Accountability in the context of civilization change in China

John Philip Margerison

PhD awarded by De Montfort University

October 2015

Abstract

The purpose of this thesis is to contribute to the understanding of accountability in the context of civilization change in China. Using a Foucaultian epistemic framework and archaeological method, data has been gathered from four sources: textual, interviews, case studies and surveys. Each source has been considered in terms of the viability of the modern episteme and the possibility of episteme change to ecological civilization taking place in China. Also the actors in the sustainability accountability network have been identified along with the key contingencies that could lead to changes in accountability in China.

Based on the data collected there is strong evidence that the existing industrial civilization in China is seen to be unsustainable. Also that there are particular contingencies in place in China that make episteme change both likely and perhaps already taking place. The key contingency in this research is the metaphysical continuum based on harmony ideas in ancient Chinese philosophy. As a result there are strong grounds for predicting that new forms of accountability will be based around groupings of organizations in provinces, geographical areas (river basins) and regions, feeding up to accountability for sustainability at national and supra-national levels.

Practically this research has opened up the possibility of accountability in China that could seriously address sustainability issues rather than the typical Western approaches based on empty rhetoric to improve reputation and legitimacy.

This research has operationalized Foucault's ideas on episteme change empirically in China. As such it represents an original contribution to research on sustainability and accountability responses thereto.

Key words – Episteme. Ecological civilization. Accountability. Sustainability.

Acknowledgements

Many thanks to the following colleagues who have assisted and provided inspiration over the years:

Professor Frank Birkin my supervisor

Dr Nick Webber my supervisor

Dr Kumba Jallow

Professor David Crowther

Dr Mingchuan Ren

Mrs Wang Yingying

Professor Peter Moizer

Professor Dave Owen

For providing constant love and care my wife Margaret Blakeborough

Contents

List of tables and figures

List of abbreviations

ANT	Actor Network Theory
B	Buddhism
BCE	Before the Christian Era
BP	British Petroleum plc
C	Confucianism
c-can	China Civil Climate Action Network
CCP	Chinese Communist Party
CCPCC	Chinese Communist Party Central Committee
CE	Christian Era
CICPA	Chinese Institute of Certified Public Accountants
CO2	Carbon Dioxide
CSD	Corporate social disclosure
CSEAR	Centre for Social and Environmental Accounting Research
CSR	Corporate social responsibility
D	Daoism (also known as Taoism)
DDT	Dichloro Diphenyl Trichloroethane
DEFRA	Department of Environment, Food and Rural Affairs (UK)
EA	Environmental accounting
EAR	Environmental accounting and reporting
EC	Ecological civilization
EM	Environmental Management
EMA	Environmental management accounting
EMS	Environmental management system
EPB	Environmental Protection Bureau (China)
ESD	Education for Sustainable Development
FCA	Full cost accounting
FEE	Federation des Experts Comptables Europeens
FON	Friends of Nature (China)
GDP	Gross Domestic Product
GEI	Global Environmental Institute (China)
GRI	Global Reporting Initiative
IC	Industrial civilization
IFAC	International Federation of Accountants
IIRC	International Integrated Reporting Committee
ISIS	Intrinsically Sustainability Implementation System
ISO	International Standards Organization
IUCN	International Union for Conservation of Nature and Natural Resources

LCA	Life cycle assessment
MEP	Ministry of Environmental Protection
MOE	Modes of Existence
MP	Member of Parliament (UK)
NASA	National Aeronautics and Space Administration
NGO	Non-governmental organization
OECD	Organization for Economic Co-operation and Development
PE	Primal episteme
RMB	Renminbi (Chinese Yuan)
RQ	Research question
RRM	Reputation Risk Management
SA	Sustainability accounting
SAR	Sustainability accounting and reporting
SD	Sustainable Development
SEA	Social and environmental accounting
SEPA	State Environmental Protection Bureau (China)
SME	Small and medium-sized enterprise
SOE	State owned enterprise (China)
ST	Structuration Theory
TBL	Triple bottom line
UN	United Nations
UNWCED	United nations World Commission on Environment and Development
WBCSD	World Business Council for Sustainable Development

1. Introduction

Fundamentally this thesis is about change – the sort of change that is needed if humans are to remain on the planet without destroying the very ecosphere that they (and all the other species) depend on for survival (Gray, 2010). This change will only take place if there is a change in the way humans think about and interpret the world around them – epistemological change.

Li Bai (2007) wrote his poem Songs of Sunrise and Sunset in his lifetime (700-762 CE). In a modern translation the final four lines are most telling in terms of the struggle for the survival of the planet:

You go against the law divine.

What you do is quite out of line.

I would embrace the universe

To be one with Nature for better or for worse (ibid).

These lines are telling in that they intimate that oneness with Nature by humans is the way forward. It is argued in this thesis that this sort of idea is the opposite of the prevailing modern view that humans can dominate nature and use it for their own devices. This modern view is termed anthropocentric.

The research for this thesis was stimulated by the author's time working in China from 2006 to 2008. Several observations were made: (1) high levels of pollution that made day to day living uncomfortable and dangerous; (2) huge levels of development of cities and industry with the attendant problems of resource use and loss of green spaces; (3) a prevailing attitude amongst my Chinese students that China should be allowed to catch up with the West, even if this meant environmental problems; (4) an awareness in the accounting community (practitioners, professors and students) about climate change and environmental matters and the need to account for them; (5) high levels of awareness and practice around ancient Chinese religions and philosophies (festivals, temples, holy places). With these observations in mind the author's own interest in environmental accounting led to the normative proposition that if China does not change course and begin to embrace notions of sustainability (in particular environmental sustainability) and account for it in new ways, then the situation could become intolerable for humans and non-humans alike both in China and in the world - because China is so important globally (WorldBank, 2015).

This thesis seeks to make an original contribution to the knowledge about changing organizational accountability for sustainability in a Chinese context. It does this by examining empirically the possibility of episteme change in a Chinese setting and the potential that this brings to organizational accountability for sustainability. It is argued that in China there is a unique blend of new science, centralized Communist government and the influence of ancient philosophy on its peoples that make it possible to observe "episteme change" in action from industrial civilization to ecological civilization.

It is hoped that this research will stimulate debate about the need for organizational accountability responses to the issue of environmental sustainability. Also that it will foster the development of better understanding that such responses are culturally distinct in different countries such as China (Lewis and Unerman, 1999).

This thesis broadly looks at accountability by organizations for sustainability and the management that underpins this across economic, social, cultural and environmental (including ecological) elements. It agrees with Porritt (2007) that environmental sustainability is primary and the other elements secondary. This is because all else is conditional on living sustainably within the Earth's systems and limits (ibid). Sustainability is defined by Porritt as the capacity for continuance into the long-term future, by living within the constraints and limits of the biophysical world (ibid). In this thesis *accountability* is used to describe all those techniques (including accounting and reporting, both calculative and narrative) by which an organization gives an account of its activities to those people and groups that have a right to that information. This definition is the author's interpretation based on several references that are discussed in the literature review (Roberts and Scapens, 1985, Gray et al., 1997, Staubus, 2003).

There follows in this introductory chapter:

- The background to the research on which the thesis is based

- The overall aims of the research and the research questions

- A summary of the chapters that follow.

1.1 The background to the research

It is agreed by commentators (Ahmed, 2014) and organizations such as the World Business Council for Sustainable Development (WBCSD, 2010) that the current business model based on economic growth is not sustainable. It has been estimated that if we continue on the business-as-usual path we will be consuming the equivalent of the resources of 2.3 planets by 2050. Hence it has been argued by prestigious organizations such as WBCSD that the way to sustainability will require fundamental changes in governance structures, economic frameworks, business and human behaviour (ibid). A recent partially NASA funded project (Ahmed, 2014) highlighted the prospect that global industrial civilization could collapse in the coming decades due to unsustainable resource exploitation and increasingly unequal wealth distribution. This NASA funded study (ibid) argued for solutions based around: reduction in economic inequality so as to ensure fairer distribution of resources; and a dramatic reduction in resource consumption by relying on less intensive renewable resources and reducing population growth.

The main thrust of this thesis is that so-called sustainability – accountability for it and its management by organizations – in practice has been to a large extent to date a search for eco-efficiency and greater competitiveness - underpinned by the imperative for reputation-risk management. To this end most of human's efforts at sustainability, particularly environmental sustainability, have been doomed to failure.

Modernism, with its anthropocentric[1] outlook based on enlightenment thinking, where humans are seen to be able to control Nature, has led to un-sustainable development. In spite of a growing green movement in the West, it remains a small minority interest area. The 2015 British general election saw the Green Party gain more votes than ever before – but only one MP. It also saw a paucity of green debate or manifesto pledges apart from the Green Party. The British Prime Minister was attributed with the comment "get rid of all the green crap" in 2013 in relation to bringing down the cost of energy bills (Mason, 2013).

In the ever more desperate scenario – global warming, sea levels increasing, extreme weather events, peak oil and therefore resource wars, ozone layer depletion, polar ice caps and glaciers melting and retreating, mass species extinctions– a large group of well-meaning voices of society in the West (OrganizingForAction, 2015) are in complete denial even in the face of a huge weight of scientific knowledge. The sceptics see the current situation as being a cyclical one in which humans have had no hand, for example they are unconvinced that rising greenhouse gas emissions are the cause of modern-day warming (BBCNews, 2009). Instead of obsessing about the state of the planet the majority attitude is business as usual with an ever increasing drive for economic growth guided by neo-classical economics (Meade, 1960) and markets. Growth is fuelled by a rising population – each new person a programmed consumer.

One minority position endorses the problems above as being significantly man-made and in Western Europe this has manifested itself in the growth of Green political parties and pressure groups (Maier, 1990). They have argued for radical measures to hold back the impending ecological disaster including: divestment from fossil fuels; drives to make renewable energy cheaper than fossil fuels; and, fairer societies with less inequality. These calls for change in the West have been driven by recourse to an ecological ethic that was developed in the 20th Century (Dobson, 1991). This ethic does not have roots in any kind of metaphysical continuum, with science and religion (mainly Christian or Judaism based) seen as mutually exclusive (Moltmann, 1985).

As a result of the problems highlighted above and the general denial of Green perspectives there have come calls for fundamental changes in humans' relationship with Nature towards Li Bai's ideal from 1,300 years ago of living at one with Nature (Harding, 2006). Harding (2006) argued that what is needed (and bear in mind that this cannot be manufactured) is a fundamental change in the way people think and relate to the earth. Consistent with his discussion in The Order of Things (Foucault, 2002) it is likely that Foucault would have described this as an *episteme change* – a discontinuity where our interpretation and ordering of knowledge changes radically. Kendall and Wickham (1999) have interpreted Foucault in suggesting that such a discontinuity only comes about where a set of contingencies (accidents of history) mesh together in a unique way and thus allow the actors to change their thinking.

---

[1] Humans at the centre of everything; Nature for humans' benefit.

This thesis argues and supports with empirical evidence that in China the contingencies in place allow the possibility of episteme change. It also argues that with this change will also come new accountability for sustainability. The change in China has already been voiced by the Chinese Communist Party in its 12th five year plan and called "ecological civilization" (BritishChamber, 2011) (see Section 2.2.5). This is mirrored by the work of Birkin and Polesie (2012) who have proposed an emerging "primal episteme" based on a return to intrinsic values (see Section 3.3.1). Intrinsic value is the value placed on what we currently do not value such as the ecosystems that provide all our resources and a sink for all our waste (ibid).

The contingencies in place in China recognised in this thesis are:

1. A people imbued with ancient philosophy and ideas of harmony; all under heaven (tian xia: reviewed in Section 2.2.4); and an active Nature (Wang and Juslin, 2009)

2. Pollution and resource constraints as an everyday fact of life in China (Economist, 2014)

3. A strong single party government (not a democracy as Westerners know it) with a long-term outlook and the ability to make policy work (Rowe and Guthrie, 2010)

4. A failing economic model based on neo-classical market-led economics – the rate of growth is falling and the level of inequality is hard to square with the Communist politics (Economist, 2015)

5. New science emerging and being embraced in China – science of renewables, thermodynamics (IRENA, 2014).

It will be further argued that these contingencies operate in and are (or will be) interpreted and worked on by a set of actors in a complex social network that is unique to China (Latour, 2005)[2]. This "actor-network" is considered to be made up of both human and non-human actors:

1. Companies and their accountants

2. Human society (made up of individuals in their families)

3. Government (1) (central government of the Chinese Communist Party)

4. Government (2) (Ministry of Environmental Protection at local office level)

5. Government (3) (local government – particularly the finance departments)

6. Scientists

7. The natural environment (with all the non-human flora and fauna)

8. Chinese Institute of Certified Public Accountants (members and executive)

---

[2] Actor Network Theory is interpreted to be a methodology whereby in a particular field there are identified the key actors and that these actors form a network and the interactions between the actors lead to unpredictable outcomes.

9. Modern day philosophers (interpreting ancient Chinese philosophy)

10. Pressure groups

11. Students and academics of accounting and finance.

The list of actors has been compiled from the researcher's own interpretation whilst carrying out this research. Although this list of actors is not unique to China, what is unique is the way that the actors interact or the associations between the actors creating the complexity of the particular Chinese situation. The argument in this thesis is that these associations between actors around the contingencies could lead to episteme change to ecological civilization with corresponding developments in accountability.

1.2 The overall aim of the research and the research questions

The overall aim of the research is:

To contribute to the understanding of accountability in the context of civilization change in China.

The main research question is:

What are the prospects for changes in accountability in China as it moves towards ecological civilization?

The subsidiary questions are:

RQ1 Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy (principally Buddhism, Taoism and Confucianism)?

RQ2 Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into *episteme change*?

RQ3 Does Chinese philosophy influence Chinese accountants?

RQ4 If 21st century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations?

These questions can be looked at diagrammatically as follows:

Figure 1 Diagrammatical representation of research questions
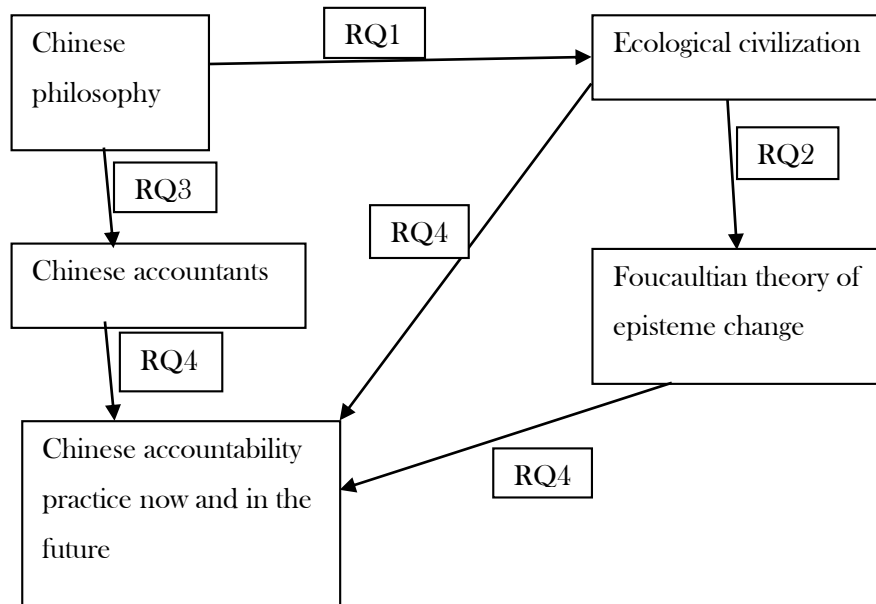
1.2.1 Scope and methodology

The scope of this thesis is China and the possibility of new accountability for sustainability therein. The main thrust of the thesis is that there are particular features of China (called contingencies) that make it possible for change to take place there, whilst other countries may not be able to change in the same way. The aim and research questions above are tackled using a mixed methods approach with an overall interpretivist philosophy. Signs are interpreted from a variety of sources – textual, interviews, case studies and surveys. The data is analysed mainly using thematic qualitative method and with some descriptive statistical analysis of the survey findings. The analysis themes are drawn from the work on episteme change by Foucault (1972) which provides themes around viability of the Modern episteme and the possibility of change to a new episteme.

1.2.2 Key contributions from the literature

The literature review (Chapter 2) has key contributions as follows:

On theories to explain epistemological change – Bhaskar (1978, 1979, 1986); Kuhn (1962); Giddens (1991); Uduigwomen (2005); Foucault (2002); and Latour (2013 (1)).

On sustainability and ecology – Goldsmith (1972); Gray and Bebbington (2000); Dobson (2007); and Meadows (1991).

On modern interpretations of ancient Chinese philosophy – Pan (2011); Tu (1998); Zhao (2005); Berthrong (2003); Miller (2003); and Spondsel and Natadecha-Sponsel (2003).

On ecological civilization in China – Wang et al. (2014), Tu (2013), Oswald (2014).

On accountability and the development of sustainability accounting – Roberts and Scapens (1985); Owen et al (1997); Gray (2002); Burritt and Schaltegger (2010); Gray and Bebbington (2000); Gallhofer and Haslam (1997); Tinker et al (1991); Elkington (1997); Bebbington et al (2007a).

On education in sustainability accounting – Collinson et al (2007, 2014); Lu and Zhang (2014).

On sustainability accounting in emerging economies – Belal and Owen (2007); Jaggi and Zhao (1996); and Rahaman (2004).

On sustainability and environmental accounting research in China – Xiao (2006); Rowe and Guthrie (2009); Xiaomei (2004); Du and Gray (2013); and Birkin (2007).

On the role of the accountant in sustainability accounting – Hines (1988); and Bebbington et al (1994).

On modern Chinese culture and ethics – Hofstede and Bond (1988); Lan et al (2009); Chan (2008); Yu (2009).

1.2.3 Explanation of how the research questions are answered in the subsequent chapters

Using the overall aim and research questions at the beginning of this section 1.2, this sub-section explains briefly how the research has been done and how it will be evidenced in the chapters that follow. Starting with the subsidiary questions:

RQ1 Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy (principally Buddhism, Taoism and Confucianism)?

This question is answered by reference to the existing literature in Section 2.2 – commentary about the recent Chinese government plans and rhetoric on ecological civilization and recent interpretations of ancient Chinese philosophy. Then this is discussed in Section 5.1.1. Its relevance to the overall aim of the thesis is that if the notion of civilization change is underpinned by ancient philosophy it is more likely to lead to real change.

RQ2 Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into episteme change?

