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Proactive Compliance?

Repercussions of National Product Regulation in Standards of Transnational Business Networks

ABSTRACT

This paper (‘Sfb-Arbeitspapier’) illustrates the links between the self-regulation of transnational business networks and the law by analysing the management of chemical substance risks in the electric and electronic equipment industry. National product regulation (and to some extent regulation of production processes) can influence standards employed globally by leading corporations within their network of suppliers and contract manufacturers. However, it is also shown that the diffusion of regulatory standards within transnational production networks is not a linear process: corporate actors to some extent selectively appropriate standards and proactively self-regulate substances of concern that are not yet regulated by state-based law. Similarly, the suppliers may also influence the contents of the standards used in the network.

CONTENTS

Proactive Compliance?

Repercussions of National Product Regulation in Standards of Transnational Business Networks[1]

I. INTRODUCTION

According to popular opinion, economic globalisation and stringent environmental standards do not go well together: In the context of global trade and open markets, economic actors are free to choose their locations with regard to the costs and benefits of the applicable legal orders. The nation state, which used to be the sovereign author of mandatory regulation, has– according to this view – become a mere subject of regulatory competition. In consequence, this is expected to lead to an erosion of often costly environmental requirements in OECD countries (the so-called ‘Delaware effect’, or ‘race to the bottom’). While the notion of regulatory competition makes some sense regarding the rules applicable to production processes in the context of foreign direct investments, product standards in the context of free trade follow a different logic (see Scharpf, 1994: 480 ff.).

In contrast to production facilities that can theoretically be relocated in low-standard jurisdictions to circumvent environmental regulation, the products themselves have to be adapted to various regulatory contexts to be globally marketable. Instead of differentiating between production lines for various markets, transnational corporations need to design uniform products that comply even with the strictest jurisdiction to reap the benefits of economies of scale and avoid transaction costs (Douglas and Craig, 1995: 9; Vogel, 1995: 250). Some political scientists and environmental lawyers therefore stress that the ‘race to the bottom’-effect does not apply to environmental regulation in the context of free trade in general (Rehbinder and Stewart, 1985; Scharpf, 1994). The dynamics of environmental product regulation have even been described as having a ‘California’ rather than a ‘Delaware’ effect (Vogel, 1995: 5 f).[2] Accordingly, not regulatory

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1 This text will be published in: *Responsible Business: Self-Governance In Transnational Economic Transactions*, Olaf Dilling, Martin Herberg & Gerd Winter, eds., Oxford: Hart Publishing, forthcoming. It owes a lot to helpful comments on earlier drafts by Martin Herberg, Fabian Sosa and Gerd Winter, and to the other participants of our workshop in June 2005 at the International Institute for the Sociology of Law in Oñati, Spain. It has also profited from the comments of two anonymous reviewers. The relentless efforts of my mother, Karin Dilling (née Banfield), and the excellent final correction of Vicki May helped to enhance the English style and readability. Remaining flaws and idiosyncrasies are due to the author’s stubbornness.

2 The term ‘Delaware effect’ is derived from an example of regulatory competition in the USA, as many corporations are registered in Delaware because of lower costs of incorporation; the term ‘California effect’ was coined

competition, but rather another political mechanism called ‘trading-up’ would characterise the relation between globalisation and environmental standards: exporting corporations already complying with strict standards of importing countries are inclined to put pressure on their domestic jurisdiction to restore fair rules of competition by also raising their environmental standards.

However, the idea that globally operating corporations invariably comply with all national laws and therefore inevitably contribute to a California effect, seems to be based on an oversimplified model of regulatory compliance. Rather than being fully determined by national laws, transnational corporate standards and practices are developing a life of their own (Teubner, 1997; Fischer-Lescano and Teubner, 2006: 41 ff.; see already Luhmann, 1971). In terms of environmental protection, this autonomous development may have negative or positive effects: On the one hand regulatory compliance is called into question on account of widely perceived implementation deficits even in a national context; on the other hand a proactive attitude of corporate actors practising self-regulation might even contribute to the emergence of new regulatory standards.[3] The question of how well environmental standards accompany economic globalisation should therefore not only be analysed in terms of political mechanisms like regulatory competition or trading up. Rather, we should scrutinize the emergence of transnational corporate standards and their role in the evolution of global environmental standards. Many of these corporate standards affect not only environmental management practices within individual organisations themselves, but establish inter-organisational duties that spread throughout transnational business networks. This paper will thus contribute to the discussion on economic globalisation and environmental regulation by analysing corporate product standards in business networks in an empirical study.

In the following section, the proactive compliance hypothesis, on which the study is based, will be presented, before an account of the empirical study on proactive compliance is given (C.), from which theoretical conclusions are drawn (D.).

II. PROACTIVE COMPLIANCE HYPOTHESIS

The criteria for analysing the corporate standards have been based on the following proactive compliance hypothesis, integrating the notion of more or less autonomous corporate standards into the ‘California effect’ theory. The hypothesis thus combines elements of regulatory compliance and of private self-regulation in a transnational context:

In terms of environmental product norms, corporate standards tend to adapt national – or European – regulation to transnational product networks (global compliance) or

by Vogel with reference to Californian automobile emission standards spreading to other States of the USA (Vogel, 1995: 259).

[3] See also the two different scenarios in Vogel (1995: 248).

even to anticipate national regulation by means of self-regulation (anticipatory risk management), thereby partly assuming executive functions from the state and actively shaping environmental policy.

In the following two sections, the analytical frame of the hypothesis will further be developed, defining its scope in terms of the distinction between product and production norms (I.), considering the role of business networks (II.), and developing the different elements of the hypothesis (III.).

A. Extraterritorial Impact of Product Norms

Although both theories concerning the Delaware effect and the California effect try to characterise global environmental governance in general, they actually draw on specific cases that do not represent the policy sector as a whole.

David Vogel's analysis of the California effect is focussed on the conflict between regulatory policy and free trade, which de facto occurs only with respect to standards applied to products. [4] By contrast, proponents of the 'race to the bottom' theory, in the debate about pollution havens and industrial locations in general, do not base their arguments on the development of product standards, but rather on the regulation of production processes.

By explicit restriction to statements on environmental product norms, the 'proactive compliance' hypothesis, developed in this paper, tries to avoid such biased generalisations.

A differentiation between standards formally applying to products and those applying to processes shows how both theories might be integrated: while regulatory competition seems to be working towards a deregulation of production standards, trading up-mechanisms could enhance product standards.

These differences are based on the potential extraterritorial impact of norms that formally apply to products. Product standards - in that formal sense of applicability - either cause a disruption of trade or have de facto extraterritorial effects, when foreign importers are forced to comply. While product standards can have the effect of a 'tax' on foreign production and are therefore a legal issue of free trade, production standards make domestic production more costly (Vogel, 1995: 21, 263). They are thus not discriminatory against foreign imports, but – on the contrary – have the effect of a 'tax' on

[4] David Vogel did not systematically develop the difference between product and production standards, but mainly based his explanation of the difference between 'Delaware effect' and 'California effect' phenomena on the argumentation that costs of environmental standards are negligible compared to the cost of labour, Vogel (1995), 6, 256 f; for the distinction between product and production-related standards, see p. 6, 263.

domestic production and are primarily discussed in the political debate on industrial locations (Vogel, 1995: 20 f).[5]

It is, however, not always possible to draw a clear line between product and production standards. Sandwiched between clear-cut product and production-related standards there are certain hybrid forms, due to ambiguities in the distinction made between the two kinds of standards. An example is the famous tuna-dolphin case under WTO law: basically the USA banned imports of tuna from Mexico caught in fishing nets which do not prevent dolphins from being killed.[6] Another example from chemicals regulation is labelling requirements for products manufactured using ozone-depleting substances such as CFCs. Even though the import regulations formally apply to a product, both target a production risk. Hence, legislators sometimes try to regulate production processes and their risks indirectly by developing rules which formally apply to products (Vogel, 1995: 18; see also Dilling, 2005: 283 ff), but in content are nevertheless related to production methods. Such hybrid cases of regulation are also covered in this paper. It could be expected that these – with respect to their contents – production-related standards show similar extraterritorial effects to product-related standards.

On the other hand there are standards applying to production processes with the purpose of enhancing environmental product quality, e.g. the ban on certain auxiliary substances, aiming at a reduction of product contamination. Such standards, which formally refer to production but substantially target product risks, are sometimes referred to in corporate standards.

