%
		N=178	N=1010	N=1188
		Difference in 'active/unpaid work' responses: 3% Phi: 0.037 **Not** statistically significant at p<0.01		
Japan	**Active/unpaid work**	**0%**	**1%**	**1%**
WAVE 3	Inactive/no unpaid work	100%	99%	99%
	Total	100%	100%	100%
		N=17	N=981	N=998
		Difference in 'active/unpaid work' responses: 1% Phi: 0.014 **Not** statistically significant at p<0.01		
Japan	**Active/unpaid work**	**0%**	**1%**	**1%**
WAVE 4	Inactive/no unpaid work	100%	99%	99%
	Total	100%	100%	100%
		N=18	N=1309	N=1327
		Difference in 'active/unpaid work' responses: 1% Phi: 0.013 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in Tables B7-B9, a majority of respondents in all countries are *not* active members of environmental organisations nor did unpaid work for them. This is particularly striking

in the case of Japan where 99 percent of respondents were not active members nor did unpaid work, but also for Germany where the figure is 98 percent. Even in the US where membership is most likely, only 9 percent of respondents had done so.

2. Willingness to act in environmentally friendly ways and attitude to the environment: Given that a tiny minority of respondents were active in environmental organisations or did unpaid work for them, a higher percentage of respondents who believed in coexisting with nature did so in the US (4 percent in wave three and 6 percent in wave four) and Japan (1 percent in waves three and four). This suggests that the two variables are intuitively associated but given the small percentages, the association appears very weak. No association is evident for Germany where 2 percent of respondents were active or did unpaid work whether they believed in mastering or coexisting with nature). The difference in the 'active/unpaid work' to 'not active/no unpaid work' responses was 0 percent for Germany, 1 percent for Japan and 3 to 6 percent in the US. These are all very small numbers, and coupled with the fact that the sample sizes for respondents who believed in mastering nature are very small in all cases, a significant association is not expected.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for all countries and so the null hypothesis that there is no relationship cannot be rejected.

Table B11: Have Contributed to an Environmental Organisation by Environment vs Economic Growth

		Environment vs Economic Growth		
	Contributed to an environmental organisation	Environment	Economic Growth	Total
Germany	**Done**	**20%**	**10%**	**14%**
WAVE 3	Not done	80%	90%	86%
	Total	100%	100%	100%
		N=756	N=917	N=1673
		Difference in 'done' responses: 10% Phi: 0.137 Statistically significant at p<0.01		
US	**Done**	**35%**	**15%**	**26%**
WAVE 3	Not done	65%	85%	74%
	Total	100%	100%	100%
		N=724	N=573	N=1297
		Difference in 'done' responses: 20% Phi: 0.221 Statistically significant at p<0.01		
Japan	**Done**	**10%**	**7%**	**9%**
WAVE 3	Not done	91%	93%	92%
	Total	100%	100%	100%
		N=315	N=273	N=588
		Difference in 'done' responses: 3% Phi: 0.039 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in Tables B7-B10, a majority of respondents in all countries had *not* contributed to environmental organisations. However, that majority is less sizeable than in these previous tables. The US has the highest percentage of respondents who had contributed to environmental organisations (26 percent) followed by Germany (14 percent) and then Japan (9 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case in all countries that a higher percentage of respondents who gave priority to protecting the environment had contributed to environmental organisations, with the US having the highest percentage (35 percent) followed by Germany (20 percent) and then Japan (10 percent). This suggests that the two variables are intuitively associated. The difference in the 'done' to 'not done' responses is largest for the US (20 percent) followed by Germany (10 percent) but very small for Japan (3

percent). This suggests that the association is likely to be strongest in the US followed by Germany. The association appears very weak in the case of Japan.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US (weak association) followed by Germany (weak association).

Table B12: Have Contributed to an Environmental Organisation by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Contributed to an environmental organisation	Master	Coexist	Total
Germany	**Done**	**9%**	**15%**	**15%**
WAVE 3	Not done	91%	85%	85%
	Total	100%	100%	100%
		N=90	N=1892	N=1982
		Difference in 'done' responses: 6% Phi: 0.037 **Not** statistically significant at p<0.01		
US	**Done**	**14%**	**28%**	**26%**
WAVE 3	Not done	86%	72%	74%
	Total	100%	100%	100%
		N=183	N=1263	N=1446
		Difference in 'done' responses: 14% Phi: 0.109 Statistically significant at p<0.01		
Japan	**Done**	**27%**	**7%**	**8%**
WAVE 3	Not done	73%	93%	93%
	Total	100%	100%	100%
		N=15	N=960	N=975
		Difference in 'done' responses: -20% Phi: 0.091 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in Tables B7-B11, a majority of respondents in all countries had *not* contributed to environmental organisations. However, like Table B11, that majority is less sizeable than in the previous tables. The US has the highest percentage of respondents who had

contributed to environmental organisations (26 percent) followed by Germany (15 percent) and then Japan (8 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents who believed in coexisting with nature in the US and Germany had contributed to environmental organisations, with the US having the highest percentage (28 percent) followed by Germany (15 percent). This suggests that the two variables are intuitively associated. For Japan the association a higher percentage of respondents (27 percent) who believed in mastering nature had contributed to environmental organisations. This suggests that the two variables are counter-intuitively associated for Japan. The difference in the 'done' to 'not done' responses is largest for Japan (-20 percent) followed by the US (14 percent) and then Germany (6 percent). This all suggests that the association is likely to be stronger in Japan and the US and weaker in Germany. The small sample sizes for responses who believed in mastering nature, particularly in the case of Japan, may reduce the statistical significance of the associations.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is statistically significant in all cases and demonstrates a very weak association in all cases, with the association being highest for the US followed by Japan (counter-intuitive) and then Germany.

Table B13: Have Attended a Meeting or Signed a Letter or Petition by Environment vs Economic Growth

		Environment vs Economic Growth		
	Attended a meeting or signed a letter or petition	Environment	Economic Growth	Total
Germany	**Done**	**40%**	**20%**	**29%**
WAVE 3	Not done	60%	81%	71%
	Total	100%	100%	100%
		N=755	N=909	N=1664
		Difference in 'done' responses: 20% Phi: 0.228 Statistically significant at p<0.01		
US	**Done**	**26%**	**10%**	**19%**
WAVE 3	Not done	74%	91%	81%
	Total	100%	100%	100%
		N=725	N=579	N=1304
		Difference in 'done' responses: 16% Phi: 0.210 Statistically significant at p<0.01		
Japan	**Done**	**18%**	**11%**	**15%**
WAVE 3	Not done	82%	89%	86%
	Total	100%	100%	100%
		N=314	N=273	N=587
		Difference in 'done' responses: 7% Phi: 0.102 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in Tables B7-B12, a majority of respondents in all countries had *not* attended a meeting or signed a letter or petition aimed at protecting the environment. However, like Tables B11-B12, that majority is less sizeable than in the other tables relating to civil action. Germany has the highest percentage of respondents who had attended a meeting or signed a letter or petition (29 percent) followed by the US (19 percent) and then Japan (15 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case in all countries that a higher percentage of respondents who gave priority to protecting the environment had attended a meeting or signed a letter or petition, with Germany having the highest percentage (40 percent) followed by the US (26 percent) and then Japan (18 percent). This suggests that the two variables are

intuitively associated. The difference in the 'done' to 'not done' responses is largest for Germany (20 percent) followed by the US (16 percent) and then Japan (7 percent). This suggests that the association is likely to be strongest in Germany followed by the US, and then Japan.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for Germany (weak association) followed by the US (weak association).

Table B14: Have Attended a Meeting or Signed a Letter or Petition by Master vs Coexist with Nature

		Master vs or Coexist with Nature		
	Attended meeting or signed a letter or petition	Master	Coexist	Total
Germany	**Done**	**24%**	**30%**	**30%**
WAVE 3	Not done	76%	70%	70%
	Total	100%	100%	100%
		N=87	N=1880	N=1967
		Difference in 'done' responses: 6% Phi: 0.026 **Not** statistically significant at p<0.01		
US	**Done**	**14%**	**19%**	**19%**
WAVE 3	Not done	86%	81%	82%
	Total	100%	100%	100%
		N=183	N=1274	N=1457
		Difference in 'done' responses: 5% Phi: 0.042 **Not** statistically significant at p<0.01		
Japan	**Done**	**13%**	**14%**	**14%**
WAVE 3	Not done	87%	87%	87%
	Total	100%	100%	100%
		N=15	N=957	N=972
		Difference in 'done' responses: 1% Phi: 0.001 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: Commensurate with the data in Tables B7-B13, a majority of respondents in all countries had *not* attended a meeting or signed a letter or petition aimed at protecting the environment. However, like Tables B11-B13, that majority is less sizeable than in the other tables relating to civil action.

Germany has the highest percentage of respondents who had attended a meeting or signed a letter or petition (30 percent) followed by the US (19 percent) and then Japan (14 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case in all countries that a higher percentage of respondents who believed in coexisting with nature had attended a meeting or signed a letter or petition, with Germany having the highest percentage (30 percent) followed by the US (19 percent) and then Japan (14 percent). This suggests that the two variables are intuitively associated. However, the difference in the 'done' to 'not done' responses is very small in all cases: 6 percent for Germany, 5 per cent for the US and 1 percent for Japan. This, coupled with small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, suggests that the association is likely to be quite weak in all cases.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant in all cases and so the null hypothesis that there is no relationship cannot be rejected.

Non-Market Financial Sacrifices

Table B15: Increase in Taxes by Environment vs Economic Growth

		Environment vs Economic Growth		
	Increase in taxes	Environment	Economic Growth	Total
Germany	**Agree**	**76%**	**59%**	**67%**
WAVE 3	Disagree	24%	41%	33%
	Total	100%	100%	100%
		N=755	N=907	N=1662
		Difference in 'agree' responses: 17% Phi: 0.172 Statistically significant at p<0.01		
US	**Agree**	**70%**	**41%**	**57%**
WAVE 3	Disagree	30%	59%	43%
	Total	100%	100%	100%
		N=720	N=566	N=1286
		Difference in 'agree' responses: 29% Phi: 0.288 Statistically significant at p<0.01		
US	**Agree**	**71%**	**46%**	**62%**
WAVE 4	Disagree	29%	54%	38%
	Total	100%	100%	100%
		N=702	N=389	N=1091
		Difference in 'agree' responses: 25% Phi: 0.251 Statistically significant at p<0.01		
Japan	**Agree**	**81%**	**60%**	**71%**
WAVE 3	Disagree	19%	40%	29%
	Total	100%	100%	100%
		N=311	N=252	N=563
		Difference in 'agree' responses: 21% Phi: 0.237 Statistically significant at p<0.01		
Japan	**Agree**	**77%**	**57%**	**69%**
WAVE 4	Disagree	23%	43%	31%
	Total	100%	100%	100%
		N=425	N=265	N=690
		Difference in 'agree' responses: 20% Phi: 0.201 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries agree with an increase in taxes if the extra money were used to prevent environmental damage, with Japan having the highest percentage (71 percent in wave three and 69 percent in wave four) followed by Germany (67 percent) and then the US (57 percent in wave three and 62 percent in wave four).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who gave priority to protecting the environment agree with an increase in taxes, once again with Japan having the highest percentage (81 percent in wave three and 77 percent in wave four) followed by Germany (76 percent) and then the US (70 percent in wave three and 71 percent in wave four). This suggests that the two variables are intuitively associated. The difference in the 'agree' to 'disagree' responses is greatest for the US where it is above 25 percent and for Japan where it is above 20 percent for both waves three and four. For Germany the difference is 17 percent. This suggests that the association is stronger for the US and Japan than for Germany.

3. Statistical test of association: Phi is statistically significant in all cases and confirms what is suggested under 2., as it indicates the strongest association for the US (weak-moderate association for both waves three and four) followed by Japan (weak-moderate association for wave three and weak for wave four) and then Germany (weak association). The association is weakening over time for both the US and Japan.

Table B16: Increase in Taxes by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Increase in taxes	Master	Coexist	Total
Germany	**Agree**	**53%**	**66%**	**66%**
WAVE 3	Disagree	47%	34%	35%
	Total	100%	100%	100%
		N=90	N=1875	N=1965
		Difference in 'agree' responses: 13% Phi: 0.056 **Not** statistically significant at p<0.01		
US	**Agree**	**37%**	**59%**	**57%**
WAVE 3	Disagree	63%	41%	43%
	Total	100%	100%	100%
		N=179	N=1250	N=1429
		Difference in 'agree' responses: 22% Phi: 0.145 Statistically significant at p<0.01		
US	**Agree**	**43%**	**64%**	**61%**
WAVE 4	Disagree	57%	36%	39%
	Total	100%	100%	100%
		N=178	N=1001	N=1179
		Difference in 'agree' responses: 21% Phi: 0.153 Statistically significant at p<0.01		
Japan	**Agree**	**54%**	**67%**	**67%**
WAVE 3	Disagree	46%	33%	33%
	Total	100%	100%	100%
		N=13	N=873	N=886
		Difference in 'agree' responses: 13% Phi: 0.034 **Not** statistically significant at p<0.01		
Japan	**Agree**	**64%**	**63%**	**63%**
WAVE 4	Disagree	36%	37%	37%
	Total	100%	100%	100%
		N=14	N=1115	N=1129
		Difference in 'agree' responses: -1% Phi: 0.004 **Not** statistically significant at p<0.01		

1. <u>Willingness to act in environmentally friendly ways</u>: A majority of respondents in all countries agree with an increase in taxes if the extra money were used to prevent

environmental damage, with Japan having the highest percentage (67 percent in wave three and 63 percent in wave four) followed by Germany (66 percent) and then the US (57 percent in wave three and 61 percent in wave four).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in Germany and the US who believe in coexisting with nature agree with an increase in taxes, with Germany having the highest percentage (66 percent) followed by the US (59 percent in wave three and 64 percent in wave four). This suggests that the two variables are intuitively associated. For Japan, a higher percentage of respondents who believe in coexisting with nature agree with an increase in taxes in wave three (67 percent), but counter-intuitively in wave four a higher percentage of respondents (64 percent) agree with paying higher taxes when they believe in mastering nature. The difference in the 'agree' to 'disagree' responses is greatest for the US where it is above 20 percent for both waves and is quite large for Germany (13 percent). For Japan the difference is the same as for Germany in wave three (13 percent) but very small for wave four (-1 percent). This suggests that the association is stronger in the US, followed by Germany, and unclear in the case of Japan. The small sample sizes for respondents who believed in mastering nature, particularly in the case of Japan, suggests that the association is likely to be quite weak in all cases and possibly not statistically significant for Japan.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Germany and Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US (weak association for both waves) and the association is strengthening over time.

Table B17: Give Part of Income by Environment vs Economic Growth

		Environment vs Economic Growth		
	Give part of income	Environment	Economic Growth	Total
US	**Agree**	**78%**	**54%**	**69%**
WAVE 4	Disagree	22%	46%	31%
	Total	100%	100%	100%
		N=705	N=388	N=1093
		Difference in 'agree' responses: 24% Phi: 0.245 Statistically significant at p<0.01		
Japan	**Agree**	**85%**	**60%**	**75%**
WAVE 4	Disagree	15%	40%	25%
	Total	100%	100%	100%
		N=412	N=264	N=676
		Difference in 'agree' responses: 25% Phi: 0.284 Statistically significant at p<0.01		

No cross tabulation is available for Germany because the question on giving part of income if you were certain that the money would be used to prevent environmental pollution was only asked in wave four whereas the question on priority to protecting the environment versus economic growth and jobs was only asked for Germany in wave three.

1. Willingness to act in environmentally friendly ways: The majority of US and Japanese respondents agreed to giving part of their income if they were certain that the money would be used to prevent environmental pollution, with Japan having the highest percentage (75 percent) followed by the US (69 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in both who gave priority to protecting the environment agree with giving part of their income. Again Japan has the highest percentage (85 percent) followed by the US (78 percent). This suggests that the two variables are intuitively associated. The difference in the 'agree' to 'disagree' responses is 24 and 25 percent in for US and Japan respectively. This suggests that the association is similar in both.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is statistically significant for both the US and Japan, with the association strongest for Japan (weak-moderate association) followed by the US (weak association).

Table B18: Give Part of Income by Master vs Coexist

		Master vs Coexist with Nature		
	Give part of income	Master	Coexist	Total
US	**Agree**	**57%**	**72%**	**69%**
WAVE 4	Disagree	43%	28%	31%
	Total	100%	100%	100%
		N=176	N=1001	N=1177
		Difference in 'agree' responses: 15% Phi: 0.114 Statistically significant at p<0.01		
Japan	**Agree**	**79%**	**70%**	**71%**
WAVE 4	Disagree	21%	30%	29%
	Total	100%	100%	100%
		N=14	N=1062	N=1076
		Difference in 'agree' responses: -9% Phi: 0.020 **Not** statistically significant at p<0.01		

No cross tabulation is available for Germany because the question on giving part of income was only asked in wave four whereas the question on mastering versus coexisting with nature was only asked for Germany in wave three.

1. Willingness to act in environmentally friendly ways: The majority of US and Japanese respondents agreed to giving part of their income if they were certain that the money would be used to prevent environmental pollution, with Japan having the highest percentage (71 percent) followed by the US (69 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: A higher percentage of respondents in the US who believe in coexisting with nature agree with giving part of their income (72 percent). This suggests that the two variables are intuitively associated. However, a higher percentage of Japanese respondents who believed in mastering nature agreed with giving part of their income (79 percent). This

suggests a counter-intuitive association. The difference in the 'agree' to 'disagree' responses is 15 percent for the US and -9 percent for Japan. The lower difference in the 'agree' to 'disagree' responses for Japan, coupled with the very small sample size for respondents who believed in mastering nature, suggests that an association between the two variables is more likely for the US than Japan.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi which is statistically significant for the US (very weak association).

Table B19: Government should Reduce Environmental Pollution but it Should Not Cost me any Money by Environment vs Economic Growth

		Environment vs Economic Growth		
	Government should reduce environmental pollution but it should not cost me any money	Environment	Economic Growth	Total
US	**Agree**	**52%**	**68%**	**58%**
WAVE 4	Disagree	48%	32%	42%
	Total	100%	100%	100%
		N=700	N=388	N=1088
		Difference in 'agree' responses: -16% Phi: 0.154 Statistically significant at p<0.01		
Japan	**Agree**	**43%**	**64%**	**51%**
WAVE 4	Disagree	58%	36%	49%
	Total	100%	100%	100%
		N=388	N=256	N=644
		Difference in 'agree' responses: -11% Phi: 0.211 Statistically significant at p<0.01		

No cross tabulation is available for Germany because the question on whether the government should reduce environmental pollution but it should not cost any money was only asked in wave four whereas the question on priority to protecting the environment versus economic growth and jobs was only asked for Germany in wave three.

1. Willingness to act in environmentally friendly ways: A slim majority of US and Japanese respondents agreed that the government should reduce environmental pollution at no cost to them, with the US having the highest percentage (58 percent) followed by Japan (51 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in both who gave priority to economic growth agree with giving part of their income. For the US the percentage is 68 percent and for Japan it is 64 percent. This suggests that the two variables are intuitively associated because, conversely to the reasoning in other cross tabulations, it is intuitively logical that respondents who place a higher priority on economic growth should disagree with the idea of the government acting to reduce environmental pollution at a cost to them. The difference in the 'agree' to 'disagree' responses is -16 percent for the US and -11 percent for Japan, large enough to think that the association between the two variables is significant.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is statistically significant for both the US and Japan, with the association strongest for Japan (weak association) followed by the US (weak association).

Table B20: Government should Reduce Environmental Pollution but it Should Not Cost me any by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Government should reduce environmental pollution but it should not cost me any money	Master	Coexist	Total
US	**Agree**	**70%**	**55%**	**57%**
WAVE 4	Disagree	30%	45%	43%
	Total	100%	100%	100%
		N=177	N=997	N=1174
		Difference in 'agree' responses: -15% Phi: 0.112 Statistically significant at p<0.01		
Japan	**Agree**	**33%**	**56%**	**56%**
WAVE 4	Disagree	67%	44%	44%
	Total	100%	100%	100%
		N=15	N=1038	N=1053
		Difference in 'agree' responses: 23% Phi: 0.054 **Not** statistically significant at p<0.01		

No cross tabulation is available for Germany because the question on whether the government should reduce environmental pollution but it should not cost any money was only asked in wave four whereas the question on priority to protecting the environment versus economic growth and jobs was only asked for Germany in wave three.

1. Willingness to act in environmentally friendly ways: A slim majority of US and Japanese respondents agreed that the government should reduce environmental pollution at no cost to them, with the US having the highest percentage (57 percent) followed by Japan (56 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in the US who believed in mastering nature agreed that the government should reduce environmental pollution at no cost, as opposed to those who believed in coexisting with nature (70 percent). This suggests that the two variables are intuitively associated because, conversely to the reasoning in other cross tabulations, it is intuitively logical that respondents who

believe in mastering nature should disagree with the idea of the government acting to reduce environmental pollution at a cost to them. For Japan, a higher percentage of respondents who believed in coexisting with nature agreed that the government should reduce environmental pollution at no cost, as opposed to those who believed in mastering nature (56 percent). This suggests that the two variables are counter-intuitively associated because respondents who believe in coexisting with nature are less willing for the government to act towards this goal at a cost to them. The difference in the 'agree' to 'disagree' responses is -15 percent for the US and 23 percent for Japan, large enough to think that the association between the two variables is significant, except that in Japan in particular the sample size for respondents who believed in mastering nature is very small.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US (very weak association).

Non-Market Other Action

Table B21: Reuse or Recycle by Environment vs Economic Growth

		Environment vs Economic Growth		
	Reuse or Recycle	Environment	Economic Growth	Total
Germany	**Done**	**87%**	**84%**	**85%**
WAVE 3	Not done	13%	16%	15%
	Total	100%	100%	100%
		N=746	N=902	N=1648
		Difference in 'done' responses: 3% Phi: 0.042 **Not** statistically significant at p<0.01		
US	**Done**	**91%**	**83%**	**88%**
WAVE 3	Not done	9%	17%	12%
	Total	100%	100%	100%
		N=733	N=580	N=1313
		Difference in 'done' responses: 8% Phi: 0.119 Statistically significant at p<0.01		
Japan	**Done**	**76%**	**62%**	**70%**
WAVE 3	Not done	24%	38%	30%
	Total	100%	100%	100%
		N=317	N=274	N=591
		Difference in 'done' responses: 14% Phi: 0.151 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries have decided to reuse or recycle, with the US having the highest percentage (88 percent) followed by Germany (85 percent) and then Japan (70 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who gave priority to protecting the environment have decided to reuse or recycle. Once again the US is first (91 percent) followed by Germany (87 percent) and then Japan (76 percent). This suggests that the two variables are intuitively associated. However, the difference in the 'done' to 'not done' responses varies significantly. It is quite high for Japan (14 percent) and lower for the US and Germany (8 and 3 percent respectively). This

suggests that the association is likely to be stronger for the US and Japan than for Germany.

3. Statistical test of association: Phi is not statistically significant for Germany and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US and Japan. It is highest for Japan (weak association) followed by the US (very weak association).

Table B22: Reuse or Recycle by Master vs Coexist with Nature

		Master nature vs Coexist with Nature		
	Reuse or Recycle	Master	Coexist	Total
Germany	**Done**	**81%**	**85%**	**85%**
WAVE 3	Not done	19%	15%	15%
	Total	100%	100%	100%
		N=87	N=1861	N=1948
		Difference in 'done' responses: 4% Phi: 0.029 **Not** statistically significant at p<0.01		
US	**Done**	**75%**	**89%**	**87%**
WAVE 3	Not done	25%	11%	13%
	Total	100%	100%	100%
		N=186	N=1281	N=1467
		Difference in 'done' responses: 14% Phi: 0.137 Statistically significant at p<0.01		
Japan	**Done**	**53%**	**71%**	**70%**
WAVE 3	Not done	47%	29%	30%
	Total	100%	100%	100%
		N=17	N=957	N=974
		Difference in 'done' responses: 18% Phi: 0.051 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in all countries have decided to reuse or recycle, with the US having the highest percentage (87 percent) followed by Germany (85 percent) and then Japan (70 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: It is also the case that a higher percentage of respondents in all countries who believed in coexisting with nature have reused or recycled. The US is highest (89 percent) followed by Germany (85 percent) and then Japan (71 percent). This suggests that the two variables are intuitively associated. However, the difference in the 'done' to 'not done' responses varies significantly. It is quite high for the US and Japan (14 and 18 percent respectively) but very low for Germany (4 percent). This suggests that the association is likely to be stronger for the US and Japan than for Germany. In the case of Japan, the very small sample size for respondents who believed in mastering nature, particularly in the case of Japan, reduces the likelihood of the association being significant.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan and Germany and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US (weak association).

Table B23: Reduce Water Consumption by Environment vs Economic Growth

		Environment vs Economic Growth		
	Reduce water consumption	Environment	Economic Growth	Total
Germany	**Done**	**74%**	**69%**	**71%**
WAVE 3	Not done	26%	31%	29%
	Total	100%	100%	100%
		N=755	N=911	N=1666
		Difference in 'done' responses: 5% Phi: 0.052 **Not** statistically significant at p<0.01		
US	**Done**	**64%**	**50%**	**58%**
WAVE 3	Not done	36%	50%	42%
	Total	100%	100%	100%
		N=729	N=579	N=1308
		Difference in 'done' responses: 14% Phi: 0.133 Statistically significant at p<0.01		
Japan	**Done**	**50%**	**44%**	**47%**
WAVE 3	Not done	50%	56%	53%
	Total	100%	100%	100%
		N=310	N=268	N=578
		Difference in 'done' responses: 6% Phi: 0.060 **Not** statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in Germany and the US have tried to reduce water consumption, with Germany having the highest percentage (71 percent) followed by the US (58 percent). However, a minority of respondents in Japan had done so (47 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: In all countries a higher percentage of respondents who gave priority to protecting the environment have tried to reduce water consumption. Germany is highest (74 percent) followed by the US (85 percent) and then Japan (50 percent). This suggests that the two variables are intuitively associated. However, the difference in the 'done' to 'not done' responses is very small in the case of Germany and Japan (5 and 6 percent

respectively) and larger for the US (14 percent). This suggests that the association is likely to be stronger for the US.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for Japan or Germany and so the null hypothesis that there is no relationship cannot be rejected. Phi is statistically significant for the US (weak association).