This question is again answered mainly by reference to the literature on ecological civilization (Section 2.2) and review of Foucault's work on episteme change (Section 2.1.1.5). The use of Foucault's archaeological method is explained and justified in the methods chapter (Section 3.1). The links are discussed in Section 5.1.2. The relevance of the question is that there have been many initiatives and civilizations put forward by government in China over the years since the revolution in 1949. It is acknowledged that even in a single party government changes in policy do take place, but in 2015 the emphasis on ecological civilization is clear.

RQ3 Does Chinese philosophy influence Chinese accountants?

This question is answered using the empirical findings from the research – interviews with and surveys of Chinese accountants (including practitioners, accounting academics and accounting students). These are discussed methodologically in Sections 3.3.2.3 and 3.3.2.5 and the findings outlined and analysed in Sections 4.2 and 4.4. This question is discussed in Section 5.1.3. The rationale for this empirical work is to test the popular notion that Chinese people are imbued with ancient philosophy (as reviewed in Section 2.5) and hence also Chinese accountants. If this is shown to be the case then the likelihood of episteme change becomes much greater.

RQ4 If 21st century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations?

This question is answered using review of the literature on modern Chinese culture in Section 2.5 and notions of accountability reviewed in Section 2.3. Some existing accountability responses in China are established empirically from the interviews (Section 4.2) and case studies (Section 4.3). This question is discussed in Section 5.1.4.

The overall research question is: What are the prospects for changes in accountability in China as it moves towards ecological civilization? This is discussed in Section 5.2 which draws together the answers to the subsidiary research questions.

Section 6.3 of the thesis concludes on the overall aim: To contribute to the understanding of accountability in the context of civilization change in China. It should be stressed that although some informed ideas on what form this accountability could take are discussed, the key to the research is that the sort of change taking place in China, if it could be described as an episteme change, could lead to changes in accountability that are as yet not fully formed.

1.3 Summary of the chapters to follow

Following on from the detailed explanation in Section 1.2.3 above, the remaining chapters of this thesis are structured as follows:

Chapter 2 – Literature review

This chapter reviews the main theories and published applied research relating to the research topic – accountability in the context of civilization change in China. The original contribution of this research is also discussed.

Chapter 3 – Methodology and methods employed

This chapter explains and justifies the methodological framework for the research and the methods employed.

Chapter 4 – Findings and Analysis

In this chapter the findings from the four sources – texts, interviews, case studies and surveys - are summarised with initial analysis of each source.

Chapter 5 – Discussion

This chapter discusses all the sources of evidence in an integrated way around the key themes from Foucault's work via the five research questions. The discussion seeks to provide readers with a model for episteme change using the key contingencies in place in China. It also seeks to use the evidence to predict what changes in accountability are likely to take place.

Chapter 6 – Conclusions

This chapter concentrates on the overall aim of the research - to contribute to the understanding of accountability in the context of civilization change in China. It summarises the whole thesis and concludes on the overall aim and objectives.

2. Literature review

This chapter reviews the main theories and published applied research relating to the research topic – accountability in the context of civilization change in China. In terms of theories, it outlines several that could be used to understand epistemological change. It reviews published applied research on accounting for sustainability. It also reviews the existing literature to establish what developments in sustainability accounting have taken place around the world to date. This is so that they can be compared with developments in China uncovered from the empirical work that forms the original contribution of this research.

The structure of this chapter is:

Section 2.1 reviews the literature on a theoretical basis for the research. Starting with theories of epistemological change and then looking at existing theories of sustainability, ecologism and environmentalism.

Section 2.2 reviews modern interpretations of ancient Chinese philosophy and its relationship to and teachings on ecology and sustainability. This review uses English language sources by both Chinese and non-Chinese philosophers – heavily influenced by the Yale Forum on Religion and Ecology (Tucker and Berthrong, 1998). To the extent that the Chinese government is operationalizing these ancient ideas in its concept of "ecological civilization," this concept is also reviewed.

Section 2.3 reviews the notion of accountability and within it the development of sustainability accounting from its roots in environmental and social accounting. In particular it reviews researchers' and practitioners' attempts to develop new forms of accounting that are able to capture the richness and the imperatives inherent in this area. It also reviews the critical literature on sustainability accounting and its reporting and developments in Chinese accountability practice.

Section 2.4 reviews research on the role of the accountant in organizational accountability for sustainability (including environmental and social accounting), starting with Bebbington et al (1994) and mainly influenced by the conferences and publications by members of CSEAR (Centre for Social and Environmental Accounting Research). The emphasis on CSEAR researchers puts this research firmly into the normative school of thinking on sustainability accounting which is discussed in more detail in this section.

Section 2.5 reviews recent literature on modern Chinese culture and ethics where it is noted that modern interpretations of ancient Chinese philosophy resonate in the thinking of Chinese people of today.

Section 2.6 is a concluding section that draws together the strands from the review and shows how they inform the empirical work that forms the basis for the original contribution of this research.

2.1 Theoretical basis

This section reviews possible theoretical bases for this thesis. Several possible theoretical perspectives on epistemological change are reviewed. Theoretical influences on the sustainable development debate are also reviewed.

2.1.1 Theories helping to explain epistemological change

It is possible to argue that there are six different theories that can help to explain why change takes place in society – Realism; Paradigm Shift; Structuration Theory; Post-Modernism; Episteme change; and, Modes of Existence. These theories are discussed in sections 2.1.1.1 to 2.1.1.6.

2.1.1.1 Realism

Realism is a highly contested word open to a variety of interpretations in the social sciences (Collier, 1994). One interpretation of realism is based on the writing of Bhaskar (1978, 1979, 1986) on critical realism (Collier, 1994). Bhaskar developed a form of realism specifically for the social sciences (ibid). He stated that the reasons and accounts that people accept and use are included among the category of things to be identified as real (ibid). He then noted that such reasons and accounts are independent of the scientist's or individual's cognition (ibid). Hence, the ways in which we order knowledge are profoundly linked to the approach taken to reality (ibid). This can be useful in explaining why there is a wider reality as revealed by scientific experts on human effects on climate change, as opposed to social reality as represented by the authoritative voices of society and informed public opinion that denies human involvement in climate change (Birkin and Polesie, 2011). This dichotomy is at the root of the problem of moving towards meaningful change that would ensure sustainability (ibid). This is because as long as there is a societal voice (social reality) which does not agree with the scientific voice (wider reality) that environmental problems are man-made, then change is unlikely to take place (ibid). They noted (ibid) that although Bhaskar's theory does provide some explanation as to why social reality may exist apart from wider reality it does not provide a way to overcome any such division and so effect change.

2.1.1.2 Paradigm Shift

Paradigm shift relates to the work of Kuhn (1962) who added this new concept to the philosophy of science. He defined paradigm shift as a discontinuity in the acquisition of scientific knowledge marked by a radical new understanding that is incommensurable with the old (ibid). He noted that it is not possible to understand one scientific paradigm from the conceptual framework and terminology of a rival scientific paradigm (ibid). It has been noted that this approach helps us to understand how a rival scientific paradigm could replace an existing one through the conscious decisions of scientists with a new scientific theory being accepted because the scientific community has tested it and found it to be better than that previously held (ibid). However, Birkin and Polesie (2011) argued that paradigm shift is only applied to science and scientists - so can be used to understand rival paradigms in say climate science. As a result it does not

allow us to study and reveal the unconscious assumptions that support divisions of knowledge (say between sociology and science) – based on assumptions that lie, in their deeper origins, beyond scientific debate (ibid). This is interpreted to mean that in society, knowledge is and people's assumptions are based on for example religion and philosophy and that the influence of science and its progress is only part of the process of epistemological change.

2.1.1.3 Structuration Theory

Structuration Theory (ST) was developed by Giddens (1991) in his work on modernity and self-identity. Giddens suggested that human agency and social structure are in a relationship with each other, and it is the repetition of the acts of individual agents that reproduces the structure (Gauntlett, 2008). This means that there is a social structure - traditions, institutions, moral codes, and established ways of doing things; but it also means that these can be changed when people start to ignore them, replace them, or reproduce them differently (ibid). Birkin and Polesie (2011) noted that social reality according to ST is merely reproduced, not created, and hence ST is limited to understanding the status quo (and how it is maintained) and does not help us to understand how the status quo was established in the first instance (origins and transformations). This means that if a change takes place in society, ST will help to explain how that change is maintained but not how that change came about (ibid).

2.1.1.4 Postmodernism

Uduigwomen (2005) referred to Lyotard who attacked the legitimating myths of the modern age - 'the grand narratives' – such as: the progressive emancipation of humanity through science and the idea that philosophy is capable of restoring unity to learning and developing universally valid knowledge for humanity. Postmodernism thus became associated with the critique of universal knowledge and foundationalism (ibid). According to Uduigwomen's review (ibid), the postmodern thinker does not subscribe to the belief in external or universal truths. He (or she) disagrees with the claim that investigation of the nature of being is crucial to the determination of the true character of reality (ibid).

A more positive view of postmodernism was discussed by Hartman (1996) who saw it as a period starting from about 1980 to the present, characterized by the emergence of the post-industrial information economy. He also states that the phrase implies a nation-state challenged by new world views: feminism, multiculturalism, environmentalism, with the old scientific certainties called into question (ibid). This sense that postmodernism is an epoch that follows modernism has been a common view (Harvey, 1990, Uduigwomen, 2005).

However, Craig (2008 p5) argued that: "The idea that we live in a postmodern culture is a myth. In fact, a postmodern culture is an impossibility; it would be utterly unlivable." This is interpreted to mean that postmodernism is a philosophy rather than a physical state and therefore not a state that can be arrived at through a process of change.

Overall there appears to be a lack of consistency in postmodern thinking that makes its applicability to epistemological change difficult to justify.

2.1.1.5 Episteme change

Foucault's (2002) work on *epistemes* – The Order of Things – was first published in French as Les mots et les choses (1966). In this monograph he introduced epistemic analysis using his "archaeology" of the human sciences. By human sciences he meant those disciplines that concerned living beings, languages, or economic facts. Foucault (ibid) argued that these disciplines change and develop over time. For example he identified in the Classical episteme (1650-1800) disciplines of grammar, natural history and the science of wealth and in the Modern episteme (1800 to the present) disciplines of philology, biology and political economy [with an emphasis on the analysis of production] (ibid p224).

It is important to note that Foucault's thinking was influenced by earlier philosophers such as Kant (transcendence), Hegel (particularly ideas about the individual as the instrument of an idea), Marx (through the work of Sartre) and Nietzsche (ideas of genealogy) and by contemporaries in the 20th Century such as Levi-Strauss (linguistics and anthropology), Sartre (Marxism and post-structuralism), Lacan (psychoanalysis) and Derrida (deconstruction) (Velibeyoghu, 1999). He was also influenced by his teachers and professors – Merleau-Ponty (phenomenology) and Girard (philosophy) (ibid). These influences show how Foucault developed into a polymath whose writing touched on many fields and who sought to explain the world in terms of contingencies (power being the key to much of his work) and discontinuities or episteme change.

Foucault (2002) explained an *episteme* as "the historical conceptual context of an age, the consequences of which determine the form that knowledge of the human sciences takes in that age." Birkin and Polesie (2011) interpreted Foucault's notion of an *episteme* as the possibility of knowledge - what knowledge makes possible - the consequences of which define an age. Another way of looking at an *episteme* is that it shows "how people order their knowledge, how they construct reality. It defines what and how they get to know their world and themselves. It influences what they value, how they make meaning. It determines who they are (Birkin and Polesie, 2012 p69)." A recent study (Spence and Rinaldi, 2014), that looked at the embedding of sustainability in a particular company and its supply chain, used episteme as one of the analytics of government in the sense of organizational governance. Their definition of episteme was based on Dean's (2009) interpretation of Foucault's *episteme* as: "....distinctive ways of thinking and questioning....and....the basis on which we privilege knowledge gathered... (ibid p439)." This definition is not applied to whole cultures but still has the sense of the ordering of knowledge.

For the purposes of this thesis a Foucaultian *episteme* is taken to mean:

An historical period, in a particular culture, during which new possibilities of knowledge have changed the previous episteme's dominant way of thinking.

It is important for this research that this interpretation of the meaning of *episteme* is used, as *episteme* has been used by academics in other contexts in different ways.

Foucault was able to identify: (i) different epistemes; and (ii) what transformations could be attributed to episteme change. The use of the word "transformations" is from Foucault and is used instead of "causes" (Foucault 2002 xxiii) which he considered to be problematic. He stated that his work represented an archaeological enquiry into those configurations within the space of knowledge which have given rise to the diverse forms of empirical science (Foucault 2002 xxiv). In order to do this he traced the development of language as it has been spoken; natural creatures as they have been perceived and grouped together; and, exchanges as they have been practised. By doing this he aimed to rediscover on what basis knowledge and theory became possible; and, how that knowledge was ordered at a particular time (ibid xxiii).

Foucault identified three *epistemes* based on Western culture – Renaissance (1500-1650), Classical (1650-1800), and Modern (1800 to 1966 [and continuing on to the present]). These dates are indicative and imprecise as is noted in Foucault's own analysis (Foucault, 2002). It should also be noted that Foucault concentrated on Western culture (with an emphasis on France). He stated that in any given culture and at any given moment, there is always only one episteme that defines the conditions of possibility of all knowledge, whether expressed in a theory or silently invested in a practice (Foucault, 2002 p183). This suggests that there may be competing epistemes in existence at the same time in different cultures. So for example today the dominant way of thinking in Foucault's "modern" episteme in the West is very different to the dominant way of thinking in the Islamic world.

To illustrate the idea of different epistemes in different historical periods, Birkin and Polesie (2012) used the example of a plant named St John's Wort. In terms of naming and representation this plant was seen in pre-Christian Mediaeval terms as having a yellow flower representing the sun and leaves with a skin-like appearance that gave the plant healing properties based on the regenerative power of the sun. It took its name from Greek antiquity – hypericum. In early Christian times it was noted that the plant had a red sap representing the blood of the martyred St John - hence its medicinal healing properties related to its miraculous representational roots and also the change of name to St John's Wort. In the Modern era (Foucault suggests 1800 to the present) the plant has been seen in scientific terms as a medicine with certain atomic structures and effects based on science rather than representation (Birkin, 2014). It can be seen that in an earlier age representation was the key to people's thinking (with that representation being related to mystical ideas – whether pagan or religious) and that today our thinking is dominated by science with the emphasis around notions of how useful something is to people (anthropocentric ideas).

Foucault (2002) stated that in the Classical age a coherence existed between: the theory of representation and the theories of language; of the natural orders; and of wealth and value (ibid xxv). He further argued that a discontinuity occurred in the entire Western episteme towards the end of the 18th century, when a scientifically strong moment was created in just the area where the Classical episteme was

metaphysically strong (ibid). This is interpreted to mean that by the end of the 18th century scientific discovery had created a new way of ordering knowledge from that based on natural philosophy (a branch of metaphysics[3]) which had dominated in the 18th century. The analysis of exchange and money gave way to the study of production; that of organism took precedence over the search for taxonomic characteristics (Foucault, 2002). Hence he argued that language lost its privileged position as an indispensable link between representation and things (ibid). This is interpreted to mean that language had been the key to representation and became just another area of specialization.

The great empirical regions of the Classical age – general grammar, natural history and exchange were transformed into Modern equivalents of philology, biology and political economy (Birkin and Polesie, 2011). Birkin and Polesie noted in Foucault that the Modern disciplines have no "metaphysical continuum" (ibid). Metaphysical continuum is interpreted to mean that there is an overarching philosophy which has continued from age to age and which is used as the basis for understanding all the human sciences. As a result of the weaker metaphysics, in the modern era there have developed as separate and it has been be argued over-specialised disciplines (ibid). Hence it was noted that the Modern episteme is characterised by the lack of an empirical synthesis (ibid). This is interpreted to mean that the Modern disciplines in the human sciences (based on observation or experience) do not form a connected or unified whole. This lack of empirical synthesis manifests itself according to Birkin and Polesie (2011) in the sustainable development (SD) sphere via a large number of scientific experts speaking with one language based around empirical method that almost universally agrees that climate change is anthropic (caused by human interventions) and the authoritative societal voice speaking with another "anthropocentric" language based around untested notions that climate is cyclical and that there is no way to blame human interventions and thus confusing and entrenching the SD debate at the philosophical level (ibid) (see also section 2.2.1.6 on modes of existence and the use of Actor-Network theory in this sphere).

A core manifestation of Modern thinking was the emergence of "epistemological man". Foucault (2002 p376) described this as "when man constituted himself in Western culture as both that which must be conceived of and that which is to be known." This was interpreted by Birkin and Polesie (2011) to mean that where there is an epistemological vacuum it is filled by Man in a unique epistemological role of being the subject and object of all knowledge. They go on to state that there are strong tendencies in the Modern episteme to consider the world as man's world (ibid). This has been termed an anthropocentric world view - a mind-set whereby man is seen as the measure of all things and the only source of power for economic well-being, political stability and social development (Tu, 1998). Another definition of anthropocentric is the view that humans are the sole bearers of intrinsic value and that all other living things are there to sustain humanity's existence (MacKinnon, 2007). With both of these

---

[3] Metaphysics is interpreted to mean philosophical enquiry of a non-empirical character into the nature of existence Gay, P. (1995). *The Enlightenment (The Rise of Modern Paganism),* London, W.W. Norton and Co..

definitions the key is that humans see themselves to be above all other species and in control of nature and its species and resources. The problems with this anthropocentric world-view are beginning to be tackled in the sustainable development sphere (see for example the recent pact between USA and China to cut carbon emissions (Taylor and Branigan, 2014)), but in response the US Senate's new Republican leader, Mitch McConnell, stated that: "This unrealistic plan, that the president would dump on his successor, would ensure higher utility rates and far fewer jobs (ibid)" is typical of our species solipsism. Foucault (2002 p331) explained this as an inward-looking perspective taken by humans where we have turned inwards towards the essential functions of life.

Foucault (2002) noted that the German philosopher Kant developed a critique of Classical thinking which had been based on representation where each object represented something (as in the example of St John's Wort) often with religious overtones and also providing an explanation - however flawed - of the origin of things. Kant's critique was to question representation and thus sanctioned the withdrawal of knowledge and thought outside the space of representation. These ideas heralded the Modern episteme in which such questioning of representation and origins was a prime characteristic (Birkin and Polesie, 2011). This was as opposed to the Classical ahistoric acceptance of all things having come from God and therefore no questioning of origins. Foucault stressed that this transformation involved the new forms of knowledge forming "....in an area where those forms of knowledge did not exist, in the space they left blank, in the deep gaps that separated their broad theoretical segments and that were filled with the murmur of the ontological continuum (Foucault, 2002 p225)." This is very poetic and can be interpreted more prosaically as that the new Modern knowledge was not a development or replacement of previous Classical knowledge – rather it was located in a new epistemological space where time had become historical.