Chart 1: References and Examples of the Product – Production Distinction

		Substantial Reference: Regulatory Issue or Purpose	
		Products	*Production*
Formal Reference: Scope of Application	*Products*	ban on a substance in product, e.g. lead in solder	labelling requirement for products manufactured using CFCs
	Production	Regulation of auxiliary substance to prevent product contamination	*‘end of pipe’ emission thresholds*

And, of course, unambiguous cases of product standards are covered, like the ban on lead in solders for electronic equipment. What is not included are those standards that clearly refer to production processes: e.g. emission thresholds, which restrict the effective emission of a substance from a production plant (see Chart 1). Thus standards can

[5] With respect to the regulation of inherent properties of tradable manufacturing plants, a conflict between free trade and standards, formally applying to production processes, could arise. In this comparatively rare case, standards for products are at the same time standards for production facilities, as both categories coincide in one regulatory object; see also Rehbinder/Stewart (1985).

[6] See GATT Dispute Panel Report on U.S. Restrictions on the Imports of Tuna, Aug. 16, 1991, 30 ILM 1594.

on the one hand be divided into those that – formally – apply to products and those applying to production methods; on the other hand they can be divided into those standards that – substantially – aim at product risks and those directed at production risks.

B. The Role of Business Networks for Private Environmental Standards

For various reasons public authorities are overburdened by environmental and social issues in transnational production networks. Apart from the fact that these networks are beyond the territorial reach of any single national jurisdiction, they are characterised by opaque, fragmented organisational structures and often contribute to highly specific environmental risks. A preventive approach by command and control, i.e. definite rules with clear law enforcement mechanisms, often fails (see e.g. Teubner, 1983; Ackermann and Stewart, 1985; Ayres and Braithwaite, 1992). The regulated issues tend to be too complex and dynamic to be sufficiently determined by hierarchical legal intervention.

Moreover, systems theorists claim that the economic subsystem is developing ‘a life of its own’, organised in accordance with economic rationality and no longer responsive to political or legal imperatives (Luhmann, 2004). Contrary to this view it has been argued that emerging organisational structures of the private sector could be seen as a chance rather than an obstacle to regulation (Mayntz, 1987: 89, 100 ff). It would require a closer look at the organisational structures of the regulatory field to clarify this.

One possible regulatory strategy is the introduction of individual producer responsibility, which allocates responsibility for product risks with the manufacturer without defining precise duties of risk management (Sachs, 2006). However, the example of hazardous e-wastes shows that production and distribution structures consist of diverse agents and are characterised by a fragmented organisational structure. E-waste generation is therefore ‘diffuse’ (Courtney, 2006: 222). A unilateral stipulation of duties, which would be the option within a vertically integrated corporation, seems to be impossible in most parts of the electronics sector with its fragmented organisational structure.

Even if the organisational structures are opaque and fragmented, some corporate actors involved in the marketing of consumer products, so-called lead firms, are highly visible and therefore vulnerable to NGO or media campaigns affecting their image. Additionally, despite their fragmented formal structures, corporate networks are often marked by close business relationships with intense cooperation and control (Gereffi and Korzeniewicz, 1994). Thus, the hierarchically structured corporation of mass production, as famously conceived and implemented by Henry Ford, has not been replaced by anonymous arm’s-length markets.

Rather than establishing pre-modern, informal social bonds between the business partners, however, the organisation of customer-supplier relations in modern industrial production seems to be characterised by formalised routines. Monitoring, benchmarking and certification systems encourage the participation of suppliers in product and production design and set a common framework for collective learning processes (Sabel, 1994). These routines generate and continuously enhance inter-organisational standards that are essential to ensure an integrated quality management throughout the supply chain.

At the same time, a critical public has emerged on a transnational level, holding multinational corporations globally responsible for their business partners' actions. Many corporations responded to accusations by establishing codes of conduct or other standards, which were not only binding for themselves, but also for business partners or even for all other agents in the supply chain (Teubner, 2005).

The complex interdependencies between the actors in corporate production networks can lead to a further diffusion of the standards within the corporate sphere. It is exactly the open organisational structure of such networks that helps to spread standards to all businesses within them (Teubner, 2005: 116).

C. Types of Proactive Compliance

According to the proactive compliance hypothesis, private standards for products are developed in the shadow of various jurisdictions relevant for the production of globally marketable products - and sometimes even precede expected regulatory developments. On the other hand, the proactive compliance hypothesis acknowledges that corporate standards are not only determined by public regulation, but follow a logic of their own. Proactive compliance thus combines elements of regulatory compliance and self-regulation.

The orientation of corporate standards towards public regulation and public policy is manifested in (a) the generalisation and (b) anticipation of public regulation (see Chart 2):

(a) *Generalisation of norms and policies* can lead to the global application of territorially restricted public regulation. These geographical generalisations may either be based on de facto extraterritorial effects, when economic efficiency forces corporate actors to apply a standard mandatory for some markets to all products (*compliance)*, or on the voluntary adoption of national norms, e.g. norms without extraterritorial impact, such as production norms (*self-regulation*). An example for geographically generalised global compliance is the adoption of the EU ban on lead in electronic solder in various transnational corporate standards. An example for a self-regulatory geographical generalisation is corporate standards adopting bans on the use of ozone-depleting chlorinated fluorocarbons (CFCs) as solvents in the production of semiconductors -

irrespective of whether or not the producing countries are signatory states of the Montreal Protocol.

(b) The *Anticipation of norms and policies* can lead to the application of legal norms earlier than formally required to enable a smooth transition period with effective compliance at the legal cut-off date (*compliance*), or even the application of values and principles expressed in legal norms to other, not yet regulated cases with comparable toxic or ecotoxic risks (*self-regulation*). An example of anticipatory compliance with respect to the implementation of a legal norm can be found in corporate standards referring to the EU Directive on the restriction of hazardous substances in electronic and electrical equipment, but giving a much earlier deadline for compliance than legally required. An example for the anticipatory implementation of a political objective is a corporate standard prohibiting a certain substance not yet regulated after the launch of a political campaign for the prohibition of that substance. An example is the recent case of perfluorinated chemicals, which have not been regulated yet by a political legislator, but sometimes appear in corporate standards.

Chart 2: Types of Proactive Compliance and Examples

	Compliance	**Self-Regulation**
Generalisations of Norms and Policies	global compliance of national norm: *de facto-extraterritorial effects of EU lead ban*	autonomous extraterritorial use of national norm: *ban on the use of CFCs as solvents*
Anticipation of Norms and Policies	early compliance with legal norm: *early deadline for compliance with EU-Directive*	anticipatory self-regulation of political goal: *ban on substance not yet regulated*

III. EMPIRICAL STUDY

A. Sample

The proactive compliance hypothesis will be tested by analysing certain corporate environmental standards on the use of chemical substances in products and production processes by means of textual analysis and descriptive statistics.

These standards were employed by corporate actors with their head office in Japan (18), the USA (11), the EU (9), South Korea (1) or Canada (1). The standards, of mostly big multinational corporations, not only apply to their own production, but are inter-organisational corporate standards insofar as they are also applied to direct business partners, like suppliers or contract manufacturers – or even other agents in the supply chain with no direct contractual relation to the focal company at all. The study is based on 40 corporate standards that were publicly accessible by Internet.[7] All standards be-

[7] They were found between spring 2004 and autumn 2005 with the help of the search-engine www.google.com,

long to companies or corporate groups that– at least to some extent – manufacture electronic or electrical equipment. Most of them either specialise in electrical and electronic equipment (17), or in information technology hardware (17); five corporations combine electronics with mechanical engineering; one corporation specialises in telecommunication services.

More than half the corporations of the sample are included in a 2005 global ranking of the 500 largest corporations.[8] Taken together, all these corporations had revenues amounting to approximately one trillion (or 1,000,000,000,000) U.S. dollars in the fiscal year 2005. Compared to political economies, this figure comes close to the total German revenue in the budgetary year of 2005. Many of the firms issuing the accessible controlled substance lists are corporate leaders of their sector, with various business relationships in- and outside the electronics sector and often with paradigmatic influence on their competitors.

In this sector complex products are manufactured to be used by consumers. Compared to the automotive industry, the electronics industry is characterised by an even more dynamic technological development, a more fragmented organisational structure and fewer integrating activities of industry associations. Furthermore, the study analyses the management of toxic risk that is usually present from early stages of the production chain onwards and continues to be relevant till the end of the individual product’s life cycle. As opposed to risks generated at the last step of the production chain, like electrical or mechanical health hazards, even more actors have to cooperate to effectively manage the overall toxic risk. Any toxic risk management coordinated by the private actors of such production networks are likely to be more difficult than in cases with less complex products, fewer unforeseeable uses, less dynamic technological development and less fragmented organisational production structures, as well as fewer production stages.

Given these characteristics and the trendsetting, paradigmatic character of this sector, it seems plausible that the results of the empirical study will have prospective value for product regulation in general.

However, it should also be considered that in contrast to the agricultural sector or, say, the production of simple textiles, the production of electronic equipment is highly globalised and export-oriented, and the various actors of the electronics production networks are highly interdependent. As the mechanisms analysed in this study are mostly based on both inter-firm and transnational interdependencies within the production

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using typical catch-words (like ‘supplier’, ‘controlled’ or ‘banned’) and numbers of the Chemical Abstract Service (CAS), relevant for these lists. A complete list of the standards can be found in an appendix to this paper.