Table B24: Reduce Water Consumption by Master vs Coexist with Nature

		Master vs Coexist with Nature		
	Reduce water consumption	Master	Coexist	Total
Germany	**Done**	**58%**	**72%**	**72%**
WAVE 3	Not done	42%	28%	28%
	Total	100%	100%	100%
		N=88	N=1885	N=1973
		Difference in 'done' responses: 14% Phi: 0.066 Statistically significant at p<0.01		
US	**Done**	**49%**	**58%**	**56%**
WAVE 3	Not done	51%	42%	44%
	Total	100%	100%	100%
		N=183	N=1277	N=1460
		Difference in 'done' responses: 9% Phi: 0.060 **Not** statistically significant at p<0.01		
Japan	**Done**	**82%**	**46%**	**47%**
WAVE 3	Not done	18%	54%	53%
	Total	100%	100%	100%
		N=17	N=928	N=945
		Difference in 'done' responses: -36% Phi: 0.096 Statistically significant at p<0.01		

1. Willingness to act in environmentally friendly ways: A majority of respondents in Germany and the US have tried to reduce water consumption, with Germany having the highest percentage (72 percent) followed by the US (56 percent). However, a minority of respondents in Japan had done so (47 percent).

2. Willingness to act in environmentally friendly ways and attitude to the environment: In Germany and the US a higher percentage of respondents who believed in coexisting with nature had tried to reduce water consumption. Germany is highest (72 percent) followed by the US (58 percent). This suggests that the two variables are intuitively associated. However, for Japan a higher percentage of respondents who believed in mastering nature had trine to reduce water (82 percent). This suggests that for Japan the two variables are counter-intuitively associated because less concern for the environment is associated with saving water. The difference in the 'done' to 'not done' responses is quite small in the case of the US (9 percent) and larger for Germany and Japan (14 percent and -36 percent respectively). This suggests that the association is likely to be stronger for Germany and Japan than the US, although, particularly in the case of Japan, the very small sample size for respondents who believed in mastering nature reduces the likelihood of the association being as strong as the difference would indicate.

3. Statistical test of association: The values of phi bear out what is suggested under 2. Phi is not statistically significant for the US and so the null hypothesis that there is no relationship cannot be rejected. Phi which is statistically significant for Germany and Japan. The association is strongest for Japan (very weak association) followed by Germany (very weak association).

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[1] For a detailed discussion, see J. Healey (1993), *Statistics: A Tool for Social Research*, 3rd edition, Belmont: Wadsworth Publishing Company, chapter 14; A. Bryman (2004), *Social Research Methods*, 2nd edition, Oxford: Oxford University Press, chapter 11; D. de Vaus (1991), *Surveys in Social Research*, 3rd edition, St Leonards: Allen and Unwin, chapter 10; and M. Norusis (1990), *The SPSS Guide to Data Analysis for Release 4*, Chicago: SPSS Inc, chapter 20.

Appendix C: Car Class Definitions

As noted in Chapter 5, there are variations in the definition of car classes across the three territories. The exact definitions are given here.

European Union

The data presented for the European Union (EU) is from the Association des Constructeurs Europeens (ACEA) which receives it in aggregated form from a private data collection agency. Phone discussions with ACEA personnel indicated that data disaggregated by country is not available, nor a uniform definition for car classes across countries and manufacturers. Furthermore, they were unsure how the private agency that aggregated the data into classes across EU member states did so. However, the ACEA was able to provide examples of cars in each class which indicates the following:[1]

- 'Small' cars are cheap, economical four cylinder cars that correspond with the definition of mini and small Japanese cars (see below) – e.g. Peugeot 106 and 206; Ford Ka and Fiesta; Honda Logo and Civic; and Volkswagen Polo and Lupo.

- 'Lower-medium' cars are more expensive, slightly larger cars – e.g. Renault Megane; Opel Astra and Tigra; Toyota Corolla; and Volkswagen Golf and Beetle.

- 'Upper-medium' cars are larger cars – e.g. Citroen Xantia; Opel Vectra; and Subaru Legacy.

- 'Executive' cars are generally larger, more luxurious models, although in some cases they are sports and performance vehicles – e.g. BMW 3 and 5 series; Alfa Romeo 166 and Spider; Opel Omega; Audi A8; and Toyota Lexus.

- 'Others' are mostly four wheel drives, people-movers and cross-over vehicles – e.g. Jeep Grand Cherokee; Ford Courier; Honda CRV and HRV; Mitsubishi Pajero; and Toyota RAV4 and Land Cruiser.

Germany

The data for the Germany was provided on request from the Verband der Automobileindustrie (VDA) which sources it from the Kraftfahrt-Bundesamt (KBA). The classes are for passenger vehicles (personenkraftwagen) and are similar to those available for the EU, except that:

- The 'small' class is disaggregated into 'mini' and 'small' classes.
- The 'others' class is disaggregated into four wheel drives (gelandewagen), vans, utilities and cabriolets.
- The disaggregation employed may, somewhat perversely, have undermined the explanatory power of the data. For example, it is unclear whether a cabriolet is a large powerful car (e.g. a large Mercedes convertible) or a smaller compact car (e.g. a Peugeot 206). It is similarly unclear whether a van is a 'people-mover' or a more utility-based vehicle, and its size is indeterminate.

In phone discussions, both VDA and KBA personnel confirmed that aggregate car class data is only available from 1999 onwards. The KBA was able to provide disaggregated data on a per-model sales basis before 1999. However, it was unclear exactly which classes individual models sold should fall into, and the author was unwilling to risk arbitrary assignment of models to classes without detailed information on each model offered for sale.

United States

For the United States (US), the classes identified are those used by the US Environment Protection Agency (EPA) and US Department of Energy. They classify cars on the basis of interior passenger and cargo volume as follows:[2]

- ‘Small’ cars and wagons include the three EPA categories for cars of minicompact (under 85 cubic feet), subcompact (85-99 cubic feet) and compact (100-109 cubic feet) and for station wagons under 130 cubic feet.

- ‘Mid-size’ cars and wagons includes cars of 110-119 cubic feet and station wagons of 130-159 cubic feet.

- ‘Large’ cars and wagons includes cars of 120 or more cubic feet and station wagons of 160 or more cubic feet.

US light trucks are classified on the basis of wheelbase length as follows:[3]

- SUVs: ‘small’ is less than 100 inches, ‘mid-size’ is 100-110 inches and ‘large’ is over 110 inches.

- Vans: ‘small’ is less than 109 inches, ‘mid-size’ is 109-124 inches and ‘large’ is over 124 inches.

- Pickup trucks: ‘small’ is less than 105 inches, ‘mid-size’ is 105-115 inches and ‘large’ is over 115 inches.

Japan

For Japan, cars are classified according to the Road Vehicles Act. These classifications are used for registration statistics and vehicle inspections. For passenger cars, there are three categories:[4]

- ‘Mini’ vehicles are under 660cc in engine displacement, under 2 metres in height, under 1.48 metres in width and under 3.4 metres in length.

- ‘Small’ vehicles are between 661-2,000cc in engine displacement, except for diesel engines, under 2 metres in height, 1.45-1.7 metres in width and 3.4-4.7 metres in length.

- ‘Ordinary/standard’ motor vehicles are over 2,000cc in engine displacement, over 2 metres in height, over 1.7 metres in width and over 4.7 metres in length.

The Japan Automobile Manufacturers Association (JAMA) notes that cars are categorised primarily on the basis of engine displacement, so a car with less than 2000cc engine displacement that has a width greater than 1.7 metres is still classified as a small vehicle.[5]

For four wheel drives, no definition is provided by JAMA for its categorisation of them in either the ‘mini’ or ‘other’ class of four wheel drives, but one may presume that this categorisation is along similar lines to that for passenger cars. Another potential problem is that JAMA’s data for four wheel drives excludes sales of imported four wheel drives, but given the predominance of Japanese manufacturers in the Japanese market (i.e. nearly 94 percent of total sales) this is not a critical problem.

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[1] Information provided on request after discussions with ACEA personnel.

[2] K. Hellman and R. Heavenrich (2003b), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003, Appendix A*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/r03006.pdf, accessed 17 February 2004; and US Department of Energy and US Environment Protection Agency (2004), ‘Introduction’, *Fuel Economy Guide*, http://www.fueleconomy.gov/feg/FEG2004intro.pdf, accessed 12 July 2004..

[3] K. Hellman and R. Heavenrich (2004c), *Light Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004, Appendix A*, United States Environment Protection Agency, http://www.epa.gov/otaq/cert/mpg/fetrends/420r04001.pdf, accessed 13 May 2004.

[4] JAMA (2004a), *2004: The Motor Industry of Japan*, Tokyo: JAMA, p.64.

[5] JAMA (2004b), *World Motor Vehicle Statistics Vol.3 2004*, Tokyo: JAMA, p.168.

Appendix D: Text of Environmental Reports

As noted in Chapter 6, text from executive statements, vision statements and environmental policy guidelines from firms' environmental reports were coded. The environmental reports the text is from are:

- Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG. In addition, Volkswagen's environmental policy guidelines were included from Volkswagen AG (2001) *Environmental Report 2001/2002: Mobility and Sustainability*, Wolfsburg: Volkswagen AG. This is because they are referred to and summarised in the 2003/4 report, but printed in full on the firm's website and in the earlier report. It was therefore thought prudent to include them.

- BMW Group (2003), *Sustainable Value Report 2003/2004: Innovation. Efficiency. Responsibility.*, Munich: Bayerischen Motoren Werke. BMW's environmental policy guidelines were included from BMW Group (2003b), *Environmental Protection: BMW Group Environmental Guidelines*, http://www.bmwgroup.com/e/0_0_www_bmwgroup_com/5_verantwortung/5_4_publikationen/5_4_4_downloads/pdf/BMWGroup_Umweltleitlinen_E.pdf, accessed 13 January 2005. These are only available from the website, although the website address where they may be found was provided in the firm's written report.

- DaimlerChrysler (2004), *360 Degrees: Environmental Report 2004: Alliances for the Environment*, Stuttgart: DaimlerChrysler Communications, including accompanying CD ROM.

- Toyota Motor Corporation (2004), *Environmental and Social Report 2004*, Tokyo: Toyota Motor Corporation.

- Honda Motor Company (2002), *Honda Ecology*, Tokyo: Honda Motor Company; and Honda Motor Company (2004), *Honda Environmental Annual Report 2004*, Tokyo: Honda Motor Company.

- Nissan Motor Company (2004a), *Environmental Report 2004*, Tokyo: Nissan Motor Company; and Nissan Motor Company (2004b), *Sustainability Report 2004*, Tokyo: Nissan Motor Company.

- General Motors Corporation (2004), *2004 Corporate Responsibility Report*, Detroit: General Motors Corporation

- Ford Motor Company (2004), *2003/4 Corporate Citizenship Report: Our Principles, Progress and Performance: Connecting with Society*, Dearborn: Ford Motor Company.

The text extracted from these reports is provided below.

Volkswagen

Executive Statement

Innovation Overcomes Obstacles to Growth

More than almost any other company, Volkswagen and its past progress stand for an approach to business which looks beyond the company's own products to take account of its social responsibility. And as we were well aware even before the Environmental Summit in Rio, we can only achieve lasting economic success if our business activities are guided not only by social considerations but by ecological aspects as well.

Perhaps the most visible and convincing proof of our successful progress down the road to sustainable development is a lastingly satisfied customer base. As a globally active automobile manufacturer and employer, we are aware of the significance that our products and activities have for society. Safeguarding the future of personal mobility poses to a manufacturer of environmentally compatible products a challenge on a truly global scale – stretching from the conurbations of industrialised countries to the nascent transport infrastructures of emerging nations.

The close relationship between our long-term corporate policy and the fields of activity associated with sustainable development is visible in our operations in China. Since the onset

of our activities in China in 1978, investments have progressively been made and expertise amassed, with the result that this flourishing economy has in the meantime become our second largest market after Germany in terms of unit sales. At the same time, through a process of dialogue with our local partners in the business and political sectors, we are endeavouring to play our part in making sustainable mobility a reality in China.

As an automobile manufacturer, it is mainly through our products that we can help to meet the demands of sustainable development. The creation of the fifth-generation Golf is a case in point. When this model, which still lends its name to a whole class of cars, was being designed, our engineers systematically took account of the 7 Environmental Goals laid down by our Technical Development department. From 2004 onwards, we will be offering a diesel-engined Golf with a particulate filter that works without a fuel additive. That said, our emissions reduction strategy is not restricted to particulate matter but targets all exhaust components. The TDI technology developed by Volkswagen has become the prototype of the clean diesel engine and was crucial to our ability to meet the requirements of the Euro 4 exhaust emissions standard in advance.

Closely related to this are our efforts to develop an innovative and sustainable fuel strategy. Substantial environmental benefits can be achieved by using synthetically manufactured fuels derived from natural gas (SynFuel) and biomass (SunFuel). What is more, we have already set automotive standards through the development of innovative fuel-economy concepts: for the fourth year in succession, the 3-litre Lupo came overall top of the "Most Eco-friendly Cars" table compiled by the environmental institute ÖKO-TREND. In addition, the 1-litre car which we presented in April 2002 provided some insight into what state-of-the-art technology can now achieve. The experience we have accumulated with the 3-litre and 1-litre cars is currently being channelled into the development of new low-consumption models which we are aiming to bring to market in 2006.

Volkswagen has always stood for a comprehensive view of social responsibility. Consequently we have never allowed ourselves to be tied down in our sustainability strategy to a purely environmental approach. In any workable sustainability model, the market acceptance of our vehicles is just as indispensable as a successful partnership in industry and with society at large. We are proud to say that Volkswagen has not only been among the

leaders in environmental protection for many years now, we have also regularly set new milestones with our innovative employment models which serve as benchmarks well beyond the company itself.

Wolfsburg, December 2003
Dr. Ing. e.h. Bernd Pischetsrieder
Chairman of the Board of Management

Sustainable Development – or "Foundations for the Future"

Leaving behind a better basis for development for future generations than the one on which the present generation had to build – such is one hallmark of the far-sighted goals of sustainable development. We are not talking here about simply preserving the ecological foundations of life by conserving resources, but about making overall provision for the future. As such, sustainable development is at the same time a principle and a guideline. And sustainable development takes on special significance in the context of globalisation. For globalisation leads to mutual dependency in many respects, which in turn calls for a three-way balance between ecological provision for the future, economic performance and social responsibility, in order to assure a stable basis for development. As a company that transcends national borders, Volkswagen is both a "medium" of globalisation and a creative force in sustainable development. As such, it must also take account of codetermination and employee representation, and live up to its responsibilities in this respect as well.

On this basis, the corporate bodies that stand for codetermination and employee representation see themselves as creative partners and innovation drivers, linking the future development of Volkswagen inseparably with ecological progress. That is why ecological topics are given due priority at the annual symposia on research and development into safeguarding jobs and corporate sites, initiated by the General Works Council. For without ecological sustainability there can be no reliable perspectives for the development of employment either. The same applies to social responsibility. Models and projects such as the "four-day week", "5000x5000" and "AutoVision" are all based on a strategy for maintaining and improving the foundations of social development at the company. This includes avoiding redundancies as well as implementing the principle of lifelong learning in order to safeguard

the sustainable employability of the formerly unemployed. That said, social sustainability is by no means restricted to the national arena. With our European and Global Works Councils we have created platforms for dialogue which have, on the one hand, helped to formulate the rules of competition governed by social responsibility and, on the other, made possible the cross-border transfer of innovative employment concepts, adapted in each case to the respective national conditions. At present, the focus in this respect is on models of more flexible working hours. Social sustainability must, however, always go hand-in-hand with economic performance as we safeguard jobs and assure the competitiveness of the company – two goals of equal importance.

Sustainability demands that we consciously take account of the interplay between company, environment and society. For this reason, under the motto "One Hour for the Future", Volkswagen's Global Works Council has lent its support to projects helping street children, setting an example of socially responsible globalisation and providing a powerful symbol of sustainability in the sense of "Foundations for the Future". It is good to note that, in the perception of a large proportion of the population, the name Volkswagen is inseparably linked with such principles.

Klaus Volkert
Chairman of the General and Group Works Council

Dear reader,

"Partners in Responsibility" is the motto at the heart of the latest Volkswagen Environmental Report. The idea is to underline the fact that, in a society marked by the division of labour, responsibility is never borne in isolation but always shared with others. Our appreciation of this fact has led to some decisive successes, not least in the field of environmental protection. As we have always been aware, such achievements are only possible with the support of external partners.

Even as we move towards publishing our own full sustainability report, our focus today is still on environmental reporting. At the same time, we are working together with other organisations to put in place the methodological backdrop for sustainability reporting in line with the guidelines from the United Nations Environmental Programme (UNEP) and the Global Reporting Initiative.

On the pages of this report, you will find a photography concept through which we have put a face to a selection of our partners: the lady who buys a 3-litre Lupo and is thus perhaps our most important partner; our partners at the environmental institutions with whom we regularly work together to draw up strategies and strive for solutions; or the suppliers who, through their innovations, support us on the road to sustainable mobility – but also the people who support our social commitment through their involvement in numerous projects.

In order to keep this report as short as possible, we have networked its contents with our Internet portal www.mobility-and-sustainability.com.

One major innovation in this year's report is the inclusion of a chapter on the Volkswagen Group. While the report as a whole is largely focused on Volkswagen AG with the products, companies and sites of the Volkswagen brand, in this chapter you will find the figures representing the environmental performance of all of the Group's brands. The Audi, Seat and ˇSkoda brands also publish their own environmental reports.

Another new aspect is that, for the first time, the report has not been subjected to an external audit. Over the years, we have learned that our Environmental Management System and the monitoring methods we apply to acquire the key indicators ensure highly dependable, accurate data. We also take due account of the fact that the methods of recording the complex realities of sustainability are still in the development stage.

One aspect which has not changed is that our Environmental Report represents an invitation for you to enter into dialogue with Volkswagen – be it as a partner or a challenger. Thank you for all your suggestions and constructive criticism in recent years. Finally, our sincere thanks go to everyone who has contributed thoughts, facts, figures and energy to the production of this issue of the Environmental Report.

The Editorial Team of the Volkswagen Environmental Report

Vision Statement

Back to the Future

Volkswagen and sustainable development

Not a day goes by without someone, somewhere on this planet discussing what a responsible and meaningful approach to shaping the Earth's future might look like. Beyond any shadow of a doubt sustainability is "in" and has actually become one of our modern world's buzzwords. But what does it really mean? Back in the 18th century, the term sustainable development was already being used to describe a careful and thoughtful form of forestry management in response to the growing demand for wood. The idea was to harvest no more timber than could be regrown. In 1987, the Brundtland Commission took up the term in its report to the United Nations, raising it to the status of a principle of social development which can be maintained over time:

Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs.

As a result of the Brundtland Report and the 1992 UN Conference on Environment and Development in Rio de Janeiro, the principle has become a global model; a model which calls for a responsible approach not only from society and politics but from companies, too. Today, sustainable development is by no means restricted to aspects of environmental protection. Instead, it is increasingly coming to be seen as an objective for any far-sighted social and economic policy.

For the business sector, attaining sustainability has become an internal and external challenge. Social interest groups including consumer and environmental associations, and thus the political sphere, set the bar high for companies, be it at national or international level. As a result, large international companies with prominent global brands are today caught more firmly in the spotlight of public attention than ever before. It is a challenge which, like other major international players, we at Volkswagen have taken up from the outset – not least by making a voluntary commitment to enter into target agreements and reduce the fuel consumption of our cars. This opens up additional scope for the company to break new ground on its own initiative and at its own responsibility. With their two 3-litre cars (100 km on just

three litres of fuel), Volkswagen and Audi have generated new impetus, bringing to market alternative products with the highest energy efficiency without waiting for the state to introduce new legislation. We are convinced that long-term economic success can only be achieved if both social and ecological aspects form an integral part of corporate policy. The concept of the "triple bottom line" – economic, environmental and social accountability – which has been around for some time now, neatly encapsulates this three-dimensional perspective.

Companies are obliged to act in line with economic considerations. Their primary function is to create economic value and satisfy the needs of their customers. In order to ensure that they can do so in the long term, however, companies must also be aware of the social and ecological impacts of their operations and wisely take these into account when shaping their policies. We see our commitment to sustainable development as an investment in the future. The shortterm costs will be offset by medium- and long-term benefits for the company's shareholders and stakeholders. Examples of this strategic direction include our module strategy in the production sector (see page 16), the development of high efficiency engine technology such as TDI and FSI, and our expertise in lightweight design using aluminium. Then there are the fields of financial services, fleet management and car rentals, in which we offer vehicle-related services for your personal mobility.

The challenge of globalisation

As the sustainable development debate progresses, the notion of "globalisation" has become a topic of increasingly heated discussion. To be sure, the opening up of the world's markets holds both risks and opportunities and stands for a new challenge for international trade. Companies from industrialised nations in particular are expected to play a model role in terms of both ecological and social aspects wherever their operations are based. Volkswagen is committed to living up to these expectations.

Accordingly, we make local commitments by promoting socially-oriented initiatives, for example, or voluntarily introducing environmental and social standards which go beyond the requirements of the law. "If leading global companies profess to have firmly-anchored moral concepts, they cannot treat their workforce differently in Europe than in the USA,

Central or South America," said Dr. Peter Hartz, Member of the Board of Management of Volkswagen AG at the signing of the "Declaration on Social Rights and Industrial Relationships" (see page 98).

Hallmarks of the sustainability process at Volkswagen

For Volkswagen, sustainability means having access to – and the long-term safeguarding of – resources at all levels: capital, employees, technology, raw materials, knowledge and reputation – among clients and the general public. As they manufacture products and provide services, companies make use of natural resources. A responsible approach to these resources is fundamental to sustainability. On the social side, companies are dependent upon qualified employees, a reliable legal system and an efficient research and scientific community. Consequently, companies not only provide jobs and pay taxes, they also take on social duties. This could be within the scope of economic or urban development measures, such as AutoVision (see page 93), or by advising the political sphere, as was the case with the Hartz Commission which advised the German government.

The hallmarks of the sustainability process at Volkswagen are as follows:

- evolution (continuous development)
- integration
- innovation
- communication
- learning

Evolution

The way we see it, sustainability is a continuous development process. In other words, basing our efforts on Volkswagen's traditions, cultural values and operating environment, we follow our own company-specific route to sustainability. Long-term planning, a careful approach to natural resources, and displaying social responsibility in our dealings with employees and other partners in society have long been central to the way we work.

Integration

When it comes to solving problems and taking decisions, we believe above all in taking an overall view. This means, for example, that when we consider strategic business issues, such as the planning of new facilities for Volkswagen, ecological and social viewpoints are invariably also considered. This policy finds expression in, among other things, the way we take account of the "worldwide environmental protection standards" for production operations and involve our experts on environmental protection and human resources in our discussions from the outset.

Innovation

This holistic perspective, together with the interests of external stakeholders, lead us to subject our current achievements to an ongoing critical review in search of improvements. The review process also includes active dialogue with stakeholder groups. In this way, Volkswagen's sustainability culture also opens up new potential for innovation, leading to new ideas such as "the breathing company", "Time Asset Bonds" (see page 92) or the world's first 1-litre car (see page 50).

Communication and learning

Social interest groups such as the electorate and its representatives, companies, initiatives and associations need to reach consensus regarding their expectations and requirements of sustainable development and their own part in achieving it. For us, that means providing the public with important information voluntarily and in a credible manner. Through the life cycle assessments that we have drawn up for models such as the Golf and Lupo, we provide insight into the materials and energy that go into our products. Our environmental reports supply comprehensive and regular information on our activities in the fields of environmental protection and sustainable development. And we make use of the Internet to serve up a constant flow of information on the latest environmental activities at Volkswagen.

Any process of fair dialogue presupposes mutual respect, a willingness to reach an understanding and the ability to deal with criticism. For Volkswagen, being open for dialogue means not only welcoming invitations to enter into discussions but also actively seeking out

direct contact to interest groups. In this way, we are aiming to lay the foundations for acceptance and trust, and enable a process of mutual learning. In this issue of our Environmental Report, we have provided several of our most prominent partners and critics with a platform from which to air their views in the shape of the Sustainability Partner items and Challenger Statements. Further examples of this constructive communications culture from which both sides benefit can be found in our environmental cooperation with the German Society for Nature Conservation (NABU) and the Institute of Applied Ecology (Öko-Institut), while our involvement in the work of associations and initiatives provides additional forums from which all concerned can learn.

Volkswagen is an active founder member of the World Business Council for Sustainable Development (WBCSD) whose Sustainable Mobility project represents a major joint initiative of the automotive sector. The project brings together car manufacturers, oil companies and automotive suppliers, working to formulate a shared vision of global mobility in the year 2030 (see page 87). Volkswagen also cooperates with other international automobile manufacturers on aspects of global environmental protection and sustainable development within the Mobility Forum set up by the United Nations Environmental Programme (UNEP). At present, the Mobility Forum is focusing on automobile-specific indicators for external corporate reporting to complement the guidelines of the Global Reporting Initiative (GRI) – see opposite page.

At European level, since 1995 Volkswagen has been involved in the work of the European business initiative, Corporate Social Responsibility Europe. The aim of CSR Europe is to support companies in their efforts to unite high profitability, sustainable growth and social progress (www.csreurope.org). Within Germany, Volkswagen is an active member of the sustainable mobility forum, econsense, an initiative of leading German companies and organisations which have integrated the vision of sustainable development into their corporate strategies. econsense was founded in the summer of 2000 under the auspices of the Confederation of German Industry (BDI) in Berlin (www.econsense.de) – see page 85.

Volkswagen's model of sustainable development

At the World Summit on Sustainable Development in Johannesburg in 2002, in our declaration on the Global Compact we formulated Volkswagen's model of sustainable development:

This model is reflected in the company's specific guidelines for the environmental and social sectors. For major international companies in particular, guidelines and principles are very important, because with diverse regional operating environments and cultures to contend with, a stronger focus on integration is called for. With its environmental policy statement issued in May 1995, Volkswagen laid down general principles for the protection of the environment. These are valid worldwide and have been modified to suit the needs of the individual brands and regions within the Group.

Thus as early as 1995, Volkswagen declared that it would "work hand-in-hand with society and policy-makers to shape a development process that will bring sustainable social and ecological benefits".

Following the first Volkswagen Group Environmental Conference in 1998, the company issued globally applicable guidelines on environmental protection standards for the production sector. Through these guidelines, we are aiming to ensure that above-average uniform minimum standards are applied to the production process at all our plants. The guidelines also provide a point of reference for the construction of new facilities and for modernisation measures. At the same time, the Factory Agreement on Environmental Protection was concluded for the Volkswagen brand between management and the General Works Council, setting out the "rules of good environmental practice"

With its "Declaration on Social Rights and Industrial Relationships", in 2002 Volkswagen became the first company in the automotive sector to agree globally applicable employee relations standards with its Global Works Council and the International Metalworkers' Federation (IMF). Further information on this topic can be found at
wwww.mobility-and-sustainability.com
www.vw-personal.de

The Global Compact

At international level greater things are expected of companies, as reflected in various external guidelines, codes and initiatives. While respecting these principles is entirely voluntary, they do act as beacons for companies such as Volkswagen.