It should be emphasised that Foucault did not propose a new episteme emerging when he wrote his thesis in 1966, rather he examined previous epistemes - using his archaeological method and the process of change from one episteme to another. Birkin and Polesie (2011) acknowledge that it is difficult to conceive of an emerging episteme when thinking and writing from within the Modern episteme. However they argue that when the episteme change examined is from an episteme not that of the writer (in their case Classical to Modern) then historic features of episteme change can be identified and can be applied to our own episteme (Modern) and the possibility of change to a new un-named episteme (ibid).

The imperative that episteme change is very likely can certainly be implied in Foucault (2002), but it is the ability to identify the possibility of such change that is the basis of his archaeological method. He argued that a change in episteme introduced a new ordering of knowledge but also undermined the credibility of the prior episteme (ibid).

Birkin and Polesie (2011) proposed four sets of questions, derived from Foucault, by which the viability of the Modern episteme could be questioned (see Chapter 3.3.1 for a full discussion of the use of Foucault's archaeological method based around these questions of viability). Their research proposed

a new ordering of knowledge leading to an emerging "primal" episteme (Birkin and Polesie, 2011, 2012). They proposed that in this new episteme order is found to be intrinsic to the universe leading to a new integrated view of the universe based on new science; a metaphysical continuum, and active self-regulating nature (ibid 2011). Their work was theoretically-based and strongly argued around philosophical scholarship including discussions with a Chinese academic linking it to Chinese philosophy (ibid 2012). The empirical basis for their theorizing was the observation of the world around them in a general sense without the use of traditional empirical data gathering tools. Hence, one Chinese academic in their monograph makes generalizations about modern China and in no way are these generalizations tested.

Although, as has been discussed, Foucault hinted at episteme change taking place when he was writing in 1966, he did not develop this theme in his thesis. Foucault did say that more than one episteme could be operating at the same time in different cultures He used the example of ancient (and modern) China in his Preface where he said: "There would appear to be, then, at the other extremity of the earth we inhabit, a culture entirely devoted to the ordering of space, but one that does not distribute the multiplicity of existing things into any of the categories that make it possible for us to name, speak and think (Foucault, 2002 xxi))." This is interpreted to mean that more than one episteme could be in existence in a different place.

Some scholars (Agger, 1991, Uduigwomen, 2005) have suggested that Foucault's work was part of postmodern thinking and even that his view of discourse/practice was seen as a version of Kuhn's (1962) paradigm shift notion. So, there could be argued to be a mixing of theories in Foucault rather than his theory being somehow completely original. However, Foucault brought together thinking around the coherent idea of episteme change and when it was published in 1966 The Order of Things was hugely influential and made him famous; having a profound impact on every field in the humanities and social sciences (Best and Kellner, 1991).

2.1.1.6 Modes of existence (MOE)

The theory of modes of existence has been developed over 25 years by Latour (2013 (1)). The method employed has been based around Actor-Network Theory (ANT) (Latour, 2005). ANT is interpreted to be a methodology whereby in a particular field there are identified the key actors and that these actors form a network and the interactions between the actors lead to unpredictable outcomes. Callon's (1986) work looking at the introduction of scallops from Japan into the St Brieuc Bay in France is a good example of ANT in action, with the scallops themselves being one of the actors.

Latour's MOE project began and continues as a study of what exists in Modern society (ibid). Fundamentally he found that there are different ways of existing in society (modes of existence) due to the fact that people hold different values (or ontologies) (ibid). Central to his work is the study of discontinuities (when modes change) and in this there are parallels to notions of episteme change. The people he called Moderns also appear to resemble the people living in the West in Foucault's modern

period since the end of the 18th century. These Moderns, Latour argued have only one ontology (where humans are seen as the subject and object of all enquiry[4]) and as a result are fundamentally opposed to ecology that reveals the interdependence of living things (ibid). This means that to Moderns there is a clear distinction between man and nature, humans and non-humans (ibid).

Although most of Latour's work is based on observation and experience, he has implied that change is needed. In a recent biographical article (Latour, 2013 (2)) he briefly alluded to his proposition that there is a choice open to humanity – to modernize or to ecologize. So it seems that his study of the Moderns has led him to the conclusion that there are different modes of existence, but that at present the dominant mode – based around neo-classical economics and capitalism – is the only one that is being recognised. This dominant mode has only one way to judge truth (so called objective knowledge) (Latour, 2013 (1)).

Latour (2014) analysed what he called the "affects" of capitalism. A key point he raised is that capitalism appears to run more smoothly than nature itself. By this he meant that the natural world is full of tipping points, peaks, troughs and catastrophes whereas the capitalist system is governed by a few fundamental and undisputable laws (ibid). Also that geologists are calling this era the "Anthropocene" in that humans are having a significant effect on the planet in the way that volcanoes or earthquakes did in earlier periods. He defined the world we live in as "first nature" and "second nature" which is capitalism. He argued that second nature had sought to control first nature and not to allow it to act as a partnership (this is an enlightenment tendency). His analysis is that the modern or capitalist mode of existence is so dominant that it seeks to subjugate all other modes into its own. The effects of this are the dystopia that we are currently experiencing and will continue to experience until there is a fundamental change to a new mode of existence (ibid). Although Latour does not think in terms of epistemes, there are parallels between Latour and Foucault in Latour's emphasis on pragmatic empiricism which corresponds with Foucault's possibilities of knowledge in epistemic analysis (Latour, 2013 (1)).

This section has reviewed different theories to help explain epistemological change. The theory chosen from this set is explained and justified in the methods chapter.

2.1.2 Sustainability, ecologism and environmentalism

It is considered useful to trace some theoretical influences on the sustainable development debate, as the theory allows the use of terminology more precisely. In the context of this research it is also important to understand developments in ecologism and environmentalism and why the debates between science and society have led to such differing opinions on the "ecological crisis" (Plumwood, 2002).

---

[4] There are parallels here with Foucault's notion of epistemological man.

2.1.3.1 Review of sustainability and sustainable development

In this review it is argued that popular thinking on sustainability and sustainable development has regressed since Goldsmith (1972), World Conservation Strategy (IUCN, 1980) and Our Common Future (UNWCED, 1987) (often known as the Brundtland Report) and that in most cases it is still seen as fatally flawed in that it fails to grasp these earlier reports' message that economic development, of the type pioneered and perpetuated since the beginning of the industrial revolution, and sustainability are not compatible.

Goldsmith (1972 passage 210) stated that: "The principal conditions of a stable society – one that to all intents and purposes can be sustained indefinitely while giving optimum satisfaction to its members - are: minimum disruption of ecological processes; maximum conservation of materials and energy – or an economic stock, rather than flow; population in which recruitment equals loss; social system in which the individual can enjoy, rather than feel restricted by, the first three conditions." Evidence suggests that these conditions have not been attained. In terms of ecological processes for example, continued depletion of whale populations affect growth of plankton and hence the capacity for the oceans to absorb carbon dioxide (Monbiot, 2014). In terms of conservation of materials and energy, countries such as Australia are cutting government funding for clean energy and conservation projects (Milman, 2014). In terms of population the evidence of runaway population growth is incontrovertible (Carrington, 2014).

The World Conservation Strategy of the International Union for the Conservation of Nature (IUCN, 1980) produced The Symbol:
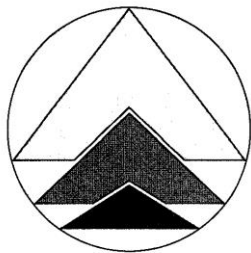
Figure 2 IUCN Symbol

The circle symbolized the biosphere – the thin covering of the planet that contains and sustains life. The three interlocking, overlapping arrows symbolized the three objectives of conservation:

- Maintenance of essential ecological processes and life support systems
- Preservation of genetic diversity
- Sustainable utilization of species and ecosystems.

Concentrating on the physical environment, it provides a convincing illustration of what conservation means. In the language of today it could be argued that "conservation" is closely allied to "sustainability". This is supported by the current mission of IUCN: "Our vision is a just world that values and conserves nature: Our mission is to influence, encourage and assist societies throughout the world to conserve the

integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable (IUCN, 2015)." The emphasis on use of natural resources being ecologically sustainable links to the definition of sustainable development discussed in the next paragraph.

Our Common Future (UNWCED, 1987) (often termed the Brundtland Report after its chairperson) defined sustainable development as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Often ignored by those who use this definition is the report's discussion of the links between poverty, inequality, and environmental degradation that formed a major theme in its analysis and recommendations. The report argued further that "what is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable." The problem with this idea of sustainable development is that it implicitly uses an assumption of development of all countries towards a "developed world" state (Rostow, 1990). Such an assumption has been largely discredited (Thring, 1990).

Hopwood, Unerman et al (2010) broke down sustainability into three areas:

- economic sustainability that provides future incomes and resources;
- environmental sustainability that provides a stable ecosphere (similar to the biosphere in The World Conservation Strategy); and,
- social sustainability that provides well-functioning societies that protect and enhance quality of life and safeguard human rights.

As with earlier definitions their three part definition begs several questions: How much future income and what resources? How is stability of the ecosphere assessed and judged? How is quality of life judged? How are human rights judged? So it is therefore an open definition that allows for a number of interpretations.

Thring (1990) regarded the term "sustainable development" as an oxymoron; arguing that development *per se* cannot be sustainable. He preferred humanity to strive for a creative and stable world with the aid of "equilibrium engineering" (Hammond and Winnett, 2009). This harks back to the stable society in Goldsmith (1972). This sort of fundamental change in development away from economic development and towards sustainable development is still being called for. The Global Commission on the Economy and Climate (Harrabin, 2014) reported recently that urban sprawl that locks in high pollution is the second biggest market failure after climate change. The implication is that the sort of development that is going on around the world more than 40 years after Goldsmith is still creating huge problems of unsustainability manifested in climate change and other environmental crises.

Gray and Bebbington (2000) stated (in line with the Earth Summit Rio+5) that there were three conditions that need to be satisfied for sustainability – (1) eco-justice (equity between peoples), (2) eco-efficiency (for example reducing material and energy inputs per unit of output) and (3) eco-effectiveness (reducing our overall ecological footprint – see Section 2.3.3). In addition they stated (ibid) that these

three conditions must apply to both the needs of the current generation and to the needs of future generations. Their conclusion was that apart from some positive signs with regard to eco-efficiency there was little sign of the three conditions being satisfied for either current or future generations.

2.1.3.2 Review of ecology, ecologism and environmentalism

Strictly ecology is the branch of biology that deals with the relations of organisms to one another and to their physical surroundings (OED, 2015). This is very different to ecologism which is seen as an ideology (Dobson, 2007) whose adherents believe that a sustainable and fulfilling existence presupposes radical changes in our relationship with the non-human natural world. Hence in the UK The Green Party (2014) has as its core value: "The Green Party is a party of social and environmental justice, which supports a radical transformation of society for the benefit of all, and for the planet as a whole. We understand that the threats to economic, social and environmental wellbeing are part of the same problem, and recognise that solving one of these crises cannot be achieved without solving the others." This has clear parallels with Dobson's notions of ecologism as it looks towards a radical transformation of society (in Dobson this is inferred by "our") for the benefit of the planet (in Dobson this is "the non-human natural world").

It has been noted that environmentalism is not a political ideology (Dobson, 2007) as its adherents have tended towards a managerial approach to environmental problems, without fundamental changes in present values or patterns of production and consumption.

In this thesis which examines sustainability (and its accountability) in a Chinese context it is interesting to note that Chinese history is littered with examples of the use of technology to advance economic power (from the Grand Canal of old (Yu et al., 2008) to the Yangtze Gorges project (LaBounty, 1984) in recent times). Rooted in much of the critical thought by ecologists is the problematic notion of the anthropocentric view of the world - which has a weak meaning around human centredness and a strong meaning which involves seeing the non-human world purely as a means to human ends (Dobson, 2007). This anthropocentrism is facing a major challenge as its central tenet of economic growth has been challenged since *The Limits to Growth* was published in 1970 by The Club of Rome (Meadows, 1991) which argued that infinite growth in a finite system is impossible and that the Earth's resources are in many cases non-renewable and therefore rapidly being exhausted. The theme of anthropocentrism has been taken up in the management literature (Gladwin et al., 1995) where it has been noted that a profound epistemological crisis is taking place due to the conceptual divide between humans and Nature.

2.2 Review of modern interpretations of ancient Chinese philosophy

In this thesis work on epistemological change and the emerging Chinese "ecological civilization" is compared with the ecological ideas such as: ecological wisdom of the ages (Pan, 2011) from ancient and modern Chinese philosophy and religion. Ideas such as: Daoist notions of the Dao (the way) reflecting Nature (see Section 2.2.2); the Buddhist belief that all living things are equal (see Section 2.2.3); the Confucian idea of man and nature becoming one (see Section 2.2.1). This has been developed by modern

Confucian thinkers (Tu, 1998) into ideas of anthropocosmic(ity) which means that humans are seen as part of a greater universe or cosmos rather than the anthropocentric view that sees humans at the centre of existence with Nature there to be used for humans' benefit. In a Chinese context the influence of traditional Chinese philosophy means going from the mathematically biased reductionism in the West to a more holistic "all under heaven" foundation (Zhao, 2005) (Tian Xia – see Section 2.2.4). In this review Chinese philosophy is examined for its links to sustainability (with an emphasis on environmental matters but not excluding social and economic). In the findings and analysis chapter the relevant texts and their ideas are compared with the notions of ecological civilization and primal epistemic thinking (Birkin and Polesie, 2012) (see Section 4.1.4).

Existing research and scholarship has suggested that the central strands of Chinese philosophy (Confucianism, Daoism and Buddhism) have strong links to ecologism in their ideas: Confucianism – human flourishing can only take place within the larger matrix of nature (Berthrong, 2003); Daoism – ideas of the harmony between heaven, earth and humans (Miller, 2003); Buddhism – humans aspiring to oneness with the natural environment (Sponsel and Natadecha-Sponsel, 2003). These scholars and others in the review that follows show that recent policies in China such as ecological civilization are supported by the modern interpretations of ancient philosophy. These ideas are reviewed in sections on each of the three main philosophical (or religious) influences and a section that reviews more all-encompassing ideas such as Tian Xia that draws from the other established traditions.

2.2.1 Confucian thinking and ecology

Confucianism is a tradition which began many centuries before the birth of K'ung Tzu (known in the West as Confucius) in 551BCE to whom it gives its name. On the face of it Confucianism had non-religious origins in that it taught a moral and ethical way of life based upon his perception of good government (Palmer, 1998). Only gradually did Confucianism become a religion of sorts with the elevation of K'ung Tzu to a god and the development of a state-religious apparatus, designed to honour hierarchy and control whilst responding to and making sacrifice to heaven (Palmer, 1998). Confucianism incorporated ideas of Dao (the Way) that forms the basis of Daoism and is reviewed in the next section.

Confucian thinking was particularly developed in the Song Dynasty (960-1279 CE) into a school of thought called Neo-Confucianism. It is from Neo-Confucian philosophy (and its modern interpretation) that this research mainly draws. Yao (2000) quoted three Confucian scholars from different eras – Wang Chong (27-107 CE), Liu Yuxi (722-843 CE) and Wang Fuzhi (1619-92 CE) – and noted that these scholars understood Heaven to mean Nature, and that harmony came from abiding by natural laws. However, he emphasised that these ancient scholars cannot be considered to be environmentalists and their ideas cannot be construed as eco-ethics (ibid). But it is their ideas that have spawned modern interpretations of Confucianism and ecology (Tu, 2001, Tucker and Berthrong, 1998), sometimes called New Confucianism.

New Confucian thinkers have introduced the notion of anthropocosmicity (Tu, 2001). Tu advocated an anthropocosmic spirit with communication between self and community, harmony between human species and nature and mutuality between humanity and heaven (Tu, 1998). In another interpretation of an anthropocosmic world-view (Tucker and Berthrong, 1998) saw the human as a microcosm situated in the macrocosm of the universe itself. This related back to ancient Chinese cosmology (Oldstone-Moore, 2003) where the cosmos was seen as a sacred place and this sacredness being upheld by maintaining harmony between human beings and between humanity and nature (heaven).

These ideas are at odds with a Western anthropocentric view derived from The Enlightenment (Tu, 1998). In an anthropocentric view man is the measure of all things and the only source of power for economic well-being, political stability, and social development (ibid). This view has led to rampant self-interest that it is argued needs to be replaced by the Golden Rule: "Do not do unto others what you would not want others to do unto you (ibid p5)." It is also argued (ibid) that supreme values such as: the sanctity of the earth, the continuity of being, the beneficiary (sic) interaction between the human community and nature, and the mutuality between humankind and Heaven need to be cultivated in an anthropocosmic world-view.

Broadening into social and economic (as opposed to environmental) ethics, Tu (2001) argued that "New Confucian Humanism" meant that for China to develop a sound environmental ethic it must also nurture a culture of peace and promote social and economic justice. He developed this further into notions of distributive justice, sympathy, civility, responsibility and human relatedness (ibid) all of which he argued are salient features of Confucian ethics.

It should be noted that not all scholars have agreed with Tu's interpretation of Confucian environmental (and social) ethics. Fan (2005) argued for humans having a sagely dominion over nature. He developed this further by arguing that the adjective "anthropocentric" is too obscure, ambiguous and imprecise (ibid). Instead he noted that Confucianism holds a weak anthropocentric account of man and nature and that this account is cosmic-principle-oriented (ibid). It is anthropocentric in that it affirms that only humans have high intrinsic values and it is cosmocentric in that the place of humans is affected by considerations that transcend humans (ibid). Overall he suggested that humans should transform the environment into a human garden in accord with cosmic principles (ibid). This is supported by Nuyen (2011) who argued that Confucianism is anthropocentric, but in spite of this was committed to the view that there is value inherent in non-human entities – including nature - both sentient and non-sentient. The implication is that if this inherent value is accepted then it allows for the sacrifice of human interests in respecting nature's inherent value (ibid). This links with a strong environmental ethic that proposes respect for nature that may require the sacrifice of some human interests (notions such as: biocentrism; eco-centrism; and deep Ecology) (ibid).

Taking a more pessimistic line, Economy (2010) took this argument further in a Chinese context where she noted that Confucianism most often promoted man's need to use nature for his own benefit. She

quoted Xunzi the Chinese philosopher of the Warring States period (403-221BCE) who articulated a belief in the human ability to control nature for human needs (ibid). Even though she acknowledged that modern neo-Confucians have tried to demonstrate an environmentalist spirit she argued that there was no environmentalism in their intellectual heritage. Taken to extremes in the Communist period the four pests campaign to eliminate common pests, including sparrows, badly backfired when it was realised that sparrows ate many insects (including locusts) so that when the sparrow was eliminated crop yields went down dramatically as the insect populations increased (Shapiro, 2001). Economy (2010) developed this thesis to show how badly polluted China has become in its striving for economic development at all costs – hence her thesis title "The River Runs Black".