8 See Fortune: The Global 500 2005, see www.cnn.com/fortune/, last visited 8th May 2006.

chain as well as the export-orientation of the final manufacturers, the results cannot be transferred to a sector still mainly dominated by domestic production and arm’s length transactions of the free market. The fragmented network structures encompassing many involved actors should not so much be seen as obstacles to coordination processes, since in contrast to mere market relations, they rather help to spread standards, and they do also present possibilities for inter-firm governance.

B. Corporate Substance Lists

The analysed standards are listed in so-called ‘Controlled Substance Lists’ and ‘Green Procurement Guidelines’. Basically these are used to communicate the standards concerning the restrictions on use and disclosure requirements for chemicals used for products – and sometimes also production processes – to business partners and other actors in the supply chain.

Only recently have they emerged as formal company standards in the electronics sector. As many of the standards prominently refer to an EU Directive made in 2003, regulating the contents of electrical and electronic equipment (RoHS Directive),[9] their emergence could be directly related to it. In fact, most of the latest versions of the corporate lists in the sample were issued between 2003 and 2005, yet some are older – one list dates back to 2000.

However, according to the first release dates, given in the overviews on the first page of the corporate lists, early versions were drawn up in the early 1990s by European companies.[10] At first, they seem to have served primarily as internal corporate norms for the design of new products (Hall, 2001: 30 f). In the 1990s Japanese Green Procurement Standards were developed and adopted by many Asian Corporations. Since the adoption of the above mentioned RoHS Directive in 2003, however, these standards have become increasingly common, not only among outstanding lead firms, but also among other actors in the supply chain who do not receive so much public attention.

Still, the emergence of these corporate standards seems to be a development rather independent from legislative processes: ‘global compliance’ does not imply that compliance with EU Directives (or rather: their corresponding national transposition acts) is

[9] Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment. For the international discussion of this European legislation and its effects on the U.S. electrical industry see Sachs, 2006; Boon, 2006; and Courtney, 2006.

[10] 1992 is given as a first release date for BTExact Technologies, no date; 1994 for Siemens, 2003. The first developments seem to go back to the late 1980s or early 1990s, also Bosch, according to a German chemical risk management consultant (Interview: Krefeld, 25.02.2005). In the automotive industry the first standards seem to have been established by Ford in 1984 and Chrysler in 1987 (Ford, 2003; DaimlerChrysler, 1997).

the main or even the only motive for private standards. On the contrary, if our hypothesis is right, the only thing that can be said with is that relevant national regulation and policy agendas can influence the details of already existing industrial standards.

The typical contents of a corporate standard on banned, restricted and reportable substances are as follow:

- Purpose
- Scope
- Definitions
- Disclaimer
- Reference Documents
- Substance List

This structure (or at least the first part containing: purpose, scope, definitions) resembles the usual contents of formal legislation as enacted by the political legislator. This is partly due to the common functional requirements of private standards and formal legal acts, both aimed at the protection of public interests. For example: an explicitly defined purpose can help a lot with the interpretation of norms in a hard case. To some extent, therefore, this quasi-legal formal structure may also be a stylistic means to stress the binding and authoritative character of that type of document. This is sometimes manifested in a seemingly superficial adherence to a formal structure: in many documents the purpose does not seem to be worded carefully, but rather arbitrarily defined, and thus considerably inconsistent. Sometimes the paragraph headed ‘purpose’ consists of an abstract of the whole document. Often legal compliance, compliance with customer requirements or the protection of the environment and workplace security, or a combination of these different objectives are given as the main purpose.

The binding and authoritative character of the documents is the prevailing impression conveyed by most standards. Many standards that actually only include formal legal requirements from different jurisdictions try to convince the reader that these are genuine requirements of the corporation. Of the complete sample of 40 standards, only two or three standards of German corporations include explicit exceptions from this authoritative and binding normative character. According to Siemens, its ‘list of prohibited substances is for information only. It is not a legally binding document’ (Siemens, 2003). The Bosch list explicitly adheres to the requirements given by European Law and a list of declarable materials by the German Association of the Automotive Industry (VDA).[11] Moreover, many of these ‘requirements’ are only to be applied if ‘explicitly stipulated on the order’ to a supplier (Bosch, 2004). Two other corporate lists were just too vague to allow a precise evaluation of their standards.

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[11] VDA Materials Declaration List.

In the corporate standards there is a certain tension between an altruistic or ethical and a more opportunistic, strategic argumentation: especially in the introductory parts of the Japanese Green Procurement Guidelines, a deep concern for ecology and a healthy environment are declared to be an integral part of the corporate culture of the enterprise. Other standards seem to be much less ambitious: no clear commitment to corporate environmental and social responsibility is made; sometimes only compliance with the existent law and regulations is given as purpose of the standard, as well as the anticipation of future laws. The general appearance and formal lay-out of these substance lists resembles other corporate standards in the areas of quality management or workers' protection. Therefore, they have a more technical appearance.

Typically, the scope of the analysed standards explicitly covers products purchased from other manufacturers, which are either integrated into their own products or sold as their own products (in case of production by contract manufacturers). These products might be substances, preparations or articles, or - in the terminology of the electronics' sector – materials and parts, as well as subassemblies, and finished consumer products. The standards are all addressed to suppliers, but some are additionally still addressed to internal divisions of the corporation, such as the purchasing department. In some cases, the scope also covers substances which are used in the manufacturing process of the purchased parts and materials.

Many corporate standards give an overview of all included reference documents. These could be legal norms as well as customer requirements and sometimes more general standards of the same corporation.

The fact that customers' corporate standards are displayed on an equal footing with formal legislation shows how important they are for their business partners, and demonstrates the functional parallels between formal legal norms and private corporate standards. With reference to these lists a disclaimer may be included, giving notice that even though the relevant legal requirements are integrated into the corporate standard, suppliers should still keep themselves informed of current legal developments.

C. Legal frame

The regulation of substance risks through corporate standards in the transnational production of electrical and electronic equipment does not take place in a normative vacuum, but is framed by certain legal requirements. Of particular importance for corporate standards is national or EU legislation. International law also plays a role in the regulatory field. For a concise analysis of the corporate standards and a distinction between the different forms of compliance and self-regulation a survey of the legal context is necessary. For the purposes of testing the hypothesis presented in Section II above, the legislation of jurisdictions with economic potential for the global marketplace, like the

EU, Japan, the USA, Germany, or – as an example for the sub-national level - the State of California is likely to be most informative.

To study the extraterritorial effects of national regulation, it is then necessary to analyse cases of a clear regulatory divide between a high standard in one jurisdiction and low standards in other jurisdictions concerning one substance or substance group. In particular, the selection of a specific substance group that is subject to a ban or restriction in one jurisdiction only would help to isolate the impact of the jurisdiction on global standards of corporations. To eliminate alternative independent variables, the highest standards should not always be sought in the same jurisdiction, but for different substances in different jurisdictions. Otherwise it could, for instance, be presumed that corporate standards are simply oriented towards one special jurisdiction, for whatever reason.

1. International Law

In the past 15 years, several relevant conventions on international chemicals legislation have been signed, such as the prohibition of persistent organic pollutants by the Stockholm convention and ozone-depleting substances in the Montreal Protocol.

Under the Convention for the Protection of the Marine Environment of the North-East Atlantic, the Paris Commission (PARCOM) has issued several decisions with respect to the use and disposal of hazardous substances. Of these, PARCOM Decision 95/1 on short-chain chlorinated paraffins is relevant, which required a two-step phasing out process of these substances, which are used e.g. as flame retardants and plasticisers, by 2004. Short-chain chlorinated paraffins are persistent, bioaccumulative pollutants that have adverse effects on marine organisms. However, this decision remained ineffective, as it was apparently only transposed into national law by the Netherlands.

2. EU and Member State Law

With respect to bans on substances and their applications in the electronics, electrical equipment and automotive sectors the most demanding requirements are virtually always laid down by the EU or their member states. The main legislative acts that are relevant here are the Reduction of Hazardous Substances Directive (RoHS) already mentioned above, the End-of-Life Vehicles Directive (ELV) with specific impact on the production of electronics for vehicles, and, for chemicals in general, Directive 76/769/EEC on Restrictions on the Marketing and Use of certain substances and preparations.

The RoHS and ELV Directives belong to the field of waste regulation. Following the preventive approach to waste regulation adopted for a while now in the EU, both directives aim at the reduction of certain hazardous substances. These substances pose considerable problems for the recycling and disposal of these products. The RoHS Directive (and, similarly, the End-of-Life Vehicles Directive) therefore prohibits materials and components from containing heavy metals such as lead, mercury, cadmium and hexavalent chromium, and certain flame retardants. Several exemptions have been made, however, which have to be amended by the EU Commission in line with technical and scientific progress on a regular basis.