Since the World Summit in South Africa, the Volkswagen Group has been supporting the UN Global Compact (www.unglobalcompact.org). The Global Compact is an initiative triggered by UN Secretary-General Kofi A. Annan at the 1999 World Economic Forum in Davos. Within the Global Compact, companies commit themselves to a set of common, globally applicable values in the fields of human rights, labour and the environment. Volkswagen is one of those companies. Our commitment was confirmed in a letter to Kofi A. Annan from the Chairman of the Board of Management, Dr. Bernd Pischetsrieder.

The Global Compact lists nine principles. Those which concern the environment state that businesses should support a precautionary approach to environmental challenges, and that they should encourage the development of environment-friendly technologies and of initiatives to promote greater environmental responsibility. The key objective is to improve living conditions in developing countries through joint initiatives of the UN and global companies. The actual wording of the nine principles is as follows:

Human Rights

- Businesses should support and respect the protection of internationally proclaimed human rights within their sphere of influence; and

- make sure that they are not complicit in human rights abuses.

Labour Standards

- Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;

- the elimination of all forms of forced and compulsory labour;

- the effective abolition of child labour; and

- eliminate discrimination in respect of employment and occupation.

Environment

- Businesses should support a precautionary approach to environmental challenges;
- undertake initiatives to promote greater environmental responsibility; and
- encourage the development and diffusion of environmentally friendly technologies.

Through its Corporate Environmental Policy (1995) and its "Declaration on Social Rights and Industrial Relationships" (2002), Volkswagen has already complied with the Global Compact at the highest level. The exchange of information among the organisations associated with the Global Compact takes place at what are known as Global Compact Learning Forums which Volkswagen also attends. In December 2002, for example, we presented a paper on the subject of "The Global Works Council and Peaceful Conflict Resolution" at one such forum in Berlin.

OECD-guidelines

In June 2000, the Organisation for Economic Cooperation and Development (OECD) published its "Guidelines for Multinational Enterprises". To date, these guidelines represent the only comprehensive code of conduct for companies that has been approved at government level, and they form the frame of reference for Volkswagen's global activities (www.oecd.org). The guidelines challenge companies to champion compliance with internationally agreed human rights and rights of association, environmental protection and consumer protection, and the fight against corruption. Child labour and forced labour are condemned, as are discrimination with reference to the recruitment and remuneration of individual groups and races. Furthermore, companies are called upon to promote the training and development of their employees and to inform them of relevant decisions on the investment front.

WBCSD and econsense

Through its membership in the WBCSD and econsense, Volkswagen is supporting the principles and maxims of these organisations.

The aim of the WBCSD is not only to apply the influence of the business sector to drive progress towards sustainable development, but also to promote eco-efficiency, innovation and a responsible approach to business. The aim of the German business sector initiative econsense is, based on the tenet of commercial success, to offer ecologically and socially acceptable products and services, and to apply and continuously develop sustainable business practices. Member companies are committed to dealing with all resources in a manner aligned with the principle of sustainability, as well as to transparency and dialogue, and to gearing their activities to national and international codes of sustainability. Through the application of competence, initiative and innovation, the companies which have joined forces within the scope of econsense are out to play an active part in shaping sustainable development.

Since 1991, Volkswagen has been supporting the International Chamber of Commerce's Charta of Sustainable Development. The ICC Charta includes 16 principles of environmental management (www.icc-deutschland.de).

A Never-Ending Story

Volkswagen and environmental protection

The Volkswagen brand's environmental strategy – part of the company's overall sustainability strategy – is based on the Volkswagen Group Strategic Principles described in Chapter 5 of this report. In 1995, the existing Environmental Guidelines were replaced by a new Group Environmental Policy, on the basis of which the individual brands within the Group, together with a number of international subsidiaries, then developed their own policies according to their particular corporate culture. Both the Guidelines and the Environmental Policy are thus the end result of a development dating back to the early 1970s, when Volkswagen's very first Environmental Department was set up. German-speakers will find more details in a recent Volkswagen publication entitled "Wasser, Boden, Luft" ("Water, Soil and Air", Historical Notes No. 5). In addition to the activities of the various plants and the development of fuel-efficient vehicles like the 3-litre Lupo, the impact of Volkswagen's environmental strategy can currently be seen in a wide variety of other areas set out in detail in this report (climate protection, fuel strategy, alternative drive systems, etc.)

Volkswagen's Guidelines and environmental-protection measures are supplemented by the Factory Agreement on Environmental Protection, which defines the scope of the measures, describes the regulations at the level of individual companies and plants, and lays down "Environmental Good Practice Rules". These contain principles that are binding for all members of the workforce, including a workplace code of behaviour and rules on how to handle resources such as energy (see page 63), raw materials and water (see interview on page 31) as well as residual materials and waste. All matters related to environmental protection are regulated by the Environmental Management System. You can find details on Volkswagen's Environmental Policy, the Factory Agreement on Environmental Protection and the history of environmental protection at Volkswagen on the Internet at www.mobility-andsustainability.com

Environmental Strategy

The Volkswagen Group is out to set new automotive benchmarks, not least in terms of the environment. The "3-litre" and "1-litre" cars are the most high-profile examples of this commitment. To ensure that Volkswagen continues to play a leading role in the future, we are guided in our efforts by a number of key strategic considerations.

Integration

New standards call for new approaches. "End-of-pipe" environmental protection has its limits. Of course we will still need wastewater treatment facilities and catalytic converters in the years to come, but our goal is to prevent environmental impacts from occurring in the first place. That calls for intelligent solutions from the outset. At Volkswagen, it is not just the environmental department that has applied itself to the challenge: every division, every department and every employee is part of the team.

Taking account of the full life cycle

Volkswagen is concerned with every phase of a car's life. Seeking solutions for a specific period of a vehicle's life cycle makes little sense. Such an approach runs the risk of advances being made in one area whilst retarding progress in another. What is of prime importance is

that any environmental impact is minimised at every stage. This applies from the extraction of raw materials through the production process and the product's service life all the way to disposal. That is why, for some years now, the Group has been drawing up life cycle assessments (see page 33). These consider not just the vehicle or specific components, but take fuel into account as well. The Volkswagen Group's commitment to its products begins before the materials reach our plants and continues long after the vehicles have left the works. By way of example, we offer our customers information and courses that can help to cut their fuel consumption by up to 20 percent (see page 89). And we expect the same holistic approach from politicians and society as a whole. It is not sufficient, for example, to judge new fuels and suitably modified drive systems solely by the amount of CO_2 they emit (see page 44).

Market-oriented solutions

The customer is at the heart of our environmental strategy because "eco-cars" which fail to find buyers are of no use to us or the environment. In the meantime, the general public too has realised that society's environmental demands or declarations of environmental awareness alone will not create a market – a fact borne out, sadly, by our cautious projected sales figures for our "3-litre" models (the Lupo 3L TDI and Audi A2 1.2 TDI). But we are facing up to the challenge and working towards incorporating environmental requirements into attractive products in the best way possible. In the process, the Volkswagen Group is putting a great deal of faith in its technological expertise, and not least in TDI and FSI engines. Nor do we forget that protecting the environment can be fun. The negative associations – in the automotive industry and elsewhere – which in the past have linked environmental protection with self-sacrifice or scaremongering have already put off far too many customers.

Global differentiation

Any globally active company like the Volkswagen Group must tailor its environmental commitment to a variety of conditions. Environmental protection involves very different tasks and responsibilities at international and regional levels. What proves successful in one community is not automatically the right solution for another. The situation facing a rural area

of Western Europe, for example, will be very different to that in a major city in a newly industrialising country.

Taking the long view

Environmental protection is no shortterm affair. On the contrary, it demands sustained commitment. Environmental topics may have faded from the front page headlines in recent years, but despite success stories like the reduction of vehicle- related emissions in industrialised countries, a great many tasks still need to be tackled.

Sustainability in context

One-off environmental solutions are doomed to fail if they do not take adequate account of economic and social aspects. That is why Volkswagen is actively engaged in the many different sectors of sustainability (see page 6). On the mobility and sustainability front, as part of the WBCSD Sustainable Mobility project, our Group is already concerned with how the world will look in the year 2030 (see page 87).

Integrated production network

Volkswagen is keen on the one hand to exploit synergies across the Group in the interests of environmental protection, and on the other to develop brand-specific solutions in keeping with our corporate vision.

A good example of our plant-related activities can be found at the Group's Czech brand, ˇSkoda. Long before the Czech Republic's accession to the European Union, licensing procedures for the new paintshops in Kvasiny und Mladá Boleslav were already aligned with the latest and most advanced EU standards. One specific feature of these standards is the stringent upper limit set for solvent emissions from the painting process, a target nevertheless easily achieved by the process employed by ˇSkoda. In addition, in the course of the licensing procedures it was ensured that not only atmospheric emissions but the overall environmental impact was minimised. This integrated approach helps to achieve optimum environmental protection in all areas.

We use a variety of tools to control and monitor our Groupwide activities. The Group Task Force – Environment (GTFE) provides a forum for the cross-functional exchange of information and for coordinating the various measures. In addition, international audits are carried out and solutions developed at regional conferences which take into account both local circumstances and the Group's high standards.

The strategic debate on sustainability

Our Group's strategic direction receives important stimuli from external initiatives and organisations, as well as from guidelines originating outside the company. In addition, we aim to contribute our own experience to the strategic debate. Given the complexity of the problems in the field of sustainability and the global economy as a whole, this debate provides an important means of setting landmarks that will keep companies on course towards sustainable development. At the same time, the debate serves to document the growing demands on an international level that globally active companies are expected to meet.

In the past, we have joined forces with various initiatives and today we take account of several key codes of practice in our strategic planning. The most important of these are the OECD's Guidelines for Multinational Enterprises (2000), the UN Global Compact (2002), the ICC's Charta of Sustainable Development (1992), the UNEP Mobility Forum (2002), Volkswagen's Environmental Policy (1995) and our Declaration on Social Rights and Industrial Relationships (2002) (see Chapter 1). Ensuring the meaningful integration of the sustainability process is the task of various cross-brand and cross-divisional steering groups, such as the Environmental Brand Committee and the Group Task Force – Environment (see page 30).

Faced with so many different ecological challenges, each of our brands has its own approach to finding solutions. Volkswagen, Audi, Seat and Skoda regularly provide details in their own publications.

Environmental Policy Guidelines

Volkswagen's Model of Sustainable Development

- At Volkswagen, our model of sustainable development is the benchmark for a long-term corporate policy which squares up not only to economic challenges but ecological and social ones as well.

- Together, commercial success, far-sighted environmental protection and social competence enhance the global competitiveness of the Volkswagen Group.

- The Volkswagen Group develops, manufactures and markets automobiles and services throughout the world in order to provide its customers with attractive solutions for their personal mobility.

- It is Volkswagen's goal to make advanced technologies available across the globe while taking account of environmental protection and social acceptability considerations.

- Along with economic success, the primary objectives of Volkswagen's corporate policy include the continuous improvement of the environmental acceptability of its products and the reduction of its consumption of natural resources.

- Volkswagen is a company with German roots, European values and global responsibility. The rights, personal development, social security and economic participation of its employees are core elements of corporate policy.

- A spirit of cooperation and partnership forms the basis of successful collaboration between management and employee representatives, in Germany, in Europe and around the world.

- For Volkswagen, globalisation is a decisive factor in securing international competitiveness and safeguarding the future of the company. Shaping globalisation to be environmentally and socially compatible is the task of a modern and responsible corporate policy. This same policy serves the long-term interests of Volkswagen's customers, stakeholders, employees and partners. Globalisation must not be based on exploitation.

- Volkswagen also actively promotes an environmentally and socially compatible approach to business among its suppliers.

- Wherever it operates, Volkswagen considers itself a partner to society and the political sphere.

Environmental Policy and Management for the Volkswagen Marque (from 2001/02 report, also available on the web with instruction to the reader to refer to it as indicated in the firm's vision statement)

In 1995, Volkswagen replaced its Environmental Guidelines with a Corporate Environmental Policy. As practical implementation of this policy can only be achieved through ongoing dialogue with the workforce and its representatives, a Factory Agreement on Environmental Protection was also concluded with the Company Works Council.

Our efforts in the direction of the widely debated concept of "sustainability" are based on our Corporate Environmental Policy. Right now, in what is a fascinating process for us all, we are considering how to make better use in this context of the particular expertise and experience developed at Volkswagen in the fields of work and social responsibility.

Preamble to Volkswagen's Environmental Policy

Volkswagen develops, manufactures and markets motor vehicles worldwide with the aim of safeguarding personal mobility. The company accepts responsibility for the continuous improvement of the environmental compatibility of its products and for the increasingly conservative use of natural resources, with due regard to economic aspects. Accordingly, the company makes environmentally efficient, advanced technology available worldwide and brings this technology to bear over the full life cycle of its products. At all its corporate locations, Volkswagen works hand-in-hand with society and policy-makers to shape a development process that will bring sustainable social and ecological benefits.

Basic Principles

1. It is the declared aim of Volkswagen in all its activities to restrict the environmental impact to a minimum and to make its own contribution to resolving environmental problems at regional and global level.

2. It is Volkswagen's aim to offer high quality automobiles which take equal account of the expectations of its customers with regard to environmental compatibility, economy, safety, quality and comfort.

3. In order to safeguard the long term future of the company and enhance its competitive position, Volkswagen is researching into and developing ecologically efficient products, processes and concepts for personal mobility.

4. Those responsible for environmental management at Volkswagen shall, on the basis of the company's environmental policy, ensure that in conjunction with suppliers, service providers, retailers and recycling companies, the environmental compatibility of its vehicles and production plants is subject to a process of continuous improvement.

5. The Volkswagen Board of Management shall, at regular intervals, check that the company's environmental policy and objectives are being observed and that the Environmental Management System is working properly. This shall include evaluation of the recorded environmentally relevant data.

6. Providing frank and clear information and entering into dialogue with customers, dealers and the public is a matter of course for Volkswagen. Cooperation with policy-makers and the authorities is based on a fundamentally proactive approach founded on mutual trust and includes provision for emergencies at each production site.

7. In keeping with their duties, all Volkswagen employees are informed, trained and motivated in respect of environmental protection. They are under obligation to implement these principles and to comply with statutory provisions and official regulations as these apply to their respective activities.

BMW

Executive Statement

Sustainable action is firmly anchored in the BMW Group's corporate management. The company's economic success and the efficient use of resources in the entire value added chain depend on one another. In this respect, it is an economic necessity to sparingly use resources in a value cycle and to consider the later impact of this use. The experience of the BMW Group shows that economic efficiency and sustainability can be compatible with one another. In recent years, the company has generated excellent sales, revenues and profits. This is largely the result of our sustainable, long-term corporate strategy.

A company also needs the strength to carry out its plans while having the long-term results in mind as well. Positive financial results are essential for above-average investment – investment in the training and know-how of our employees, in products and production plants, and in the BMW Group's ambitious research and development projects. The company's future thus depends in every respect on responsible action.

In our company, we pursue a corporate culture that combines the determination to achieve economic success with cosmopolitanism, trust, transparency and responsibility for our environment. This attitude is reflected in all areas of the company and is absolutely essential if we are to put the BMW Group's current product and market offensive successfully into practice and thus safeguard the future of the BMW Group on a sustainable basis.

Dr. Helmut Panke
Chairman of the Board of Management

In a competitive world, it is extremely important to be one of the most attractive employers. Only then can we recruit the most suitable and dedicated employees. We want to achieve this objective through high social standards, a climate of mutual trust and the active promotion of our employees by creating unique individual perspectives. Measures to safeguard continued employment and different models for flexible work time which reconcile the requirements of the company and its employees, contribute to our success. These measures create a success-oriented corporate culture that is based on the principle of performance and reward.

Ernst Baumann
Board Member, Human Resources and Industrial Relations Director

The BMW Group's economic success depends on us managing not only to satisfy our customers, but also to generate enthusiasm and make them customers for life. In addition to strong brands and excellent products, we offer our customers premium service throughout the product's life. This ranges from purchase consultation and service for new and used cars to the recycling of end-of-life vehicles. With innovative technical concepts, such as Condition Based Service, or sophisticated recycling technologies, we create real value added for the customer (convenience) and conserve resources and the environment."

Dr. Michael Ganal
Board Member, Sales and Marketing

Innovations create success and safeguard the future viability of companies. They are also essential for sustainable development. That is why we have concepts to manage innovations. They focus not only on the development of our products, but also on production, sales, service and the recycling of end-of-life vehicles. We think consistently in product life cycles with overall responsibility.

Dr.-Ing. Burkhard Göschel
Board Member, Development and Purchasing

Responsible, sustainable corporate activities and profit and growth-oriented business operations depend on one another. This is clearly evident in the development of shares of particularly sustainable companies at the international stock exchanges and in the attention that investors pay to corresponding share indices for sustainable and ethically responsible activities. Thus, stakeholder and shareholder value are inseparably linked. Investors and other stakeholders, such as our customers, employees and business partners, all benefit from our growth.

Stefan Krause
Board Member, Finance

Uniformly high standards of quality, work safety and environmental protection apply throughout our production network worldwide. Thus, we ensure that all our products live up to the BMW Group's premium claim. At the same time, we guarantee that the sparing use of resources as guiding principle in production planning and sequences in the BMW Group has our full attention. The most recent example is the development of the world's most modern automobile plant in Leipzig with flexible architecture, work and production structures.

Dr.-Ing. Norbert Reithofer
Board Member, Production

Vision Statement

The world is mobile, because people are. We want it to stay that way, while taking into account the needs of people and the environment alike. As a result, it is essential today to develop ideas that others do not dare to think. For the mobile society of the 21st century – for future viability, with passion and responsibility. This is the way we understand sustainability – in the interest of our company, our customers, our employees and our shareholders. In the interest of future generations and of tomorrow's world.

The BMW Group's strategy is geared to longterm, profitable growth. Our goal is to be the most successful premium manufacturer in the automobile industry with a comprehensive product range in all the relevant segments of the automobile market. In order to achieve this goal the company is carrying out the largest product and market offensive in its history.

The BMW Group's value and asset management is characterised by sustainability. By gearing its policy to economic sustainability, resources are used more efficiently, the reputation of the BMW Group and the image of its brands are increased and risks are minimised.

1.1 Economic success and responsibility. For the BMW Group, long-term economic success provides the basis for its activities. It is only on this basis that the company can assume responsibility permanently and sustainably.

In the coming years, the BMW Group aims, with new models, to capture new market segments, develop business on the existing triad markets and, when the opportunity arises,

expand on new markets. With its current product and market offensive the company will grow to a new dimension. By 2008, the sales of the BMW Group are expected to increase to more than 1.4 million cars.

The year 2003 shows the scale of the product and market offensive. The new Rolls-Royce Phantom started off the year. A diesel-powered MINI was added to the existing model range. The BMW brand launched the new BMW 5 Series. In addition, the BMW Z4 was introduced in Europe and Asia, and three revised versions of the BMW 3 Series were presented. Two new models, the BMW 6 Series Coupé and the BMW X3, will also be introduced. They will be followed next year by the BMW1 Series, the new BMW 5 Series Touring and the BMW 6 Series Cabrio.

By consistently serving the premium segments of the car market, the BMW Group creates the right conditions for profitable, long-term growth. According to market researchers both inside and outside the company, the premium segments will grow almost twice as much as the mass segments in the next few years. At the same time, above average growth in Asia will stimulate demand. The BMW Group recorded the highest growth rates there in 2002.

Internationalisation continues resolutely.

In Asia, the BMW Group pursues a long-term strategy that dates back to 1981. The BMW Group was at that time the first international car manufacturer to have its own subsidiary in Japan and thus laid the foundations for its long-term commitment in the region. Subsidiaries in South Korea and the Philippines followed. In 2003, the BMW Group continued this strategy resolutely with the extension of the assembly plant in Rayong, Thailand, and the establishment of a subsidiary in Malaysia. In 2003, the first BMW to be made in China will roll off the assembly line in Shenyang in northern China. There the BMW Group will manufacture up to 30,000 BMW 3 and 5 Series cars a year as part of a joint venture with its Chinese partner Brilliance China Automotive Holdings.

Thus, the BMW Group is taking a second major step forward in the company's internationalisation and is continuing the strategy that had led ten years earlier to the establishment of the Spartanburg plant in the United States: production follows the market.

The strength for this growth course is generated by the company itself. The BMW Group's capital expenditure is entirely financed out of the cash flow.

Success and responsibility belong together.

For the BMW Group, economic success is both the prime objective and stable basis for assuming responsibility – for the company, its employees, its shareholders and business partners, as well as for the environment and society. In addition, the BMW Group helps to safeguard its own future by assuming social, economic and ecological responsibility. Sustainability is a management task and a success factor.

The economic relevance of sustainability management is seen in three elements: resources, reputation and risks.

Sustainability is resource management.

The BMW Group's resource management includes finance and human resources, as well as the use of materials and energy and their influence on the environment. The aims of sustainable use of resources are efficiency and future competence in finance and human resources, as well as in product development and production. Frequent cost reductions, increases in productivity and sustainable products enhance the company's future viability.

Sustainability enhances reputation.

The BMW Group's commitment to social, economic and ecological responsibility as an international company is in keeping with its performance as a corporate citizen. Thus, reputation management serves to develop the company as a responsible partner in the global community. A company that is firmly anchored in society as a reliable partner creates acceptance for its products. This acceptance is particularly important for a premium supplier, such as the BMW Group with its brands BMW, MINI and Rolls-Royce.

Sustainability reduces risks.

Companies that act responsibly take account of the economic and social interests of various stakeholders: from the interest of employees in an attractive and secure workplace to the

interest of society in environmental protection and compatibility in both production and product design. At the same time, company activities should be transparent and calculable. This helps to build up trust in the company among employees, customers, shareholders, investors, 11 suppliers, business partners and the general public – a trust that reduces risks.

Sustainability as management task.

The BMW Group recognised at an early date the connection between resources, reputation and risks as the economic dimension of sustainability. According to a resolution by the Board of Management in 2000, "Sustained development is becoming the main guiding principle for economic and social prosperity, as well as for the interaction of market and democracy."

With this commitment to sustainability, the BMW Group supported Kofi Annan's "Global Compact" from the start. This international initiative by the Secretary General of the UN aims to create an alliance between the spheres of business and politics in order to establish and strengthen worldwide the role of companies as the advocates and promoters of sustainability. Kofi Annan's voluntary initiative is based on nine principles for the observation of human rights, labour standards and a far-sighted, cautious approach to the environment.

The BMW Group supports Kofi Annan's initiative with its long-term corporate strategy, which includes not only business targets but also social and ecological aspects, and with concrete examples in the Global Compact's worldwide "Learning Forum". This is the place where the newly developed Sustainability Management System and Clean Energy are discussed as the concept for introducing alternative hydrogen-based fuels for automobiles.

Shareholder value through stakeholder value.

The world of finance increasingly honours corporate activities that are geared to the long term. And for good reason: it is now generally accepted that sustainability is a suitable concept for increasing and positively influencing a company's value. The development of the Dow Jones World Composite Sustainability Index, considered an important benchmark in the field of sustainable investment, was compared over many years with the development of the Dow Jones World Stock Index, compiled according to conventional economic criteria. The comparison shows a yield advantage for sustainability oriented investors. This also applies to

the recent past, which brought significant price losses on the international stock markets because of continuing uncertainty about world economic and political development. Growth rates for investment guided by principles are still high, suggesting that in the near future we shall see a further increase in demand for shares in companies whose management decisions are based not only on economic but also on social and ecological criteria.

In September 2002, the BMW Group was included for the fourth time in succession in the family of the world's leading sustainability indices of Dow Jones, STOXX Limited and SAM Group. In the SAM Group's ranking for the Dow Jones Sustainability Index World the analysts found that the BMW Group had above-average ratings for 27 out of a total of 33 different criteria. The company also qualified for the FTSE4Good Europe 50 Index of the Financial Times and the London Stock Exchange as well as for the German Sustainability Index of Oekom Research. The new sustainability internet platform of the Institute for Ecology and Corporate Management at the European Business School ranks the BMW Group with a listing in seven sustainability indices among the leaders in this field.

Transparent activities, open communications.

The policy that the BMW Group has adopted is confirmed by UNEP and the international business consultancy SustainAbility. The BMW Group's Sustainable Value Report 2001/2002 ranks among the top fifty sustainability reports worldwide on UNEP's and SustainAbility's list. In the car industry segment, the BMW Group achieved one of the top rankings.

Excellent capital market communications.

The BMW Group's communications with shareholders and investors are marked by transparency and fairness. According to the results of a survey by the investor magazine "Börse Online", private investors appreciate the outstanding credibility and comprehensibility of the BMW Group's capital market communications. In 2003, the company was awarded the new Prize for the Best Investor Relations in Germany (BIRD). 160 large German stock corporations were included in the survey.

Corporate Governance Code for BMW Group.

In view of the growing responsibility of companies with international operations and the discussion about corporate governance, transparency plays an important role for the BMW Group. The company supports the recommendations and suggestions made in this code and, using the German Corporate Governance Code as a basis, has developed its own code to take account of the company's specific circumstances. In addition, a coordinator for all corporate governance issues reports regularly to the Board of Management and the Supervisory Board.

However, exemplary corporate governance is not achieved simply by obeying rules. It is also important to promote trust in the company. For the BMW Group, corporate governance is an all-embracing issue that affects all areas of the company. Taking responsibility for our actions, transparency and trust in others have long been the principles of our corporate culture. This corporate culture is essential for the success of the BMW Group both today and in the future

Environmental Policy Guidelines

Environmental Protection. BMW Group Environmental Guidelines (from the website address provided in the 2003/04 report).

Responsibility for our Environment.

We are all responsible for sustaining and protecting our natural environment. The BMW Group is called upon to conduct responsible and sustainable environmental policies, which are also economically viable. This is an obligation we have taken upon ourselves through our competence as a manufacturer of highly technological products and as an employer of a highly qualified workforce around the world. To this end, we strive to reconcile the interests of people and nature, technology and progress with the right of future generations to an intact environment. These BMW Group environmental guidelines are the basis of how we conduct our daily operations:

1. Objectives.

We use resources in a responsible and efficient manner, and hereby undertake to protect our environment for the long term. All Divisions of the BMW Group are guided by the

international environmental charter (ICC Charter for Sustainable Development), signed by BMW AG, and the principles outlined in Agenda 21.

2. Corporate commitment and responsibility.

Responsibility for environmental protection lies with all members of the Group. Our managers and executives, in particular, are called upon to implement these Environmental Guidelines, motivating our employees through their own example to act in the same spirit and assume the same responsibility.