Palmer (1998) noted that Confucianism as a religion in modern China is dead but that Confucian social structures still exist and shape Chinese attitudes to society and to life. Whether or not one agrees with an anthropocosmic ethic in New-Confucian thinking – there is no doubt that there are modern thinkers who interpret ancient Confucian texts in this way.

2.2.2 Daoist thinking and ecology

Daoism takes its name from the Dao (or Tao) – the nature of the universe – which is best described in a famous series of verses in the Tao De Jing, written in the fourth century BCE:

'The Dao gives birth to the One:

The One gives birth to the Two:

The Two gives birth to the Three:

The Three gives birth to every living thing.

All things are held in yin and carry yang:

And they are held together in the qi of teeming energy (Palmer and Finlay, 2013).'

The One is the universe, which gives birth to the two primal forces of yin and yang, which are the natural forces of opposites. Yin, for example, is cold, wet, winter, female, and earth, whilst yang contrasts to this by being hot, dry, summer, male, and heaven. They are locked in perpetual combat, yet – as their classic symbol shows – each contains the seed of the other. So while autumn and winter are yin, they inexorably give way to the yang spring and summer, which in turn give way to autumn and winter and so on. These Two give birth to Heaven, Earth, and Humanity, which give birth to all living things, but with humanity given the role of balancing everything else. And all life – including human – is said to be motivated by the power of the breath that animates each of us, known as "qi" (ibid).

Miller (2003) stated that Dao is the same as the flourishing of nature. He noted that Confucianism and Daoism are not mutually exclusive in that Confucian scholars have used the concept of the Dao in their teaching throughout history since Confucius. He further argued that it would be foolish to consider early Daoists as environmentalists - but that the Daoist texts and traditions are appealing in the present climate

of environmental degradation (ibid). He further referred to the sacred text – One Hundred and Eighty Precepts (a fourth century CE text attributed to Lord Lao (Komjathy, 2013)) – in which twenty of the precepts were directly concerned with the preservation of the natural environment, for example Number 36 – "You should not throw poisonous substances into lakes, rivers and seas" (ibid).

Economy (2010) took a more cynical view that Daoism's mystical background and advocacy of simplicity with the wise sage living a simple life in union with nature. She suggested that this might eventually protect the environment but, importantly, it would delay economic development (ibid). Along similar lines Goldin (2005) warned of the dangers of "self-serving appropriation of the past for purposes grounded in the present" in that the ancient Daoist philosophers did not assert explicitly that their arguments might be applied to concerns of ecology or environmentalism. However in his closing paragraph he did allow that the Daoist ideal of the person who lives in harmony with the external world is an inspiring one.

Palmer and Finlay (2013) expressed the unique sense of value in Daoism in that it judges affluence by the number of different species, with all things in the universe growing well in a society of affluence. They argued that a new dimension of Daoist teaching has emerged – rooted in tradition but addressing the contemporary issue of environmental damage (ibid). Hence religions move forward while maintaining ancient truths – an idea central to this thesis. This will be explored in the Section 2.5 on modern Chinese ethics and religion.

2.2.3 Buddhist thinking and ecology

The third great historic religion in China is Buddhism. It emerged in China around the first century CE with the arrival of missionaries from India. By the end of the fifth century CE Buddhism had become a major player in the religious and philosophical world of China (Palmer, 1998). Buddhist ideas in China are based around Chan (known as Zen in Japan) and draw heavily upon Daoist ideas and practices (Palmer, 1998).

Swearer (1998) outlined key aspects of Buddhism – firstly, the universality of suffering and the compassion that Buddhists show. In humans showing them how to cease suffering and gain enlightenment. This compassion is extended to empathy for all forms of life, in particular sentient species; secondly, the moral principle of non-violent alleviation of suffering – manifested in universal loving kindness; thirdly, concern for the total living environment – an extension of loving kindness to animals, plants and the earth itself. The concept of "karma" meaning that humans can be reincarnated as sentient beings (animals, birds and insects) leads to human kinship with sentient beings.

The key to Buddhist ethics is the attribution of inherent value to non-human forms of life (Swearer, 1998). He goes on to emphasise that humans bear the biggest responsibility – we have caused the ecological crisis and must therefore solve it (ibid). Further he noted that the Buddhist mythological "Eden" was one where the earth flourished naturally (ibid). However, he noted that human selfishness and greed

has led to division and ownership of land, leading to violent conflict, destruction and chaos – the notion that human agency destroys the natural order of things (ibid).

Swearer (1998) went on to consider a modern notion of Buddhist environmentalism comprising: the causal principle of interdependence – an ecological vision that unites all species in the ecosphere in mutual co-dependence; rejection of the hierarchical dominance of human over human and human over nature; and, an ethic of empathetic compassion that respects biodiversity. He referred to the rather chilling reference by the modern Thai monk – Buddhadasa Bhikkhu (1906-1993CE) – who suggested that unless we built a noble environment we would perish (Swearer, 1998). This was extended by Swearer to the view of the modern Buddhist as having a world view or Dharma that refers to all things in nature – Buddhism as a religious ecology of preservation of species biodiversity (ibid). This view goes back to Dogen (1200-1253CE) whose sutras covered the entire universe, mountains, and rivers, the great wide earth, plant and trees. He further noted (ibid) that the application of Buddhist insights to a broad ecology of human flourishing represents the tradition at its best – a creative, dynamic response to its contemporary context. This response also led to the conclusion by Buddhist thinkers that technology alone could not solve the ecological crisis – rather it requires a transformation of values and lifestyles (ibid).

Palmer (1998) endorsed much of Swearer's view on modern Buddhism and its powerful teachings about care for nature – based around the notion of compassion. He observed that the lands around Buddhist temples have often become de facto sanctuaries for wildlife (ibid). He has further noted that by making a decision to choose to live in endangered forests, the Forest monks of Thailand can be active environmentalists even as they meditate the divine feminine element in Chinese religion. In Chinese religion the divine feminine is manifest in the stories, statues, and the person of the popular goddess Guanyin (Palmer and Finlay, 2013).

The divine feminine is operationalized today in Yunnan Province in southwest China (ibid) where Buddhist temples around a lake called Dianchi have led to the survival of four of the rarest endemic fish species because of the unconscious sanctuary that the temples have offered. The sacred springs near these temples – with powerful names like Black Dragon Pool, Blue Dragon Pool, and Dragon Pond – have been kept clean, with fishing forbidden and it is here that these rare species continue to live. The Buddhist temples have in effect practiced a sort of passive conservation for centuries, thus enabling the survival of the species through protection of their habitat (ibid).

They went on to explain (ibid) that in the past few years, provincial, state, and international governments have set up the Yunnan Environment Project in conjunction with the World Bank and most importantly the local office of the Buddhist Association of China. The Buddhists' role as the historic but passive guardians of the lake has now been recognized. But more than that, now that the Buddhists have themselves recognized what they have done, they have been able to turn their passive protection into an active program of protection and education. The Buddhist Association of China elsewhere in China has proved to be very responsive to the conservation message (ibid).

2.2.4 Tian-xia (all under heaven) and ecology

This Chinese world concept originated 3000 years ago (Zhao, 2009). As a traditional concept Xu (2013) denoted Tian-xia as (1) the entire geographical world; (2) the metaphysical realm of mortals; and, (3) political sovereignty. Zhao (2005, 2009) suggested that a renewed theory of Tian-xia might be helpful in finding a solution to the chaotic situation of the world we live in. He explained his renewed idea of Tian-xia in terms of three meanings thus: (1) the Earth and all lands under the sky; (2) a common choice made by all peoples in the world (a universal agreement in the 'hearts' of all peoples); and, (3) a political system for the world with a global institution to ensure universal order (Zhao, 2009). The implication is that the natural world is included in this philosophy (ibid).

Fang (2011) supported the explanation of Zhao in suggesting that the notion of Tian-xia embodied a worldwide public perspective rooted in Confucian moral and political thinking. His paper (ibid) described the vision of Tian-xia as anchoring a universal authority in the moral, ritualistic, and aesthetic framework for a secular high culture. It was also noted (ibid) how Tian-xia runs counter to the Western temperament steeped in conflict between nation states, geopolitical rivalry, and economics based on possessive individualism and imperialist expansion. Xu (2013) reviewed critics of Zhao's system who made the following points: (1) the system appears to put Chinese culture in opposition to Western culture; (2) Zhao's alleged misunderstanding and misinterpretation of Chinese classical literature and Chinese culture; (3) the reality of Chinese philosophy and culture is that is not as ideal and wonderful as Zhao depicted; and (4) Zhao is accused of proposing Tian-xia not for the world but for China.

These criticisms were explained by Xu (ibid) as misunderstandings in that for example Zhao has specifically said that Tian-xia is "of all and for all" and not specifically for China; Zhao has also said that there is no question of his interpretation of Tian-xia including the ancient Chinese tribute system (where subordinate Confucian states paid tribute to the emperor); finally Zhao has not used any single philosophical influence in developing his idea – rather, he has interacted systematically with various philosophies – both from the West and China – while constructing his own new theory (ibid).

Birkin and Polesie (2012) have proposed that using Tan-xia and the Dao it is possible to imagine a future for all human and non-human life sharing one world. What is noticeable about this concept in its modern form is that it seems to draw from both Confucian and Daoist traditions. Clayre (1976) noted that the three beliefs often "flowed into one" at a popular level. This fusing of traditional philosophy and religion (Confucianism, Daoism and Buddhism) was further noted by Pan (2011) when he argued that under their combined influences the Chinese nation formed a unique cultural system, the core of which is the harmonious unity of man and Nature. Pan Yue is the vice-minister at MEP and here it is noted that the Chinese government has taken Tian-Xia and operationalised it into the notion of ecological civilization (discussed in the next sub-section)

2.2.5 Ecological civilization in China

The Chinese government incorporated harmonious society and the scientific development concept into its 11th five year plan (2006-2010) and the constitution of the Chinese Communist Party (CCP) in 2005 and 2007 (Chan, 2014). A key component of a harmonious society according to President Hu in 2005 was the maintenance of harmony between man and nature (ibid). Hu named five pairs of coordination in the proposed scientific development, one of which was human versus nature (ibid). He also identified a number of areas of social discord that required a long-term strategy, one of which was environmental degradation (ibid).

It has been proposed that the ideas behind ecological civilization have their roots in the thinking of ecological Marxists, constructive postmodernists, and radical environmentalists (Wang et al., 2014). They go on to say that "to create an ecological civilization in general and to implement environmental laws in particular requires support from tradition (ibid p61)". These traditional values include: respect for heaven; awe of the Dao; oneness of nature and humanity; the tradition of thrift; and, the wisdom of cherishing all living things (ibid) and have been discussed in the section on Chinese philosophy.

Senior CCP figures (Pan, 2011) from 2007 outlined the concept of ecological civilization (sometimes called eco-civilisation) with harmonious society (certainly the environmental parts of the idea) being incorporated into the rhetoric. Oswald (2014) noted that in 2007 at the Seventeenth National Congress of the Communist Party of China (CCP) Party General Secretary Hu Jintao announced a new model of growth incorporating "ecological civilization" to replace the old unsustainable industrial model "industrial civilization". It has been noted that whilst it created unprecedented levels of material wealth, the industrial model of development, based on high levels of resources and energy consumption, also brought serious pollution and ecological destruction to the industrialised world (Ma, 2007). He further noted that global capitalism had transferred the most polluting, resource-intensive and high-risk manufacturing industries to developing countries (ibid). This had allowed developed countries to alleviate the pressure on their own environments without making any changes to their model of growth (ibid). In this context China developed its industrial economy at the expense of heavy environmental degradation which is seen to be unsustainable (ibid).

Ecological civilization was enshrined in the 12th five year plan (2011-2015). The plan in translation stated: "In transforming the economic development mode, the importance of building a resource-saving and environment-friendly society should be stressed to save energy, reduce greenhouse emissions and actively tackle global climate change. We should develop circular economy (sic) and low carbon technologies. Through striking a balance between economic development and population growth, sustainable development will be enhanced (BritishChamber, 2011 p3)". In terms of resource conservation and environmental protection the Plan incorporated targets for: maintaining farmland reserves; cutting water consumption; increasing the water efficiency coefficient in agricultural irrigation; increasing the

proportion of non-fossil fuel resources use in primary energy consumption; and, reducing energy consumption and CO_2 emissions per unit of GDP[5] (ibid).

Tu (2013) proposed that we are entering a new Axial-Age[6]. The original Axial-Age was coined by German historian Jaspers (2011) in 1949 and related to the period 800-200BCE. This new Axial-Age is one in which it is argued that all religious traditions must cultivate a humanist vision (ibid). He proposed a Confucian humanism (as opposed to a secular humanism in the West) that would include five salient features:

1. Four inseparable dimensions of human experience – (1) cultivation of the self (2) harmonization of the community (3) sustained and harmonious relationship between the human species and nature (4) mutual responsiveness between Heaven and Humanity.

2. Humanity forms one body with Heaven, Earth and the myriad things with Nature always part of a human communion. Nature not a collection of senseless matters to be manipulated or abused.

3. Heaven is my father and Earth is my mother. All people are my brothers and sisters and all things are my companions.

4. I am related to all people, all members of the animal kingdom, the life world, the inanimate universe – connection by a sense of Consanguinity (descent from a common ancestor).

5. I am a human not by choice. Care for the earth as my proper home is dictated by my common sense as well as my faith in the survivability of the human species (ibid pp4-5).

He noted that the Chinese leadership had broadened the strategy to include cultural and ecological dimensions (ibid). But, on the contrary, he noted that the race for growth had led to poor environmental performance and heavy reliance on pollution prone industries (ibid).

It has been suggested that ecological civilization requires that humans live in harmony with the environment (nature), because the environment is the foundation of our very existence (Ma, 2007). In order to find a way forward that is truly in harmony with nature, there is a need to develop clean, renewable energy on a large scale and make efficient use of resources, which should then be recycled (ibid). Ma (2007) also stated that this fundamental change could not be achieved by any single country, but only through the concerted efforts of China and other countries who together aim to safeguard global ecological security.

A further interpretation of the concept of ecological civilization is based on ideas of frugality, environmental protection and sustainability (Oswald, 2014). He noted that the concept was adopted due to rising public concern over widespread environmental degradation (ibid) and that its protagonists urge people to rethink humanity's relationship with nature. It can be seen as the latest progression of

---

[5] Energy and CO_2 intensity

[6] Axial in the sense of being pivotal.

civilisations – Spiritual Civilisation to Material Civilisation to Political Civilisation have all been used by the CCP since the beginning of reform and opening up (ibid). Involving shifting human society away from the destructive consequences of attempts to master Nature and instead nurturing interdependence between people and Nature is stressed (ibid).

In 2013 at the Third Plenary Session of the 18th CCP Central Committee (CCPCC) the following was reported: "'In constructing eco-civilization, it is imperative to build a sound system and to protect the ecological environment through the system (Oswald, 2014)." In effect eco-civilisation was enshrined in law and policy in 2013. The CCPCC outlined a four step strategy for implementing an eco-civilization:

1. Strengthen property rights over natural resource assets and strengthen the systems to control their usage.
2. Demarcate danger zones (red line) for ecological protection. This links to ideas of environmental carrying capacity and efficient use of resources.
3. Implement systems for resource usage compensation and ecological compensation systems. This seems to tie in nicely with environmental accounting concepts such as natural capital accounting, carbon (and other resource) trading schemes and marketization of environmental protection.
4. Reform of environmental protection management systems (ibid).

The emphasis on laws to enforce environmental policies is set against the history of China's poor environmental law enforcement (ibid). Also the fact that local governments are driven by a system of measuring progress in terms of GDP growth (ibid). Oswald (2014) concluded that eco-civilization is more than a rhetorical slogan as it is attached to specific actions and goals that represented a positive move towards environmental sustainability in China.

2.3 Accountability and the development of sustainability accounting

This section of the review is split into:

Subsection 2.3.1 reviews the notion of accountability and its relationship to accounting.

Subsection 2.3.2 reviews research on social and environmental accounting from its inception in the 1970s that was carried out before sustainability accounting became part of common parlance. Different accounting methods proposed are explained and reviewed and critiques of the whole movement in social and environmental accounting and reporting are reviewed.

Subsection 2.3.3 reviews the move towards sustainability accounting since 2000 – again with emphasis on new accounting models and methods that have been proposed.

Subsection 2.3.4 reviews research on the development of education in sustainability accounting, mainly from a Western perspective but with references to China.

Subsection 2.3.5 works on the basis that this thesis is about China and organizational accountability for sustainability and China can be considered to be a developing country by most definitions. Hence it reviews research on the developments in sustainability accounting in both developing countries in general and specifically in China.

2.3.1 Accountability

Accountability can be understood as "the giving and demanding of reasons for conduct" (Roberts and Scapens, 1985 p447). This suggests that there is some form of conduct – typically the activities of an organization and the interaction of those activities with society. It also suggests that there is a giver and a receiver of accountability information with the giver typically being managers of an organization. The receiver has tended to be the shareholder group but this has been extended to a larger group of stakeholders in recent years (Unerman, 2007). Roberts (1991b) developed the discussion of accountability to look at the destructive tension between ethical and strategic concerns. By this is interpreted that there may be ethical reasons for providing information but these can be overridden by concerns over jeopardizing the strategic plans of the organization.

Rights to information is another way of considering accountability (Gray et al., 1997) but this fits more with a democratic social structure. In a Chinese setting these rights have typically been exercised by government (Rowe and Guthrie, 2010). If there is a right to information then there is a preparer of that information and a demander of that information based on a right to receive. This can be compared with an "obligation of a person entrusted with a duty to explain his/her performance of that duty (Staubus, 2003 p3)." This obligation puts more emphasis on the provider of the information, leaving the receiver as an assumed party.

Typically accountability information in the accounting area has comprised both calculative and narrative (Kamuf, 2007). Calculative information is interpreted to mean information using accounting numbers including sustainability accounting techniques such as full cost accounting and environmental footprinting (see Section 2.3.3); whilst narrative information is based on words such as sustainability reporting on environmental impacts and the measures in place to manage the environmental aspects leading to those impacts.