Directive 76/769/EEC contains a regularly updated list of chemical substances whose marketing and use is prohibited or restricted in the EU. The substances included that are relevant for the sectors under analysis here are asbestos, certain heavy metals, PCB and various others.

Directive 67/548/EEC on Dangerous Substances also includes relevant chemicals. All substances listed in its Annex I must be labelled according to their classification. However, Directive 67/548/EEC applies only with respect to chemical substances as such and in connection with Directive 1999/45/EC on preparations such as paints, adhesives, additives, etc. Substances included in durable articles (such as electronic or electrical equipment) are not generally subject to chemicals regulation. Only in certain circumstances are they covered by the new REACH Regulation, which was passed after the empirical study, this paper is based on, had been completed.[12] The current reform of European chemicals law changes little in that respect.[13] According to Article 176 of the EEC Treaty, EU member state law can be stricter than the respective European legal acts, based on Art. 175 of the Treaty. As Directive 76/769/EEC is based on Art. 95 EEC Treaty, notice must be given of stricter national requirements according to Art. 95 (4) EEC Treaty and they must be approved by the European Commission. As mentioned above, the Netherlands have transposed the ban on short-chain chlorinated paraffins issued by the international Paris Commission. This transposition, which is stricter than Directive 76/769/EEC has only been partly approved.[14]

Switzerland also has exceptionally strict requirements. Even though small countries such as the Netherlands or Switzerland may play a minor role as importing markets, explicit references can be found in some of the Japanese and U.S. American standards.

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12 The REACH Regulation uses the somewhat cumbersome definition of articles as objects ‘composed of one or more substances or preparations which during production is given a specific shape, surface or design determining its end use function to a greater degree than its chemical composition does”, Art. 3 REACH.

13 According to Art. 7 REACH, registration requirements exist only in some cases for dangerous substances integrated into imported articles that are released during expected use.

14 See Commission Decision 2004/1/EC of 16 December 2003 concerning national provisions on the use of short-chain chlorinated paraffins, notified by the Kingdom of the Netherlands under Article 95(4) of the EC Treaty.

3. U.S. Federal and State Law

U.S. American federal law of primary relevance for our purposes is the Toxic Substances Control Act and the Clean Air Act. The Toxic Substances Control Act includes prohibitions or restrictions for a few substances or substance groups like asbestos and PCBs. Under the Toxic Substances Control Act the U.S. Environmental Protection Agency (EPA) is also commissioned to prepare the regulation of highly persistent and bioaccumulative substances still widely used in the semiconductor industry and many other sectors, as they are suspected of being carcinogenic.[15] The U.S. Clean Air Act Sec. 611, as amended in 1990, not only requires the labelling of products containing ozone-depleting substances, but also the labelling of products imported to the USA that are manufactured with certain ozone-depleting substances. These requirements of the U.S. Clean Air Act could thus indirectly affect offshore production. In 1993, additional rules of the U.S. EPA qualified that these labelling requirements only apply if the manufacturers themselves use ozone-depleting substances under certain circumstances, e.g. if such substances are not completely destroyed after use or if they have physical contact with the manufactured product in a way that is not merely incidental, etc.

U.S. State legislation on the toxic properties of products include the State of California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), which requires a warning for every chemical known to cause cancer or reproductive defects. A list of such substances is updated every few years.

4. Japanese Law

Japanese chemicals law partly transposes international obligations, and partly has genuine requirements, especially concerning the authorisation of certain substances dangerous to the marine environment. Asbestos is restricted by the Industrial Health and Safety Law; the obligations of the Montreal Protocol on ozone-depleting substances have been implemented by the Ozone Layer Protection Law. Other relevant substances are regulated by the Japanese Chemical Substance Control Law.[16] Regulated substances either require authorization, like bis(tributyltin)oxide, polychlorinated naphthalenes, PCB and other organic pollutants as well as products in which such substances are used (see Articles 2 (2), 6 and 14 of the Chemical Substance Control Law), or notification and labelling, like other organotin compounds. Polychlorinated naphthalenes are not

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15 See e.g. the initiative of the U.S. EPA on perfluoroalkyl sulfonates (PFAS), and especially perfluorooctanic acid (PFOA), at http://www.epa.gov/oppt/pfoa/, last visited 21 February 2007.

16 Law Concerning the Evaluation of Chemical Substances and Regulation of their Manufacture, etc., Law No. 117, October 16, 1973, last amended by Law No. 49 May 28, 2003 (available in provisional translation by the Ministry of Economy, Trade and Industry).

regulated in the EU (nor in the USA), which may be due to the fact that it is a substance with a low production volume and only one supplier in the EU. However, in Switzerland a ban on polychlorinated naphthalenes exists, albeit rarely cited in corporate standards.[17] Other substances regulated in Japan, like bis(tributyltin)oxide, which does not seem to be a relevant substance for the electronics sector, are also regulated in the EU – at least labelling requirements exist.

5. Conclusions for the Research Design

There are several cases of relevant substances with a clear regulatory divide between the EU as a high-standard jurisdiction and the USA and Japan, where lower standards exist. Examples of substances in recent use in the electronics and automotive sector which– with exemptions – have been prohibited only in the EU by the RoHS Directive, are lead, cadmium, mercury and hexavalent chromium. Lead is still common in the electronics industry, especially for use in solders. Under the RoHS Directive additional prohibitions of PBB (polybrominated biphenyls) and PBDE (polybrominated diphenyl ethers) exist. PBDE are a group of flame retardants still used in the sector and often referenced in corporate standards, but are meanwhile of minor importance, as they can be substituted. However, many of the substitutes (often other brominated flame retardants) are also suspected of having adverse effects on human health and the environment.

Both Directive 76/769/EEC and the afore-mentioned Dutch transposition of the Paris Commission decision contain restrictions on short-chain chlorinated paraffins, although the restrictions of the EU Directive do not or only marginally concern specific applications in the electronics sector. They could therefore serve as an example for the effectiveness of product regulation by the jurisdiction of a relatively small political economy. It should be borne in mind, however, that corporate standards are also directly influenced by the international PARCOM decision. Chlorinated Paraffins are used as plasticisers in paints, coatings, sealants and flame-retardants in rubber and plastic. It seems to be unclear whether or to what extent they are still used in the electronics sector, but they are classified as a chemical substance group with a high production volume still with several producers or importers in the EU.[18]

An outstanding regulatory initiative of the USA is the labelling requirement for the use of CFCs and other ozone-depleting substances in offshore production. It is interesting to see how the USA was able to spread standards for the environmentally friendly

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17 Previously StoV, Annex 3.1 – in May 2005 replaced by Chemical Risk Reduction Ordinance (ChemRRV), see Annex 1.1 to Article 3 ChemRRV.

18 See HPV-LPV Information on ‘Alkanes, C10-13, chloro’ in the European chemical Substances Information System (ESIS) supplied by the European Chemicals Bureau, http://ecb.jrc.it/ESIS/, last visited 21 February 2007.

manufacture of semi-conductors worldwide – by introducing regulatory measures for products manufactured with the aid of ozone-depleting substances.

Regarding Japanese law, the authorisation requirement for polychlorinated naphthalenes is considered to be the strictest regulation in one of the main jurisdictions. However, the Swiss ban on polychlorinated naphthalenes is an example of an even stricter regulation in a small jurisdiction. In the electronics sector, polychlorinated naphthalenes were formerly applied for similar purposes as PCBs (in capacitors etc.) and may have been used more recently as flame retardants. Since the 1970s, however, they have been phased out. Today even in the industrialised world the facts about their use seem unclear (Plassche and Schwegler, 2002).

Chart 3: Examples Illustrating the Regulatory Divide between EU, USA and Japan

Substance (Group)	EU*)	Japan	U.S.**)	Commonness of application in OECD
PBDE	BAN			may be still be used as flame-retardants in polymers
Lead & compounds	BAN		DIS	commonly used for solders, cables, wires etc.
Short-chain chlorinated paraffins	RES			before phase-out used in metalwork fluids such as flame retardants, plasticizers and lubricants
Polychlorinated naphthalenes		DIS		before phase-out used as additive to lubricants, rubber, paints etc.
CFCs used in offshore production			DIS	before phase-out used as solvent in the semiconductor production

Annotations:
*) Relevant restrictions on short chain chlorinated paraffins (aka alkanes, C10-C13, chloro) apply in the Netherlands only.
**) The indicated disclosure requirement for lead applies in the U.S. State of California only.