3. Responsible implementation of objectives.

We will consistently review the success of our environmental protection measures and make further improvements as necessary. In our Group operations, we comply with laws, regulations, official standards and directives. Wherever the technical, scientific and managerial know-how for reducing environmental impact can achieve economically viable standards, which exceed those, required by law, we will apply such know-how accordingly.

4. Group-wide environmental protection.

In the areas of development, design, production, the operation of facilities and when conducting other activities, we use appropriate technical and economic means for conserving resources and minimising the environmental impact.

It is of particular importance, when introducing new production processes and methods, to consider their environmental compatibility in the context of technical, commercial and economic decisions. BMW Group's objective is therefore, as stated in the ICC Charter, to take into consideration the efficient use of energy and raw materials, the sustainable use of renewable resources, the minimisation of all adverse environmental impact and waste generation, and the safe and responsible disposal of residual wastes. We implement environmental management systems in order to assess in advance all significant environmental aspects.

5. Emergency precautions.

In the event of an emergency, our first priority is the protection of health and the environment. We maintain contingency plans for emergencies and other incidents, making allowances for effects extending beyond our facilities. These contingency plans are consistently updated to reflect latest developments.

6. Vehicle compatibility with the environment.

Being fully aware of our responsibility for human health and our natural habitat, we consistently apply advanced technology to enhance safety and to minimise exhaust emissions, noise emissions, and fuel consumption. Through the optimum design of our products we ensure that any environmental impacts are kept to a minimum. We further support this process by providing information to our customers regarding the use and maintenance of our vehicles.

7. Recycling.

In order to avoid waste generation, we are developing solutions for recycling old vehicles, applying these technologies systematically. Our objective is to promote recycling optimised product design and to make use of secondary raw materials. This effort decreases overall consumption of energy and resources in production and operation while completing the cycle for the reuse of materials.

8. Alternative propulsion concepts.

In our quest to preserve resources and improve the environmental compatibility of our vehicles, we are developing alternative propulsion technologies, which are constantly improved and upgraded. We are also committed to the development of infrastructure aimed at the production and distribution of alternative energy sources required by these vehicles.

9. Mobility for the future.

By jointly planning and cooperating with all areas of politics, society and government administration, the BMW Group is able to offer perspectives for the future where mobility and responsibility for the environment no longer represent a contradiction in terms. We are

therefore developing transport concepts and technologies with the overriding objective of maintaining mobility without undermining the quality of life.

10. Suppliers.

With regards to efficient use of resources and the sustainability of our environment, we consider ourselves responsible to include our suppliers in these corporate objectives and to therefore encourage and promote this environmental policy. Our suppliers are required to adhere to relevant BMW Group norms and standards pertaining to product environmental performance. In order to ensure that the integrated environmental compatibility of our processes is maintained, we expect our suppliers to introduce and maintain effective environmental management systems.

DaimlerChrysler

Executive Statement

In times of increasing globalisation, adopting a socially responsible approach to business has become a challenge of the first order. Today, the practical implementation of sustainable development means far more than compliance with environmental principles. In this respect too, DaimlerChrysler — with its more than 115-year tradition of technological leadership and innovation in the automotive sector — is out to set new standards in the industry. We know that we can only attain such future-oriented development through active cooperation with our partners in what we call “Alliances for the Environment.” Consequently, DaimlerChrysler is committed to organisations and initiatives such as the World Business Council for Sustainable Development (WBCSD), the United Nations (UN) Global Compact, and the Forum for Sustainable Development of German Business (Econsense).

What dedicated “Alliances for the Environment” can achieve and how they can contribute to this development process is documented in our 2004 Environmental Report. For the first time ever, DaimlerChrysler has geared its environmental reporting to the guidelines of the Global Reporting Initiative (GRI).

Our commitment to sustainable development is at its most effective when we can combine it with our core competencies in automotive engineering. Our aim is to safeguard future mobility and secure a competitive edge by developing innovations and future-oriented technologies that benefit the environment, safety, and comfort. In the ongoing pursuit of new benchmark technologies, this year alone we will invest 5.6 billion euros in research and development. By 2006, that number will have risen to 16.4 billion euros

We have already taken some decisive steps for the future. Over the past ten years DaimlerChrysler has cut CO_2 emissions from its passenger car fleet in Europe more than any other automaker. Over the same period, through the application of common rail direct injection, the fuel consumption of our diesel-engined cars has fallen by one quarter. And in mid 2003 we presented the world's first synthetic fuel derived from biomass. When burned, this fuel only releases the same amount of carbon dioxide as the plants took up from the air. Achieving a further reduction in fuel consumption and CO_2 emissions is the central topic as we strive for sustainable mobility. The first step down this road is the ongoing optimisation of conventional gasoline and diesel engines, whose potential is far from exhausted. Other aspects include the production of improved fuels and new synthetic ones. And finally, we are continuing our intensive work on alternative powertrains. In this respect we consider hybrid drive systems an important interim step en route to fuel cell drive — the technology of the long-term future.

Today, 30 Mercedes-Benz fuel cell buses are out and about in ten major European cities, and three more will be shipped to Perth, Western Australia, in the course of this year. The first of 60 Mercedes-Benz A-Class "F-Cell" models have also been handed over to customers for trials in day-to-day use. As a result, DaimlerChrysler has the largest fuel cell fleet in everyday operation of any automaker — documenting our expertise in the implementation of future-oriented technologies. On the following pages you will find our environmental balance sheet for the past year. As in the past, we have asked expert contributors to engage in an open dialogue with us on these pages, and we cordially invite you to join in the debate. We would be interested to hear your views.

Prof. Jürgen E. Schrempp
Chairman of the Board of Management of DaimlerChrysler AG

Dr. Thomas Weber
Member of the Board of Management of DaimlerChrysler AG, responsible for Research and Technology and the Development of the Mercedes Car Group

Vision Statement

In 1987 the Brundtland Report defined "sustainable development" as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainability, a concept formulated for the Rio de Janeiro Earth Summit in 1992, has now become a practical objective, as well as a benchmark for the performance of industry, government, associations and social interest groups.

Why sustainability is so important for us.

As a global automobile group, DaimlerChrysler bears far-reaching responsibility. Several hundred thousand people are involved in manufacturing and marketing our products around the world. Our vehicles are part of the street scene in almost every nation on earth. They meet people’s need for personal mobility and provide a flexible means of freight transportation. However, the production and use of our vehicles also impact on the natural environment. And as important factors in the fields of commerce, transportation and infrastructure, our vehicles also have a wide-ranging influence on society. For our part, we must live up to our responsibility for this complex interplay of impacts and influences. Consequently, in order to safeguard the future of the company and increase its acceptance in society at large, we have committed ourselves to the principle of sustainable development.

What sustainability means to us.

For DaimlerChrysler, the vision of sustainability is defined by responsibilities in three main areas:

- Responsibility for the economic performance and the long-term business success of the company;

- Responsibility for the sparing use of the resources available on our planet and for maintaining an intact environment – for present and future generations;

- Responsibility for the people involved in or affected by the activities of our company, and for society – which the company sees itself helping to shape.

At the same time we gear our activities to the long term, because we know that what we do today will influence the backdrop for our business in the future.

How we strive for sustainability

Securing the long-term success of the company

By producing high-quality products and sophisticated technologies that take account of and drive the market trends of the future, we boost our competitiveness and extend our global lead among automobile manufacturers.

Designing sustainable mobility

Through a wealth of different activities we actively shape the future of the automobile and prepare the ground for the further enhancement of its environmental compatibility. In order to minimise any negative impact on humankind and the environment, we always consider the bigger picture: the complete road transportation scenario, and the full value-added chain in the vehicle production process. For example, we do not focus exclusively on the powertrain in our efforts to reduce fuel consumption and CO 2 emissions, because we are convinced that the only route to sustainable solutions leads via the optimisation of the entire system of high-efficiency powertrain and environmentally compatible fuel. On-board telematics systems also help make optimum use of the existing transportation infrastructure. And driver assistance systems help avoid accidents and protect all road users. In our mobility service portfolio we are also testing the efficiency of links between the automobile and other means of transportation.

Key topics and central fields of activity

1. Climate protection: Reducing the fuel consumption and CO 2 emissions of our vehicles, fostering the development of alternative fuels; development of alternative powertrains.

2. Air pollution control: Reducing the emissions of our vehicles during production and use.

3. Resource conservation: Design for environment; sparing use of resources and increasing the efficiency of energy use in production.

Bearing global social responsibility

Through our support for the UN Global Compact and the formulation of Social Responsibility Guidelines for the DaimlerChrysler Group, we have laid the foundations for the social behavior of our company. We consider our commitment to the interests of our employees and of society at large not an obligation but an investment in the future of DaimlerChrysler

Key topics and central fields of activity

Participation in the development of fair framework conditions for globalisation, dialog with social groups, implementation of the Social Responsibility Guidelines valid throughout the Group and ensuring appropriate working conditions for employees; support for local and regional social initiatives

Corporate governance: how we stay on course

How does DaimlerChrysler manage and control the implementation of corporate policy in terms of the goal of sustainability? Central control elements in the social and ecological sectors are:

Our Environmental Protection Guidelines

Our Environmental Protection Guidelines define the environmental policy of the DaimlerChrysler Group and describe our commitment to the kind of integrated environmental protection that assesses in advance the ecological implications of production processes and products, and takes these findings into account in corporate decision-making. The

Environmental Protection Guidelines are binding for all of the Group's employees and at all corporate locations.
PDF FILE: ENVIRONMENTAL GUIDELINES

Our certified environmental management systems

The vast majority of DaimlerChrysler facilities throughout the world are validated or certified in accordance with the European EMAS directive or the international standard ISO 14001. Each of our facilities pursues a clearly defined environmental protection strategy which also takes account of plant-specific needs and has appropriate control instruments and organisational structures in place with which to implement that strategy.

Our Integrity Code

The Integrity Code has been in force since 1999. It lays down a binding framework for the activities of all employees worldwide. Among other things, it contains rules of conduct concerning international transactions, conflicts of interest, the issue of equality, the role of internal monitoring systems, the right to the fulfillment of statutory standards, as well as other internal and external regulations.
PDF FILE: INTEGRITY CODE

Our Social Responsibility Guidelines

In these Guidelines, DaimlerChrysler acknowledges its social responsibility and commits itself to the principles of the United Nations Global Compact initiative. The Corporate Social Responsibility Guidelines, which apply worldwide, were agreed by DaimlerChrysler corporate management and the company’s World Employee Committee in 2002. These guidelines, which are based on the conventions of the International Labor Organisation (ILO), have now been integrated into the DaimlerChrysler Integrity Code.
PDF FILE: SOCIAL RESPONSIBILITY GUIDELINES

Code of Ethics

As a company listed on a US stock exchange, DaimlerChrysler has adopted a code of ethics applicable to Board members and other senior officers in accordance with the Sarbanes Oxley Act.
PDF FILE: CODE OF ETHICS

OECD Guidelines for Multinational Enterprises

These international guidelines for multinational companies, which have now been ratified by 33 countries, represent an important framework for the activities of DaimlerChrysler.

Clear targets at all levels

Ecological and social aspects are also an integral part of the targets agreed between managers and employees. This approach, which is adopted at all levels of the Group's organisation, not only ensures that all employees concentrate on mutual targets but also provides a basis for the remuneration system for all management levels.

More information, greater transparency

Corporate governance issues have rightly attracted considerable attention and are now the subject of wide-ranging public debate. DaimlerChrysler supports the various initiatives for improving corporate governance. Many of the principles that have been developed by these initiatives have been common practice within the DaimlerChrysler Group for some time. As a Group with roots in both Germany and the USA, it is one of the key objectives of DaimlerChrysler to ensure the international orientation of its corporate governance system and to make the system transparent. This is why we provide comprehensive information on this subject both in our 2003 Annual Report and on the Internet.

Environmental Protection and Sustainability in the Product Sector

Our strategy for the sustainable mobility of the future

The finite nature of our fossil fuel reserves, their concentration in politically unstable regions, the global increase in energy consumption, and the resultant ongoing rise in the concentration

of the greenhouse gas carbon dioxide in the atmosphere are among the biggest challenges facing our society in the 21st century. As an automobile manufacturer, DaimlerChrysler is committed to making a decisive contribution to the realisation of an environmentally acceptable and sustainable form of mobility.

Our core objective is clear: reducing CO_2 emissions and consumption of fossil fuels, while maintaining a leadership role in the reduction of exhaust and evaporative emissions. In order to reach this goal we are focusing on two fields of activity: technical innovations in the vehicle and powertrain sectors on the one hand (core activities), and fuels on the other (support activities). Only by tackling both fields can the full potential of the overall vehicle/fuel system be exploited. Through our technical innovations in the vehicle and powertrain sectors we are also pursuing another goal: We are out to achieve a further reduction in exhaust emissions from our products.

Sound Reasons for Good Deeds

In common with many other leading companies, DaimlerChrysler is squaring up to its social responsibilities well beyond the workplace. But there is far more to it than a charitable spirit.

In the rush to become good corporate citizens, companies are rapidly discovering that there is more to the role than doling out the dollars. “DaimlerChrysler’s commitment to good corporate citizenship is built upon making positive contributions to society, both in terms of traditional philanthropy and in terms of minimising the impact of our business on the environment,” says Rob Liberatore, Global External Affairs and Public Policy. “If you’re going to impress people with your products, you also have to convince them with your philosophy.”

As they make their decisions, companies are bound up in an intricate web of relationships with employees, customers, business partners, shareholders, law-makers and society as a whole. Showing commitment to this outside world is about more than supplying a Mercedes-Benz Sprinter van for an aid convoy, or handing over funds to support a local theater. “Over and above our commercial status as an automaker, we are very much a part of the society in which we operate,” says Michael Inacker, a member of the leadership team at the External Affairs and Public Policy department. Companies across the board are now

honing their skills in this relatively new role. “Corporate citizenship,” “corporate social responsibility” (CSR) — call it what you will, for any organisation that takes this aspect seriously, standing still is not an option. Companies need to play a proactive part. To this end, DaimlerChrysler is committed to a process of dialogue with politicians, trade associations and social interest groups.

Klaus M. Leisinger is Professor of Development Sociology at the University of Basle in Switzerland. As he sees it, “the sphere of corporate social responsibility extends beyond measures stipulated by law.” Michael Inacker agrees: “It’s all about voluntary commitment,” he says, and nowhere is that commitment more relevant than for companies with locations all over the world. “CSR is particularly important in developing countries, where in many areas the appropriate legislation doesn’t go far enough or is not adequately enforced,” Leisinger points out. And that’s why UN Secretary General Kofi Annan set up the Global Compact initiative. Since he did so, more than 1,100 companies, including DaimlerChrysler, have signed up to this universal drive to promote human rights, improve labor conditions, and push forward environmental protection. “In 2002 we published our group-wide Principles of Social Responsibility, principles based on the key elements of the Global Compact. We now expect our suppliers to respect similar principles,” adds Inacker. The automaker has been working closely with its World Employee Committee to uphold equal opportunities, safety standards, and minimum wage legislation for employees, and to clamp down rigorously on any violations.

Companies have long recognised that a stable socio-political environment is a key factor in securing commercial success. DaimlerChrysler South Africa is currently facing the potentially devastating consequences of HIV/AIDS. At stake are not only the lives of its employees, but also the long-term social stability of the entire region. The automaker has joined the fight against the epidemic, setting up an employee education program to deal with both the social and economic implications. “If we don’t take decisive action now, we risk losing valuable employees, with all the negative human and commercial consequences that implies,” says Inacker.

“We see corporate social responsibility as a networked concept,” he explains, “one that combines the interests of society as whole with ecological, commercial, and entrepreneurial considerations.” Projects already up and running in Germany, Brazil, India, and South Africa -

soon to be joined by an initiative in the Philippines - prove that such ambitious threefold targets are not beyond the company's capabilities. DaimlerChrysler has effectively put in place a "global sustainability network" which not only explores new sources of energy but also processes natural fibers for Mercedes-Benz vehicles. Thus the company creates skilled jobs in poor regions, helps preserve the environment by growing and using renewable raw materials, and opens up new options on the production front. On top of which, using coconut, sisal or abaca fibers also makes economic sense. And that's important, because companies have to be profitable, otherwise they will not be able to meet their social responsibilities.

Further details can be found in the DaimlerChrysler Corporate Social Responsibility Report 2004. Copies can be ordered from www.daimlerchrysler.com.

Environmental Policy Guidelines

Environmental protection is one of our fundamental corporate objectives.

DaimlerChrysler is committed to enhance the quality of life and the environment in the communities and societies we serve. Environmental protection is one of the fundamental corporate objectives of the DaimlerChrysler Group. In this context, environmental protection is an integral component of the corporate strategy, designed to ensure long-term value creation.

DaimlerChrysler's goal of maximum product quality includes compliance with stringent environmental standards and careful treatment of the natural foundations of life. Accordingly, our approach to environmentally acceptable product design requires careful consideration of the entire product life cycle from design, production and use to disposal or recycling.

The Environmental Protection Guidelines approved by the Board of Management define the environmental policy of the DaimlerChrysler Group and describe the commitment to integrated environmental protection that addresses environmental impacts at their roots, assesses in advance the ecological implications of production processes and products, and takes these findings into account in corporate decision-making. Appropriate control and monitoring procedures and measures have been implemented. Responsibility for the implementation of and adherence to environmental protection measures has been assigned to

specific employees in all functional areas, from development and production to sales and service, and at all corporate staffs.

The Environmental Protection Guidelines are binding for all the Group's employees and at all corporate locations. Accordingly, the Group supports and encourages all employees to put environmental protection into practice at the workplace at his or her own initiative. Measures implemented at the various corporate locations are regularly assessed and subject to a process of continual improvement. In order to comply with its self-imposed environmental protection standards, the DaimlerChrysler Group draws up its own environmental goals. The ecological programs required to meet these goals are monitored through a comprehensive auditing process aimed at measuring compliance with procedures and regulations, and when necessary, corrective actions are taken to improve performance.

The underlying environmental management system is coordinated by the Chief Environmental Officer, who reports to the Board of Management on these matters at regular intervals. A verifiable environmental report, published annually, documents the Group's activities and achievements. We also will endeavor to ensure that our Environmental Protection Guidelines are accepted in joint venture partnerships. Our responsibility for the environment does not stop at our Group's doors. Accordingly, in addition to our own environmental protection activities, DaimlerChrysler will promote the development of intelligent ecological solutions and encourage the international development of environmental technology. Our objective is to retain and further develop transportation products and systems which cater equally to the requirements of the individual, society and the environment.

1. We face the environmental challenges of the future by working continuously to improve the environmental performance of our products and our operations.

Compliance with environmental legislation and regulations is a matter of course for DaimlerChrysler. To ensure sustainable development, the Group is also committed to the active and ongoing development of environmental protection. This includes the manufacturing processes and our products. DaimlerChrysler also contributes its expertise to non-corporate scientific, technical and governmental activities designed to improve the environment. The Environmental Protection Guidelines of the DaimlerChrysler Group are binding for all employees and at all corporate locations. Particular responsibility rests with managerial staff:

through their example, they make an active contribution to the further development of our environmental policy and of ecological awareness among the Group's employees, as well as helping to anchor environmental protection in our corporate culture

2. We strive to develop products which in their respective market segments are highly environmentally responsible.

Our approach to environmentally acceptable design covers the entire product spectrum of the DaimlerChrysler Group, taking into account the product life cycle from design through disposal or recycling. Continuously improving the environmental performance of our products is one of our important goals. DaimlerChrysler is committed to the ongoing pursuit of this objective, especially in its research and development activities

3. We plan all stages of manufacturing to provide optimal environmental protection.

DaimlerChrysler sees itself as a leader in the ongoing development of environmentally responsible production technology which minimises the burden on the environment. This includes proactive behavior to prevent or minimise the impact of accidents which may adversely affect the environment. Particular emphasis is given to the application and continuing development of technologies which save energy and water, and which are characterised by minimal emission and waste levels. This includes the development of effective environmental assessments, emission controls, reuse and recycling strategies. DaimlerChrysler aims to achieve closed-loop material cycles. Our ultimate goal is waste-free production. DaimlerChrysler requires its suppliers and contractual partners to comply with all applicable laws and regulations and encourages them to pursue proactive environmentally responsible practices. Contractors working on DaimlerChrysler properties also must comply with the location's own standards and requirements

4. We offer our customers ecologically oriented service and information.

Our customers should be able to use the DaimlerChrysler Group's products in an environmentally acceptable manner. DaimlerChrysler therefore provides its customers with products with a long service life in an effort to conserve natural resources. Our service outlets

work to provide optimal information and expert service on environmental matters. Customers also receive comprehensive and competent advice on eco-friendly motoring.

5. We endeavor to achieve exemplary environmental performance worldwide.

DaimlerChrysler manufactures and markets its products internationally. The Group endeavors to behave in an exemplary manner in environmental protection at all of its plants and service outlets around the world and to continually enhance environmental protection through the application of progressive environmental management. For a global player, however, taking responsibility for environmental protection seriously also means looking beyond our boundaries. At its locations around the world, DaimlerChrysler supports and encourages the cooperative development of environmentally superior technology and management methods throughout industry and the public sector. In addition we cooperate with authorities to develop technically and financially sound, environmentally responsible laws and regulations

6. We provide our employees and the public with comprehensive information on environmental protection.

At DaimlerChrysler we believe that only a policy of openly providing information on environmental protection measures and reporting on achievements and problems in the implementation of these measures will motivate employees and create credibility in the general public. The Group employs the available personnel development, employee training and information measures to transform environmental awareness into specific employee behavior. As a corporate member of the community, DaimlerChrysler actively seeks dialogue with the public on important environmental issues and works cooperatively with other groups, institutions and parties to protect and conserve the environment. Employees, customers and the general public are provided with the information they need to understand the ecological impact of the products and corporate activities of DaimlerChrysler.

Toyota

Executive Statement

From Toyota's standpoint as a member of the Japanese automotive industry, I have often emphasised our "desire to work hard so that we will be able to point to the various contributions that Japan's automotive technology has made toward alleviating the impact automobiles have on the environment."

The second generation Prius, which was launched in September of 2003, was developed on the basis of this idea. Since its launch, the Prius has received high acclaim and support in markets around the world, and sales are increasing steadily. The success of the new Prius has provided us with a great deal of confidence in our stance of making environmental issues a central management issue.

Toyota hopes to bring the benefits of mobility offered by automobiles to as many people as possible, and is striving to contribute to society by further expanding the appeal of automobiles throughout the world. To accomplish this, one of the most important tasks for Toyota to address involves environmental issues.

Toyota adopted the Global Vision 2010 as a medium- to long-term management plan that puts forward the corporate image Toyota should strive to attain. As one objective, "Toyota will strive to become a leader and driving force in global regeneration by implementing the most advanced environmental technologies." I have already mentioned the new Prius above, but Prius sales still account for only a very small percentage of Toyota's total sales. We will seek to achieve class-leading environmental performance for our other vehicle series as well. Considering that the automobile industry generates a certain level of environmental impact in all areas of its operations, Toyota reaffirms the importance of carrying out top-level environmental action in all countries and regions at the development and design, production, sales, and disposal stages of a vehicle's life cycle.

As another aspect of the corporate image Toyota is pursuing, the Global Vision 2010 states that, "Toyota seeks to become a truly global enterprise that is respected by all peoples around the world." We would be extremely happy if Toyota's environmental initiatives are of use in the various regions and countries where they are carried out. At the same time, being

able to contribute to society through such activities instills pride and courage among the numerous Toyota employees who are steadily working in various areas of Toyota's operations around the world.

Finally, Toyota places great importance on the idea of "good faith." Good faith means acting with sincerity and without betraying the confidence and expectations of others, keeping one's promises, and fulfilling one's duties, and this is embodied in the following way in the Guiding Principles at Toyota Motor Corporation: "Undertake open and fair corporate activities to be a good corporate citizen around the world." True to the idea of good faith, Toyota will consider the interests of all stakeholders, and contribute to the sustainable development of society and Earth at large through its business activities.

Fujio Cho
President, Toyota Motor Corporation
Chairman, Toyota Environment Committee

In FY2003, Toyota's main environmental achievements were the confirmation of the prospect of achieving the Third Toyota Environmental Action Plan goals through an interim review, the launch of the new Prius, start of FCHV bus operations, the introduction of the comprehensive environmental impact assessment system Eco-VAS, the creation, announcement, and expansion of the Toyota Recycle Vision, progress in responses to the Automobile Recycling Law, and incorporation of recyclable designs in the Prius, Raum, and other new vehicles.

The section on social aspects, which was begun in FY2003, discusses Toyota Motor Corporation's fundamental thinking concerning its relationship with customers, society, business partners, and employees, and lists the progress of initiatives over the course of the previous fiscal year. The focus is on Toyota's activities in Japan, but also included are reports on best practices that overseas affiliates have taken in other countries and regions in response to local conditions.

In the future, Toyota intends to further enhance the content of the section on social aspects.

Kosuke Shiramizu
Executive Vice President, Member of the Board, Toyota Motor Corporation
Vice Chairman, Toyota Environment Committee

Vision Statement

Creating a Prosperous Society Together by Making Things and Making Automobiles

Toyota hopes that the 21st century will be truly prosperous for society, and aims to grow as a company together with its stakeholders, including customers, shareholders, business partners, and employees, through making things and making automobiles, while seeking harmony with people, society, the global environment and the world economy.

In order to put this management philosophy into practice, the "Guiding Principles at Toyota Motor Corporation" were established as the fundamental management policy (Please see p. 5). These principles were adopted in 1992 to codify the business spirit handed down since the company's foundation, and revisions including the stipulation of legal compliance were made in 1997. Each of the seven items is a cornerstone of Toyota's business activities.

Contribute to the Realisation of a Prosperous Society in the New Century through Global Vision 2010

In April 2002 Toyota adopted the Global Vision 2010 which proposes the corporate image which Toyota should strive to achieve in 2010 and beyond. (Please see p.5) Centered on the basic theme of "Innovation into the Future — A Passion to Create a Better Society," and with a view toward what society is expected to be like in the medium to long term, the Vision sets the course for the multi-faceted roles to be played by Toyota vis-à-vis society, people and the Earth.

Specifically, Toyota has made internal and external commitments to: lead a recycling-based society; to develop the age of ITS and the ubiquitous network society; promoting motorisation on a global scale; and becoming a presence that is respected in a mature society.

Toyota plans on making specific proposals in tangible form concerning the realisation of a prosperous society in the new century by participating in and displaying exhibits at the World Congress on ITS in October 2004 and at the 2005 World Exposition, Aichi, Japan (EXPO 2005) opening in March that year.