In this thesis accountability is used to describe all those techniques (including accounting and reporting, - both calculative and narrative) by which an organization gives an account of its activities to those people and groups that have a right to that information. This definition is the author's interpretation based on the references that have been discussed above (Roberts and Scapens, 1985, Gray et al., 1997, Staubus, 2003, Kamuf, 2007).

2.3.2 The development of social and environmental accounting (SEA)

For the purposes of this sub-section social accounting has been taken to be the measurement and communication of the social and environmental effects of an organization's economic actions to particular interest groups and to society at large (Owen et al., 1997). This definition has been superseded to an extent by sustainability accounting (defined in Section 2.3.3) but the references reviewed in this section were written before the advent of sustainability accounting.

When The American Accounting Association (1973) published its "Report of committee on environmental effects of organizational behaviour" this represented a chance for the accounting profession to develop environmental accounting, a chance that has been taken slowly, as can be seen by the professional guidance by accounting bodies (see for example: FEE, 2002, IFAC, 2005). Academics were at this time starting to take an interest in social and environmental accounting. For example, Ullmann (1976) - one of the earliest examples of active engagement with forms of social accounting and an early example of environmental accounting and Ullmann (1979) where environmental accounting developments were placed in some kind of cultural, national and legal context (Gray, 2002). Wiseman (1982) was typical of a then growing theme – the statistical analysis of social - in this case environmental - disclosures against observable corporate characteristics such as size, industry, stock market performance (Gray, 2002). The conclusions for this 26 firm US study were that the corporate environmental disclosures were incomplete and not related to the firms' actual environmental performance.

It was in the 1990s that the emerging area of social (including environmental) accounting and its disclosure by companies was more comprehensively researched by the academic community. Mathews (1997) in reviewing the period from 1970 split his review into those articles that could be described as: 1) empirical studies; 2) normative statements; 3) philosophical discussion; and, 4) radical/critical literature. This taxonomy appears reasonable in that it enables the relative balance of research to be ascertained. According to Mathews it was the empirical studies that dominated and, of these, disclosure studies based on published reporting were typical. From a pragmatic viewpoint the data for such studies is in the public domain and therefore makes them easier to carry out. He cited studies from the 1990s (Adams and Roberts, 1995, Blaza, 1992, Deegan et al., 1995, Gibson and Guthrie, 1995, Harte and Owen, 1991, Roberts, 1991a) which sought to determine the extent of environmental disclosures and prevailing attitudes towards such disclosures. Research of the 'what is going on' variety was typified by Deegan and Rankin (1996) who looked at environmental disclosures by Australian companies. Theory used in these studies tended to be based on legitimacy and stakeholder theory, from which useful insights were gained. More recent research has tended to develop notions such as reputation risk management (RRM) as a key driver of SEA (Bebbington et al., 2008) which is reviewed in Section 2.3.2.1.

Running alongside the research which looked at external environmental accounting and its reporting there has been a major strand of research which has looked at environmental management accounting (EMA) for internal management purposes (Burritt et al., 2002, Burritt and Schaltegger, 2010, Schaltegger

and Burritt, 2000, Schaltegger and Burritt, 2006, Schaltegger et al., 1996). This research could be said to have presented a managerial approach to EA in that the environmental accounting interventions studied were for the benefit of managers seeking to improve business performance (with environmental benefits being secondary to economic returns) and it was based on the practical experience of the researchers in liaison with practitioners in the field.

Typical of studies looking at the emergence of EMA is that of Frost and Wilmshurst (2000) who, through a questionnaire study of the top 500 Australian quoted companies, tested the hypothesis that firms in environmentally sensitive industries were more likely to develop environment-related management accounting procedures than firms in less environmentally sensitive industries. They classified companies in mining and resources, chemical and petroleum industries as more sensitive and all other companies as less sensitive. They broke down environment-related management accounting into: the inclusion of environmental information within the formal management accounting system; formal accounting procedures for a number of specific environmental issues; cost-benefit analysis to determine viability of actions which included consideration of environmental issues; undertaking audits of environmental issues; and, reporting environmental information to external stakeholders. The study failed to provide conclusive evidence of an association, as the only significant differences between the two groups of companies were in actions associated with more environmentally sensitive industries such as site contamination and clean-up and rehabilitation where there were typically laws and regulations governing those activities (ibid).

Jasch (2003b) provided a most managerial of papers that reported on the work of the Expert Working Group on "Improving the Role of Government in the Promotion of Environmental Management Accounting" – a United Nations initiative whose first publication was a set of procedures and principles for EMA. Here environmental accounting was seen as a set of techniques and procedures to be used by companies to reduce both costs and environmental impacts, hence the managerialist slant. Within Jasch's paper there is an interesting case study of a Swedish pulp and paper company which broke down environmental costs (and revenues) across a set of agreed headings. What this type of paper did was to show how environmental accounting could be used and applied in practice – with no overt judgements made as to the link between the procedures and environmental sustainability.

In terms of this thesis the EMA type of research and the practices it examined, with its positivist approach and its acceptance of the prevailing political and economic structures (the Modern episteme) is unlikely to have significant impact on sustainability or lead to anything but small scale, incremental change. Gray (2002) and Owen (2008) also regarded the EMA school as uncritical and managerial in approach and making no real contribution to (environmental) sustainability. It has been argued that in the 1990s the environmental accounting agenda was appropriated or "captured" by the managerial school (Gray and Bebbington, 2000). They argued that the business/environmental agenda (as championed by managerialists) and environmental protection were in fundamental conflict (ibid). They have also argued

that the environmental accounting reported by companies in the 1990s was in danger of doing more harm than good (ibid). The sorts of environmental accounting (and reporting) that emerged in the 1990s typically focused on reducing environmental impact and environmental footprint (ibid). It was argued by Gray and Bebbington (2000) that environmental accounting was not enough alone to deliver environmental sustainability as it typically only scratched the surface of the problems faced in environmental terms. Gray further argued that the ends of big business were those around managerialism, masculism, capitalism, imperialism and exploitation (Gray, 2002). This could be described as Modern epistemic behaviour (see Section 2.1.1.5).

In fact Gray and the critical school (Gallhofer and Haslam, 1997, Everett and Neu, 2000) tended towards a view that all the existing structures of capitalism (Modern structures) would need to be broken down and replaced with a more utopian socialist vision before real progress could be made in sustainability terms. This sort of critique by Gray (2002) presented a very gloomy picture of the environmental accounting project. He explained that this was because for EA it still remained the case that the managerialist agenda was the dominant one in that the business case was so often cited in support of environmental accounting and reporting initiatives (see for example DEFRA, 2006).

By way of further critique, Maunders and Burritt (1991) brought the ecological crisis firmly into the accounting realm. Their hypothesis was that adverse ecological impacts arose directly as a result of the use of accounting information. Their key criticism of traditional accounting was that it obsessed on current/short-term performance of a financial nature and that, internally, discounted cash flow techniques tended to undervalue ecological impacts that were often arising a long way into the future (the so-called inter-generational legacy). In their concluding comments (ibid) they called for deep ecology principles (see also: Birkin, 1996) to be rooted in research by accountants. These principles were summarised as: 1) harmony with Nature; 2) all Nature has intrinsic worth such that there is biospecies equality; 3) elegantly simple material needs; 4) Earth supplies are limited; 5) appropriate technology; 6) doing with enough/recycling; and 7) minority tradition. Their critique and proposals related to research carried out before 1990 but its challenge to the status quo was one which was taken up by a number of researchers thereafter (Owen, 1992, Gray et al., 1996, Gray, 2002).

Everett and Neu (2000) noted that existing research up to 2000 was deeply influenced by eco-modernism This is interpreted to mean environmental management systems set up to reduce resource use and minimise waste. As such it tended to perpetuate the white, male, capitalist view of the world and to hide the reality of disadvantaged groups for whom the environmental debate could hardly be said to be high on their agenda. In essence they argued (ibid) that there was a real danger that environmental accounting perpetuated unequal and exploitative social relations. Radical thinkers such as Tinker, Lehman and Neimark (1991) branded Gray and colleagues such as Bebbington and Owen as pragmatists who tried to work within existing societal structures in encouraging an environmental accounting agenda

in business. The problem with the critical school is that it is difficult to see a way forward because their thinking has been so radical that there is no realistic prospect of change along their proposed lines.

The way environmental accounting developed in the 1990s was heavily based on voluntarism on the part of organisations – leading to a flowering of many different (and often inconsistent) approaches to environmental accounting and reporting. In critical vein Gallhofer and Haslam (1997) argued for an interventionist stance to regulation in the environmental accounting and reporting (EAR) area – saying that a degree of bureaucracy and planning was unavoidable in mitigating what was rapidly becoming an environmental nightmare (for evidence see: Economy, 2010). They argued that voluntarism gives an illusion of progress, whilst most organisations do nothing more than ensure compliance with the existing weak environmental laws and regulations (ibid).

Birkin (1996) argued that traditional accounting represented a "flight from Nature" with its ability to portray a company as having contributed to economic wealth, whilst at the same time that company has inflicted the most appalling damage to social, psychological, spiritual and environmental health. He argued (ibid) that environmental accounting, which accounted for emissions and resource use, provided some limited respite, but that it was only a staging post on the way to what he described as ecological accounting which had potential to fundamentally change the way organisations account for the environment and to show the extent to which sustainable development has been achieved. What this research highlighted was the extent to which the environmental accounting that developed in the 1990s was an add-on to traditional accounting reports and in fact often separate from the annual report. This indicated that it was not considered to be central to the financial statements.

Parker (2005) cautioned that the critical school's: "preoccupation with avoiding social and environmental accounting (SEA) capture may sentence their discourse to be confined to the halls of academe and thereby distance them from any significant influence on whatever institutionalisation of SEA occurs (ibid p856)." This is interpreted to mean that the critical school was unlikely to be practically constructive in working with organizations. It is this critique that has been answered in part by calls for engagement with the wider community of practitioners. Answering calls for engagement by Gray (2002) were papers such as that by O'Dwyer (2002) that looked at managerial perceptions of corporate social disclosure (CSD) using an in depth interview methodology. His discussion made the point that the perspectives gained suggested that while CSD may occasionally form part of a legitimacy process, ultimately this was doomed to failure in that a state of legitimacy was rarely attained (O'Dwyer, 2002). In spite of such research, Owen (2007) was still calling for academics in the field to seek to inform public policy debate and promote practical change. O'Dwyer's study was in an Irish context that can be compared with Australian-based research by O'Donovan (1999), (2002) that came up with similar conclusions that legitimacy theory was useful in explaining environmental disclosures. Both research projects involved semi-structured interviews with managers in three companies and both found strong evidence of legitimation strategies at work through CSD and environmental disclosures. The key

difference being that O'Dwyer seriously questioned the usefulness of legitimation strategies whereas O'Donovan took a more uncritical perspective.

2.3.2.1 Studies developing theoretical perspectives on why and how environmental accounting emerged

The key influences on social and environmental accounting and its reporting that have been identified in the literature link to legitimacy theory, together with stakeholder theory and institutional theory (including regulatory pressures leading to coercive isomorphism where organisations are forced to change because of external pressure – usually from governments) (Cho and Patten, 2007, Deegan, 2002, Holland and Foo, 2003, Wilmshurst and Frost, 2000, Larrinaga-Gonzalez, 2007). These theories have predominated as they concentrate on explaining the reasons for external reporting of SEA data by companies. Such theorising has in recent times been criticised (Gray et al., 2010) with calls being made to open up SEA research to a broader range of theoretical perspectives.

Research on influences on the development of environmental accounting has mainly taken a developed country perspective and focused on the reporting of environmental impacts or broader social accounting in countries such as USA, UK, Portugal, Australia, New Zealand (Adams, 2002, Adams, 2008, Annandale et al., 2004, Bebbington, 1997, Brammer and Pavelin, 2008, Brown, 2007, Brown and Fraser, 2006, Chen and Bouvain, 2009, Coupland, 2006, Deegan and Rankin, 1996, Dias-Sardinha and Reijnders, 2005, Holland and Foo, 2003, Lewis and Unerman, 1999, Llena et al., 2007, Martin and Hadley, 2008, Nyquist, 2003, O'Donovan, 2002, Patten, 1992, Van Staden and Hooks, 2007, Wanderley et al., 2008, Wilmshurst and Frost, 2000, Wilmshurst and Frost, 2001).

Focusing on several of these studies highlights the work carried out to date:

Adams (2002) attempted to grasp the key influences on corporate "social" reporting and identified those around: 1) corporate characteristics, 2) general contextual factors and 3) internal context. In particular she focused on the internal factors through a set of interviews with staff involved at a high level with social reporting (not accountants) in pharmaceutical companies in the UK and Germany. The key motivation for corporate ethical reporting identified was to enhance corporate image and credibility with stakeholders, with mention being made of public pressure to report.

Brammer and Pavelin (2008) looked at the factors influencing the quality of environmental disclosure in a UK context. Their study was based on a cross sectional survey of 450 firms which measured the quality of disclosures around a set of five relevant indicators: disclosure of an environmental policy, the description of environmental activities, reporting on environmental improvements, setting of environmental targets, and the presence of an environmental audit or assessment. They found that high quality disclosure was primarily associated with larger firms and those in sectors most closely related to environmental concerns. Explanations for the conclusions were not attempted by Brammer and Pavelin but clear links to the legitimacy theory approaches can be seen.

Lewis and Unerman (1999p543) suggested that "if concepts of what constitutes morally right behaviour vary between societies or key stakeholder groups, then corporate social reporting can also be expected to vary." Their paper argued for this ethical relativism to be used to explain differences in corporate social reporting. They also provided a useful discussion of legitimacy theory in this context and outlined four legitimation strategies used by companies where there is a perceived breakdown in the social contract between a company and the society in which it operates: 1) the company changes its behaviour so that it conforms with the expectations of key stakeholders and reports on this; 2) no change in behaviour by the company – rather it tries to convince stakeholders that it has changed behaviour using discourse; 3) no change in behaviour and no attempt to convince – instead the company redirects the attention of key stakeholders onto other aspects of operations which managers believe stakeholders will see as positive; and, 4) the company seeks to change stakeholders' expectations using discourse so that these revised expectations match the company's unchanged behaviour (Lewis and Unerman, 1999p525). It can be seen how in three of these strategies there is no change in behaviour by the company – rather cynical attempts to gain legitimacy that could leave socially- and environmentally-damaging practices in place (ibid).

Deegan (2002p293) suggested that the notion of legitimacy was central to institutional theory as developed by DiMaggio and Powell (1983). Institutional theory was outlined by Gray et al (2010p26) as involving the process of institutionalisation that is primarily a process of homogenisation – or isomorphism – in which organisations converge in their behaviours. The process of homogenisation is presumed to occur through a combination of *coercion* (e.g. regulations, laws), *normative mechanisms* (shared and converging values) and *mimetic mechanisms* (typically imitation of behaviours that appear to be successful).

The role of the State in the US and UK was examined by Holland and Foo (2003) in terms of the legal and regulatory context and its influence on environmental reporting practices. Their study used content analysis of firms' annual reports and other disclosures. In conclusion they noted (ibid) that in the UK a voluntary approach to disclosure is different to the US where disclosure follows the requirements of the legislature and therefore higher levels of disclosure were seen in US annual reports. This links back to the earlier work by Gallhofer and Haslam (1997) calling for greater regulation.

In a recent study Bebbington, Larrinaga et al (2008) posited that a good explanation for corporate social reporting (including environmental) could be based around the idea of Reputation Risk Management (RRM). This is based on the notion that: "the purposes of CSR reporting may have more to do with the manufacture of an identity and self-preservation than with communication/accountability purposes (ibid p346)." The study also showed that RRM has close links with legitimacy theory and stakeholder theory. It was only an exploratory study and concentrated on reporting rather than the accounting mechanisms inside the firm. They went on to suggest as an avenue for further research the exploration of a more sociologically informed analysis of reporters' motivations via interviews or case studies.

2.3.3 Sustainability accounting and reporting (SAR)

SAR has been labelled in many ways by different authors: Bebbington and Gray (2001) used "an account of sustainability", Lamberton (2005) and Burritt and Schaltegger (2010) used "sustainability accounting," Hopwood, Unerman and Fries (2010) "accounting for sustainability" and, most recently, Unerman (2014) used "accounting for sustainable development." Bebbington and Gray (2001) defined SAR as related to the role that accounting practice played in issues of sustainability. On the one hand they saw social accounting and reporting (SAR) as part of attempts by business, and presumably any organization today that has accountability to stakeholders, to legitimate its alleged belief that its operations are potentially sustainable (ibid). On the other hand SAR developments were seen as challenges to notions of sustainability by developing alternative accounting which offered different constructions of 'nature' and 'society' (ibid). To summarize, sustainability accounting and reporting are interpreted to be the giving of an account *by* and *of* organizations on their sustainability interactions with the environment, society and economy. This includes internal accounting for management decision making and control and external accounting to stakeholders outside the organization. The words *by* and *of* relate to the SAR *by* organizations - such as sustainability reports by corporations - and *of* organizations - those reports by parties external to the organization – known as shadow social reporting (Dey, 2003).

Burritt and Schaltegger (2010) suggested that there were two paths of sustainability accounting development – critical and managerial. The more managerial approach was typified by the reporting reviewed by Hopwood et al (2010) where the key principles of the Prince's Accounting for Sustainability Project - Connected Reporting Framework – were based around the embedding of sustainability alongside financial reporting. The Framework includes reporting on: 1) Environmental – Greenhouse gases, waste, resource usage; 2) Social – Employment, welfare, innovation, fair trade; and, 3) Economic – Tax collected, tax paid, retained profit, dividends and interest paid. The emphasis is on providing accounting information on these issues, whilst at the same time providing support for behavioural change towards more sustainable practices.

Critical theorists have argued that corporate sustainability accounting is the cause and source of corporate sustainability problems (Burritt and Schaltegger, 2010). This critical view is exemplified by Gray (2010) where his view was that accounting was under the control of those whom it purported to hold to account and that hence there was widespread pessimism about whether accounting could contribute to a more sustainable society (Bebbington and Larrinaga, 2014).

In terms of development of alternative accounting, Lamberton (2005) provided a good outline of five methods of sustainability accounting that had been developed – 1) sustainable cost accounting, 2) full-cost accounting, 3) natural capital inventory accounting, 4) input-output analysis and 5) triple bottom line accounting (TBL). These are all new methods of accounting that take social and environmental factors into account and represent the effort by accounting academics to develop experimental methods to deal with the difficult issues raised by environmentalists. To an extent these methods have been tested in the

real world (see for example the full cost accounting in Bao Steel in China (Liu, 2007), input-output analysis by Danish Steel Works Ltd (Gray et al., 1996), sustainable cost calculation for Landcare Research New Zealand Ltd (Bebbington and Gray, 2001)).