The table above (Chart 3) gives an overview of the divide between regulations and regulatory loopholes in the EU, the USA and Japan regarding the use of substances of concern in the electronics sector; five exemplary substances and substance groups are selected. ‘BAN’ signifies the prohibition of a substance for use in electrical and electronic equipment or its phasing out within a specified deadline in the next five years, although certain minor applications may be exempted.[19] ‘RES’ refers to other material restrictions than prohibitions of substances. This can be a threshold limit, as in the case of short-chain chlorinated paraffins restricted by Directive 76/769/EEC or a restriction on certain applications as in the Chlorinated Paraffins Decision of the Netherlands. DIS indicates a labelling or disclosure requirement (including the duty to supply safety data sheets), or notification or authorization requirements. A cell left blank signifies that in the indi-

[19] For such prohibitions a typical threshold limit would be 1000 ppm (the equivalent to 0.1 % by mass) for unintentional contamination. For example, solder containing less than 1000 ppm is considered to be lead-free.

cated jurisdictions no regulations for the substance exist, which are applicable to products of the electronics sector.

With respect to the use of lead in electronic equipment, apart from the EU ban, a disclosure requirement exists in the U.S. State of California. It is assumed that the ban is a stricter regulation than the disclosure requirement – even though in certain cases public disclosure requirements can have a prohibitive effect comparable to a ban.

D. Empirical Analysis of the Different Types of Proactive Compliance

To study compliance of corporate standards more closely, five substance groups were selected, including PBDE, lead and its compounds, short-chain chlorinated paraffins, polychlorinated naphthalenes, and certain ozone-depleting substances used in the offshore manufacturing of semiconductors (see Chart 3). For these substances a systematic evaluation of the 40 corporate standards has been carried out.

Our question always was to what extent the highest standard of one of the three main jurisdictions of the global market (EU, USA, Japan) could also be found in the corporate substance list as a universally applicable transnational standard. Theoretically a globally compliant standard would consist of a combination of the highest standards of different jurisdictions. In practice, a comprehensive substance list that takes all applicable public regulations of all jurisdictions into consideration is almost impossible to find. Whenever a universally applicable standard, incorporating the strictest public regulation on a specific substance, could be found in a corporate substance list, it was considered as ‘globally compliant’. To rule out the alternative reading that the compliance of corporate standards is still based on traditional mechanisms of national law enforcement, the compliance rate of ‘domestic’ corporations with their head office in the strictest jurisdiction, is compared to standards of ‘foreign’ companies registered outside the jurisdiction in question (see Chart 4).

During the evaluation of the lists it turned out that four of the 40 standards could not be considered globally compliant with respect to any or most of the six substances, even though they do not directly violate national legislation. These standards either explicitly restrict themselves to being merely ‘informative’ with respect to prohibited substances, or claim the territorially restricted applicability of national regulations.

In many other cases, standards were partly globally compliant, and partly not explicitly compliant. There are many possible reasons for this; a substance may not be included into the standard, because the corporation wants it to be used by its suppliers and contract manufacturers without restrictions, or because the use of the substance in materials, parts and products is regarded as improbable – or is just ignored.

It also had to be considered in the evaluation that both the public and private regulation of substance risks is a dynamic process. In temporal terms, global compliance is not a fixed category, but constantly changes in line with the publication of new laws and regulations and the issuing and amendments of new corporate standards. As the requirements of the RoHS Directive for hazardous substances in electrical and electronic equipment only became applicable on July 1st, 2006, no corporation was formally obliged to adhere to these requirements at the time of the evaluation of the standards. Nevertheless, whether or not the standards were already adapted to the obligations of the directive was taken into account in the empirical analysis.

There is no common standard as to which substances should be included in the corporate substance lists. The substances covered by the individual standards therefore vary to a great extent. Some substances irrelevant for the sector may be included, or other relevant substances left out. Substance bans are thus only useful as indicators for legal compliance, if the use of the substances is relevant for the sector and has not been abandoned for other reasons.

Even if an evaluation is restricted to the relevant substances, considerable differences can be found. These variations do not necessarily imply that the corporation positively decided not to regulate a certain substance. In some cases they may be explained by the differences in the range of substances, considered relevant for the individual corporate profile with respect to manufactured products and contracted suppliers.

1. Geographical Generalisation of Regulatory Standards

Compliance with environmental law presupposes knowledge about the regulatory basis. Environmental management systems such as ISO 14001 ff. and other environmental management schemes therefore require the documentation and regular updates of all relevant regulation. In nearly half the standards such regulatory information is given, either in the form of reference lists, or in a special column of the restricted substance list, often referring to legal norms as reasons for the inclusion of a substance. Such references also enable the suppliers to independently keep track of regulatory developments. A review of all the standards shows considerable differences in terms of detail and precision. Often, no accurate first-hand knowledge seems to be available for the main jurisdictions of the global market – sometimes not even for the domestic jurisdiction of the respective corporation.

The reasons given in standards for substance bans can therefore also be misleading. In many cases, companies declare bans or other measures to control substance risk as their own demands, even if they are legally required to do so. Typical examples are the labelling requirement for nonylphenol, which is given in Directive 67/548/EEC, and the ‘labelling requirement’ for polychlorinated naphthalenes, which, according to the Japanese Chemical Substance Control Law, even requires authorisation. Restrictions for formaldehyde and dioxin, given in the German Ordinance on the Prohibition of Chemicals, as well as in Swedish and Austrian regulations, are also purported to be genuine corporate self-regulatory standards in many corporate lists. Similarly, some standards base restrictions on self-regulatory standards or customer requirements. The ban on short-chain chlorinated paraffins, for example, is based on the German Blue Angel label and a Swedish eco-label for office equipment emissions, because ‘no laws and regulations regulate this category of hazardous substances’ (Maxim IC), whereas the existing Dutch regulation is ignored.

On the other hand, in some corporate standards for certain substances, regulations are cited that do not exist, are outdated or do not apply to the substance in question or its application. The standard of a U.S. manufacturer of mobile phones bans PBDE, which is based on ‘Canadian Regulation’ (Motorola, 2005). However, no Canadian regulation for PBDE as yet exists, although voluntary strategies are currently under development in cooperation with the industry.[20] A Californian manufacturer of computer processors and chipsets bans all uses of mercury except for lamps and relays, switches, contacts and guards based on Directive 89/677/EEC, although this specific directive only restricts uses of mercury in substances or processes not relevant to the electronics sector, like antifouling paints, wood preservation, textile impregnation or water treatment (Intel, 2003).

In one case a Japanese electronics corporation refers to a – nonexistent – EU Directive to explain the ban of polychlorinated naphthalenes, without mentioning the Japanese authorization requirement or the Swiss prohibition.

Possible reasons for this lack of knowledge are the fragmentation of the regulatory framework for transnational production and marketing networks, poor transparency of regulatory requirements – even though the recent development of online-resources facilitates research on national legislation – and an insufficient doctrinal treatment of the global legal regime for chemical products by environmental lawyers. In the light of these shortcomings, the resulting material contents of the corporate standards are, at least at first sight, relatively homogenous and comprehensive.

a) Global Compliance with Product Quality Standards

Most requirements for corporate standards concern problematic substances in the finished product. Typical product standards that can virtually be found in the list of every corporation are restrictions or bans on asbestos, PCB, ozone-depleting substances, some heavy metals, and certain brominated flame retardants.[21]

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[20] See the official website of the Canadian Ministry of Environment, http://www.ec.gc.ca/CEPARegistry/documents/subs_list/PBDE_draft/PBDEfaq.cfm, last visited 21 February 2007.

[21] Other potential candidates for corporate bans and restrictions include polychlorinated terphenyls, pesticides like DDT or mirex, azo dyes, phthalates, polychlorinated naphthalenes, short-chain chlorinated paraffins, organotin compounds, ethylene glycol ethers, perfluoroorganic compounds and radioactive substances.

A corporate standard is considered to be globally compliant if it adopts all relevant product-related public regulations on a substance used in the production chain. By the same token, not globally compliant are corporate substance lists that adopt a standard only for products destined for the territory to which this regulation formally applies. As demonstrated by the chart, global compliance with public product regulation can only partly be found in corporate standards.

This raises doubts with regard to a linear perception of the trading-up process: the horizontal transfer of norms should be seen as a selective and interactive process rather than as inevitable determination. Even in the domestic context, sociologists of law have stressed the difference between law in the books and law in action, and questioned the effectiveness of legal regulation, as they usually found low compliance rates in empirical studies. Hence, it should come as no surprise that the global compliance rates are even slightly lower than domestic compliance. While the full global compliance of corporate standards seems to be an ideal rather than a reality, a more qualitative evaluation of the standards shows that national public regulation still exercises a significant influence on global corporate standards.