Toyota believes that to realise the corporate image that it is striving to achieve in the future, without complacency, it is important to undertake a paradigm change from the

following three perspectives: Technology development/Product development; Management; and Profit structures.

As inter-company competition intensifies on a global scale, Toyota is working to strengthen its business foundations further.

Environmental Management

In the twentieth century, although the automobile played an important role in the development of society, it has also imposed a certain impact on the environment. If the automobile is to remain a beneficial tool in the twenty-first century, environmental responses are essential. Without environmental responses, the automobile industry has no future, and Toyota is convinced that only automakers that succeed in this area will be acceptable to society.

To ensure that its products are accepted and well received around the world, Toyota has positioned the environment as a priority management issue and seeks to become a leader of global regeneration through its outstanding environmental technologies. In order to achieve this, Toyota is implementing environmental responses at the highest levels in all regions around the world and in all areas. Toyota also believes that it is important to conduct continual and constant follow-ups.

Toyota conducts meticulous environmental management in all areas and in each stage of the vehicle life cycle, including production, logistics, use, disposal, and recycling. Toyota also implements integrated environmental responses from the production to disposal stage.

2010 Global Vision

Innovation into the Future

A Passion to Create a Better Society: To contribute to society through the manufacturing of automobiles. We must now move forward with renewed passion and even higher aspirations, to create a more prosperous society in this new century.

A New Corporate Image for Toyota to Pursue

Kind to the Earth

Become a leader and driving force in global regeneration by implementing the most advanced environmental technologies.

Arrival of a Revitalised, Recycling-based Society

- Global movement toward a “Revitalised Society.”
- Shifting from an age of mass production and mass consumption to a “Recycling-based Society.” Reduction, Reuse and Recycling of Resources.

Comfort of Life

Become a leader in creating automobiles and an automobile-based society in which people can live in ease, safety and comfort.

Age of ITS and the Ubiquitous Network Society

- Advanced communication technology and automobile IT technologies.
- Dramatic improvement in information services accessible while driving.
- Improved driving safety, coordinated with the traffic structure.

Excitement for the World

Promote the appeal of cars throughout the world and strengthen the Toyota brand image.

Expansion of Motorisation on a Global Scale

- People all over the world will benefit from the car’s mobility.

Respect for all People

Be a truly global company that earns the respect and support of people all over the world.

Advent of a Mature Society

- Society will move toward greater respect for people from other nations and cultures.
- In international companies, people from different nations and ethnic groups will work together.

The Paradigm Change to Achieve our Vision

1. Technology Development / Product Development

(1) Technology Development

(2) Product Development

2. Management

1) Transnational management

(2) Group strategic management

(3) Changing the way we work

3. Profit Structures

(1) Create a balanced global structure

(2) Focus on stakeholders and efficient use of capital

Leading to:

Paradigm Change

We must adopt a new corporate structure paradigm and improved business practices.

Environmental Policy Guidelines

The Spirit of the Toyoda Precepts Passed on since Toyota's Foundation

The Toyoda Precepts, passed on from the time of Toyota's foundation up to the present day, have acted as the core of Toyota management. The precepts capture the thinking of the

founder of the Toyota Group, Sakichi Toyoda, and have become the basis of the Guiding Principles at Toyota Motor Corporation.

Initially this did not have a definite shape. However, with the growth of the scope of the company, the need arose for the principles to be codified so that they could be propagated among employees. Risaburo Toyoda and Kiichiro Toyoda, in the pioneer days of the company, gathered together the teachings of Sakichi Toyoda and published them in the form of the Toyoda Precepts on October 30, 1935, the fifth anniversary of his death. From that time, the precepts have played the role of a spiritual support for employees as the principles of the company. This spirit of the Toyoda Precepts can still be felt today.

The Toyoda Precepts

1. Be contributive to the development and welfare of the country by working together, regardless of position, in faithfully fulfilling your duties.

2. Be at the vanguard of the times through endless creativity, inquisitiveness and pursuit of improvement.

3. Be practical and avoid frivolity.

4. Be kind and generous; strive to create a warm, homelike atmosphere.

5. Be reverent, and show gratitude for things great and small in thought and deed.

Guiding Principles at Toyota Motor Corporation

1. Honour the language and spirit of the law of every nation and undertake open and fair corporate activities to be a good corporate citizen of the world

2. Respect the culture and customs of every nation and contribute to economic and social development through corporate activities in local communities

3. Dedicate ourselves to providing clean and safe products and to enhancing the quality of life everywhere through our all activities

4. Create and develop advanced technologies and provide outstanding products and services that fulfil the needs of customers worldwide

5. Foster a corporate culture that enhances individual creativity and teamwork value, while honoring mutual trust and respect between labor and management

6. Pursue growth in harmony with the global community through innovative management

7. Work with business partners in research and creation to achieve stable, long-term growth and mutual benefits, while keeping ourselves open to new partnerships

Toyota Earth Charter

I. Basic Policy

1. Contribution toward a prosperous 21st century society

Contribute toward a prosperous 21st century society. Aim for growth that is in harmony with the environment, and set as a challenge the achievement of zero emissions throughout all areas of business activities.

2. Pursuit of environmental technologies

Pursue all possible environmental technologies, developing and establishing new technologies to enable the environment and economy to coexist harmoniously.

3. Voluntary actions

Develop a voluntary improvement plan, based on thorough preventive measures and compliance to laws, that addresses environmental issues on the global, national, and regional scales, and promotes continuous implementation.

4. Working in cooperation with society

Build close and cooperative relationships with a wide spectrum of individuals and organisations involved in environmental preservation including governments, local municipalities, related companies and industries.

II. Action Guidelines

1. Always be concerned about the environment

Challenge achieving zero emissions at all stages, i.e. production, utilisation, and disposal.

1. Develop and provide products with top-level environmental performance.
2. Pursue production activities that do not generate waste.
3. Implement thorough preventive measures.
4. Promote businesses that contribute toward environmental improvement.

2. Business partners are partners in creating a better environment

Cooperate with associated companies.

3. As a member of society

Actively participate in social actions.

1. Participate in the creation of a recycle-oriented society
2. Support government environmental policies
3. Contribute also to non-profit activities

4. Toward better understanding

Actively disclose information and promote environmental awareness.

III. Organisation in Charge

Promotion by the Toyota Environment Committee which consists of top management (chaired by the President)

Honda

Executive Statement

Striving to Become a Company that People Will Want to Exist

Introduction

In 2003, at the Ninth Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 9) in Milan, Italy, discussions were held on establishing detailed rules on implementing the Kyoto Protocol. Also the framework to reduce greenhouse gas emissions on a global scale is advancing steadily. However, in certain regions of the world a rapid growth of the economy or of the population is expected. Therefore it will be more urgent but also more difficult to resolve the diverse environmental issues surrounding us.

Honda has long been involved in environmental conservation activities. In 1992, we created the Honda Environment Statement, which clarifies our view on environmental conservation. Based on this statement, we conduct various activities that address environmental issues at every phase of our products' life cycle. Honda is conducting environmental conservation activities not because it is obligated to comply with regulations but because it wishes to preserve the environment for future generations. This reflects the Company's belief that continuing environmental conservation activities on a global scale is an important management responsibility.

Review of Activities in Fiscal 2003

In 1999, Honda released numerical targets to lower the exhaust emissions and improve the fuel economy of its products as well as the year in which these figures were to be attained. In fiscal 2003, Honda succeeded in achieving the targets it set for 2005, i.e., an approximate 75% reduction in total exhaust emissions of HC and NOx for automobiles and an approximate 30% improvement in the average fuel economy for motorcycles. Of the nine targets it set, Honda has achieved six of them earlier than planned.

We were the first in the world to apply electronic fuel injection technology to 50cc scooters, which were subsequently introduced into the market. We were able to achieve

technical breakthroughs and thus numerical targets a year or more in advance. We will accelerate efforts to improve exhaust emissions and fuel economy by further applying the technology to many of our small motorcycles.

We established the Green Factory Project, which aims by the year 2010 to reduce our factories' energy consumption per unit at our factories by 30% of the 1990 levels. In fiscal 2003, the energy consumption per unit at our factories decreased approximately 18.9% illustrating that our efforts have brought about a significant benefit.

For those targets that were achieved earlier than expected, we will continue our efforts to realise further improvements.

As for exhaust gas from automobiles, all of our automobile models comply with the newly established 2005 exhaust emission regulations as of the end of March 2004, one or more years earlier than the required year. Six of our automobile models were approved as "**** low emission vehicles," which means that their exhaust emissions are 75% less than the exhaust emissions standards. As for improvement in fuel economy, 25 out of 31 models that were marketed in fiscal 2003 conformed to 2010 target standards for fuel economy, and the fuel economy of 18 of those 25 models was better than the 2010 target standards by 5% or more.

Honda is a company that pursues better mobility. In fiscal 2003, the HondaJet succeeded in an experimental flight. The fuel economy of the HondaJet, which has a self developed airframe equipped with a self-developed turbofan engine, was improved approximately 40% compared with conventional airplanes. Thus, Honda is positively making an effort to improve mobility in new fields while paying attention to environmental conservation.

Toward the Future

Honda has continued efforts to create a new power train in place of internal combustion engines with an objective of realising sustainable mobility. Twelve FCX fuel cell vehicles, which Honda started selling in 2002, were leased in Japan and the United States. Honda succeeded in developing the next generation of high-powered fuel cells, called the Honda FC STACK, which are significantly smaller and enable cars to be started below freezing point,

something that was considered impossible in the past. Thus, Honda is making a positive effort to put such fuel cells into practical use.

To contribute to the realisation of a recycling-oriented society. Honda started experimenting with a home energy station. This station can generate hydrogen fuel using natural gas and has a cogeneration function to generate heat and electricity. In addition, Honda applied self developed next-generation thin-film solar cells to a water electrolysis hydrogen station that uses solar energy. We believe that these thin-film solar cells, which can be manufactured using a minimum amount of energy, will be one of core technologies for a recycle-oriented society. The aim of these efforts is to generate electricity using highly efficient solar cells, generate hydrogen from water using such electricity, and drive fuel cell vehicles using such hydrogen (these vehicles emit water only). This is a challenging effort to pursue the ultimate system to save energy.

Passing down a Clean Environment to Future Generations

Honda is engaged in various activities to become a company that people will want to exist. To pass down a clean environment to future generations, Honda has made positive efforts in conserving the environment. Honda will continue its efforts to help solve those environmental issues that may change with the times by creating unique ideas. Honda will strengthen its efforts in various fields to meet the expectations of customers and society.

This report summarises the achievements of our activities in each fiscal year and is published annually to keep the public informed of our efforts. We would greatly appreciate it if you would read through this report and give us your frank opinion or comments that would help us continue to improve.

June 2004
Takeo Fukui
President and C.E.O
Michiyoshi Hagino
Director in charge of environment
Senior Managing Director

Global environmental problems represented by global warming, resource depletion, and the disposal of waste began to be internationally recognised as common problems for everyone in

the 1990s. At the Kyoto Conference held in 1997, targets for the reduction of greenhouse gas emissions were set and at the World Summit on Sustainable Development held at Johannesburg in 2002, the Johannesburg Declaration was adopted to promote sustainable development and environmental conservation at the same time.

Since the 1960s when pollution was recognised as a serious problem, Honda has been aggressively striving to solve environmental problems by promoting technological development, including the development of CVCC engines, towards a goal of ensuring a "blue sky for children." Honda's strenuous efforts for environmental conservation also includes the development of world-leading exhaust emission reducing technology, and the hybrid technology to achieve the world's highest fuel efficiency. As a result of such effort, the users of Honda products, including motorcycles, automobiles, and power products, exceeded 12 million people around the world in fiscal 2001.

By the year 2010, Honda is determined to become a company that all people can look up to. To attain this goal, and to be a leader in environmental conservation, we have always promoted our efforts in the environmental field. As a result, the Honda FCX has become the world's first fuel cell vehicle to obtain U.S. government approval for commercialisation. We would like to further our commitment to the environment throughout our corporate activities and to provide customers with products that totally satisfy them.

This booklet is published separately from the *Honda Environmental Annual Report,* and is revised every three years to promote a wider understanding of our ideas, past efforts, and future projects concerning environmental conservation.

We would be very pleased if this fully revised edition gains more readers, and look forward to receiving the frank opinions and reactions of our readers.

December 2002
Hiroyuki Yoshino
President and CEO

Michiyoshi Hagino
Senior Managing Director
Director responsible for
environmental activities

Vision Statement

Fundamental Principle and Vision

Honda, under the slogan “Blue Sky for Children”, has long been conducting environmental activities. In the 1990s, we improved our organisational structure step by step and created the Honda Environment Statement to clearly describe our attitude towards environmental issues. Since then, Honda has been improving its environmental conservation activities, regarding them as one of our most important themes.

Looking towards the future, Honda has set out its vision for 2010, based on a corporate culture of “freedom and openness, challenge and cooperation.” As mentioned in our vision statement, in order to pass on our joys to the next generation, we will strengthen our measures to achieve the challenging environmental improvement goals that we have set for ourselves. Through these activities, we aim to become a company that people want to exist.

To Share Our Dreams and Joys with More Customers

Handing down “Joy” from one generation to the next

Honda has long been engaged in environmental conservation, aggressively undertaking measures suitable for the time. In the 1990s, amid the increasing momentum toward environmental conservation and the acceleration of environmental measures all over the world, we improved our organisational structure and system step by step (see page 54) and made our “Honda Environment Statement” as guidelines for our attitude towards the environment (see page 10).

In the 21st century, Honda is accelerating its environmental activities to create new joys for its customers through giving full consideration to the global environment. Also, it is aiming to become a company that all people can look up to, by aggressively communicating with local people and with its customers throughout the world and sharing its joys with them.

Towards higher goals

For the effective promotion of environmental conservation activities and for the steady achievement of results, we are always setting higher goals. For example, for every product

domain, we announce the quantitative targets for cleaner exhaust gases and for fuel economy, with time limits, and disclose information about the achievement of these targets in the *Honda Environmental Annual Report* and at our website.

For global and social sustainability

Honda thinks it important to deeply understand what impacts companies have on the world's environment, society, and economy and to act based on this understanding. To share joys with a greater number of customers, we will search for ways to enable the development of society in harmony with the environment.

Creating new values of joy

We continuously strive to be a leader in bringing forth new values and creating joy.

Expanding joy

Honda will seek to expand the circle of joy by putting down roots in the communities in which it operates while maintaining its position as a global corporation.

Joy for the next generation

In order to pass on joy to future generations while sustaining social development, Honda will do its part to solve environmental challenges on a global scale.

A company that people can look up to

Meeting the Challenges of the Age and Making Progress towards the Next Age
Honda's History of Environmental Conservation

Honda's history of environmental conservation: this means to meet the challenges of the time and to make progress towards the future. Honda has always wanted to pass on the beautiful natural environment to the next generation, and will continue its environmental conservation activities, meeting the high goals that it has set independently.

Taking Steady Measures to Share Joy with People All over the World

Honda has been delivering its products to its customers all over the world to share its joys with them, while at the same time making every effort to solve environmental problems, recognising the impact it has on the global environment. We are now determined to continue to fulfill our environmental responsibilities, which are increasing in their importance, while endeavoring to obtain more than 20 million customers by fiscal 2004.

Ongoing Technological Developments to Attain Higher Goals for the Next Generation

It is important for us to improve the environmental performance of our products to enable our customers to use the products without being concerned about the impacts caused by these products to the global environment. In their lifecycles, our products tend to cause the largest environmental impacts while they are in use, and we need to reduce such impacts. To meet this requirement, Honda is striving to build a better relationship between people, the earth, and our products by setting severe voluntary standards for environmental conservation, including cleaner exhaust gases and higher fuel efficiency.

Environmental Policy Guidelines

As a responsible member of society whose task lies in the preservation of the global environment, company will make every effort to contribute to human health and the preservation of the global environment in each phase of its corporate activity. Only in this way will we be able to count on a successful future not only for our company, but for the entire world.

We should pursue our daily business interest under the following principles:

1. We will make efforts to recycle materials and conserve resources and energy at every stage of our products' life cycle from research, design, production and sales, to services and disposal.

2. We will make every effort to minimise and find appropriate methods to dispose of waste and contaminants that are produced through the use of our products, and in every stage of life cycle of these products.

3. As both a member of the company and of society, each employee will focus on the importance of making efforts to preserve human health and the global environment, and will do his or her part to ensure that the company as a whole acts responsibly.

4. We will consider the influence that our corporate activities have on the regional environment and society, and endeavor to improve the social standing of the company.

Established and announced in June 1992

Nissan

Executive Statement

For Nissan, our corporate vision of “Enriching People’s Lives” embraces protecting our environment. We firmly believe that a sound environmental policy is at the core of a sound business practice.

There is a strong interest in the world today about how to balance economic development with environmental protection. Economic growth does not necessarily threaten the environment. To the contrary, investments in technology can greatly benefit our understanding of the world we live in and how to preserve it. Collaboration among corporations, civic organisations, governments, and society in general will help move the world toward an effective balance between a healthy environment and healthy growth.

As a global corporation, Nissan places a high priority on sound environmental management. Our approach is twofold: we take actions to provide real-world value today, and we develop actions to create cleaner products and a cleaner world in the future.

Today, our efforts to fulfill our responsibilities to protect and sustain the environment are far-reaching. Within our company, we promote the highest levels of practice in every region and in every area of our operations. Eliminating landfill waste, reducing waste emissions, conserving natural resources, and enhancing recycling activities are a daily emphasis in our manufacturing and sales/service operations. We take care to reduce environmental impacts at every stage of our products’ lifecycle–from production, sales, service, and use through disposal and recycling. At present, 90% of a new Nissan vehicle is

recyclable, and efforts from the earliest stages of development emphasise making all our vehicles easier to disassemble and recycle.

In our products, we continue to work on cleaner exhaust emissions and increased fuel economy. More and more Nissan models are offered with continuously variable transmissions (CVT), which provide better fuel economy and better performance. Approximately 90% of new Nissan vehicles sold in Japan and, increasingly, in other parts of the world, are certified as ultra-low emission vehicles (ULEV), and we are pushing our lead further with super ultra-low emission vehicles (SU-LEV). Our Bluebird Sylphy was the first car ever to be certified as a SU-LEV.

Aside from its contribution to cleaner air, perhaps the greatest benefit of U-LEV technology is its affordability. We recognise that if the price of a vehicle ends up being higher than the value perceived by the customer, then even the best of new technologies will fail in the market. ULEV technology is efficient, affordable, and widely available to consumers, providing a real improvement in air quality today.

All these actions, and many more, are important for the world we live in today, but that is only half the story. We are pressing forward on research and development for future benefits as well.

Our investments span numerous technologies. We are working with several research institutions on solutions to the issue of carbon dioxide (CO_2) emissions, a major contribution to global warming. In 2003, we launched the X-TRAIL fuel cell vehicle in Japan, and our FCV research continues on many fronts. We are also developing hybrid electric vehicle technologies with Toyota, and our first model, an Altima Hybrid, will be introduced to the United States market in 2006. We are continuing to invest in improving gasoline engines and diesels, in alternative fuels and other technologies so that we will be ready to respond quickly when the market moves in any given direction.

For today and for the future, our commitment is to create products that our customers will value even as we make real and lasting improvements that will benefit the earth we all live in. Keeping that commitment is both good citizenship and good business.

Carlos Ghosn
President and chief executive officer
Nissan Motor Co., Ltd.

I am pleased to introduce Nissan's first Sustainability Report.

Sustainability is an integral part of what Nissan is and does. In every decision we make, we aim for consistency between short-term goals and actions and long-term strategy. Whether the topic is product design, technology, brand identity, profitability, or environmental and social measures, we systematically look at both the short- and long-term consequences of our decisions. We will not accept short-term gains if it means compromising our future needs or the ability of future generations to meet their own needs.

Three areas of focus: environment, governance, and corporate citizenship

To Nissan, contributing to sustainable development means taking proactive action in three primary areas – the environment, governance, and corporate citizenship.

Especially in the field of the environment, there is a need to take measures that allow for compatibility among economic growth, human development, and respect for the natural environment. We share public concerns about major environmental issues such as global warming, and we agree that precautions are needed to allow economic development to continue. In our view, protecting the environment is the single most important aspect of sustainability.

In addition to disciplined environmental management at all our plants and operations, Nissan develops environmental technologies and solutions that are feasible in the market. Customers want environmentally friendly cars, but they expect a sound value proposition, so we have to find solutions that are affordable to ensure that they will be adopted. One successful solution is our offer of ultralow emission vehicles, or U-LEVs in Japan. U-LEVs help keep the air clean, and they also make sense to customers in economic terms. Introducing super ultra-low emission vehicles (SU-LEVs), such as the Bluebird Sylphy introduced on the market in 2003, was a natural extension of our U-LEV strategy. Nissan is continuing research and investment in other environmental technologies, such as hybrids and fuel cells, but we realise that economic viability – or, from the customer's point of view, affordability – is crucial to the acceptance and success of new technologies.

You will find an overview of our environmental activities in this report, and detailed information is published in a separate Environmental Report.

A second area of focus for Nissan is governance. At a time when corporate governance is under scrutiny and greater transparency is being requested from businesses around the world, I am proud of the fact that Nissan has achieved every single commitment made in the business plans we have implemented since 1999. We present clear plans for the future direction of the company and, with the Nissan Management Way, we have established a clear governance system. Transparency is a priority, not only in our business plans, but also in our commitments to shareholders. Nissan is the only global automotive company that has provided a dividend policy offering three years of visibility. Making and keeping commitments is important, both for motivating people inside our company and for building trust and respect among people around our company. We are convinced that operating with a high level of integrity and transparency makes us a more competitive company.

Sound corporate citizenship is our third area of focus, but we recognise that it is impossible for us to deliver on every item that interests our various stakeholders. We have chosen three main areas of corporate citizenship action – namely, education, the environment, and providing humanitarian relief when necessary. Young people inherit the future, so investing in education clearly contributes to sustainable development. Environmental research is also future-oriented. If we devastate the earth's resources, progress will not happen. And assisting communities in times of great need is another priority. We want to use resources to help relieve the pain and difficulty of people who are struck by disaster.

A baseline for progress

This Sustainability Report presents a new and integrated look at our approach to the issue of sustainable development and the ways in which we are carrying out our corporate responsibilities. We think this report will serve as a baseline for further progress in the years to come. Even though Nissan is making progress in many of the areas we are addressing as a company, we are continually learning, listening, and making improvements. We realise that we are far from reaching our full potential, and we still have a lot of work to do.

I am not a pessimist when it comes to the future. Amazing technological advances have been made in the last few decades, and greater advances are sure to continue. The real challenge for the future is to develop technologies and to work on regulations to allow all

people on the earth to enjoy a positive lifestyle without compromising future sustainability. This is a race where technology must go first and open horizons to allow more people to participate in economic development. This is an area where global corporations such as Nissan can make a great contribution to society.

"Enriching People's Lives" is our vision. This means building a sustainable future for all our stakeholders today and for future generations to come. As you read this report, I hope you gain a greater understanding of what our company stands for and how we conduct our business. I am committed to ensuring that we at Nissan keep our motivation high and use our knowledge, skills, and resources wisely. I invite you to share with us your thoughts about this report, and I welcome your constructive comments.

Carlos Ghosn
President and chief executive officer
Nissan Motor Co., Ltd.

Vision Statement

Nissan's Perspective

Global environmental issues that surround the automobile are complex and diverse. In this section, we discuss Nissan's perspective on global environmental issues and our level of awareness in approaching these issues. Nissan's perspective is to look toward the future, aiming to attain a symbiosis of people, vehicles, and nature.

Providing Cleaner Vehicles to More Customers

Our mission is to provide safe and comfortable mobility. At the same time, we cannot deny that vehicles have an impact on the environment. Given this, we at Nissan believe that we must steer the vehicle itself in a direction that is in better balance with the environment.

After careful consideration of how to address the environmental impact of automobiles, we chose to make more than 80% of our gasoline passenger vehicles sold in Japan ultra-low emission vehicles (U-LEV).

U-LEV is a low-emission vehicle that by definition has achieved emissions 75% below year 2000 emissions standards for nitrogen oxide (NOx) and hydrocarbon (HC). Achieving the

U-LEV standard for 80% of our gasoline passenger vehicles would have almost the same effect regarding NOx and HC reduction as selling 400,000 zero emission vehicles, such as fuel cell vehicles or electric vehicles, every year in Japan.

We believe that Nissan's most effective means of solving environmental issues is through the rapid application of this highly effective technology, to provide more customers with clean energy vehicles at a more affordable price. Our continuous adoption of these types of realistic approaches is a dominant characteristic of Nissan's environmental management.

Finding solutions to present-day global environmental issues is of course important, but also we must look ahead to the future. Nissan is putting effort into the research and development of fuel cell vehicles, electric vehicles, hybrid electric vehicles, and natural gas vehicles.

While we cannot predict what the major trends in mobility will be for the coming generations, we believe that the future will be multifaceted. Therefore, we are determined to make technological advancements while visualising every possible future scenario.

Nissan's Environmental Approach - From the Time of Rapid Growth and Onward

Nissan's environmental efforts date back to the company's period of rapid growth. It was during this time, from the 1960s to the 1970s, when pollution problems, the downside of rapid growth, began to come under close scrutiny.

In 1972, Nissan established an environmental management department at our head office and an environmental management division at each plant in order to manage the disposal of substances with an environmental impact.

In 1973, when the oil shocks swept across the globe, energy management and improvements in fuel economy inevitably became topics of concern. We made full use of our technological capabilities to improve the fuel efficiency of our cars and worked to improve the efficiency of our manufacturing systems.

After the 1992 UN Conference on Environment and Development (Rio Summit), we established an Environment Management Committee in 1993 and created a Mid-term Environmental Action Plan. We then established an Energy Conservation Committee and a

Waste Reduction Committee, putting increased efforts into finding ways to tackle environmental issues.

In 1994, the United Nations University (Tokyo, Japan) launched the Zero Emissions Research Initiative. Zero emissions is not limited to the recycling and reuse of waste produced through business activities. This concept also captures the idea of infinitely bringing the amount of waste produced closer to zero by creating cycles between corporate sectors. Nissan has since adopted the concept of life cycle assessment (LCA).

In 1997, Japan made a commitment to reduce greenhouse gas emissions by 6% through the Kyoto Protocol adopted at the Third Conference of Parties to the UN Convention on Climate Change (COP3). For Nissan, curbing carbon dioxide (CO_2) emissions has become a top priority.

Within this history, a big challenge for Nissan came with the implementation of the exhaust emissions regulations that accompanied rapid motorisation in the 1970s. Beginning in the US, followed by Japan, demands from society regarding exhaust emissions became increasingly strict.