Sustainable cost and full cost accounting (FCA) (Lamberton, 2005) relate to the hypothetical cost of restoring the earth to the state it was in prior to an organization's impact i.e. the amount of money an organization would have to spend at the end of an accounting period to place the biosphere back into the position it was in at the start of the accounting period (Gray, 1994). It recognizes the need to maintain the stock of natural capital for future generations. The problem with this accounting method is that it would leave most businesses as unsustainable, as after the deduction of the sustainable cost the business would be making a loss (Bebbington et al., 2001) and as a result was seen by interviewees as unacceptable. Bebbington and Larrinaga (2014) clarify that FCA involves the valuation of external costs (externalities) that are otherwise fee to the organization such as environmental and social services.

Natural capital inventory accounting (Lamberton, 2005) involves the recording of stocks of natural capital over time with changes in stock levels as an indicator of the quality of the natural environment, Gray (1994) suggested four categories of natural capital: 1) *Critical*, for example, the ozone layer, tropical hardwood, biodiversity; 2) *Non-renewable/non-substitutable*, for example, oil, petroleum and mineral products; 3) *Non-renewable/substitutable*, for example, waste disposal, energy usage; and, 4) *Renewable*, for example, plantation timber, fisheries. Lamberton expressed doubts as to whether natural inventory accounts could meaningfully reflect nature's interconnectedness and enormous diversity. Efforts have been made to operationalize it but usually in the context of an organization involved directly with wildlife such as a nature reserve (Jones, 2003).

A development of natural capital accounting is ecological footprinting. It is a methodology that has been employed mainly by cities, regions or nations (Holland, 2003). It measures the biological capacity (both resource use and waste assimilation) measured in area of productive land required to support human activities and to sustain human life (ibid). The methodology was originally developed by Wackernagel and Rees (1996) who estimated that each human on average needed an eco-capacity of 1.5 hectares. The use of the methodology for organizations such as companies has been limited, with the most common use for countries pioneered by organizations such as the Global Footprint Network (www.footprintnetwork.org).

Input–output analysis (Lamberton, 2005) accounts for the physical flow of materials and energy inputs and product and waste outputs in physical units. It aims to measure all materials inputs into the process, and outputs of finished goods, emissions, recycled materials and waste for disposal (Jorgensen, 1993). Resource flows are accounted for using units of volume, although accounting in financial units is considered feasible (Gray, 1994). Input–output analysis uses a balancing technique familiar to accountants, applying the principle *what goes in must come out*, providing a disciplined approach to the provision of environmental information. This method does not measure sustainability or unsustainability

but it does alert organizations to their use of resources and to the ways in which they recycle, reuse or dispose of waste – so encouraging more sustainable initiatives (Gray, 1994). Closely aligned to input-output analysis is an established tool - "Life-cycle Analysis." This has been used since the 1990s and in essence involves an assessment of the environmental impacts and resources used throughout a product's life cycle – from raw material acquisition via production and use phases to waste management (Finnveden et al., 2009).

Triple bottom line accounting (TBL) (Elkington, 1997, Lamberton, 2005) describes a form of sustainability accounting which aims to report on an organisation's 1) economic, 2) social and 3) environmental impacts. Some versions of TBL have attempted to use monetary units to measure economic, social and environmental performance, whereas others versions such as that used in the GRI Sustainability Accounting Guidelines (GlobalReportingInitiative, 2013) utilise a wide array of mainly non-financial indicators to measure performance toward the goal of sustainability.

Birkin and Polesie (2011) argued that triple bottom line reporting (Elkington, 1997) comes too late in the process and therefore merely provides strategies for managing negative effects and only slows down ecological disaster via efficient use of resources (eco-efficiency: see discussion above). Instead of triple bottom line, Birkin and Polesie (2012) called for ideas of "triple top line" that are rooted in ecologically intelligent design where products enhance the wellbeing of nature and culture whilst generating economic value (McDonough and Braungart, 2002). This leads to safe generation of prosperity, where materials become food for the soil or flow back to industry in a recycling loop (ibid). It was argued that if triple top line were to be implemented then designs would be developed that improve prosperity, celebrate the local community and enhance the health of all species (ibid). Their model was based on a fractal triangle, which at its corners are ecology, equity and economy respectively. This leads to ideas of: fairness and safety for the whole ecosystem; improving quality of life for all stakeholders; and, use of resources efficiently so as to eliminate waste (ibid). Of course many products cannot be redesigned and are already producing negative effects, but the ideas of triple top line make possible different models of sustainability accounting that can do more than show how the negative environmental impacts are being managed and reduced.

As a development of full-cost accounting, but also considered to be an engagement-based initiative by academics, has been the work of Bebbington et al. (2007a) in developing a new form of accountability in the sustainability area – the Sustainability Assessment Model. These academics have worked with practitioners and with companies such as BP plc. In terms of environmental aspects the model seeks to capture the values of resources used and to value environmental impacts categorised as: 1) damage cost estimates from emissions; 2) depreciation of properties arising from noise, odour and visual nuisance; 3) land area unavailable for use due to a project; and, 4) damage costs that arise from wastes created (ibid). They suggested that a dialogic approach to be taken (ibid) where the academic works with stakeholders to develop thinking in the sustainability accounting area.

Another new accounting model for sustainability is an accounting based on relationships called the Intrinsically Sustainability Implementation System (ISIS) (Birkin, 2000). This system necessitates reporting on four kinds of information:

1) Resource flow – materials and energy flows from suppliers through to waste, with the high level aim of full circular flow management and a lower level comprising recycling and reusing for example.

2) Resource flow impact – uses EA techniques such as Life Cycle Assessment (LCA) to assess the impacts on societies, the environment and ecosystems. The ideal is that there are no adverse or ecological impacts, with a lower level being the use of environmental performance indicators.

3) Stakeholder participation is assessed: suppliers, investors, employees, regulators, customers and other stakeholders including the human community – local, global and future. The ideal is 100% stakeholder support, with a lower level being stakeholder reporting.

4) Ecological resilience – a measure of the capacity for systems to adapt and change – including species carrying capacity assessment. The ideal being interactions with flourishing ecosystems and a lower level being ecological conservation activities (ibid).

Birkin suggested that this ISIS model could lead to a balanced scorecard approach. Organisations would score from low to high against each of the four types of information, with the key being that scores against each item are similar – leading to a balanced horizontal graph of results (Birkin, 2000). It should be noted that the ISIS model has not been tested in the field.

Recent work by Bebbington and Larrinaga (2014) looked at the emerging area of sustainability science as a way forward for accounting for sustainability. Sustainability science is a particular approach to knowledge production in the sustainability arena. Several points made about this approach are most apposite when considering the sort of changes that might be needed in China as it moves to ecological civilization: (1) that the sort of morally infused problems in the SD arena require *innovation in our modes of thinking*; (2) that a sustainability science approach to "wicked"[7] problems of SD calls for an examination of *the fundamental character of interactions between nature and society*; (3) a sustainability science approach also calls for *an interdisciplinary approach to SD problems*; and, (4) there are possibilities for *changes in accounting for SD at country and sector levels* (ibid) (italics inserted to show links to Foucaultian notions of episteme change). Their discussion opens the way for more interdisciplinary research on SAR if it is to move beyond the much criticized position where it does not have any role to play in the moves towards a sustainable society.

---

[7] A wicked problem is a social or cultural problem that is difficult or impossible to solve for as many as four reasons: incomplete or contradictory knowledge, the number of people and opinions involved, the large economic burden, and the interconnected nature of these problems with other problems - Kolko, J. (2012). *Wicked problems: problems worth solving,* Austin, Texas, Austin Center for Design.

In conclusion it is apparent that researchers into sustainability (and its accounting) fall into one of these two camps –

(1) Managerialists (Schaltegger et al., 1996, Schaltegger and Burritt, 2000, Schaltegger and Synnestvedt, 2002) who could be said to take an eco-modernity perspective in that they consider that environmental problems can be solved by technological advances, without any major adjustments to economic systems (Jallow, 2010) and

(2) Those who argue critically for fundamental change in society and by organizations (Gray and Bebbington, 2000). However there is no evidence that research by the critical/fundamental change group has led to the sort of changes that they have proposed. The world, more than forty years on from Meadows et al and the Limits to Growth (1972), still seems intent on a growth-based capitalist model fuelled largely by fossil fuels. The sort of fundamental change in society and by organizations that has been called for is the subject of this thesis – with change to ecological civilization in China - and then the possibility of changes to accountability as a result. The next section goes on to review developments in education on SAR as it is posited that only by education will the accountant of the future be able to contribute to developments in accountability.

2.3.4 The development of education in sustainability accounting

This section is included because: (1) this research includes surveys of Chinese academics in China and Chinese students studying for undergraduate degrees in accounting and finance in the UK and (2) education is seen as an important area for accountants of the future in China to acquire knowledge of sustainability that they will possibly link to Chinese philosophical influences and new science, so as to develop new forms of accountability in the sustainability sphere.

Key references are: Bebbington (1997), Collinson et al. (2007, 2014), Niu et al. (2010) and Lu and Zhang (2014). The first two references (the second being in two editions of the same book) are reviews relating mainly to higher education in the West and the second two references look at higher education for sustainable development in China (the second being a comparative study with a Chinese and a British HE institution).

Bebbington (1997) concentrated on environmental accounting (EA) in a review of the status of EA and research thereon. In terms of education the review concluded that education of accounting students presented an opportunity to enable the next generation of accountants to appreciate the possibilities presented by EA. But, based on this review it was acknowledged that at that time (the mid-1990s) courses were rarely compulsory and the level of uptake relatively low. As a result the accounting education route was seen as one often neglected. The article alluded to capture of the EA agenda (by big business and vested interests in society) and presented a depressing view of the future where the potential of EA (and its education) was seen to be contestable and contingent on evading this capture (Bebbington, 1997).

Moving forward to Collinson et al. (2007) the discussion was still about the "possibilities" of education on social and environmental accounting (by this stage also referred to as part of sustainability accounting). Education (on EA and SA) - for accountants and many others - was seen as a necessary, but not sufficient, condition for more radical changes in humanity's outlook on sustainability, but there was still little evidence of it being taught in a systematic and radical way across higher education.

Collinson et al. (2014) revised their review from 2007 and so presented an opportunity to see if their pessimistic conclusion then had become more optimistic. A key finding was (ibid) that courses were still mainly offered by interested academics in the field and that they were in danger of being "bolt-on" (courses on CSR, Social and Environmental Reporting, SAR) that did not challenge the status-quo of the shareholder dominated landscape based on neo-classical economics and a positivist philosophy. Ethics course were seen a "tokenism in action" where often environmental degradation and pollution were seen as an externality. A number of initiatives were cited – The UN Decade for Education for Sustainable Development (from 2005), the Bonn Declaration on Education for Sustainable Development, United Nations Principles for Responsible Management Education, the Global Reporting Initiative on reporting about environment, social and governance by OECD large and medium-sized enterprises, the Copernicus Charter for Sustainable Development (signed by 240 European universities). But in spite all these initiatives the review concluded that there was little evidence of the existence of the application of wider, inter- or cross-disciplinary perspectives on SEA educational provision (ibid).

In a Chinese context Niu, Jiang and Li (2010) carried out a review of policy and practice relating to higher education for sustainable development (ESD). The focus on ESD was broader than the accounting focus of the UK-based reviews above and provided some very different results. The first observation from the paper was that the Chinese government has been involved in directing and funding developments in ESD since the early 1990s. This has included the establishment of regional centres for the promotion of ESD and the rolling out of ESD programmes to half of the 33 provinces in China. Also cited were several universities – with Tongji University in Shanghai a leader in the field – where initiatives with students have promoted ideals of the green campus. The key fields mentioned were economics, construction and environmental engineering – leading to the widespread application of lifecycle assessment methods. Overall approximately 50 percent of all the universities had launched general courses linked to SD and almost all universities had begun to address the need for curriculum reorientation in line with ESD (ibid).

Another recent paper looked at an ESD initiative in China (at Tongji University) and compared it with an unnamed UK university (Lu and Zhang, 2014). Important in their paper was the notion of the sustainable institution with a series of building blocks that needed to be in place: (1) a cross-disciplinary pedagogical unit that brings staff together to share insights into ESD; (2) interdisciplinary project-based activities for engaging both staff and students in campus-wide activities; (3) top-down strategy to encourage whole-institution change; (4) supporting existing staff with expertise in ESD; (5) nurturing areas of excellence, and (6) pedagogies that encourage students to become active, creative and critical. However,

in conclusion it was noted that neither university had managed to get all these building blocks in place, but that there were lessons to be learned from the two institutions that could be applied across higher education in the two countries. The lessons were around (1) the interplay between top-down and bottom-up approaches and empowerment of staff and students and (2) the importance of interdisciplinary approaches to ESD (ibid).

The strong impression gained from the studies reviewed in this section on education for sustainable development and related subjects is that higher education has an important role in changing perceptions about sustainability (and its accountability). However, although since the 1990s there have been research and initiatives in this area, most of the provision is still undeveloped and lacking in integration and interdisciplinary initiatives. Certainly in the UK there has been a strong feeling that ESD as it stands is the victim of capture by vested interests in maintaining the status quo. All the evidence suggests that in spite of efforts in ESD over thirty years we are moving faster and faster towards unsustainability and environmental catastrophe.

2.3.5 Sustainability accounting in emerging economies

It is generally accepted (see for example: Lin, 2011) that China is in a period of rapid economic growth and industrialisation and to this extent is an emerging economy or emerging market according to the definitions by organisations such as the World Bank (2008). The question is – are there particular factors relevant to the development of SAR practice in emerging economies that can be used in this research on Chinese developments? This discussion is guided by Belal and Momin's (2009) review of research on corporate social reporting in emerging economies. They identified three types of study: (1) studies related to the extent and level of corporate social reporting and their determinants; (2) managerial perception studies; and, (3) stakeholder perception studies. The first group was by far the largest, using mainly content analysis and producing quantitative analyses (De Villiers and Van Staden, 2006, Belal, 2000). The second group looking at managerial perceptions have used interview and questionnaire methods and produced predominantly qualitative studies (Belal and Owen, 2007, Rahaman, 2000, Rahaman et al., 2004, Jaggi and Zhao, 1996).

An early content analysis based study looked at social reporting by Bangladeshi companies in 1996-97 (Imam, 2000). The author observed that social and environmental disclosures were mainly qualitative and that there was a relatively small quantity of disclosure in the 40 companies sampled. Typical of reporting-based studies this study made a dangerous assumption that a lack of reporting on environmental issues meant that the company did not have any concern for environmental issues.

Jaggi and Zhao (1996) examined the perceptions of managers and accountants on environmental performance and reporting in a Hong Kong context. The study used a questionnaire methodology together with a content analysis of actual environmental disclosures by the sample companies. The study found that managers appeared to have a growing awareness of the need for environmental performance

51

measures and reporting, but that this was not borne out by actual practices and reporting by companies in the sample, with the lack of legal requirement to report being cited as a reason. Accountants were found to be weak in their attitude towards disclosure of environmental information.

Rahaman et al (2004) looked at social and environmental reporting at a Ghanaian public sector organisation – the Volta River Authority (VRA). The research design used was a dual one of interviews and document analysis. The interviews sought to extract the motivations for environmental and social reporting at the VRA. Using a theoretical framework around institutional theory, the researchers found that strong institutional pressure – particularly from the World Bank – was the dominant explanation for VRA's environmental reporting practices. As an in-depth case study this was a rare attempt to get inside an organisation beyond its external reports. The paper made a strong case for mandatory regulation of environmental reporting in developing countries, arguing that multi-national companies can take advantage of these countries in ways that would not be possible in the developed world.

Belal and Owen (2007) also looked at corporate social reporting (CSR) in Bangladesh but their study was different from Imam's in that they engaged with corporate managers via a series of interviews. Following on from work in a Western context (Adams, 2002) the main objective of Belal and Owen's study was to examine the perceptions of a group of senior managers towards the emerging phenomenon of corporate social reporting in Bangladesh. In conclusion they noted that overwhelmingly the views of their interviewees suggest that: "as was the case with Western-based studies considered earlier, a CSR process in Bangladesh driven by a concern to improve corporate image and to manage the perceptions of economically powerful stakeholders (Belal and Owen, 2007p487)." This links with the work on reputation risk management with the key motivation for CSR reporting being to improve corporate image. It should be emphasised that this study concentrated on overtly social aspects of reporting such as employee matters with a lesser emphasis on environmental disclosures. As a final comment they argued that there is a pressing need for institutional reform so as to give less powerful indigenous stakeholders a voice – but that the prospect was not one which they viewed with optimism.

In conclusion: firstly it is noted that studies in developing or emerging economies have been predominantly of the "what is going on" type; secondly that the emerging economy situation is seen to be one in which sustainability accounting and its reporting is driven by similar motivations to those apparent in existing Western studies, with the strong institutional influence of governments and major international institutions such as the World Bank a common theme; and finally it is noted that the imperative for moves towards sustainability in developing economies is driven by a realisation that many such economies will be the first to be affected by phenomena such a sea-level increases and extreme weather events, with Bangladesh being a case in point (Denissen, 2012).

2.3.5.1 Sustainability and environmental accounting research in China

Research on environmental reporting in China was tackled in a study based on interviews with managers in Shanghai (Rowe and Guthrie, 2009) and generally found a dearth of environmental reporting in the Chinese companies sampled. As to environmental accounting, apart from certain requirements in China to report on environmental fines there was little evidence of attempts being made to use modern environmental accounting techniques. Rowe and Guthrie (2009) examined the influence of institutional cultural norms on Chinese corporate environmental reporting and outlined the influence of Confucianism in this sphere. However, their research was carried out in 2002-2005 during a period of minimal reporting.

Xiao (2006) reviewed 324 published papers on EAR in Chinese journals from 1992-2003 and noted that 98% of the papers were what he described as normative in the sense that they tended to be about theoretical concepts rather than being empirical. This normative type study is typified by Xiaomei (2004) who defined and discussed the basic concepts of EA, moved on to look at EMA in a theoretical sense, briefly discussed what was happening in China based on ISO14001 take-up and went on to advise on strategies for the future. Why so few papers were empirical seems to reflect the research tradition in China with the academic acting in an advisory capacity and disseminating ideas rather than conducting empirical work. But the sheer volume of papers surely indicates a real interest in the subject in Chinese academic circles.