Chart 4: Corporate Standards Compliant with Selected Jurisdictions

Highest Regulatory Standard			**Global Compliance of Corporate Standards***	
Jurisdiction	*substance (group)*	*regul. type and date***	*Domestic*	*foreign*
EU			all EU standards (9)	non EU standards (31)
	PBDE	BAN 01/03	6	28
	lead & compounds	BAN 01/03	5	18
NL	SCCPs***	RES 11/99	3	14
Japan			all Japanese (18)	non Jap. (22)
	polychlorinated naphthalenes	DIS 1988	16	7
USA	offshore production using CFCs		all U.S. (11)	non U.S. (29)
		DIS 11/90	6	8

Annotations:
*) Figures relate to those of the 40 analysed standards that were positively considered to be globally compliant in relation to the current regulation of a specific substance – other standards do not necessarily violate the law! For example, some of the standards found in the internet could not be considered globally compliant, as they were issued before the publication of the RoHS Directive and did therefore not include its obligations; other standards do not list the substance in question for whatever reason, or have only informational status.
**) ‘BAN’ signifies prohibition of substance for electrical and electronic equipment; ‘RES’ – threshold limit level for product applications requirement; ‘DIS’ – authorization, notification or labelling duties. The dates give the month/year of formal publication of the regulation.
***) Short chain chlorinated paraffins.

Polybrominated Diphenyl Ethers (PBDE)

With respect to the ban on PBDE, only six of the 40 corporate standards were not globally compliant. Foreign standards of corporations outside the EU were no less compliant than EU standards. Apart from three European standards that are never globally compliant because they are not normatively binding, only one Japanese standard, one British and one Canadian standard were not considered to be ‘globally compliant’ with the RoHS prohibitions, as they only required substitution without giving a definite deadline. As these standards were researched about a year before the scheduled application of the ban, this can be considered as a good global compliance rate. Nevertheless, it should be noted that regarding a PBDE ban, not so much seems to be at stake for the electrical and electronic equipment industry. Most of its applications have already been phased out and for the remaining applications alternatives exist, albeit not necessarily less problematic ones than PBDE. Often other brominated flame-retardants, which are also substances of concern, are used e.g. in printed circuit boards (Lohse and Lißner et al, 2003: 100 f). Moreover, certain voluntary industrial initiatives on PBDE have existed in Europe since the 1980s (Leisewitz and Schwarz, 2001: 37 f). In the USA, the only domestic manufacturer of two chemicals of the PBDE group declared a production stop till the end of 2004, after the U.S. EPA had recommended that they be phased out.[22] In the meantime several U.S. states as well as the federal U.S. EPA initiated regulation processes concerning PBDE.

Apart from lead, the other substances prohibited by the RoHS Directive – mercury, cadmium, hexavalent chromium and PBB – show similar results. At least regarding their application in mobile phones, they are either not functionally required or easily substituted.[23]

Lead

Compared to the other above-mentioned substances dealt with in the directive, much fewer corporations adopted the requirements of the RoHS Directive on the use of lead in electronic and electrical equipment in their standards governing their worldwide transactions with business partners. Still two thirds of the European and more than half the non-EU corporate standards have already integrated the ban on lead. Many of the foreign standards are directly influenced by the EU Directive. This can be concluded in at least five Japanese standards, which more or less literally repeat the exemptions listed in the Directive’s Annex.

It seems even more rewarding to look closely at the cases in which no global compliance could be assumed. The lead prohibition for solder in the EU RoHS Directive is sometimes ignored by competent and well-informed corporate leaders, such as Intel or Samsung. Instead of adopting the prohibition, these leaders first require disclosure for

22 See http://www.epa.gov/oppt/pbde/pubs/qanda.htm, last visited 21 February 2007.

23 Guidance Document – Environmentally Sound Management of Used and End-Of-Life Mobile Phones, Basel Convention ‘Mobile Phone Partnership Initiative”, Draft, March 2006, http://www.basel.int/industry/mppiwp/guid-comment/guidoc200406.pdf, last visited 21 February 2007.

the inclusion of lead in electronic parts and materials, probably to get an overview of the actual uses and substitution possibilities. This may also be regarded as a more realistic approach to the preparation of full compliance, as a text passage in the IBM standard shows. According to IBM, the maximum concentration level requirements of the RoHS directive have still not been established. Therefore IBM requires of its suppliers only disclosure of lead contained in all materials, parts and products supplied for IBM applications. However, IBM already reserves the right to introduce ‘(o)ther more stringent IBM specifications’ that may supersede the disclosure requirement (IBM, 2003).

Other companies are even more explicit with their problems concerning the strict requirement of lead substitution in most electronic and electrical equipment applications: ‘Maxim will continue to supply leaded parts to customers that prefer leaded parts, therefore lead will not be totally eliminated from solder and surface finish operations. Customers demanding lead containing parts are typically those that are not impacted by European legislation. (...) In addition, the technology to eliminate lead from certain products has not been developed and proven acceptable for commercial applications. Flip chip and BGA products currently have no lead free alternatives’ (Maxim Integrated Products and Dallas Semiconductors). At the same time, this citation implies that some customers of the electronics industry still seem to supply regionally restricted markets.

Short-Chain Chlorinated Paraffins (SCCP)

Short-chain chlorinated paraffins are only listed in 29 of the 40 standards. Even in the case of Royal Philipps Electronics, the only corporation in the sample with its head office in the Netherlands, short chain chlorinated paraffins are only banned in the specifications of certain product divisions. It is striking to see that standards of EU corporations show even less compliance (3 out of 9) than standards of non-EU corporations (14 out of 31). This could be due to the fact that compliance of the Dutch restrictions with EU law is disputed in Europe and that corporate standards are directly influenced by or even explicitly refer to Decision 95/1 of the Paris Commission (PARCOM), though this is an act of public international law of which the formal addressees are states only.

Polychlorinated Naphthalenes

Regarding polychlorinated naphthalenes there is a high compliance rate in Japan; of 18 standards, 16 prohibit the substance group, while the remaining two require disclosure, so that authorization requirements can be fulfilled. In contrast, less than half of the non-Japanese corporate standards are globally compliant as they explicitly ban the substance or require disclosure. However, the substance group, which historically had been in use in the electronics industry for transformer and capacitor fluids (even before PCBs were introduced) and in electroplating, was phased out in the USA in the late 1970s and most of Europe in the 1980s (van de Plassche and Schwegler; Santillo and Johnston, 2004).

In Europe it is today classified as a low production volume substance with only one French supplier.[24] Additionally, even if the information on national regulatory requirements worldwide has improved enormously since the emergence of the internet, Japanese laws are still difficult to track and exist only in provisional translations into English.[25] It may therefore well be that the substance (and its Japanese regulation) was not considered relevant enough to be included in non-Japanese corporate standards.

b) Extraterritorial Use of Production Standards

Standards aimed at the regulation of production risks could also be disseminated horizontally to other jurisdictions, if they were included in corporate product standards. This could mitigate the frequently stark disparity between the ambitious harmonisation of product standards and the ‘race to the bottom’ effects of production standards.

However, the evaluated standards showed rather diverse results regarding such production requirements. Some corporate standards explicitly exclude substances used in the manufacturing processes of suppliers from corporate substance control.[26] Other standards avoid the issue of auxiliary substances in manufacturing processes of business partners or leave the question open.

Still, corporations are often not only concerned with the contents of their products, but also with the regulation of production processes, especially with respect to auxiliary substances. Some corporate standards thus extend all substance bans and restrictions to all substances used in manufacturing processes of suppliers and contract manufacturers.

Still, such extreme positions taken by corporations – accepting either no responsibility at all or full responsibility for all substances used by business partners – seem to be the exception. The general rule is rather an intermediate level of responsibility for substances used in production processes of other economic agents in the supply chain. Ten corporate standards therefore include restrictions for certain auxiliary substances, especially ozone-depleting substances and ethylene glycol ethers.

Intel even distinguishes between suppliers and contract manufacturers (‘OEMs’) and has higher standards for auxiliary chemicals in the production processes of contract manufacturers. This shows even more differentiated levels of responsibility: the basic responsibility for suppliers only manufacturing parts and materials, the increased re-

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[24] See the ESIS-database, http://ecb.jrc.it/esis/, last visited 21 February 2007.

[25] See the Japanese Law Concerning the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc., http://www.meti.go.jp/english/information/downloadfiles/cChemicalControl.pdf and its enforcing ordinance, http://www.meti.go.jp/english/information/downloadfiles/kashin1.pdf, last visited 21 February 2007.

[26] E.g., ‘Chemical substances used for the production of the Purchased Goods are not subject to chemical substance control, on condition that the chemical substances are used only for processing at the suppliers or the contractors of the suppliers and the chemical substances do not remain in the Purchased Goods.’ (Nippon Chemi-Con, 2003).

sponsibility for business partners manufacturing products which bear the lead firm’s label, and the full responsibility for substances included in their own products or for auxiliary substances used by the lead firm itself.