In view of this major issue, Nissan gathered its technical capabilities and moved forward in developing technology to reduce exhaust emissions. In 1965, five years earlier than the government-mandated deadline, Nissan completed the production of a vehicle with an installed emissions reduction device.

Even more strict emissions regulations were established in the 1970 Muskie Act in the US and in the Japanese version of the Muskie Act, which is a 1976 regulation announced in Japan in 1975. How would Nissan satisfy the regulations criteria without diminishing performance? To meet this challenge, improvements were gradually made to engine and oxidation catalyst technology.

Through the accumulation of technology over the years, Nissan's clean exhaust technology has reached world class levels. For instance, the 2000 Sentra CA sold in the US was the first gasoline vehicle to receive PZEV＊certification by the California Air Resources Board (CARB).

Especially because social conditions are always changing, we have improved the technological capacities in the production of our vehicles and have continued to pursue

voluntary initiatives in seeking the best road to take as an automobile manufacturer, while understanding the influence that our products have on society and the environment

Three Key Issues

And now, in what is being called the "Environmental Century," we are reflecting upon our efforts to tackle environmental issues. There are many environmental issues that we must deal with as an automobile manufacturer; for instance, reducing vehicle noise or protecting the ozone layer through air-conditioner refrigerant emissions controls. In recognition of this, Nissan has identified three key issues which we regard with particular importance. They are: curbing global warming; protection of the air, water, and soil; and resources recycling.

Our focus is evolving: from better energy management triggered by the oil shocks to the "curbing of global warming" promoted by the ratification of the Kyoto Protocol; from efforts in meeting pollution measures as well as exhaust emissions regulations to the "protection of the air, water, and soil"; and from the concept of zero emissions, issues concerning locations for waste disposal, and the introduction of LCA to "resources recycling."

Starting on page 19 of this report, we attempt to convey Nissan's intentions regarding these three key issues.

Overcoming Dilemmas in Creating a Society with a Symbiosis of People, Vehicles, and Nature

Nissan is now faced with a new situation.

First of all, society is demanding a shift from conventional environmental management to consolidated environmental management, to include our consolidated subsidiaries. Furthermore, this is not only restricted to related companies, but Nissan must take responsibility for management practices at all points in the supply chain. As Nissan is moving toward global management, we are still coming to grips with the full scope of our responsibilities.

In addition, environmental issues affecting automobile manufacturers are much more diverse today than in the past. One example is the issue of biodiversity. Until now, we have taken ecological factors into consideration in the construction of our plants. However, how are we to handle the destruction of ecology during road construction, or accidents related to our

vehicles coming into contact with animals? Nissan has not yet been able to come up with solutions to fully address these problems.

Out of the complex and continually more diverse environmental issues, we must identify those of particular importance to Nissan and then work toward their solution. To do this, Nissan has started two activities. One is a dialogue with our stakeholders. Another is our participation in the World Business Council for Sustainable Development (WBCSD).

For an automobile manufacturer, development of technology to control CO_2 emissions during vehicle use is crucial. At the same time, we believe that it is extremely important for our customers to be conscious about conserving energy when driving. We want to see automobile manufacturers, customers, and society as a whole come together in tackling environmental issues. Nissan held the first stakeholder dialogue in 2003. Opinion leaders from various fields have given us insight into perspectives that are new to Nissan and have provided us with constructive feedback.

What will be expected of Nissan in the future? In what way will Nissan be expected to contribute to the development of future society? Nissan would like to learn and take in as much information as we can through stakeholder dialogues and apply the knowledge gained to our next challenges.

In addition, Nissan is a participant in the WBCSD Sustainable Mobility Project. Together with other member companies, we have been engaging in discussions regarding the future of mobility. The results of the discussions have been compiled into the report, “Mobility 2030: Meeting the Challenges to Sustainablity,” which proposes seven targets including the reduction of exhaust emissions and the control of greenhouse gas emissions.

Although sustainable mobility is beyond the scope of a single company, we realise that the role that technology plays is extremely important, and that one company also has a tremendous responsibility.

Nissan’s stance on environmental issues is not pessimistic. We are facing unprecedented hardships, but these are also new, valuable opportunities to take on challenges of an unprecedented scale.

As we face global environmental issues, we will act with a sense of volition. We will turn every issue we face into a motivating force for improvement as we aspire for a society with a symbiosis of people, vehicles, and nature.

Respecting the global environment is the most important aspect of our journey toward sustainable development. At the same time, in order to allow all people across the world to enjoy a prosperous lifestyle, further industrial development is a necessity.

Continued innovation is crucial to achieve a balance between economic development and the protection of the natural environment. At Nissan, we view this as a major challenge.

Innovation is taking place in many areas. The birth of the super ultra-low emission vehicle, with exhaust gas that is almost as clean as the air, is one example of innovation.

Environmentally friendly products can become effective when they are more widely popular. But for that to happen, it is essential that customers are satisfied with the price of these products. To meet this requirement, we have focused our efforts on realistic technological developments while taking on a multitude of technological innovations.

Keeping nature and industry in balance while opening the way to the future through the development of credible technologies: at Nissan, we view this as our mission.

Environmental Policy Guidelines

The foundation of Nissan's environmental protection initiatives

Based on our environmental philosophy and policies, Nissan's environmental initiatives work toward the creation of a sustainable society. To this end, Nissan is developing environmental systems and structures that serve as the foundation for our global environmental initiatives.

Nissan's Environmental Philosophy and Policies

At Nissan, we developed our vision and mission in 2002 with the goal of sharing our mid- to long-term vision of the ideal company with all employees, which we are now sharing with all Nissan group companies worldwide. Our vision, "Enriching People's Lives," demonstrates one of our longstanding corporate values, while our mission demonstrates the role the company should play in pursuing it. Furthermore, we established guiding principles to help

our employees understand the actions and behaviours they should take in pursuit of our mission. Nissan works to create a corporate culture that inspires the entire company to join together in meeting common goals based on our vision, mission, and guiding principles. (Please refer to page 2 for our vision, mission, and guiding principles.)

To realise one of our guiding principles, to be “customer focused and environmentally friendly,” we developed our environmental philosophy and environmental policy. We believe it is our social mission to conduct our business based on our philosophy and guiding principles to help build a sustainable and recycling-based society.

Nissan’s Environmental Philosophy

Symbiosis of people, vehicles and nature.

It is our view that the basis of environmental protection lies in the human capacity to show kindness and concern. Along with striving to understand the environment better, all of us at Nissan bring a shared concern for people, society, nature and the Earth to bear on our activities.

This commitment and concern are embodied in every Nissan product and throughout all of the company's operations as the driving forces of Nissan's ongoing contributions to the advancement and enrichment of society.

Action Policy

1. To promote creative activities
2. To advance comprehensive activities
3. To foster cooperative activities

Environmental Policy

Nissan is taking the initiative to promote wide-ranging activities aimed at improving the environment both globally and localy in line with the guidelines noted here. These efforts are being pursued in all areas of the company’s operations, including product development,

manufacturing, sales and service, in order to make Nissan's Environmental Philosophy a reality.

1. Achieving a cleaner automotive society

Nissan aims to reduce the environmental impact at every stage of the vehicle life cycle, namely product development, manufacturing, use and disposal, in order to create a cleaner living environment. Besides working to improve vehicles themselves, Nissan also contributes to the improvement of social systems involving vehicle use.

2. Conserving natural resources and energy

Because the earth's natural resources and energy supplies are finite, Nissan is advancing efforts to minimise their consumption at every stage of the vehicle life cycle.

3. Expanding and continuously improving Nissan's environmental management system

Nissan is implementing an in-house environmental management system that conforms to the environmental management system standard formulated by the International Organisation for Standardisation (ISO).

Preventing environmental issues in the first place and observing laws and regulations.

- Observing laws and regulations is the first step toward environmental protection. Nissan's environmental measures go far beyond simple compliance with legal and regulatory requirements to address the actual environmental circumstances of the local area.

- Prior environmental impact assessments are conducted when mapping our new plans for product development projects or manufacturing processes. In this way, every effort is made to prevent environmental issues in the first place.

Cultivating a corporate culture dedicated to environmental protection.

- Extensive educational activities are conducted in-house with the aim of cultivating a corporate culture in which everyone from senior management on down is positively committed to the resolution of environmental concerns.

Undertaking cooperative activities with subsidiaries and affiliates.

- Nissan works closely with its subsidiaries and affiliates at home and abroad on ways to address environmental issues.

Strengthening communications and cooperation with customers.

- The cooperation of customers is indispensable to environmental protection at the stage where Nissan products are used. In line with this understanding, Nissan provides information and undertakes educational activities as part of its efforts to work closely with customers on protecting the environment.

4. Issuing reports on environmental activities

Nissan regularly issues announcements and publications explaining the company's efforts to address environmental concerns.

General Motors

Executive Statement

Chairman's Message

The global auto business grows more competitive every year. To succeed, to continue leading the industry as we have for the last 73 years, we at General Motors must work to be the best in every facet of our business, including the way we conduct our business. At GM, we are committed to leading not only with our products and business results, but economically, socially, and environmentally, as well.

Economically, we believe in participating as a good corporate citizen in every market where we do business - creating jobs, seeding technology, contributing tax revenues, improving standards of living, supporting sustainable economic development. In 1977, we

were proud to become the first company to adopt Rev. Leon Sullivan's "Sullivan Principles" and help hasten the end of apartheid in South Africa. Now, in 2004, we are thrilled to be returning full-time to South Africa to help build the nation's auto industry and the promise it represents for the citizens of South Africa.

Socially, GM has a long history of supporting the communities where we do business, including minority communities. In 1968, GM established the auto industry's first supplier diversity program. Since then, we have purchased more than $44 billion in goods and services from minority suppliers, including $7.2 billion in 2003 alone. In 1972, we were the first domestic automaker to institute a minority dealer development program. Today, we're proud to have more than 400 minority-owned dealerships, more than any other company in the business.

Environmentally, we continue to minimise the impact of the automobile on the world around us. In the US., we've launched a hybrid propulsion program focused on larger vehicles, like full-size trucks and SUV's, because that's where most of the fuel is consumed in the U.S. We're currently conducting pilot programs in nine U.S. cities with our innovative GM hybrid transit buses, and in May 2004, delivered the first of 235 of these buses to King County, Washington. Our hybrid buses can deliver up to 60 percent better fuel economy than traditional transit buses, and could save as much as 750,000 gallons of fuel every year for King County. We continue to invest heavily in the development of hydrogen fuel cells. In June 2004, our HydroGen3 demonstration vehicle established a new distance record for fuel-cell technology, travelling more than 6,000 miles in a 38-day marathon drive across Europe. And we continue to improve the environmental performance at our plants and facilities by increasing recycling and reducing waste generation, water and energy use, and emissions. We have established a goal of reducing our global greenhouse-gas emissions from our facilities by eight percent between 2000 and 2005, and we are making steady progress toward that target.

At GM, we will continue to work toward innovative solutions to our society's economic, social, and environmental challenges. We invite you to review our progress in this report, and to join us as we extend our practice of doing business the right way.

Rick Wagoner
Chairman and Chief Executive Officer

Public Policy Centre Welcome

Automakers, like all consumer product companies which compete on a global scale, flourish when economies are growing, societies are progressing, and people are constructively engaged in finding solutions to our present and future challenges. As people find work and live in stable, peaceful societies, there are increased opportunities for education and personal betterment. The rule of law is more likely to advance and prevail. Society, as a consequence, is better able to organise and address the wide range of inevitable challenges that require farsighted action.

It is in our interest to work toward that type of world. There is much cooperation and effort required from all sectors of our world, national and local communities, to achieve and sustain this vision.

Four elements comprise General Motors' commitment to being a constructive corporate citizen globally, wherever we have operations or market our products and services.

The first is our values and policies. We gladly subscribe to the Global Sullivan Principles for corporate conduct and encourage our business partners to do likewise. Our core values beckon us to match our words with our deeds. Our guidelines for employee conduct, called Winning With Integrity, inform our actions as we strive to conduct our business honestly, responsibly, and successfully.

The second element is our conduct - our deeds, since we know we will be measured by what we do, and often the perception of what we do, much more than by what we say. Given our scale of operations, there is much to review in this area. But, a report on our behaviour must start with delivery on our promise to design, build and offer great cars and trucks that meet the full range of consumer needs and preferences in the markets where we compete. Great cars and trucks mean vehicles which offer outstanding value in terms of quality, reliability, performance, convenience and other attributes valued by our customers. General Motors is delivering on its promise, as evidenced by increasingly high marks being accorded for its product leadership.

There are many other very important aspects of our business conduct that bear on our performance in the areas of corporate social responsibility and sustainable development. We monitor and measure the productivity and efficiency of our plants, what they emit into the

environment, and how well we are doing in eliminating waste from our processes and products. We challenge ourselves to innovate and are an industry leader in emissions technologies, safety enhancements, and future propulsion systems, including hybrids and fuel cells. Our record in protecting the health and safety of our workers is the best in the industry and among the best in the world. We also try to enrich the communities of which we are a part through investments in facilities, participation in civic projects, and support for philanthropic and humanitarian causes, especially ones that are related to our business or which affect the vitality of these communities. These and other aspects of our performance are summarised in this report.

A third element of our program is engagement- with business partners, other corporations, NGOs, civic and charitable groups, and, of course, governments. Our recent joint activities and projects range from participation as a co-chair of the Sustainable Mobility Project of the World Business Council for Sustainable Mobility, to participation in many safe driving initiatives such as National Safe Kids and MADD, to regular dialogues with organisations such as the Coalition for Environmentally Responsible Economies (CERES) and the Global Reporting Initiative (GRI).

These engagements influence our conduct. This 2004 Corporate Responsibility Report of General Motors has been prepared in accordance with the 2002 GRI guidelines. It represents a balanced and reasonable presentation of our organisation's economic, environmental, and social performance. By cooperating with others to develop a common framework for balanced corporate reporting and selecting the guidelines under which we report through dialogue with various stakeholders, we become more transparent to the world which is the fourth element of our work in this area.

I know General Motors and its many employees strive to be constructive influences in the community and to act responsibly in ways that consider the interests not only of our shareholders and employees, but the interests of all those impacted by what we do and say. This report provides our assessment of our progress and will enable the reader to be more informed of GM's record of performance in being a force for a better world.

Tom Gottschalk
Executive Vice President - Law and Public Policy

Vision Statement

At General Motors, we have been left an important legacy by those who went before us - a legacy of doing business the right way. This tradition represents a great asset for our company, but it also brings with it a tremendous responsibility.

Vision

GM's vision is to be the world leader in transportation products and related services. We will earn our customers' enthusiasm through continuous improvement driven by the integrity, teamwork and innovation of GM people. Becoming the best is an unending journey, a constantly changing destination. But that's where we're determined to drive - one car, one truck, one customer at a time.

Values

We have defined six core values to guide our global business conduct:

1. Customer enthusiasm
2. Integrity
3. Teamwork
4. Innovation
5. Continuous improvement
6. Individual respect and responsibility

Our employees conduct their day-to-day business with the strong foundation of our core values. Integrity is one of our core values; we live it every day, with each decision we make and each action we take. Integrity transcends borders, language and culture; it's all about creating an environment that supports, and demands, proper business conduct. Doing the right thing is not always convenient, but it's essential to sustaining our culture of integrity and our leadership position in corporate responsibility. It means honest and accurate reporting of our performance, both internally and externally. It means competing - and succeeding - by the

rules, whether they are laws, regulations, or simply GM policy. It means making our actions match our words.

Communicating Values Internally

All six core values are outlined in a series of information booklets that we have circulated to all of our staff called .Winning with Integrity - Our Values and Guidelines for Employee Conduct. These guidelines demonstrate our global commitment to achieving business success with integrity, and cover personal integrity, integrity in the workplace, marketplace, society and its communities. We publish the guidelines in nine languages and also deploy them electronically via the GMability website. Each booklet discusses aspects of “Winning with Integrity” explaining our policies and expectations, with examples of situations employees might face, and suggestions of how they ought to deal with them. “Winning with integrity” also describes four cultural priorities that we consider to be critical to the success of our business, they are:

1. Enhance product and customer focus
2. Act as one company
3. Embrace stretch targets
4. Move with a sense of urgency

See the “Winning with Integrity” guidelines (only available online in English).

Responsibility Vision

At General Motors, we have long recognised the importance of government policies, international relations, environmental performance and labor and community responsibilities to our business. Recently, these issues have increased in visibility as the public, government, and nongovernmental organisations (NGOs) have looked to corporations and the private sector to play a leading role in addressing the impact of globalisation on living standards, economic development and environmental improvement.

This makes our commitment to corporate responsibility more important than ever. Our values are clear and reflected in our Guidelines for Employee Conduct, as well as our

commitment to the Global Sullivan Principles. The principles, developed under the guidance of the late Rev. Leon H. Sullivan, are a guide for responsible corporate behavior, emphasising the common goals of human rights, social justice and economic opportunity. We use the principles as the foundation for our corporate responsibility initiatives and measure our performance against the principles using the Global Reporting Initiative guidelines.

Innovation is a long-standing priority at GM, and our renewed commitment, our drive, is to build on that heritage. We've led in introducing innovative new technologies to the mass market. We focus on thinking beyond "the way it's always been done" to new ways - better ways – it can be done. Working as a team, building a collective passion for new ideas, we strive for automotive innovation that stands out from the competition and results in great cars and trucks.

We are also using innovation to reduce the environmental impacts of our plants. GM has reduced energy consumption from our facilities, eliminated the use of many materials in our production processes and developed innovative new approaches for reducing waste. We have also reduced the amount of material going to landfill in our North American operations by increasing the recycling and reuse of our waste materials as new useable products. In addition, we have initiated land-management initiatives in partnership with local governments to redevelop former GM manufacturing facilities and sites. Our goal is to convert these sites into productive, job-creating complexes that benefit local communities.

We continue our focus on health and safety initiatives, and on developing the skills and capabilities globally of our workforce. We also are expanding our education initiatives at the community level. Our long history of building strong partnerships with our employees, customers, investors, governments, communities, our dealers and others helps us to be responsive to the needs of our various stakeholders. By working with other businesses, governments and NGOs, we are making significant progress toward a responsible and sustainable future.

GM realises its vision of industry leadership by operating our business the right way worldwide. Our responsibility lies in building great cars and trucks, and in balancing the environmental, social and economic impacts of our industry.

Our Products

At GM, we are committed to providing our customers with “gotta have” products that are high quality and visually appealing, and to being leaders in fuel economy and safety. Every day our employees are looking for new and innovative ways to improve the products we manufacture.

Whether it is using fuel cells to virtually eliminate emissions, or developing safety systems that can help drivers avoid crashes, GM is working to provide products that meet the needs of both our customers and society as a whole.

Overview

GM Global Technology Strategy

Automotive leadership is demonstrated by companies that have applied and continue to apply the most innovative and appropriate technologies in ways that define and meet local customer and societal needs around the world. At GM, we approach the application of new technology to our vehicles with three simple and direct principles in mind:

GM needs to offer vehicles that people want to buy. If no one buys the product, the new technology has no real impact.

GM must meet basic business objectives. Technology cannot be sustained if automakers must heavily subsidise it. In today’s competitive market - with razor-thin profit margins -success only comes from selling vehicles at a price customers will pay and by keeping production costs in line with those prices.

GM has a responsibility to continue improving vehicle emissions and fuel economy.

Environmental Policy Guidelines

The GM Environmental Principles, adopted in 1991, apply to our facilities, products and employees worldwide, and provide guidance in the conduct of daily business practices. Each of our plants have local environmental guidelines that build on and implement GM’s Environmental Principles.

As a responsible corporate citizen, General Motors is dedicated to protecting human health, natural resources and the global environment. This dedication reaches further than

compliance with the law to encompass the integration of sound environmental practices into our business decisions.

The following environmental principles provide guidance to General Motors personnel worldwide in the conduct of their daily business practices.

1. We are committed to actions to restore and preserve the environment.

2. We are committed to reducing waste and pollutants, conserving resources, and recycling materials at every stage of the product life cycle.

3. We will continue to participate actively in educating the public regarding environmental conservation.

4. We will continue to pursue vigorously the development and implementation of technologies for minimising pollutant emissions.

5. We will continue to work with all governmental entities for the development of technically sound and financially responsible environmental laws and regulations.

6. We will continually assess the impact of our plants and products on the environment and the communities in which we live and operate with a goal of continuous improvement.

Ford

Executive Statement

Letter from Bill Ford
Chairman and CEO

Moving Our Vision from Concept to Reality

When I became Chairman of Ford Motor Company five years ago, I pledged that we would distinguish ourselves as a great company through our efforts to make the world a better place. Shortly after that, we published our first Corporate Citizenship Report, which sketched the

broad outline of an expanded definition of corporate citizenship. In it, we made a public commitment to strengthen our connection with society and play an active role in bringing about the transition to greater economic, social and environmental sustainability.

In the last five years we've had many successes and a few setbacks as we explored these new ideas and worked to turn them from aspiration to action. One thing that has not changed is my belief that improved sustainability performance is not just a requirement, but a tremendous business opportunity. I want our Company to be a leader in driving the transition and to be in a position to benefit from it.

My family connects me to the automotive business in a unique way. I feel a special responsibility and pride in the contributions Ford makes to the quality of life of our employees, customers, business partners and neighbors worldwide. I am dedicated to ensuring that we are the best automotive company in the world, by any measure.

Commitment to Candor

Our Corporate Citizenship Reports are an ongoing account of our efforts to make that vision a reality. In our 1999 report, we were the first automaker to publicly acknowledge environmental and other concerns related to sport utility vehicles. In our 2000 report, we were among the first automakers that attempted to understand and estimate the global greenhouse gas emissions associated with the entire lifecycle of our vehicles, both new and those already on the road. And last year, we acknowledged and discussed not meeting our goal of improving SUV fuel economy by 25 percent by 2005.

Such transparency is still uncommon in our industry. I view it simply as an acknowledgement and explanation of changing business realities. But some see it as an admission of failure, while others use it to question our intentions. Transparency and open dialogue can be uncomfortable at times, but I believe these are prerequisites for building the trust required to move forward.

Dialogue presents an opportunity to understand other perspectives and approaches to issues. When we find ourselves disagreeing with people whose points of view we respect – which is inevitable – we need to offer viable alternatives. We must continue to work hard to

improve both our communication and our constructive participation in the search for workable and effective solutions to the important problems we face.

On April 16, 2004, Ford Motor Company was presented with a North American Sustainability Reporting Award from the Coalition for Environmentally Responsible Economies (CERES) and the Association of Chartered Certified Accountants (ACCA). The award was in recognition of excellence in sustainability reporting for our Corporate Citizenship Report released in 2003. It noted our candor in addressing our challenges as well as describing the progress we made.

This award is one indication of how far we've come in the last five years. But we've done much more in that time than just write about the issues we face. Many of the concepts we sketched out when we began this process are becoming reality, and our business is changing in new and exciting ways.

Five Years of Progress

In recent years, by necessity, much of our focus has been on the economic dimension of sustainability. In January 2002, I announced a comprehensive, long-term plan to return Ford Motor Company to profitability. The first phase of our plan – stabilising our business and getting it back on a sound operational and financial foundation – is done. As a result of our continuing efforts, our overall financial results have improved by about $5 billion in two years, which is ahead of plan. Our employees, dealers and suppliers all contributed to this achievement, and each of us should feel proud of our accomplishments.

Because of difficult economic conditions, it was important that we concentrated on short-term business issues. However, even as we worked to improve on the basics of our business, we did not ignore or forget about our long-term commitment. As a result, many of the projects that we embarked on when I became Chairman have already been completed or will be shortly.

Our new Ford Escape Hybrid, which will reach dealer showrooms later this summer, is the cleanest and most fuel-efficient SUV in the world. It uses a combination of gasoline and electric power to deliver more than 35 miles per gallon in city driving without compromising versatility or performance. The hybrid system also meets the strictest emissions standards.

New technology that offers customers no-compromise solutions to concerns about fuel prices and greenhouse gases is becoming a major competitive advantage in our industry. The fastest way to bring about the transition we are seeking is through the market and competition. We plan to be at the forefront and differentiate ourselves in an industry in which this is becoming increasingly difficult to achieve.

In addition to the Escape Hybrid, we will market a hybrid version of the Mercury Mariner compact SUV in 2006, and a hybrid midsize car after that. We are also developing a range of advanced technologies to help us move to the next step. We are developing a full range of production and research vehicles intended to help chart a course to a hydrogen-powered future. Our research fleet includes vehicles powered by hybrid and nonhybrid hydrogen internal-combustion engines and dozens of Focus fuel cell vehicles that we are deploying in the United States, Canada and Germany.

To secure their role in providing mobility to a growing and changing world, automobiles of the future must have dramatically lower smog-forming and greenhouse gas emissions. That future will become a reality, and we will be driving that change. I have asked a group of our senior leaders to develop a sensible approach to the issues of climate change, energy security and fuel economy. Some of their viewpoints are shared in this report. Their work will drive our product development. It is a key element in building our Company for the next 100 years.

Another recently completed project that points toward our vision of the future is the renovation of the Ford Rouge Center in Dearborn, Michigan. The goal of what we called the Heritage Project was to transform our Rouge complex – which was built more than 85 years ago as the world's first totally integrated manufacturing site – into a model of sustainable manufacturing. To do that, we combined advanced environmental technologies within a world-class lean manufacturing center.

The renovations included a new lean and green manufacturing facility, the Dearborn Truck Plant, which recently began producing F-150s. It is the first all-new assembly plant built in the Rouge complex since it was first developed, and our first anywhere in the United States in more than 25 years. We built it on an existing site because of our legacy at the Rouge and our strong commitment to our employees and the local community.

Dearborn Truck, which is the flagship of our all-new, next-generation flexible manufacturing system, is also clean, energy efficient and environmentally friendly. It features the world's largest "living roof," with more than 10 acres of sedum plants that help to clean the air, generate oxygen and manage stormwater runoff.

In renovating the Ford Rouge Center, we drew on the inspirations of our past and our aspirations for the future. In a way it has become a very real symbol of where Ford Motor Company is going – building on our heritage, but reinventing and redefining it for the 21st century.

We are eager to share this new icon of sustainable manufacturing with the world. To do that, we are reinventing another great tradition from our past – the Rouge tour. In partnership with The Henry Ford, America's Greatest History Attraction, we are once again inviting the world to come to Dearborn and see how automobiles are made.

We have made real progress in a number of other areas. To clarify our intentions internally and externally, we developed a comprehensive set of Business Principles. The Principles are now being embedded into our planning processes and performance scorecards, making explicit our high standards regarding products and customers, the environment, safety, community, quality of relationships, financial health and accountability. To address human rights in our facilities and our supply chain, we engaged with internal and external partners to develop the most stringent Code of Basic Working Conditions in the automotive industry, which we are now in the process of implementing.