Xiao (2006) reviewed in detail the six empirical papers he found in Chinese journals during the period 1992-2003. These tended to be questionnaire surveys of companies and stakeholders and looked at EA and more broadly environmental management. This emphasis on environmental management (EM) suggests that EA is seen by Chinese academics as a tool of EM which fits with earlier discussions of the managerial branch of EA research and practice (Schaltegger and Burritt, 2000). The findings in these six papers showed that environmental accounting was rare and that environmental awareness was generally low. In terms of mandatory environmental reporting the paper described the reports mandated by the Ministry of Environmental Protection and noted that they contained little environmental accounting information, being largely based on physical quantity disclosures.

Xiaomei (2004) presented a review of environmental management accounting challenges to China with a strong emphasis on the role of government. This paper was not based on a specific research project which involved the gathering of data. On the contrary it was typical of Chinese-based research where the researcher reviews a situation from specialist knowledge and makes recommendations of a policy type. The key recommendation in this paper was that government in China needed to establish an environmental accounting and auditing system for use by companies and then direct the market through taxation and economic instruments so as to improve environmental performance of companies.

Since Xiaomei's research there have been a number of developments – not least the promotion to full ministry status of Ministry of Environmental Protection (Economy, 2010) and the much wider use of

environmental accounting and reporting by larger Chinese companies (Gao, 2009). Gao's research and other surveys (Guo et al., 2008) showed a growth of CSR disclosures by large Chinese companies in the period since 1995.

Chinese research on disclosure by Chinese companies of environmental accounting information (Zhang, 2010) presented a pessimistic view that there is a lack of concern by government and the general public about such disclosure. The suggestion was made that investors tended to invest in any business which will bring high profit and tended to ignore environmental effects. Zhang recommended that: the idea of Green investment should be advocated; naming and shaming of heavy polluters; a national database of environmental reports of companies; and, pressure on companies to publish environmental accounting information voluntarily (ibid).

Recent research (Du and Gray, 2013) on the emergence of stand-alone social and environmental reporting in Mainland China begged the question as to what are the drivers for entities to disclose environmental information and suggested that there is much to be done on this question. Xiao (2006) suggested that environmental accounting and reporting in China is needed so that companies can integrate environmental issues into the business agenda and discharge their environmental accountability.

This absence of reporting by Chinese companies is worthy of reflection and further research. Choudhury's (1988) paper on absence in accounting suggested that one reason for absence is that it implies trust. This implies that when an organisation is in a position of trust by society it will not see it as necessary to account and report. In SAR terms perhaps the absence of trust is what motivates Western companies and their big Chinese counterparts to account and report on environmental matters. Perhaps it is the trust by stakeholders in the majority of Chinese companies that leads to the absence of external reporting. Du and Gray (2013) noted suggestions of a negative relationship between state ownership and disclosure but their own findings did not bear this out. The implication of this negative relationship is that when the state owns an enterprise the only reporting will be to the Ministry of Environmental Protection (MEP).

Birkin (2007) was heavily involved in a report on environmental management in China. This report was on a project which interviewed groups of stakeholders and managers in companies in Yunnan and Jiangsu provinces that had embraced environmental management systems (EMS). The report (ibid) made it clear that there was a link between EMS and environmental accounting and reporting, in suggesting that an EMS would normally include mechanisms for measurement, audit and review of environmental management performance and internal and external reporting procedures. The report (ibid) went on to identify pressures on companies to introduce EMS: (1) government in the form of fines and levies; (2) government in the form of incentives and subsidies; (3) market pressure particularly for those companies trading in overseas markets; (4) customers who were becoming more environmentally concerned; and, (5) pressure groups (the report suggested that in 2007 there were over 1,000 environmentally oriented NGOs in China) (ibid).

A recent study looking at standalone corporate social responsibility reporting in China (Patten et al., 2015) used reports by large companies issued in 2011-2012. The findings were based on a hypothesis that firms with legitimacy-related issues would be more likely to provide greater disclosure than other firms (ibid). The legitimacy-related issues identified were: firm size; membership in a socially exposed industry (basic materials, oil and gas, utilities, alcoholic beverages); and being a state owned enterprise (SOE) (ibid). The findings were that bigger firm size and socially exposed industry membership were associated with greater CSR disclosure, but being a SOE did not have an association (ibid). Their conclusion was that standalone CSR reports were more a tool of legitimation than a vehicle for meaningful disclosure of social and environmental impacts.

In conclusion, research on Chinese sustainability and environmental accounting and its reporting has thus far provided little evidence of serious engagement by Chinese companies. Even those larger companies that were engaging were doing so to in order to enhance their image or to provide legitimation of their activities rather than making serious moves towards sustainability or sustainable development.

2.4 The role of the accountant in sustainability accounting

Hines (1988p254) provides a starting point for this review, in her paper on the way in which financial accountants construct reality she discussed pollution and the need to account for it: "Once the organization becomes accountable for something, we must account for it, sooner or later (ibid)." The "we" in this quotation is interpreted as being accountants and the "must" infers a normative side to accountants' work, based on a sense of responsibility and accountability. It was also an early discussion of an environmental impact and the need to account for it by organisations. Hines continued, positing that the accountant had a hidden power: "...because people think of you as *communicating* reality, but in communicating reality, you *construct* reality (ibid, 1988p257)." So, the accountant was seen as having a very powerful role in the subjective presentation of accounting information where numbers do not have an objective reality – rather they are the social constructions of accountants.

Bebbington et al. (1994) carried out a study looking at accountants' attitudes and environmentally-sensitive accounting by surveying a sample of UK finance directors that examined: (1) background data about the company; (2) the company's current activity with regard to the environment – including accounting initiatives and the accountants' involvement – with reasons for this activity; and, (3) information about the respondents and their attitudes to various issues. The key findings were that:

(1) there was homogeneity of accountants' attitudes in that they presented a positive attitude to innovation and environmentally-related innovation in particular;

(2) a gap between attitudes and actions with regard to environmental activity in that the attitudes were positive whilst the level of involvement was limited; and,

(3) accountants' lack of knowledge about the possibilities of environmental accounting.

Nyquist (2003) looked at the Swedish legislation that required companies to report on the impact of business activity on the natural environment. Perceptions of Swedish accountants about these new demands were assessed by the use of a questionnaire to public accountants (accountants working in practice). The paper concluded that the accountants had a positive attitude towards environmental information provision as it was seen to contribute to a better overall picture of the company. It should be stressed that this study questioned public accountants who were auditing disclosures on environmental matters in the annual report, rather than company accountants (Bebbington et al., 1994).

Wilmshurst and Frost's (2001) research was based on a postal questionnaire with only a very limited response rate and the use of a Lickert scale for the majority of the questions so as to find out the accountants' attitudes and perceptions. They concluded that there was no overwhelming active involvement by accountants in many Australian companies' environmental management (ibid). They also suggested that there was the potential for accountants to be very actively involved in companies' environmental management (ibid). The key issue seemed to be the perception by companies that environmental accounting did not form part of the environmental management system.

In conclusion, much of the existing research on the role of the accountant in sustainability accounting and reporting has argued that the role should be an important one, but that the existing practice is very patchy with accountants still very resistant to both change and to the implementation of SAR initiatives.

2.5 Review of the recent literature on modern Chinese culture and ethics

From a review of the literature on recent management trends in China a recurring theme is that its ancient philosophy influences modern Chinese society (Chung et al., 2008, Chan, 2008, Berthrong, 2005, Cheung and King, 2004, Erdener, 1998, Fan et al., 2008, Gao and Handley-Schachler, 2003, Ip, 2008, Jacobs et al., 1995, Lan et al., 2009, Whitcomb et al., 1998). The argument put forward in much of the literature is that the ancient religions/philosophies of Daoism, Buddhism and Confucianism are still very influential in modern China. This review seeks to explore this literature and to draw conclusions on the direction that the literature is taking. It also examines those references in Birkin and Polesie (2012) that showed how these philosophical influences could be part of a move towards their "Primal episteme".

2.5.1 The influence of ancient philosophy on modern Chinese society

Lan, Ma et al (2009p62) carried out a comparison of the personal values of Chinese accounting practitioners and students. They made the following comments: "Chinese traditional values, especially Confucianism, are ingrained in the Chinese way of life and affect Chinese people's perception of what is important and what is not" and "Confucianism has been a dominant and enduring influence on cultural values in China despite the economic and political upheavals in the last two centuries (ibid)." The inference is that traditional values are influential in the lives of Chinese accountants.

Gao and Handley-Schachler (2003) looked at the influences of Confucianism, Feng Shui and Buddhism in Chinese accounting history. They commented that: "Confucianism is recognized as the dominant influence on cultural values in China (ibid p45)" and that: "The principles of Yin and Yang polarity lie in the very roots of Chinese culture (ibid p49)." On accounting they noted the tendency towards strong statutory control, high levels of uniformity, a tendency towards conservatism and secrecy (based on Gray (1988)). These cultural characteristics of accounting are strongly related to the ancient philosophy in their paper.

On contemporary business ethics Chan (2008p357) commented that: "Confucian Ethics can and does play an important philosophical and practical role in impacting or influencing the direction of contemporary business ethics." Chan's thesis was that Confucian philosophy impacts on business ethics world-wide – not just in a Chinese context. In the context of this thesis, in particular he commented on the Confucian doctrine of the Mean – concerned with human nature and being in harmony with the universe (ibid). His argument was that as China increases in importance globally, so its ethics will become more pervasive (ibid).

In recent research in the business ethics and management areas, Confucianism has often been cited as a strong influence on individuals, Chinese enterprises or on modern China (Chung et al., 2008, Chan, 2008, Roper and Weymes, 2007). Hofstede and Bond (1988) described a cultural dimension called Confucian Dynamism that was associated with a set of values such as: persistence; ordering of relationships; thrift; having a sense of shame; personal steadiness; protecting your face; respect for tradition; and, reciprocation of greetings, favours and gifts. Their work has been criticised by some (Fang, 2003) but it did attempt to factor Confucian values into understanding about culture. The Journal of Business Ethics has a useful stream of articles on Confucianism and its ethical effects (Chung et al., 2008, Chan, 2008, Ip, 2008). The first of these articles (Chan, 2008) looked at the relevance and value of Confucianism in contemporary business ethics and focused on Confucian notions of reciprocity and harmony. Chan argued that with the growing stature of the Chinese economy and with continuing internationalisation, the role of Confucian Ethics was likely to grow and influence contemporary business ethics. The second article (Chung et al., 2008) explored ethical perceptions of business students among East Asian Confucian cultures and compared them with the USA. China formed one of the Confucian cultures in this article and it was noted that on the level of personal relationships and actions, residual Confucian values may apply, in particular the importance of personal relationships and saving face. In the third article (Ip, 2008) focused on Taiwan and looked at the growth of corporate social responsibility along with corporate scandals that provided a contradictory scene. He noted that what he called Confucian familism – the family as the apex of society – fitted well with the "crony capitalism[8]" that he observed.

---

[8] Corruption and misconduct involving family members in firms.

Zu and Song (2009) questioned a group of Chinese managers across the whole of China on their values on corporate social responsibility and the determinants of those values. Surprisingly the article found that firms of smaller size, owned by the State, and located in the poorer regions would be more likely to have managers who value CSR more. The business case seems to be the most likely determinant but correlations and causality are uncertain. No mention was made of Confucianism in this article but it is possible that in regions more undeveloped economically the influence of traditional Confucian values may be greater because the influence of modern capitalism may be less.

Several writers have noted the contradiction between philosophy and practice (Tucker and Berthrong, 1998, Li, 1998, Economy, 2010). Each of these writers pointed out that in China (and East Asia), in spite of the philosophical writings by New Confucians, there was a high level of industrialisation and associated pollution and that traditions such as Confucianism have been ineffective in inhibiting ecologically destructive human actions. On the other hand, recent interview based research on a group of Chinese managers working for Chinese and foreign multinationals in Shanghai (Moletsane and Margerison, 2009) showed a high level of awareness of environmental responsibilities and evidence of actions to fulfil these responsibilities.

Recent publications in popular philosophy (Yu, 2009, Bell, 2008) have argued strongly that ancient philosophy – particularly Confucianism – has a modern-day relevance in China. Bell (2008) looked at modern China from a political philosophy perspective and noted a revival in Confucianism in, for example, the leadership's use of the term harmony and harmonious society. Yu (2009) wrote a popular text arguing that Confucianism had a role in today's world. The fact that it became a ten million copy best seller in China is testimony to the fact that it touched many modern Chinese readers. As can be seen, many researchers and commentators have suggested that ancient Chinese philosophies are very influential in Chinese life today.

Birkin and Polesie (2012) used many references to China, its philosophies and attitudes to nature. A key point was the concept of harmonious development that has been so dominant in Chinese history (ibid). Also from Daoism the idea that people and their bodies were dependent on the physical world and the natural environment (ibid). They also noted that in ancient China people were forbidden to abuse nature or destroy harmony (ibid). Hence a moral equality existed where heaven, earth, nature and man were all one (ibid). The inference being that China could be (and may already be) a rich source of Primal epistemic thinking where all things are connected in the continuity of being and beginning. A key point in the book occurs when the Chinese character shouts at the Swedish and British academics: "Nature is dead in your culture, and so is (sic) you (ibid p110)." This alluded to the strong Modernist tradition from Descartes where Nature was seen as passive. This has been countered in a Chinese context by notions of Ch'i which means "air" or "breath" and a living force in all natural things – so Nature is seen as being alive and active (ibid p229).

2.6 Summary

This review has attempted to review the key references that can be used to both inform and to answer the research questions. Below is a brief summary of each of the main areas of the review and a note linking the area to the research questions and the empirical work forming the original contribution of this thesis: (1) textual analysis of documents (for example: newspaper cuttings and environmental NGO websites); (2) interviews with Chinese accountants and managers to find out what they are doing and to see if they have special characteristics; (3) case studies looking at changing behaviours by companies; and, (4) surveys of Chinese accountants to support and deepen the interview findings.

The first area reviewed was the literature with a view to establishing a theoretical basis for the research. In Chapter 1 the need for change was argued with the current business model based on economic growth seen as unsustainable. In terms of the theoretical basis of the research – Foucault's (2002) work on episteme change and its applicability – the review has explored research on realism (Bhaskar 1978, 1979, 1986), paradigm shift (Kuhn 1962), structuration theory (Giddens 1991), post-modernism (Uduigwomen 2005) and modes of existence (Latour 2013 (1)). The researcher has been guided in the choice of these possible alternatives by arguments in the literature (Birkin and Polesie 2011) and has justified the choice of episteme change in the methods chapter – Section 3.1.1. Foucault (2002) developed a theory of episteme change by examining historical examples of episteme change looking at the human sciences and using his archaeological method. The empirical work outlined in Chapter 4 will seek evidence to support this argument – particularly that looking at developments in society (newspapers and web sites of NGOs) and in companies (via case studies).

The second area reviewed included modern literature on sustainability and ecology where a broad range of views have been reviewed – from climate deniers (BBC News 2009) to utopians (Burnside 2014) to scientific approaches (Gleick 1988). In terms of philosophy and ethics and culture the review included perspectives for Chinese and Western academics – those favouring Confucianism or Buddhism or Daoism and those advocating a more all under heaven view that fuses the existing philosophy into one (Tian Xia). Another group of researchers into Chinese philosophy argue that the ancient sages had no intention or appreciation of ecology in their teaching (Fan 2005). However, the dominant view is that of modern interpretations of ancient ideas that suggest there are clear links to ecology in the teachings (Tu 1998). This review found that there are many parallels between the ancient philosophies and their notions of for example: harmony, reciprocity, yin and yang and current radical thinking on ecology and environmental sustainability. The empirical work seeks to examine these (often subliminal) influences on modern day Chinese accountants through interviews and surveys.

The third area reviewed was the notion of accountability and the development of sustainability and environmental accounting. The review moves from the managerialists (Schaltegger and Burritt 2000, 2006) to those seeking engagement with practice (Bebbington, 1997, Owen, 2008) to those seeking fundamental change in society (Gray R. 2010) to those taking a critical perspective (Gallhofer and Haslam

1997, Tinker et al 1991). It should be noted that the approach used in this thesis around Foucault's epistemic analysis provides a new approach in that the modern scholars reviewed are by definition approaching the problems and issues around sustainability and its accountability from within the existing episteme. What is required, it is argued in this thesis, are changes in the basic assumptions and ways of thinking. This leads to empirical work examining current sustainability accounting practices in China and comparing them with developments elsewhere – interviews and case studies providing the key empirical findings.

The fourth area reviewed was research on the role of the accountant in sustainability accounting (including environmental and social accounting). Although from a normative perspective the accountant's role is seen as pivotal, the literature shows that accountants' engagement in sustainability management, accounting and reporting has been patchy to date. The empirical work for this thesis looks at Chinese accountants' engagement in accountability for sustainability through interviews and case studies. The extent to which Chinese companies do not report on sustainability matters is also analysed with reference to the accounting literature on absence (Choudhury, 1988).

The fifth area reviewed was recent literature on modern Chinese culture and ethics and so their possible links to ideas of ecological civilization and the "Primal episteme" mooted by Birkin and Polesie (2012). In terms of this thesis the key is that it appears to be generally accepted that Chinese people today are imbued with rich philosophical influences and that these influences should affect their views on the natural environment and its sustainability. The empirical work for this thesis – in particular the surveys – seeks to establish whether this is true in groups of accountants, accounting academics and accounting students.

3. Methodology and methods employed

This chapter explains and justifies the methodological framework for the research. It starts with a general discussion of the research philosophy (interpretivism) and the ontological (relativist) and epistemological (transactional or subjectivist) stances that support the philosophy. It also explains and justifies why the chosen research philosophy and theory are most appropriate in seeking answers to the research questions.

An approach to the application of Foucault's archaeological method on episteme change is discussed. This has been based mainly on Birkin and Polesie (2011, 2012) and their proposed change to a "primal episteme".

Next it outlines and justifies the mixed methods in use in this study – textual analysis, interviews, mini-case studies and surveys – and explains how the data generated is analysed using Foucaultian archaeological method based around episteme change and the notion that such change is more likely in certain social groups or cultures (in this case broadly China and its accountants).

Finally there is a discussion of ethical issues raised by the methods employed and how these ethical issues have been dealt with by the researcher.

3.1 Philosophy and theoretical basis for the research

This research is using an interpretivist philosophy in that it seeks to interpret the signs from a variety of sources (mainly people) in China in answering the key research question: is there a possibility of new accountability in the context of civilization change in China?