CFCs and Other Ozone-depleting Substances

The most important group of auxiliary substances regulated in corporate standards, are ozone-depleting substances, commonly used as solvents in the production of semiconductors. In some standards, these are the only substances prohibited in manufacturing processes of ‘upstream’ business partners. An evaluation of such a ban on CFCs and other ozone-depleting substances should take into account that the phase-out of CFCs as halogenated solvents has been on the political and industrial agenda at least since the 1980s. For some ozone-depleting substances the Montreal Protocol required the phase-out already in the late 1990s. Sec 604 (b) of the U.S. Clean Air Act required a complete phase-out of CFCs out of production for the domestic market by 2000. The European Union and Japan both implemented the Montreal Protocol in the 1990s. The production and use of ozone-depleting substances was thus already densely regulated before the analysed standards were issued.

Still, it does make sense for corporations to regulate the use of ozone-depleting substances as auxiliary substances in manufacturing processes of suppliers and contract manufactures: as admitted in Art. 5 of the Montreal Protocol, CFCs can still be produced for export to developing countries for their basic domestic purposes.[27] The obligations of the Protocol or national regulation may thus be circumvented by the offshore outsourcing of manufacturing processes to developing countries or even countries not signatories to the Protocol. Corporations banning these substances from manufacturing processes of their products and components therefore commit themselves to resisting such circumvention. Further, other ozone-depleting substances like HCFCs are still in common use as CFC substitutes and a complete phase-out according to the Montreal Protocol is not required until 2030. Yet several American, European and Japanese standards already now ban the use of HCFCs as auxiliary substances.

This ban may concern all or some of the substances listed in the annexes of the Montreal Protocol. Corporate standards sometimes use the distinction between two classes of ozone-depleting substances (basically CFCs and HCFCs), which does not follow the classification in the annexes of the Montreal protocol, but corresponds to sec 601 ff. U.S. Clean Air Act.[28] Sec. 611 (d) Clean Air Act requires under certain conditions the

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[27] See also sec 604 (e) U.S. Clean Air Act.

[28] According to the U.S. Clean Air Act, Class I substances include CFCs and halons, as well as carbon tetrachloride and methyl chloroform listed in annex A and B of the Montreal Protocol; Class II covers the HCFCs in annex C, group I of the Protocol.

labelling of products manufactured with CFCs and some other substances. The use of HCFCs can also lead to labelling requirements, if a petition based on adequate data is accepted by the public administration. As already mentioned, the Intel standard distinguishes between manufacturing processes of suppliers and those of contract manufacturers: while for contract manufacturers the use of all ozone-depleting substances in manufacturing processes is prohibited, suppliers just have to avoid the use of CFCs and some other especially problematic substances.

In the IBM standard a clear reason is given for the inclusion of standards for manufacturing processes of the suppliers: ‘the use of certain materials in manufacturing materials, parts, and products for IBM applications may restrict IBM’s ability to market products in certain countries or jurisdictions’ (IBM, 2003). In particular, the prohibition of such substances in manufacturing processes helps to avoid potential labelling duties according to section 611 of the U.S. Clean Air Act. However, only one of the corporate standards requires disclosure for ozone-depleting substances. It seems that the requirement to label products manufactured by means of ozone-depleting substances is so daunting to many manufacturers that they prefer to prohibit such substances altogether.

Still, only 14 out of the 40 standards explicitly ban CFCs from manufacturing processes of suppliers or contract manufacturers. This relatively low rate of explicit compliance could be explained by the fact that the obligations of the Clean Air Act are rather restrictively applied (only to manufacturing processes of the manufacturer, not to those of suppliers). Therefore, most of the standards concerning the use of ozone-depleting substances in manufacturing processes may be shaped by self-regulation rather than compliance.

2. Anticipatory Effect of Regulatory Standards

The horizontal transfer of standards can partly be understood as a factual result of compliance with formal product legislation of various markets. An example for more autonomous forms of private self-regulation are standards anticipating either already existing legislation not yet in force (early compliance), or public debates and political initiatives on substances of concern which have not even led to regulatory outcome (voluntary standards).

a) Early Compliance

In some cases corporations demand that their suppliers substitute certain substances earlier than legally required. While for the RoHS Directive of the EU the original compliance deadline is July 1st, 2006, almost half the Japanese and U.S.-American and one European Corporation set earlier target dates for substitution. These periods of early compliance range from a few months to more than three years. Only six (mostly German) corporations explicitly stick to the legal date. The fact that many German corporations take a formalistic attitude reflects their conception of the standards merely being of an informative nature. Other corporations do not give any specific compliance deadlines, or they state that they already comply. Their justification for fulfilling requirements in advance is that only this will ‘ensure a successful transition’ to compliance with the RoHS Directive (HP, 2005). This reason is of special relevance if both manufacturers and suppliers are located outside the European Union, as the implementation process then has to be organized without the administrative infrastructure provided by public authorities and industrial associations in the EU. Effective compliance is then only possible if production networks do not stick to a passive attitude of formalistic compliance. Often, complex transition processes provoked by public regulation are difficult to control and predict. Therefore, safety margins have to be introduced in order to monitor and control the implementation process and thus guarantee effective compliance. Within the transition period an active implementation process must be organised by the lead firms of the production networks.

b) Voluntary Standards for Substances of Concern

Some corporate standard requirements are not based on existing public regulation at all. For example, the use of certain glycol ethers is forbidden in several cases in production processes or in products. In many other cases they are categorised as restricted, reportable or controlled substances.

Only under the German workplace standard TRGS 609 is the substitution of methylene and ethylene glycol ethers and their acetates required as far as possible. They may not be used by young and pregnant workers, and special measures must be taken to reduce workplace exposure. They are also classified as dangerous according to Directive 67/548/EEC, with the result that disclosure is legally required within the EU.

The corporate standards go beyond these restrictions, however. The far-reaching commitment to prohibit their use not only within the corporation itself, but also to ban them in production processes of business partners may result from the high scandalising potential of these substances: they are highly teratogenic and therefore pose a serious threat especially to pregnant workers and their unborn babies. According to a reference in one standard, the semiconductor industry has voluntarily committed itself to the phasing-out of ethylen glycol ethers in manufacturing processes. Considering the extensive processes of offshore outsourcing to South-East Asia in semiconductor production, it is not surprising that the public authorities of OECD countries avoid direct regulation and prefer alternatives without territorial restrictions such as voluntary commitments by industrial associations or individual companies.

Another example concerns perfluoralkyl sulfonates, which are sometimes prohibited in corporate standards. This is a case of self-regulation in anticipation of a significant new use rule currently being drawn up by the U.S. EPA under the Toxic Substances Control Act.[29]

In various other corporate standards, substances such as PVC, phthalates, formaldehyde, etc. are banned, but only in singular cases, so that no clear patterns emerge.

Most corporate requirements that exceed legal obligations do not concern bans, but are rather soft instruments such as disclosure requirements or recommendations to seek substitutes.

In the context of the Basel Convention, there is a voluntary initiative on waste mobile phones, including the phasing-out of certain problematic substances from mobile phones. One possible explanation for the commitment of the manufacturers may be the fact that it is still under discussion whether or not waste mobile phones should be considered as toxic waste according to the Convention. [30] Even if there is no clear decision on whether electronics waste is covered by the Basel Convention, the electronics industry may still feel under pressure by the mere possibility of being subjected to restrictions in that respect. After all, the producers of mobile phones did participate in a voluntary programme under the Basel Convention, committing themselves to ambitious and detailed obligations.[31]

c) Procedural Requirements Beyond Legal Compliance

The substantial demand to ban certain substances, e.g. those listed in the Montreal Protocol, in the manufacturing process even if they are no longer traceable in the final products, is often combined with procedural requirements for environmental management systems.

More than half the standards, especially those of Japanese and U.S. corporations, require the certification of an environmental management system for all their suppliers. In many cases these certifications either could be made according to adopted systems such as ISO 14001 ff., or according to individual specifications or minimum requirements given in questionnaires attached to the corporate standards.

3. Inter-organisational Aspects of Corporate Standards

Compliance with product-related standards directly relevant to the physical qualities of the product itself requires cooperation throughout the supply chain from the raw materi-

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29 See http://www.epa.gov/EPA-TOX/2006/April/Day-10/t3400.htm, last visited 21 February 2007.

30 For the position in favour of categorizing waste electronic and electrical equipment containing heavy metals as toxic waste according to the Basel convention, see the Basel Action Network (BAN), http://www.ban.org/, last visited 21 February 2007.

31 See the ‘Mobile Phone Partnership Initiative’ under the Basel Convention, http://www.basel.int/industry/mppi.html, last visited 21 February 2007.

als to the finished consumer product. Manufacturers and their suppliers thus try to integrate environmental and health standards into supply chain management. Production network structures and inter-organisational standards can thereby help to spread standards globally and across different industry sectors.