We are taking our philosophy of being profitable and responsible to other emerging markets around the world. Projections show that the Asia- Pacific region will be the fastest-growing market for the automotive industry in the coming decade, with China accounting for the largest part of that growth. We have plans to be aggressive in participating in that growth and strengthening our presence in the region. I believe that more sustainable business practices are critical in realising those goals.

Looking Ahead

Our ultimate goal is to build great products, a strong business and a better world. As with the vehicles we create, this goal is evolving over time from initial concept to final product. We

know that true leadership will require strong vision and values, as well as perseverance and patience. It also will require dedicated leaders and active partners.

This report includes the perspectives of some of the pioneers, from inside and outside the Company, on the transformation that is occurring and how we are responding. I invite you to read their comments, learn about the steps we are taking and join us in bringing our commitment from concept to reality.

Vision Statement

There is no clear, distinct section that outlines the vision of Ford in the 2003-04 report. The (long) Chairman's letter appears to be the vehicle for this. Reporting is then done against Ford's Business Principles (see below). Therefore, the rest of the report examines how the company is meeting its business principles and objectives, so that the 'vision' is never really expressed in one place, other than in the business principles. However, throughout the report a variety of 'voices' from within the firm as well as external to it are quoted in the relevant sections. The ones commenting on environmental factors are copied below.

Susan Brennan
Director, Manufacturing – Vehicle Operations

As part of the yearly business planning process, Vehicle Operations does a "gap analysis" to see how our actions and results stack up against the manufacturing scorecard. In 2003, we added a check and balance against each of the seven Business Principles. We wanted to make sure there was alignment among the Business Principles, what we do and what we measure – both on paper and in intent.

The scorecard integrates well with the Principles. Take the Community Principle, for example. Our plants have a major impact. If we are not the largest employer in any given community, we are one of them. Our employees contribute a great deal to the community. We are responsible for providing a safe and healthy environment for both employees and community members. So, in practice, there is strong integration among the Community Principle, the scorecard measures and our actions. That gives us accountability. Now we must continue to support our plants with tools that enhance what they are doing.

Beyond manufacturing, I've been part of a team looking at climate change and the reduction of greenhouse gas emissions. This is an area where we need greater alignment between our aspirations and actions. Times are changing; I hear more questions about fuel economy. It's an attribute that is being placed higher on our customers' decision tree – and our own.

Given Ford's strong problem-solving culture, our team has spent time first defining the problem before we start fixing it. This approach holds as true for greenhouse gas emissions as it does for critical business issues like quality.

The product side is where this gets exciting, because one way of shifting the internal culture is getting people to recognise fuel economy – as J.D. Power already does – as a quality issue. This discussion inside the Company couldn't have happened at a better time. As the culture and opinions evolve, we're finally hitting the wall with the concept of "bigger is better."

Ford Motor Company is at a crossroads. We must choose the right path on climate change. Our customers are demanding accountability from us in this area. It's a leadership choice that should not be dictated to us by the government, because sound business drivers are in place. We must deliver, and I am convinced that we're going to do just that.

Fran Leedham
Group Environment Manager, Jaguar and Land Rover

"Sustainable development" is a priority at Jaguar and Land Rover, and appears in our corporate business plan and scorecard. This enabled us to begin to develop a comprehensive and balanced set of sustainability requirements.

It is essential that Jaguar and Land Rover balances and integrates its economic, social and environmental responsibilities. This is highly cross-functional, requiring all areas to make a contribution. Our internal governance structures support implementation and monitor delivery of the requirements.

Our scorecard process, with the identification of business priorities and creation of supporting deployment actions and clear metrics, enables recognition at all levels. It elevates performance in the area of sustainable development to sit alongside other business imperatives.

A key element of business integration is the Ford Business Principles, which provide strategic direction and a framework of global and corporate values. The Principles establish the highest levels of operation across the Ford family of brands. The development of our scorecard and, in particular, the sustainable development priority, is linked to the Principles. Through 2004, we will continue to map our activities to demonstrate alignment and to identify gaps and opportunities. One of the benefits of the Business Principles is that they offer high-level values without being overly prescriptive, thereby enabling the brands to develop the most appropriate delivery mechanisms.

However, integration is more than just lining up what we are currently doing against the Business Principles and communicating it. We must recognise the responsibilities that come with being a major, global organisation and the influences we have, both positive and negative. Adopting a set of principles means we must uphold these values in our decisions and our actions to make the commitment real. This is the challenge sustainable development presents. While I'm certain we'll get there, it's going to take time and creativity.

Phil Martens
Group Vice President, Product Creation

As a company operating in markets around the world, we have the advantage of a global perspective. One of our challenges is to effectively apply what we learn from that perspective across the entire Company.

Having spent considerable time in Europe and Japan, I've had the opportunity to see how different societal and environmental conditions influence attitudes towards fuel economy. Congestion, high fuel prices and public awareness have resulted in a stronger demand for fuel-efficient vehicles in these places. The technology to improve efficiency and reduce emissions differs, however. In Europe, diesels are approaching half of all new car sales, and four-cylinder engines dominate the landscape. In Japan, hybrids are making headway. There is no single global solution.

In North America, there are mixed and often conflicting signals from the market. On the one hand, our customers want better fuel economy to benefit their pocketbook and the environment, as well as address concerns they have about energy security. However, horsepower, handling and performance capture imaginations and influence purchases.

The competitive and technological landscape is changing this dynamic. Today, fuel efficiency and environmental performance are significant competitive battlegrounds. Technologies like hybrids and clean diesels are beginning to resonate.

It's not that our customers want these environmental benefits at any expense. Quite the opposite. They're saying they want it all at little additional cost. They don't want tradeoffs between environmental performance and the power, comfort and safety they've grown to expect. Our products must reflect this "no compromises" attitude. Look no further than the Ford Escape Hybrid to see how well this view actually fits with our brands and culture.

We learned a great deal about product development through engineering the Escape Hybrid. We developed our own leading-edge hybrid system to build our technology capabilities in-house. We figured out how to marry the primary demands of our customers for performance, features and value with their desire for environmental benefits.

The market isn't standing still, and neither are we. Our re-energised product-creation process is providing a true competitive advantage. This is key to our product-led future.

Jim Gouin
Vice President and Controller

In finance, various groups and institutions are starting to discuss and quantify how climate change and greenhouse gas emissions might affect the income-producing power, and therefore value, of assets. This is particularly relevant for industries and firms like ours that currently rely on carbon intensive processes or products.

Research is emerging that analyzes the nature and magnitude of potential risks to corporate value related to greenhouse gas emissions. Key financial service sectors are beginning to factor the potential effects of climate change into their decision making. This includes risk avoidance as well as opportunities for investment in new technologies that can reduce greenhouse gases. Pension fund managers and administrators globally, including a number of U.S. state and local treasurers convened by CERES, have joined together to discuss the financial risks they may face because of investments in companies whose products and services have an adverse effect on climate change.

The growth in this activity is understandable. Mechanisms to measure and ultimately control greenhouse gas emissions are starting to emerge, including schemes to "trade" carbon

credits. While currently voluntary in nature, these schemes could become real constraints with mandatory compliance. If that happens, companies will need strategies to reduce greenhouse gas emissions to succeed in an increasingly "carbon-constrained" world.

Compelling evidence exists to support the conclusion that global warming will continue. The challenge for Ford is to identify strategies and actions that can deliver meaningful improvements in greenhouse gas emissions while maintaining sustainable and acceptable financial returns. Often these objectives are at odds – which is one of the primary reasons we cannot always move as fast as we might like. Looking ahead, one of our key roles will be to ensure that Ford's decision models and reporting metrics provide an appropriate balance between both the short-term costs and long-term benefits related to actions that reduce greenhouse gas emissions.

There is often a risk for strategic issues like this to be "overshadowed" by pressing near-term traditional business issues. However, we at Ford realise that starting early and regularly monitoring our progress on the issue of climate change is critical to our long-term corporate viability and financial success.

Dave Szczupak
Vice President, Powertrain Operations

Hybrid electric vehicles are grabbing plenty of attention these days. They offer an exciting alternative – one that does not sacrifice performance or convenience. The early interest in our Escape Hybrid has been so encouraging that we will be offering full hybrid powertrains in two more models – the Mercury Mariner and our new midsize sedan. These vehicles will help us create a mass market for hybrids and continue to make them more affordable.

But hybrids aren't the only game in town. We are in various stages of bringing to market advanced gasoline, clean diesel, hydrogen and fuel cell powertrains. No one is sure which combination of technologies will ultimately prevail, but we are confident that alternatives to traditional gasoline engine powertrains will continue to emerge. Winning technologies will need to have significantly better fuel economy and lower lifecycle emissions while meeting customer expectations of safety, availability, reliability, driveability and cost.

So we are working along several different paths – advancing the science, improving the engineering and working with others on broader issues. We want to ensure that we prepare for changing markets and also help bring about the change.

As we began to consider a comprehensive strategy on climate change, we asked several environmental organisations and activist groups to work with us, provide advice and exchange points of view. Some of us in the operational side of the business did not know what to expect, though we knew we would be talking with some of our toughest critics. And we genuinely wanted to hear the perspective they bring to the issue.

We sat at the table and listened to – and learned from – views quite different from our own. We didn't – and still don't – agree on everything: how far, how fast and how much. But we do agree that climate change is real and requires significant change across many industries, including our own. We found common ground around the need to build markets for the new technologies we're developing. And we agreed on a range of issues that must be addressed to develop viable solutions.

We will continue to engage with external groups in our plans going forward. I believe the exchange will result in better plans and better products.

Sheri Shapiro
Marketing Manager, Escape Hybrid

There are many preconceived notions as to who is interested in purchasing hybrids. We're learning that these customers are "opinion influencers." They are the go-to people, the ones most often asked for opinions or advice. They are naturally curious about technology and its benefits and thus, research products more than the average customer. They care about leaving the world a better place for their children and grandchildren. They tend to be leaders in their communities.

These consumers want to buy products from companies that share their values. They are asking us, "What else are you doing environmentally?" So we're reaching out and communicating about our commitment, inviting people to do things like drive the vehicles, tour the Rouge facility or sign up for our e-newsletter to receive the most up-to-date information on the Escape Hybrid and other environmental initiatives.

We've had positive impressions so far. People love the look of the vehicle – that it doesn't look different – just a few key visual cues tell you it's a hybrid. They find it comfortable and roomy. They enjoy the on-board display and seeing which mode the

Environmental Policy Guidelines

(These are Ford's Corporate Social Responsibility Guidelines, Available in total from http://www.ford.com/en/company/about/corporateCitizenship/report/overviewPrinciples.htm, accessed 4 January 2005, also broken down and reported against in separate sections in the 2003/04 Corporate Citizenship Report)

Ford Motor Company is committed to creating value for our shareholders over the long term through the delivery of excellent automotive products and services and to do so ethically and responsibly. These Principles will guide our decisions and actions globally. As a whole, they set the standards by which we judge ourselves and by which we hope to be judged by others.

Products and customers

We will offer excellent products and services. We will achieve this by:

- Focusing on customer satisfaction and loyalty and keeping our promises.
- Using our understanding of the market to anticipate customer needs.
- Delivering innovative products and services that offer high value in terms of function, price, quality, safety and environmental performance.

Safety

We will protect the safety and health of those who make, distribute or use our products. We will achieve this by:

- Working to create the safest possible workplace.
- Striving to continuously reduce the risk of accidents, injuries and fatalities involving our products.

- Striving to protect people and property.

Financial health

We will make our decisions with proper regard to the long-term financial security of the Company. We will achieve this by:

- Striving to create value for our shareholders that is sustainable over the long term.
- Seeking enhanced stakeholder loyalty as a route to competitive advantage and long-term growth.

Environment

We will respect the natural environment and help preserve it for future generations. We will achieve this by:

- Working to provide effective environmental solutions
- Working to continuously reduce the environmental impacts of our business in line with commitment to contribute to sustainable development
- Measuring, understanding and responsibly managing our resource use, especially materials of concern and nonrenewable resources
- Working to eliminate waste

Community

We will respect and contribute to the communities around the world in which we work. We will achieve this by:

- Respecting and supporting, in line with the legitimate role of business, the basic human of all people within our businesses and throughout our entire value chain.
- Being sensitive to, and engaging in, the cultures of the communities in which we participate.

- Making responsible and mutually beneficial investment in the communities we serve.

Quality of relationships

We will strive to earn the trust and respect of our investors, customers, dealers, employees, unions, business partners and society. We will achieve this by:

- Building and maintaining a caring culture of partnership and mutual benefit.
- Developing individual and team skills so employees may reach their full potential and contribute to the success of the Ford Motor Company.
- Creating a business climate that encourages innovation, learning and exceptional performance.
- Actively pursuing the benefits derived from a diverse workforce, as well as those from the diversity of perspectives provided by our stakeholders.

Accountability

We will be honest and open and model the highest standards of corporate integrity. We will achieve this by:

- Being responsive to stakeholders' concerns on the impact of our operations, products and services through public disclosure and regular reporting.
- Making accurate and forthright statements, competing ethically, avoiding conflicts of interest and having zero tolerance for the offer, payment, solicitation or acceptance of bribes.

Appendix E: Coding of Environmental Reports

The text of firms' environmental reports was analysed using QSR NVivo 2.0 qualitative analysis software. This software allows codes to be applied to the text for recurring concepts expressed. Coding was applied to those sections of environmental reports where rationales for action are outlined, rather than the action itself. Thus, codes were applied to executive statements at the front of reports, sections on the company's 'vision' vis a vis the environment, and the firm's actual environmental policy guidelines.

The rules employed for coding are summarised below. Following this, tables presenting the detailed results of coding are provided.[1]

Coding Rules Applied

The following coding rules were applied:

- Paragraphs were regarded as the maximum unit for coding. No coding was applied across paragraphs for the reason that each represents a new idea, or a new idea on the same subject. Therefore, a separate code is warranted.

- Sometimes a code was applied twice or more within a paragraph if separated by a sentence/sentences that represent another idea. Where contiguous sentences express a rationale for action based on the same idea, these were not coded separately, but were coded once together.

- Because product and product development is the area of analysis, with environmental impact of passenger cars in use the focus rather than manufacturing processes, no coding was applied to passages relating to manufacturing.

- All coding was based on rationales for action, not on the action itself unless this is in some way attached to the rationale (e.g. a reference to emission reductions expressed in reference to state regulatory requirements). Statements that were coded answer the question of *why* action is being taken, rather than the fact that action is being taken per se.

Many passages were coded more than once. For example, statements that relate to the codes for responsibility to the company's direct stakeholders and the code for broader responsibility to society in general are often found in the same statements, along with others, such as in the following statement from Volkswagen's environmental report:

> For Volkswagen, sustainability means having access to, and the long term safeguarding of, resources at all levels: capital, employees, technology, raw materials, knowledge and reputation among clients and the general public.[2]

This statement was coded for environmental sustainability (the concept that starts the sentence); brand value (i.e. "reputation among clients"); responsibility to society – unspecified (i.e. "the general public"); and responsibility to stakeholders (i.e. "capital", "employees" and "clients"). Thus, this is a complex statement that includes several rationales for action, all of which require coding.

Detailed Results of Coding

When compiling the following tables, the coding of Nissan's *Environmental Report* and *Sustainability Report* were combined, and likewise for Honda's *Environmental Annual Report* and *Ecology*. The rationale for doing so is that these companies intend the reports to be complementary and inform one another, and therefore they should be read together.[3]

For the sake of comparison, percentages are primarily used when comparing coding applied to the text between firms. The intention in so doing is to avoid the spurious effects of using raw frequencies of codes from passages of different lengths, or from passages that do not offer as many rationales for action as others. What is of interest is the relative emphasis on different rationales for action, not the total number of codes applied for each. However, the coding frequencies from which percentages were calculated is also made available here, and is consulted where the frequency of coding on individual codes is so low that it produces more 'extreme' percentages than might be warranted (e.g. if only one code is applied for a given factor, this would result in a percentage of 100 percent for this code within that factor), or when the frequency on a given code is so high that it deserves comment.

Executive Statement

Table E1: Material Factors – Market Forces

		Competition			Safeguarding Financial Returns				Proactive Action		
		Consumer Demand	Competitive Pressure from Other Firms	TOTAL (no multiple coding)	Profits and Sales	Shareholder Value	Risk Management	TOTAL (no multiple coding)	Market Share/ Leadership	Business Opportunity	TOTAL (no multiple coding)
GERMANY	**Volkswagen**	2	0	**2**	1	0	0	**1**	0	0	**0**
	BMW	1	0	**1**	2	1	0	**2**	1	0	**1**
	DaimlerChrysler	0	0	**0**	0	0	0	**0**	1	1	**2**
JAPAN	**Toyota**	0	0	**0**	2	0	0	**2**	1	0	**1**
	Honda	2	0	**2**	0	0	0	**0**	1	0	**1**
	Nissan	4	0	**4**	1	0	0	**1**	0	0	**0**
US	**General Motors**	1	0	**1**	0	1	0	**1**	3	0	**3**
	Ford	1	1	**2**	3	0	0	**3**	3	3	**6**
TOTAL		11	1	**12**	9	2	0	**10**	10	4	**15**

Table E2: Material Factors – State Regulation

		International Regulation			National Regulation			General	TOTAL
		Meetings	Voluntary Agreements	Protocols	Input to Policy/ Regulations	Voluntary Agreements	Legislation (complying/ exceeding)	(complying/ exceeding)	
GERMANY	**Volkswagen**	1	1	0	0	0	1-exceeding	0	3
	BMW	0	0	0	0	0	0	0	0
	DaimlerChrysler	0	2	0	0	1	0	1-exceeding	4
JAPAN	**Toyota**	0	0	0	0	0	1-complying	0	1
	Honda	2	1	2	0	0	1-exceeding	0	6
	Nissan	0	0	0	1	0	1-complying	0	2
US	**General Motors**	1	4	0	0	0	0	0	5
	Ford	0	1	0	0	0	0	1-complying	2
TOTAL		4	9	2	1	1	4	2	23

Table E3: Material Factors – State Regulation in terms of Voluntary Agreements, Legislation and Policy Input

		National and International Voluntary Agreements	National and International Legislation	Input to the Policy Process	TOTAL
GERMANY	**Volkswagen**	1	1	1	3
	BMW	0	0	0	0
	DaimlerChrysler	2	1	0	3
JAPAN	**Toyota**	0	1	0	1
	Honda	1	3	2	6
	Nissan	0	1	1	2
US	**General Motors**	4	0	1	5
	Ford	1	0	0	1
TOTAL		9	7	5	21

Note: This table is similar to Table E2 but with the focus not on international versus national regulation, but instead on the *type* of regulation (i.e. voluntary agreements, legislation or policy input). National and International Voluntary Agreements = national and international voluntary agreements. National and International Legislation = international protocols, complying with or exceeding national legislation, and complying with or exceeding general regulations. Input to the Policy Process = international meetings and national input to policy/regulations. There are some discrepancies in totals between Tables E2 and E3 due to double coding being eliminated in the latter (e.g. some sentences in the text may have referred to both national and international voluntary agreements so in Table E2 they were coded for both to recognise national and international dimensions, but in Table E3 there is only one code given as the statement refers to voluntary agreements generally).

Table E4: Normative Factors – Social Attitudes

		General Social Concern/Raised Awareness	Firm Image			Responsibility to society				Responsibility to Stakeholders
			Brand Value	Building Trust	TOTAL (no multiple coding)	Responsibility to Society (unspecificed)	Responsibility to Society (global)	Responsibility to Society (nation)	TOTAL (no multiple coding)	
GERMANY	**Volkswagen**	0	0	1	**1**	4	3	1	**8**	3
	BMW	0	3	1	**4**	0	0	0	**0**	1
	DaimlerChrysler	0	0	0	**0**	1	0	0	**1**	0
JAPAN	**Toyota**	0	1	2	**3**	0	2	1	**3**	1
	Honda	2	0	3	**3**	0	0	0	**0**	0
	Nissan	2	1	0	**1**	2	0	0	**2**	2
US	**General Motors**	0	0	1	**1**	1	0	0	**1**	3
	Ford	0	0	1	**1**	1	0	0	**1**	2
TOTAL		4	5	9	**14**	9	5	2	**16**	12

Table E5: Normative Factors – Internal Company Strategies

		Corporate Policy			History/Path Dependence	Leader's Vision
		Corporate Belief	Guiding Principle	TOTAL (no multiple coding)		
GERMANY	**Volkswagen**	3	1	**4**	4	0
	BMW	3	0	**3**	0	0
	DaimlerChrysler	0	0	**0**	1	0
JAPAN	**Toyota**	2	3	**5**	0	1
	Honda	3	1	**4**	2	0
	Nissan	4	0	**4**	0	1
US	**General Motors**	3	1	**3**	0	0
	Ford	3	1	**4**	1	6
TOTAL		21	8	**27**	8	8

Table E6: Environmental and Economic Sustainability

		Environmental Sustainability	Environmental and Economic Sustainability Linked	TOTAL
GERMANY	**Volkswagen**	19	2	21
	BMW	4	6	10
	DaimlerChrysler	3	0	3
JAPAN	**Toyota**	1	0	1
	Honda	2	0	2
	Nissan	8	4	12
US	**General Motors**	2	0	2
	Ford	4	1	5
TOTAL		43	13	56

Vision Statement

Table E7: Material Factors – Market Forces

		Competition			Safeguarding Financial Returns				Proactive Action		
		Consumer Demand	Competitive Pressure from Other Firms	TOTAL (no multiple coding)	Profits and Sales	Shareholder Value	Risk Management	TOTAL (no multiple coding)	Market Share/ Leadership	Business Opportunity	TOTAL (no multiple coding)
GERMANY	**Volkswagen**	4	0	**4**	0	1	0	**1**	2	0	**2**
	BMW	0	0	**0**	2	6	5	**13**	2	1	**3**
	DaimlerChrysler	0	1	**1**	1	0	0	**1**	2	1	**3**
JAPAN	**Toyota**	0	1	**1**	0	0	0	**0**	3	0	**3**
	Honda	0	0	**0**	1	0	0	**1**	2	0	**2**
	Nissan	2	0	**2**	0	0	0	**0**	0	2	**2**
US	**General Motors**	5	1	**6**	1	0	0	**1**	5	0	**5**
	Ford	9	2	**11**	1	1	1	**2**	3	3	**5**
TOTAL		20	5	**25**	6	8	6	**19**	19	7	**25**

Table E8: Material Factors – State Regulation

		International Regulation			National Regulation			General	TOTAL
		Meetings	Voluntary Agreements	Protocols	Input to Policy/ Regulations	Voluntary Agreements	Legislation (complying/ exceeding)	(complying/ exceeding)	
GERMANY	**Volkswagen**	6	9	0	2	2	1-exceeding	1-exceeding	21
	BMW	0	3	0	0	1	0	0	4
	DaimlerChrysler	2	5	0	1	0	0	1-complying 1-exceeding	10
JAPAN	**Toyota**	0	0	0	0	0	0	1-complying	1
	Honda	0	0	0	0	0	0	1-exceeding	1
	Nissan	3	2	2	0	0	4-complying 1-exceeding	1-complying	13
US	**General Motors**	0	1	0	0	0	0	1-complying	2
	Ford	1	0	0	0	1	0	0	2
TOTAL		12	20	2	3	4	6	7	54

Table E9: Material Factors – State Regulation in terms of Voluntary Agreements, Legislation and Policy Input

		National and International Voluntary Agreements	National and International Legislation	Input to the Policy Process	TOTAL
GERMANY	**Volkswagen**	11	2	8	21
	BMW	4	0	0	4
	DaimlerChrysler	5	2	3	10
JAPAN	**Toyota**	0	1	0	1
	Honda	0	1	0	1
	Nissan	2	8	3	13
US	**General Motors**	1	1	0	2
	Ford	1	0	1	2
TOTAL		24	15	15	54

Note: This table is similar to Table E8 but with the focus not on international versus national regulation, but instead on the *type* of regulation (i.e. voluntary agreements, legislation or policy input). National and International Voluntary Agreements = national and international voluntary agreements. National and International Legislation = international protocols, complying with or exceeding national legislation, and complying with or exceeding general regulations. Input to the Policy Process = international meetings and national input to policy/regulations. There are some discrepancies in totals between Tables E8 and E9 due to double coding being eliminated in the latter (e.g. some sentences in the text may have referred to both national and international voluntary agreements so in Table E8 they were coded for both to recognise national and international dimensions, but in Table E9 there is only one code given as the statement refers to voluntary agreements generally).