Reference to other corporate standards, which can often be found in corporate substance lists, shows how suppliers ‘cascade the requirements’ (Motorola, 2005) to sub-tier suppliers without direct contractual relationship with the producer of the final consumer product, so that the entire supply chain is confronted with the standard of lead firms. Some standards also directly address the responsibility of the suppliers. This means that suppliers are not only obliged to comply with the material standards, e.g. they have to substitute lead in certain applications, but they also have to assure that their own suppliers stick to the standards of the customer. This can be even more demanding if not only product standards but also production standards come into play, as in the case of IBM.

The full impact of this cascading process can only be understood if business relations are not visualized as linear value chains, but rather as complex production networks: customers multiply the circulation of a standard if they have multiple input from many suppliers. And a supplier with many customers will also factually proliferate his customers’ standards by selling compliant products to all other customers because of economies of scale. In the electronics and the automotive sector recent structural changes have led to the emergence of influential ‘first tier suppliers’. Often, these suppliers supply system components to more than one final assembler and therefore have comparable economic power. They often develop product design as well as production standards in close cooperation with their customers (Womack, Jones and Roos, 1990: 146 f.).

Nevertheless, in most cases it is the final product manufacturer who initiates the development of standards, as also documented by the fact that the standards found were mostly those of leading final product manufacturers. But even if standards are set unilaterally by the manufacturer, suppliers do not necessarily accept them. One interview partner from a corporation supplying system components for the automotive industry reported that on one occasion they rejected a customer’s threshold level for a certain substance and sought to re-negotiate the contract. According to the supplier, who in this case had not been consulted beforehand, the value was later changed by the customer, a well-known U.S. automobile manufacturer.[32]

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[32] Interview with a supplier of electronic system components for the automotive industry, Frankfurt am Main, February 25th, 2005.

The corporate standards analysed here are used by different actors in the value chain. They are not necessarily restricted to distinct industry sectors. For example, companies in the electronics industry also refer to standards laid down in the automotive sector, and manufacturers of polymers must adhere to the standards of various business sectors. Thus, corporate standards are not restricted to one business sector, but may spread across the whole global market.

E. Summary

The results of this empirical study show that most corporate leaders of transnational business networks are not passive subjects of the law, but that they actively select legal norms, that they take the law into their own hands, or adapt standards according to their particular needs. At the same time, corporate actors often use national legislation as a point of reference providing them with normative orientation. The results therefore confirm the assumption that private product standards in the transnational field are neither characterised by the formal application of national regulations, nor by forms of autonomous self-regulation that are completely out of touch with state-based law.

The term ‘proactive compliance’ may be too optimistic a term to describe the quantitative rates of explicit compliance. Regarding the selective application of laws and the wide self-regulatory scope, corporate standards seem to have an appropriative rather than a proactive character. However, a more thoroughgoing qualitative analysis showed that in cases of lower (or less anticipatory) compliance the concerned substances were either no longer used in the sector, or for some applications no technical substitute had been developed until the standards were issued. Therefore leading firms first aimed at getting an overview over the actual uses and thus required disclosure – possibly as a first step in the implementation process. In the case of ozone-depleting substances the labelling requirements of the U.S. Clean Air Act have been applied very restrictively by the U.S. Environmental Protection Agency. It is therefore no wonder that the impact on non-U.S. corporations has been relatively low.

The empirical study confirms our thesis of anticipatory effect more clearly than that of global compliance, which might result from the fact that the analysis (regarding the early implementation of the RoHS Directive) is methodically less difficult. The phenomenon of anticipatory compliance also shows how the distinction between compliance and self-regulation gets blurred: on the one hand it seems impossible to change the contents of a complex product from one day to the next; on the other hand it can hardly be determined exactly how long in advance the conversion process should start. Some standards even banned the use of substances immediately after the EU-Directive was published. This also shows that multinational corporations often do not stick to legal norms in a formalistic manner, but rather take requirements as a rough orientation for their own autonomous standards.

The cases of ‘true’ self-regulation, i.e. private standards for substances of concern not yet regulated, also have an anticipatory character, as they often appear in the context of regulatory initiatives, be it on the national or international level. Corporate self-regulatory standards often explicitly state this reason to justify self-regulation, e.g. ‘These lists ... have been compiled to meet existing and anticipated legal requirements and market demands’ (Ericsson, 2003).

However, reflecting the phenomenon of combined compliance and self-regulation, the motives given for developing the standards, namely ‘observing the law’ and ‘protecting the environment’, are more or less interchangeable; there was no evidence that different argumentations relating to compliance or self-regulation respectively correlate with more or less stringent standards.

IV. THEORETICAL CONCLUSIONS

The above analysis focuses on the influence of national or European public regulation on corporate standards. Scholars of political science or legal theory often explain private standards in the transnational sphere with other factors than (expected) regulatory requirements. They usually refer to public pressure generated by civil society agents or by socially and environmentally conscious consumers, fear of litigation, and sometimes even to factors within the corporate sphere such as the professional ethos of employees (e.g. Haufler, 2001). It would not make much sense to argue that regulation has priority over these factors. Still, it is interesting to consider the role public regulation can play regarding the other factors.

Litigation has played no important role so far in the management of chemical risks in the electronics sector; the same applies for environmentally conscious consumer schemes, such as eco-labels.[33] In terms of public pressure, changed social perceptions of the responsibilities of transnational corporations and business networks can play an important role in the development of inter-organisational standards dealing with social and ecological issues. This has been illustrated by the case of the apparel and sports’ equipment industry, where large global players like Nike started to develop social and environmental codes after massive protests about working conditions in Asian sweatshops. Even if manufacturing has been outsourced, and is therefore in the hands of legally independent suppliers or contract manufacturers, responsibility for the working conditions might still be attributed to transnational corporations. By developing inter-organisational ethical standards they often acknowledge this responsibility. This was also seen as the only means to protect the image of the brand from attacks by NGOs.

[33] Although the TCO-Label exists for electronic office equipment and has some testing and emission requirements for chemical substances, especially brominated flame retardants, it is rarely referenced in corporate standards, see http://www.tcodevelopment.com/, last visited 21 February 2007.

Similarly, questions of ecological and social responsibility for offshore production have been raised in the electronics sector. This was shown when substandard practices of recycling and waste disposal were documented in China (Puckett and Smith, 2002).

The risks of product liability, NGO pressure and image deficits may thus be an important mainspring for corporate risk management in the electronics sector. However, as a rule, neither a judge nor the average consumer is competent or capable enough to decide hard cases and assess the complex mechanisms of toxic risk management. Even if judges or consumer organisations can always consult scientific expertise, it rarely helps to achieve definite certainty. But whenever in one of the major jurisdictions a ban on a certain substance or one of its applications is imposed, this signals the transformation of arbitrary suspicions within the realm of scientific debate into the solid facts of regulatory policy. In the transnational sphere the probability of classic law enforcement mechanisms may be drastically reduced; yet that does not make public regulation ‘merely symbolic’, and hence ineffective. On the contrary, it is precisely the ‘symbolic’ quality of national regulation that seems to make it so effective in influencing the behaviour of globally operating corporations (Führ, 2003; Berman 2006: 945 f., 951 f.). These symbolic qualities may appeal less to public inspectors, whose scope for controlling multinational corporations is restricted anyway, but they are likely to be more appealing to consumers and environmental organisations, the media, or perhaps even juries in U.S.-American product liability processes. Similarly, on the side of the addressees of legal duties, these symbolic qualities may be of less interest to small and medium-sized businesses, which have no public image to lose, but more to global players with well-known brands. Nevertheless, for the credibility of performance within a specific business sector, it seems increasingly important for smaller firms to fulfil certain social and environmental standards (Sabel, O’Rourke and Fung, 2000).

The orientation of transnational private standards towards public regulation and the anticipation of public policies are characteristic for a changed relationship between the state and the private sector, especially multinational corporations. In contrast to the classic hierarchical relationship, the phenomenon of proactive compliance implies that interdependencies between public regulation and corporate standardisation arise from the mutual reliance between globally operating corporations and national legislators. In the field of product risk management both sides are constrained by the demand to adapt products or product regulation to various possible contexts: large corporations tend to design uniform products for the global market, principally complying with all regulatory environments. Similarly, national public authorities have to anticipate the variety of functional contexts of the products to make comprehensive risk assessments and draw regulatory consequences. Agents of the private and public sector alike are overburdened by unforeseen regulatory and technological developments in the other respective area.

To reduce this mutual unpredictability, public and private standards have to be developed in coordination. This presupposes a mutual reflection on the other sector's rationality, i.e. each sector has an interest in its objectives being reflected in the other sector's planning. Accordingly, the phenomenon of proactive compliance can be described as the reflection of national regulation and public interests in corporate global standards, combining elements of regulatory compliance and industrial self-regulation.

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