Table E10: Normative Factors – Social Attitudes

			Firm Image			Responsibility to Society				Responsibility to Stakeholders
		General Social Concern/Raised Awareness	Brand Value	Building Trust	TOTAL (no multiple coding)	Responsibility to Society (unspecificed)	Responsibility to Society (global)	Responsibility to Society (nation)	TOTAL (no multiple coding)	
GERMANY	**Volkswagen**	4	2	1	**3**	3	2	0	**5**	5
	BMW	0	4	5	**8**	3	0	0	**3**	3
	DaimlerChrysler	1	1	1	**2**	8	0	0	**8**	5
JAPAN	**Toyota**	1	3	2	**5**	3	1	0	**3**	2
	Honda	1	0	2	**2**	0	0	0	**0**	2
	Nissan	3	0	0	**0**	1	0	0	**1**	2
US	**General Motors**	1	2	0	**2**	2	1	0	**3**	2
	Ford	3	1	1	**2**	0	0	0	**0**	2
TOTAL		14	13	12	**24**	20	4	0	**23**	23

Table E11: Normative Factors – Internal Company Strategies

		Corporate Policy			History/Path Dependence	Leader's Vision
		Corporate Belief	Guiding Principle	TOTAL (no multiple coding)		
GERMANY	**Volkswagen**	3	5	**8**	2	0
	BMW	2	0	**2**	1	0
	DaimlerChrysler	0	7	**7**	0	0
JAPAN	**Toyota**	4	2	**6**	1	0
	Honda	4	3	**6**	4	0
	Nissan	4	1	**5**	7	0
US	**General Motors**	2	2	**4**	3	0
	Ford	0	3	**3**	0	0
TOTAL		19	23	**41**	18	0

Table E12: Environmental and Economic Sustainability

		Environmental Sustainability	Environmental and Economic Sustainability Linked	TOTAL
GERMANY	**Volkswagen**	36	3	39
	BMW	21	6	27
	DaimlerChrysler	13	4	17
JAPAN	**Toyota**	0	2	2
	Honda	2	2	4
	Nissan	2	2	4
US	**General Motors**	1	0	1
	Ford	5	4	9
TOTAL		80	23	103

Environmental Policy Guidelines

Table E13: Material Factors – Market Forces

		Competition			Safeguarding Financial Returns				Proactive Action		
		Consumer Demand	Competitive Pressure from Other Firms	TOTAL (no multiple coding)	Profits and Sales	Shareholder Value	Risk Management	TOTAL (no multiple coding)	Market Share/ Leadership	Business Opportunity	TOTAL (no multiple coding)
GERMANY	**Volkswagen**	1	1	**2**	0	0	0	**0**	0	1	**1**
	BMW	0	0	**0**	0	0	0	**0**	0	0	**0**
	DaimlerChrysler	0	0	**0**	0	0	0	**0**	1	0	**1**
JAPAN	**Toyota**	1	0	**1**	0	0	1	**1**	1	0	**1**
	Honda	0	0	**0**	0	0	0	**0**	0	0	**0**
	Nissan	1	0	**1**	0	0	2	**2**	0	0	**0**
US	**General Motors**	0	0	**0**	0	0	0	**0**	0	0	**0**
	Ford	1	0	**1**	1	2	0	**3**	0	0	**0**
TOTAL		4	1	**5**	1	2	3	**6**	2	1	**3**

Table E14: Material Factors – State Regulation

		International Regulation			National Regulation			General	TOTAL
		Meetings	Voluntary Agreements	Protocols	Input to Policy/ Regulations	Voluntary Agreements	Legislation (complying/ exceeding)	(complying/ exceeding)	
GERMANY	**Volkswagen**	0	0	0	2	0	0	1-complying	3
	BMW	0	1	0	1	0	0	1-complying 1-exceeding	4
	DaimlerChrysler	0	0	0	2	0	0	2-complying	4
JAPAN	**Toyota**	0	0	0	0	0	0	3-complying	3
	Honda	0	0	0	0	0	0	0	0
	Nissan	0	0	0	0	0	0	1-complying 1-exceeding	2
US	**General Motors**	0	0	0	1	0	0	1-exceeding	2
	Ford	0	0	0	0	0	0	0	0
TOTAL		0	1	0	6	0	0	11	18

Table E15: Material Factors – State Regulation in terms of Voluntary Agreements, Legislation and Policy Input

		National and International Voluntary Agreements	National and International Legislation	Policy Process	TOTAL
GERMANY	**Volkswagen**	0	1	2	3
	BMW	1	2	1	4
	DaimlerChrysler	0	2	2	4
JAPAN	**Toyota**	0	3	0	3
	Honda	0	0	0	0
	Nissan	0	1	0	1
US	**General Motors**	0	1	1	2
	Ford	0	0	0	0
TOTAL		1	10	6	17

Note: This table is similar to Table E14 but with the focus not on international versus national regulation, but instead on the *type* of regulation (i.e. voluntary agreements, legislation or policy input). National and International Voluntary Agreements = national and international voluntary agreements. National and International Legislation = international protocols, complying with or exceeding national legislation, and complying with or exceeding general regulations. Input to the Policy Process = international meetings and national input to policy/regulations. There are some discrepancies in totals between Tables E14 and E15 due to double coding being eliminated in the latter (e.g. some sentences in the text may have referred to both national and international voluntary agreements so in Table E14 they were coded for both to recognise national and international dimensions, but in Table E15 there is only one code given as the statement refers to voluntary agreements generally).

Table E16: Normative Factors – Social Attitudes

			Firm Image			Responsibility to Society				Responsibility to Stakeholders
		General Social Concern/Raised Awareness	Brand Value	Building Trust	TOTAL (no multiple coding)	Responsibility to Society (unspecificed)	Responsibility to Society (global)	Responsibility to Society (nation)	TOTAL (no multiple coding)	
GERMANY	**Volkswagen**	1	0	1	**1**	1	2	0	**3**	5
	BMW	0	0	0	**0**	1	0	0	**1**	3
	DaimlerChrysler	0	0	1	**1**	2	1	0	**3**	2
JAPAN	**Toyota**	0	0	1	**1**	1	2	1	**4**	3
	Honda	0	0	1	**1**	2	0	0	**2**	0
	Nissan	0	0	0	**0**	3	0	0	**3**	2
US	**General Motors**	0	0	0	**0**	0	0	0	**0**	0
	Ford	0	2	4	**6**	1	0	0	**1**	4
TOTAL		1	2	8	**10**	11	5	1	**17**	19

Table E17: Normative Factors – Internal Company Strategies

		Corporate Policy				
		Corporate Belief	Guiding Principle	TOTAL (no multiple coding)	History/Path Dependence	Leader's Vision
GERMANY	**Volkswagen**	5	4	**9**	0	0
	BMW	0	1	**1**	0	0
	DaimlerChrysler	6	1	**7**	0	0
JAPAN	**Toyota**	4	2	**6**	2	0
	Honda	1	0	**1**	0	0
	Nissan	7	2	**7**	1	0
US	**General Motors**	2	0	**2**	0	0
	Ford	0	0	**0**	0	0
TOTAL		25	10	**33**	3	0

Table E18: Environmental and Economic Sustainability

		Environmental Sustainability	Environmental and Economic Sustainability Linked	TOTAL
GERMANY	**Volkswagen**	3	3	6
	BMW	5	3	8
	DaimlerChrysler	1	0	1
JAPAN	**Toyota**	2	0	2
	Honda	0	1	1
	Nissan	2	0	2
US	**General Motors**	0	0	0
	Ford	2	0	2
TOTAL		15	7	22

Total Codes

Table E19: Summary of all Codes

		Material Factors		Normative Factors		Over-arching Concerns		
		Market Forces	**State Regulation**	**Social Attitudes**	**Internal Company Strategies**	**Environmental Sustainability**	**Environmental and Economic Sustainability Linked**	**TOTAL**
GERMANY	**Volkswagen**	13	27	39	27	58	8	172
	BMW	20	8	23	7	30	15	103
	DaimlerChrysler	8	17	23	15	17	4	84
JAPAN	**Toyota**	10	5	26	21	3	2	67
	Honda	7	7	13	17	4	3	51
	Nissan	12	16	18	25	12	6	89
US	**General Motors**	17	9	13	12	3	0	54
	Ford	33	3	22	14	11	5	88
TOTAL		120	92	177	138	138	43	708

Table E20: Summary of all Codes – Percentages

		Material Factors		Normative Factors		Over-arching Concerns		
		Market Forces (%)	**State Regulation (%)**	**Social Attitudes (%)**	**Internal Company Strategies (%)**	**Environmental Sustainability (%)**	**Environmental and Economic Sustainability Linked (%)**	**TOTAL (%)**
GERMANY	**Volkswagen**	8	16	23	16	34	5	100
	BMW	19	8	22	7	29	15	100
	DaimlerChrysler	10	20	27	18	20	5	100
JAPAN	**Toyota**	15	7	39	31	4	3	100
	Honda	14	14	25	33	8	6	100
	Nissan	13	18	20	28	13	7	100
US	**General Motors**	31	17	24	22	6	0	100
	Ford	38	3	25	16	13	6	100
TOTAL		17	13	25	19	19	6	100

Table E21: Summary of Material versus Normative Factors - Percentages

		Market Forces (%)	State Regulation (%)	TOTAL MATERIAL (%)	Social Attitudes (%)	Internal Company Strategies (%)	TOTAL NORMATIVE (%)	ALL MATERIAL AND NORMATIVE CODES (%)
GERMANY	**Volkswagen**	12	25	38	37	25	62	100
	BMW	24	14	48	40	12	52	100
	DaimlerChrysler	13	27	40	37	24	60	100
	GERMAN AVERAGE	**18**	**23**	**41**	**37**	**22**	**59**	100
JAPAN	**Toyota**	16	8	24	42	34	76	100
	Honda	16	16	32	30	39	68	100
	Nissan	17	23	39	25	35	61	100
	JAPAN AVERAGE	**16**	**16**	**32**	**32**	**36**	**68**	100
US	**General Motors**	33	18	51	25	24	49	100
	Ford	45	5	50	30	19	49	100
	US AVERAGE	**40**	**10**	**51**	**28**	**21**	**49**	100
ALL FIRMS		**23**	**18**	**40**	**34**	**26**	**60**	100

Table E22: Summary of Over-Arching Concern for Sustainability - Percentages

		Environmental Sustainability (%)	Environmental and Economic Sustainability Linked (%)	ALL CODES (%)
GERMANY	**Volkswagen**	88	12	100
	BMW	67	33	100
	DaimlerChrysler	81	19	100
	GERMAN AVERAGE	**80**	**20**	100
JAPAN	**Toyota**	60	40	100
	Honda	57	43	100
	Nissan	67	33	100
	JAPAN AVERAGE	**63**	**37**	100
US	**General Motors**	100	0	100
	Ford	69	31	100
	US AVERAGE	**74**	**26**	100
ALL FIRMS		76	24	100

Table E23: Material Factors – Market Forces in Detail

		Competition			Safeguarding Financial Returns				Proactive Action			TOTAL
		Consumer Demand	Competitive Pressure from Other Firms	TOTAL (no multiple coding)	Profits and Sales	Shareholder Value	Risk Management	TOTAL (no multiple coding)	Market Share/ Leadership	Business Opportunity	TOTAL (no multiple coding)	(no multiple coding)
GERMANY	**Volkswagen**	7	1	8	1	1	0	2	2	1	3	13
	BMW	1	0	1	4	7	5	15	3	1	4	20
	DaimlerChrysler	0	1	1	1	0	0	1	4	2	6	8
JAPAN	**Toyota**	1	1	2	2	0	1	3	5	0	5	10
	Honda	2	0	2	1	0	0	1	3	0	4	7
	Nissan	7	0	7	1	0	2	3	0	2	2	12
US	**General Motors**	6	1	7	1	1	0	2	8	0	8	17
	Ford	11	3	14	5	3	1	8	6	6	11	33
TOTAL		35	7	42	16	12	9	35	32	12	43	120

Table E24: Material Factors – Market Forces in Detail - Percentages

		Competition			Safeguarding Financial Returns				Proactive Action			TOTAL
		Consumer Demand (%)	Competitive Pressure from Other Firms (%)	TOTAL (no multiple coding) (%)	Profits and Sales (%)	Shareholder Value (%)	Risk Management (%)	TOTAL (no multiple coding) (%)	Market Share/ Leadership (%)	Business Opportunity (%)	TOTAL (no multiple coding) (%)	
GERMANY	**Volkswagen**	54	8	**62**	8	8	0	**15**	15	8	**23**	100
	BMW	5	0	**5**	19	33	24	**75**	14	5	**20**	100
	DaimlerChrysler	0	13	**13**	13	0	0	**13**	50	25	**75**	100
JAPAN	**Toyota**	10	10	**20**	20	0	10	**30**	50	0	**50**	100
	Honda	33	0	**29**	17	0	0	**14**	50	0	**57**	100
	Nissan	58	0	**58**	8	0	17	**25**	0	17	**17**	100
US	**General Motors**	35	6	**41**	6	6	0	**12**	47	0	**47**	100
	Ford	31	9	**42**	14	9	3	**24**	17	17	**33**	100
TOTAL		28	6	**35**	13	10	7	**29**	26	10	**36**	100

Table E25: Material Factors – State Regulation

		International Regulation			National Regulation			General	TOTAL
		Meetings	Voluntary Agreements	Protocols	Input to Policy/ Regulations	Voluntary Agreements	Legislation (complying/ exceeding)	(complying/ exceeding)	
GERMANY	**Volkswagen**	7	10	0	4	2	2	2	27
	BMW	0	4	0	1	1	0	2	8
	DaimlerChrysler	2	7	0	3	1	0	5	18
JAPAN	**Toyota**	0	0	0	0	0	1	4	5
	Honda	2	1	2	0	0	1	1	7
	Nissan	3	2	2	1	0	6	3	17
US	**General Motors**	1	5	0	1	0	0	2	9
	Ford	1	1	0	0	1	0	1	4
TOTAL		16	30	4	10	5	10	20	95

Table E26: Material Factors – State Regulation – Percentages

		International Regulation			National Regulation			General	ALL STATE REGULATION CODES (%)
		Meetings (%)	Voluntary Agreements (%)	Protocols (%)	Input to Policy/ Regulations (%)	Voluntary Agreements (%)	Legislation (complying/ exceeding) (%)	Legislation (complying/ exceeding) (%)	
GERMANY	**Volkswagen**	26	37	0	15	7	7	7	100
	BMW	0	50	0	13	13	0	25	100
	DaimlerChrysler	11	39	0	17	6	0	28	100
JAPAN	**Toyota**	0	0	0	0	0	20	80	100
	Honda	29	14	29	0	0	14	14	100
	Nissan	18	12	12	6	0	35	18	100
US	**General Motors**	11	56	0	11	0	0	22	100
	Ford	25	25	0	0	25	0	25	100
TOTAL		17	32	4	11	5	11	21	100

Table E27: Summary Material Factors – State Regulation in terms of Voluntary Agreements, Legislation and Policy Input

		National and International Voluntary Agreements	National and International Legislation	Input to the Policy Process	TOTAL
GERMANY	**Volkswagen**	12	4	11	27
	BMW	5	2	1	8
	DaimlerChrysler	7	5	5	17
JAPAN	**Toyota**	0	5	0	5
	Honda	1	4	2	7
	Nissan	2	10	4	16
US	**General Motors**	5	2	2	9
	Ford	2	1	1	3
TOTAL		34	32	26	92

Table E28: Summary Material Factors – State Regulation in terms of Voluntary Agreements, Legislation and Policy Input - Percentages

		National and International Voluntary Agreements (%)	National and International Legislation (%)	Input to the Policy Process (%)	TOTAL (%)
GERMANY	**Volkswagen**	44	15	41	100
	BMW	63	25	13	100
	DaimlerChrysler	41	29	29	100
JAPAN	**Toyota**	0	100	0	100
	Honda	14	57	29	100
	Nissan	13	63	25	100
US	**General Motors**	56	22	22	100
	Ford	50	25	25	100
TOTAL		37	35	28	100

Note: These tables are similar to Tables E25 and E26 but with the focus not on international versus national regulation, but instead on the *type* of regulation (i.e. voluntary agreements, legislation or policy input). National and International Voluntary Agreements = national and international voluntary agreements. National and International Legislation = international protocols, complying with or exceeding national legislation, and complying with or exceeding general regulations. Input to the Policy Process = international meetings and national input to policy/regulations. There are some discrepancies in totals between Tables E25 and E27 due to double coding being eliminated in the latter (e.g. some sentences in the text may have referred to both national and international voluntary agreements so in Table E25 they were coded for both to recognise national and international dimensions, but in Table E9 there is only one code given as the statement refers to voluntary agreements generally).

Table E29: Normative Factors – Summary Social Attitudes

		General Social Concern/Raised Awareness	Firm Image	Responsibility to Society	Responsibility to Stakeholders	TOTAL
GERMANY	**Volkswagen**	5	5	16	13	39
	BMW	0	12	4	7	23
	DaimlerChrysler	1	3	12	7	23
JAPAN	**Toyota**	1	9	10	6	26
	Honda	3	6	2	2	13
	Nissan	5	1	6	6	18
US	**General Motors**	1	3	4	5	13
	Ford	3	9	2	8	22
TOTAL		19	48	56	54	177

Table E30: Normative Factors – Summary Social Attitudes - Percentages

		General Social Concern/Raised Awareness (%)	Firm Image (%)	Responsibility to Society (%)	Responsibility to Stakeholders (%)	TOTAL (%)
GERMANY	**Volkswagen**	13	13	41	33	100
	BMW	0	52	17	30	100
	DaimlerChrysler	4	13	52	30	100
JAPAN	**Toyota**	4	35	38	23	100
	Honda	23	46	15	15	100
	Nissan	28	6	33	33	100
US	**General Motors**	8	23	31	38	100
	Ford	14	41	9	36	100
TOTAL		11	27	32	31	100

Table E31: Normative Factors – Summary Internal Company Strategies

		Corporate Policy	History/Path Dependence	Leader's Vision	TOTAL
GERMANY	**Volkswagen**	21	6	0	27
	BMW	6	1	0	7
	DaimlerChrysler	14	1	0	15
JAPAN	**Toyota**	17	3	1	21
	Honda	11	6	0	17
	Nissan	16	8	1	25
US	**General Motors**	9	3	0	12
	Ford	7	1	6	14
TOTAL		101	29	8	138

Table E32: Normative Factors – Summary Internal Company Strategies - Percentages

		Corporate Policy (%)	History/Path Dependence (%)	Leader's Vision (%)	TOTAL (%)
GERMANY	**Volkswagen**	78	22	0	100
	BMW	86	14	0	100
	DaimlerChrysler	93	7	0	100
JAPAN	**Toyota**	81	14	5	100
	Honda	65	35	0	100
	Nissan	64	32	4	100
US	**General Motors**	75	25	0	100
	Ford	50	7	43	100
TOTAL		73	21	6	100

[1] The literature informing the approach undertaken for coding and qualitative analysis includes P. Bazeley and L. Richards (2000), *The NVivo Qualitative Project Book*, London: SAGE Publications; G. Gibbs (2002), *Qualitative Data Analysis: Explorations with NVivo*, Buckingham: Open University Press; A. Bryman (2004), *Social Research Methods*, 2nd edition, Oxford: Oxford University Press; M. Denscombe (1998) *The Good Research Guide for Small Scaled Social Research Projects*, Buckingham: Open University Press; R. Yin (2003a), *Case Study Research: Design and Methods*, 3rd edition, Thousand Oaks: Sage Publications; and R. Yin (2003b), *Applications of Case Study Research*, 2nd edition, Thousand Oaks: Sage Publications.

[2] Volkswagen AG (2003), *Environmental Report 2003/2004: Partners in Sustainability*, Wolfsburg: Volkswagen AG, p.8.

[3] Honda Motor Company (2002), *Honda Ecology*, Tokyo: Honda Motor Company; Honda Motor Company (2004), *Honda Environmental Annual Report 2004*, Tokyo: Honda Motor Company; Nissan Motor Company (2004a), *Environmental Report 2004*, Tokyo: Nissan Motor Company; and Nissan Motor Company (2004b), *Sustainability Report 2004*, Tokyo: Nissan Motor Company

Appendix F: Participant Information Statement and Interview Questions

Participant Information Statement

Dear [INSERT NAME OF INTERVIEWEE]

Research Study on The Car Industry and the Environment
Participant Information Statement

Aim and purpose of the study
I am inviting office holders in selected major car firms to participate in interviews on their attitudes and perceptions with respect to environmental concerns. Taking an increase in concern for environmental sustainability generally in the last ten years as the backdrop for research, the study will look at attitudinal change within the car industry on the environment. This is the first detailed academic study of this kind, and I believe that it will potentially be of value to the industry as well as academic audiences.

What will be involved

- An interview about the vehicles produced by your firm and how they perform with respect to the environment (ie. how 'clean' or 'green' they are and how this has changed over the last ten years). The interview will include questions on: major initiatives being undertaken by your firm and why they are being undertaken, the role of government regulations, the role of market forces, and the challenges facing your firm with respect to the environmental performance of the vehicles it produces.
- The interview will last for about an hour and, with your permission, it will be audio taped.
- The entire transcript of the interview will not be used in any publications, and will only be seen by me. However, selected quotations will be used in publications and these quotations may identify you because of your unique position in the company.
- You will be sent a copy of the interview transcript for your own records; you will also be sent a copy of the written report detailing this research.
- You have the right to withdraw from the research study and the interview process, if the need arises, at any stage and without any repercussions.

I am a PhD candidate at the University of Sydney. Please feel free to contact me at any time with questions about this research project. My telephone numbers are XXXX XXXX or XXXX XXX XXX and email: XXXXXXXX@mail.usyd.edu.au.

If you are willing to be interviewed please return the enclosed Consent Form. I will then phone your office to arrange the time and place for the interview at your convenience.

John Mikler

Interview Questions

Interviews were conducted with key personnel in major German, US and Japanese companies. They were semi-structured in order to guide interviewees, but not so rigid as to prevent interviewees from deviating from the exact question asked in order to express a view they thought important. In particular, time was made at the end of interviews for interviewees to express any views they may have felt pertinent that were left out in the course of the interview process.

Nine interview questions asked. These were designed to allow the possibility of reflection on the part of interviewees. The questions asked were as follows:

1. What would you say are the major initiatives your firm is taking in producing vehicles that are more environmentally friendly? Why has your firm taken these initiatives?

2. In a business sense, how do you believe improvements in the environmental performance of the vehicles produced by your firm may be encouraged: government regulations, consumer preferences (market forces), internal company strategies? Please feel free to expand on your answer.

3. Do you believe the approach of government on environmental issues has changed in the last ten years? How?

4. What do you think the role of government should be in encouraging the production of more environmentally friendly vehicles? [PROMPT: standards, taxes, subsidies, penalties, rewards]

5. Does government policy shape the strategic direction taken by your firm with respect to the environment? If so how? Has this changed the strategic direction taken by your firm over the last 10 years?

6. What major market conditions, if any, have prompted your firm to improve the environmental performance of the vehicles it produces?

7. What changes have you noticed in consumer attitudes or demand in the last ten years with respect to the environment? Has this changed your firm's business significantly? How?

8. Which is most important in shaping your firms' long-term planning: consumer attitudes or actual consumer demand?

9. What do you believe are the major challenges facing your firm in the next ten to twenty years with respect to the environmental performance of the vehicles it produces? How do you think your firm will respond to these challenges?

Questions 1 and 2 are in the form of open questions that seek interviewees' opinions on what their company is doing and why. It allows them the opportunity to state, up front, the activities of their firm is taking with respect to the environment and the rationale for environmental strategies that have been adopted.

Questions 3 to 8 are designed to allow the interviewee to reflect on the statements made in questions 1 and 2. They broadly cover two themes. Questions 3 to 5 probe, from a variety of angles, the interviewee's conception of the role of government vis a vis the company's environmental strategies in product development, and how the company operates in the light of government action. Questions 6 to 8 are designed to elucidate opinions in a similar manner with respect to market forces. Hence, these two sets of questions go to examining how personnel in different companies from different countries perceived their firms' strategies as related to exogenous material factors, or the 'lens' through which such factors are interpreted.

Question 9, like questions 1 and 2, is an open question that seeks interviewees' opinions on what their company is likely to do in future and why. Coming at the end of the interview, it is designed to produce a response on what is likely to be the strategy of the company in future and the challenges it will face, 'coloured' by the issues and the perspectives on them already covered in the preceding questions. Posing a 'crystal ball

gazing' question at the end of the interview also gives interviewees an opportunity to reflect on what they have said in the course of the interview and add anything they believe is important that they may not have already highlighted.

Apart from questions 1, 2 and 9, there are no questions where interviewees were asked specifically about firm strategies that are not associated with external forces. In fact, only in question 2 is the possibility that firm strategies may have been generated internally with no relation to government regulations or market conditions raised, although the possibility for answering in this way is implicit in questions 1 and 9. The reason for this is twofold. First, the hypothesis that firms can generate such strategies independently should be spontaneously given rather than suggested in order to avoid confirmation bias. Secondly, this thesis is not so much concerned with the possibility that material factors are irrelevant (it would be incredibly naive to believe this) but that their importance and how they are perceived differs between different companies on the basis of their nationality.

In almost all cases, questions permitting simple 'yes' or 'no answers were avoided, and where they were asked (questions 3 and 5) this was done to get a clear response to the influence of government on business strategies, given that a key aspect of this thesis is whether regulation is a key factor in the internalisation of environmental externalities and because the Varieties of Capitalism approach, which strongly focuses on the role of government and government-business relations, underpins the institutional analysis conducted.

Appendix G: Key Aspects of the Firms Involved in Interviews

In Chapter 7, the point was made that the firms which granted access for interviews are key representatives of their national industries. The following presents a brief summary for the interested reader as to what characterises them, and therefore provides further details on just how they are representative of the industry from their respective territories.

Volkswagen

The Volkswagen Group is the major German volume producer and dominates the European market. In 2003, the company had the highest share of the European diesel market (23 percent), and diesel vehicles accounted for more of the company's European sales than any other company's European sales (55 percent). It also overwhelmingly makes its profits in Europe.[1]

Volkswagen has volume brands including Volkswagen, Skoda and Seat. Audi is its major premium brand. Fifty percent of the company's sales are from the volume Volkswagen brand, and 29 percent from Audi. Both are strong brands that manage to extract price premiums from consumers, to the extent that Volkswagen is sometimes seen as a 'sub-premium' brand with connotations of prestige for its products in many markets despite being the 'people's car'. Both are seen as technologically-advanced brands that offer a quality product with expertise in advanced diesel engines.[2]

BMW

As a premium rather than volume brand, BMW is a bit different from a company like Volkswagen. BMW's brand image is: prestige, sporty, quality. Its premium brand image allows it to extract high price margins and consumer loyalty for its products. As the leading global premium car brand, along with DaimlerChrysler's Mercedes, it is more internationally focused and internationally dependent for its revenues – e.g. 27 percent of its revenues and 35 percent of its profits are from US sales. Even so, the firm's most important markets are Germany and Europe which together account for 47 percent of its sales and 45 percent of its profits.[3]

Ford

Ford is an established, large volume-driven American firm that has a similar market profile to the other major US firm, General Motors. It relies on the North American market for 60 percent of

its revenues and virtually all of its profits. By contrast, the company makes losses in Europe, its other major market. In terms of its product line-up, 66 percent of its revenues and 80 percent of its profits are accounted for by sales of light trucks. Of the remaining 20 percent of its profits, nearly half of these (8 percent) are accounted for by the sale of luxury cars. In addition, the profitability of its automotive operations is slim. Virtually all its profits are derived from its finance operations, despite the fact that the finance division only accounts for 16 percent of its revenues. The company is dependent on sales of light trucks in North America to drive its finance operations.[4]

Ford has research and product development, manufacturing and sales operations in Australia and produces unique vehicles for the Australian market. In common with its general market profile these are larger vehicles. They include six cylinder passenger cars such as the Falcon, a light truck/cross-over vehicle called the Territory, and luxury V8s such as the Fairlane.

Toyota

Toyota is the largest Japanese volume manufacturer, and second largest car manufacturer in the world after General Motors. It is characterised by leading-edge technology, quality and reliability. It is the world leader in developing and selling cars featuring hybrid petrol-electric drivetrains, the first of which was the Prius. It is therefore also perceived as an innovator and risk-taker. Japanese firms make money from selling cars internationally more than German or US firms. Like Honda and Nissan, Toyota makes profits in every region of the world where it sells cars. The North American market, responsible for 28 percent of its sales, is particularly important to the firm and like other Japanese firms it continues to increase its market share in the US and Europe. Even so, like its Japanese counterparts Toyota dominates its home market more than German or US firms do theirs. Toyota depends on Japan for 51 percent of its sales.[5]

Like Ford, Toyota has research and product development, manufacturing and sales operations in Australia where it is the number one brand on the basis of sales volume.

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