Myers (2013) argued that an interpretivist approach involved gaining access to reality through social constructions such as language, shared meanings, and instruments. In effect it involves integrating human interest into the study (Dudovsky, 2015). Chowdhury (2014) developed this understanding of an interpretivist approach to mean the study of the world through subjective thoughts and ideas; seeing the world through the eyes of the people being studied and therefore allowing multiple perspectives of reality (rather than the "one reality" of positivism). Hence, he argued that value-free data cannot be obtained – since the researcher uses his/her own preconceptions in order to guide the process of enquiry (ibid). In that this research does not seek universal truths or causality between variables and is guided by the researcher's interpretation first of textual sources and then the attitudes of Chinese accountants it is bound to find multiple perspectives and so fit an interpretivist philosophy.

The main dangers with interpretivism in research are: (1) that it is by its nature subjective due to the bias of the researcher and (2) one cannot generalize from the primary data as it is heavily impacted by personal viewpoints and values of both the researcher and the researched (Dudovsky, 2015). Hence it is argued that reliability and representativeness are undermined (ibid). On the plus side, interpretivism produces data that tends to be trustworthy and honest, with high levels of validity (ibid). This honesty is enhanced if the researcher accepts that all answers (from interviews, surveys) will not point in the same direction

and that there will almost certainly be contradictions. As long as these contradictions are acknowledged and not left out of the findings, then the results and subsequent analysis will not provide neat answers but will do something altogether more important – allow for the richness of the real world to be portrayed with all its inconsistencies and questions. Another interesting matter is that in this research there are cases where there is an absence of data of particular types (particularly public reporting on environmental sustainability accountability matters) and this absence is very relevant to the interpretivist philosophy, in that sometimes the absence of something where it might have been expected to exist is an important part of an analysis (Choudhury, 1988).

With the dangers in mind, this research is not seriously impaired by subjectivity as the researcher's perspective is a commonly held one – that it is vital for the major emerging economies such as China to develop new ways of avoiding the worst effects of pollution/emissions and resource use and waste-disposal if the planet is to move forward in a sustainable way. Given this perspective, in this research the researcher is looking for signs and contingencies of change towards an ecological civilization in China that could lead to the effects being dealt with and so accounted for in innovative ways.

Bryman and Bell (2011) discussed the subjectivity of qualitative research in more general terms. Their first point was that findings rely too much on the often unsystematic views of the researcher about what is important (ibid). In terms of this research the search for signs and contingencies rather than conclusive evidence to prove hypothetical relationships between variables means that the research is bound to be subjective, in the sense that what represents a sign or contingency is down to the judgement of the researcher. However this search is informed by the literature on episteme change and ecological civilization and each piece of evidence is analysed based on this literature.

The second area of subjectivity in Bryman and Bell (2011) is around the lack of transparency, in that how participants were selected is often not made clear in qualitative research. This is fully described in Section 3.3.2.1 on the purposive sampling used in this research. Another researcher would almost certainly select different samples from different groups and in this sense there is subjectivity. However, surely even the most positivist study is in fact riddled with subjectivity, take for example a study that looks at the return on stocks over a particular period – which stocks are sampled and the period over which they are sampled are both subjective decisions on the part of the researcher. Here it is argued that the mixed methods used in this research provide a rich tapestry of findings that are never available to the positivist researcher.

The third area links back to the second – that of replication problems. In this study this is not a problem as the researcher could easily brief another researcher on the samples chosen and these could be used in another study. Bryman and Bell (2011) argued that precisely because it is unstructured and often reliant upon the researcher's ingenuity, it is almost impossible to conduct a true replication and interpretation will be profoundly influenced by the subjective leanings of the researcher. Whilst agreeing

with these criticisms to an extent, it is noted that as this study is based on a theoretical model of episteme change and current thinking on ecological civilization, the researcher's own bias is limited.

In terms of representativeness, any researcher into China and its accountants has to take into consideration that the population of accountants and accounting students probably runs to more than a million. Hence to achieve representativeness is an impossible task and not the aim of this research. Rather this research seeks to find insights in textual sources and from Chinese accountants that help to open up the debate on episteme change and the ecological civilization. If representativeness takes place it is representativeness to a theory – in this case the theory of episteme change as discussed in the next paragraph.

3.1.1 Theoretical basis for the research

The chosen theory for this thesis is that of episteme change, based mainly around Foucault (2002) (originally published in French in 1966) and more recently Latour (2014) who appeared to support Foucault's thinking. There follows a justification of the use of Foucault's ideas on episteme change. Birkin and Polesie (2011) made the following substantive points in support of Foucault's theory of episteme change:

- Foucault's ideas apply to the human sciences (economics, sociology and psychology) and as such are not limited to the social sciences. This allows for a wider view than that taken using Bhaskar's (1978, 1979, 1986) notions of realism (see page 18 for a fuller discussion of realism).
- Foucault's epistemic analysis can reveal new possibilities of knowledge and provide explanations of origins. This is an improvement on structuration theory (ST) where the origins of change are not dealt with (see page 19 for a fuller discussion of ST).
- Foucault does not fall into the a priori[9] trap since the epistemes he described were based upon historically well-established perceptions of reality (a posteriori[10]).
- Foucault's work is potentially open to inputs from all disciplines and cross-disciplinary analyses because of the nature of the questions he asks.
- Foucault's approach has the promise not only of revealing the possibilities and processes of epistemological change but also the content of such change.

It should be noted that ideas from Latour's (2013 (1)) work on modes of existence resonate closely with Foucault's work on episteme change (particularly notions of discontinuities and the imperative for change from modernism to ecologism). To that extent Latour's theorising is useful in the context of this thesis. For example, Actor-Network Theory (ANT) (Latour, 2005) can be used to explain the situation in the Western sustainable development sphere, with key actors being (1) climate change scientists and (2) the

---

[9] a priori - reason proceeding from theoretical deduction

[10] a posteriori – derived from observable facts

authoritative voice of society. The interactions between these actors and their entrenched positions and vested interests potentially provide an explanation for the current lack of action to combat climate change in countries in the West (Birkin and Polesie, 2011). These ideas are used in this thesis in that the actors in the Chinese sustainable development network are identified and the interactions examined (see Section 5.1.2.3).

3.2 Methodology

In this section the ontological perspective and epistemology used in the thesis are outlined and examined.

3.2.1 Ontology – relativism

Ontology is defined as "the philosophical assumptions about the nature of reality (Easterby-Smith et al., 2008)." This is explained by Bryman and Bell (2011) as how the social world (reality) is regarded – is it something external to social actors or is it something that people are in the process of fashioning? In social science the three main ontological positions are: representationalism, relativism and nominalism (Easterby-Smith et al., 2008). *Representationalism* sees the world as objective, concrete and external to the researcher (sometimes called realism) (ibid). This leads the researcher to verify predictions by gathering data about the reality out there (ibid). *Relativism* sees 'reality' as not objective and exterior but rather depending on the viewpoint of the observer (and the observed), with phenomena being determined through consensus between different viewpoints; so that what counts as the truth varies from place to place and time to time. *Nominalism* as an ontological position includes the view that each person establishes his or her truth and labels or names this truth. This means that phenomena can be described in many different ways depending on who observes them and in what circumstances (ibid).

In this research the researcher is observing the development of organizational accountability for sustainability (particularly environmental) in China and how the attitudes of accountants and other actors could influence those developments. It uses a lens based on Foucault's work on episteme change (2002) as operationalized by Birkin and Polesie (2011, 2012) and by the Chinese government in its recent pronouncements on ecological civilization (Ma, 2007, Tu, 2013). So, another researcher, faced with the same phenomena could arrive at a very different interpretation, using, for example, an institutional theory lens (see for example: Rowe and Guthrie, 2010). To this extent the research is using a relativist ontology. No universal truths can or will be established. The important thing about a relativist ontological perspective is that it enables the researcher to add to the understanding of phenomena without pretending spurious causality or truth. Basing the research on Foucaultian methods places it firmly in a world of contingencies rather than causes (Kendall and Wickham, 1999). This approach is carefully developed and explained in the methods section later in this chapter.

3.2.2 Epistemology - subjectivist

Epistemology is defined as a general set of assumptions about the best ways of inquiring into the nature of the world (Easterby-Smith et al., 2008). The epistemology chosen for a particular research project is based on the ontology on which the research is based (ibid). A representational ontology leads to a positivist epistemology. A relativist ontology leads to a transactional or subjectivist epistemology. A nominalist ontology leads to a social constructionist epistemology (ibid).

A positivist epistemology assumes that there is a reality (or multiple realities) which exists independently of the observer (the researcher) (ibid). Positivism usually starts with a hypothesis about the relationship between variables (ibid). Data is collected about the variables and is analysed using quantitative methods so as to establish causality between the variables (ibid).

A transactional or subjectivist epistemology works on the basis that people cannot be separated from their knowledge and that there is a clear link between the researcher and research subject (Dudovsky, 2015). Very often this sees the researcher and the subject working in a cooperative or participative way (ibid). The outcome is (1) an understanding of what people think (their attitudes), (2) what problems they are confronted with and (3) how they deal with these problems (ibid). The sort of research instrument used is often a survey or questionnaire (ibid) and in this research in particular such an instrument is useful in finding out what Chinese accountants think and their attitudes towards environmental matters.

However there are strong parallels with social constructionism as it is accepted that reality is socially constructed (see below) and that there can be multiple realities (ibid). The social constructionist epistemology does not assume any pre-existing reality and aims to look at the structures that people invent to help them make sense of what is going on around them (Easterby-Smith et al., 2008). Very often this is done by the researcher having conversations (via interviews) with relevant people and hopefully it leads to understanding of phenomena. It also works from the assumption that there is no single objective reality and that the researcher/observer is not separate from the sense making process.

In this research a subjectivist epistemology is used with a strong nod towards a social constructionist perspective in that sustainability and its accounting are seen as socially constructed and given meaning by people (Birkin, 1996). The structures being looked at in a Chinese context are (1) government in the form of the Ministry of Environmental Protection; (2) accountants as servants of management also guided by the professional bodies (for example Chinese CPA); and, (3) education systems for prospective Chinese accountants (both in China and in the West).

The sections that follow show how the philosophy and theory outlined and the ontology and epistemology are operationalised using mixed methods around Foucault's archaeological method.

3.3 Methods

This section firstly outlines how Foucault's archaeological method can be used to identify the possibility of episteme change, then it outlines the mixed methods used in this research to gather data that can be analysed using the archaeological method.

3.3.1 Foucault's archaeological method on episteme change

In this research the use of Foucault's method, around notions of episteme change using an epistemic analytical framework, is based on the premise that in the current Modern episteme our understanding of reality is flawed (in for example our understanding of sustainable development) and hence there is the potential for change to take place (Birkin and Polesie, 2011p241).

Based on Foucault's theory of episteme change (Foucault, 2002) reviewed in the literature review, Birkin and Polesie (2012) argued that there is the possibility of episteme change, from Modern to what they called Primal, taking place now. The Modern episteme (since 1800) is based around abstract, anthropocentric, logical belief systems and, they argued, has led to unsustainable development based on consumer-driven capitalism. The possible "Primal episteme" is based on the knowledge of things as they are created – a knowledge of primal processes (ibid). At the centre of the primal episteme is empirically grounded science such as thermodynamic dissipative structures (Hammond, 2004), with accompanying developments in mathematics such as chaos theory (Gleick, 1988). This leads to new metaphysics - a life-centred morality (with Nature seen as active and self-regulating) (Birkin and Polesie, 2012).

Birkin and Polesie (2011) used four sets of questions of viability or negative evidence of why the Modern episteme must fail at some point:

The first set of questions are around *right and proper conduct* – that is morality. Foucault (2002 p357) argued convincingly that Modern thought has never been able to propose a morality. In essence his persuasive argument was that due to the centrality of epistemological man[11] in the Modern episteme, morality is not possible. This is interpreted to mean that in the science-based Modern episteme there is no morality. Science has been entirely harnessed to service the needs of humans to the detriment of Nature; the environment; and, all other species. Humans are both the subject and object of all scientific enquiries. Scientific efforts directed at life "improvements" for mankind alone may be necessarily doomed to fail in a form of species-solipsism (Birkin and Polesie, 2011). Hence, efforts to improve sustainable development prospects may cause the reverse. This is illustrated by Burnside (2014) on wind turbine developments in Scotland to produce renewable energy for humans and their adverse effect on endangered bird species.

---

[11] Epistemological man - man as both subject and object in all enquiries.

The second set of questions are around *specialization*. Birkin and Polesie (2011) noted that specialization is an inevitable consequence of the creation of fragmented origins without a metaphysical continuum. The most relevant reductionism is economism – the enormous weight that anthropocentric economic considerations can bring to bear down upon SD debates – for example the notion that supply and demand and market forces are the key to all decision making – hence ignoring biological, ethical, cultural and scientific dimensions. They argued further that economism's influence on the structuring of business entities, where they are based on market-defined values and costs only, leads to unsustainability. They acknowledged recent developments – Global Reporting Initiative; Life Cycle Assessment; Environmental Management Systems; and Principles for Responsible Management Education (a UN Initiative to overcome specialization) (ibid). They noted that these initiatives were likely to help with SD both by overcoming the problems of the Modern episteme and also providing their own new integrated solutions - among which the removal of strong disciplinary boundaries must be of paramount importance (ibid).

The third set of questions are around *anthropologization*. Foucault (2002) argued that *anthropologization* was the great internal threat to knowledge in his day (in his case the 1960s). This he argued lent a precariousness to the human sciences (ibid). In Birkin and Polesie's (2011) terms *anthropologicization* is a consequence of epistemological man and this centring of everything around man is a consequence of weak metaphysics. They noted (ibid) that this powerful self-centring tendency of man has led to ideas of "extreme narcissism[12]" in accounting (Amernic and Craig, 2010). This manifested itself in "creative accounting" where accounting numbers were manipulated to portray corporate success that in reality was no more than a chimera (ibid). On the contrary, Birkin and Polesie (2011) gave examples of thinkers who have reached out beyond the boundaries of the modern, for example: Leopold (1968) and his discussion about 1930s USA national parks where man's intervention to kill the "dangerous" wolves meant that the deer population grew and that their grazing caused deforestation of the mountain.

The fourth set of questions are around *mathematization*. By *mathematization* is interpreted to mean the ordering of knowledge[13] reduced down to mathematical relationships. Here they argued that there has been an unjustified over-application of mathematics in empirical fields, for example economics and accounting and finance models used by market participants (ibid). Recent examples such as the LIBOR rate fixing scandal (Economist, 2012) and the Tesco accounting scandal (Smith, 2014) suggest that this argument is a good one. Foucault (2002 p382) stated that "it was the retreat of the mathesis, and not the advance of mathematics, that made possible for man to constitute himself as an object of knowledge." This is interpreted to mean that when knowledge is ordered based on positivistic mathematical relationships all matters can be seen to be controlled by humans – even Nature.

---

[12] Self-obsession leading to unethical behaviour

[13] Sometimes termed "mathesis"

According to Birkin and Polesie (2011) any new ordering of knowledge (new episteme) has to deal with these four sets of questions of viability. They further argued (ibid) that evidence of an emerging Primal episteme is based around:

1. *A new metaphysics based around a life-centred mor*ality (with Nature seen as active and self-regulating) with, in this research, evidence of strong connections to Chinese philosophical traditions by Chinese accountants being the key .

2. *Invention as in the emerging mathesis[14] linked to new science.* These developments in new science are well documented in Birkin and Polesie (2012) and include developments in non-linear mathematics; chaos theory; dissipative thermodynamics; and, autopoiesis. For the purposes of this research the researcher is seeking examples of new science around climate change, renewables and resource conservation[15].

3. *The disappearance of specialization* is examined in this research by looking at accountants, academics and accounting students to see if their work incorporates sustainability accountability and *the disappearance of anthropologization* with a more integrated view of the universe and our part in it. This is evidenced in this research by examining the moves towards ecological civilization in China and the attitudes of accountants to the environment.

The questions of viability above and the evidence of an emerging episteme are based on the theoretical deductions and observations of Birkin and Polesie (2011) and have not been applied in an empirical sense. However the authors were apparently heavily influenced by Chinese contacts (in their book they are represented by a Chinese PhD student) and it was noted that the Chinese view of the world is significantly different from that in the West – in particular a view that Nature is active and that humans coexist within a matrix of Nature (Birkin and Polesie, 2012).

This research seeks to make an original contribution by testing the ideas of episteme change in a Chinese context. It uses primarily qualitative method with thematic analysis around Foucault's archaeology of the human sciences (Foucault 2002). It does this by looking for the signs that the evidence provides that the modern episteme is no longer viable and that there is the possibility of an emerging episteme (entitled ecological civilization by the Chinese government).

In using Foucault's methods it is important to understand that he is considered to have been a most careful investigator and most certainly not post-Modern in the sense that he did not seek to change the world – rather very carefully explain the discontinuities from the past (episteme change) (Kendall and Wickham, 1999). One of his important contributions was the notion of contingencies and contingent relations (ibid). Contingencies are developments that could be considered to be accidents of history or

---

[14] A universal science of measurement and order (Foucault 2002 p62))

[15] Today grouped in the area: sustainability science: see Bebbington, J. & Larrinaga, C. (2014). Accounting and sustainable development: An exploration. *Accounting Organizations and Society,* 39**,** 395-413.

the unintended consequences of history (ibid). In Foucault's work contingencies emerge, they cannot be forced or manufactured. It should also be noted that contingencies are in a constant state of flux and emergence.

Foucault's approach to contingencies is used alongside "Actor-Network-Theory" as developed as a methodology by Latour (2005). In simple terms Latour's approach is to explain the social world in terms of "the sociology of associations" (ibid) where the actors in a society interact in often unpredictable ways that defy positivist analysis. In this research the actors and contingencies around sustainability and organizational accountability in China are identified and evidence is gathered, so that the contingencies and associations between actors can be analysed (see Section 5.1.2.3).

3.3.2 Mixed methods in this research

The methods of data gathering used in this research are mixed – textual analysis, interviews and observation leading to the development of mini case studies; and surveys. As a result the analysis is based mainly on qualitative research method, with some limited quantitative analysis of responses from the interviews and surveys. It should be stressed that the quantitative analysis is not to arrive at statistical relationships – rather using descriptive statistics so as to summarize modes within survey responses and to assist in interpretation of themes using qualitative analysis as discussed below.

3.3.2.1 Sampling - purposive

In this research the populations are so great as to render futile any attempt at statistical sampling. The sampling used can be described as purposive (Bryman and Bell, 2011). Items are not sampled on a random basis, rather the sampling is carried out in a strategic way (ibid). This means that the researcher samples with certain research goals in mind (ibid). Hence it is a non-probability sampling approach where it is not possible to generalize to a population. It should be stressed that it is not convenience sampling which is available by chance to the researcher.

The documentary evidence comes from the extensive literature – both academic and from the press, NGOs' websites and communications and from government pronouncements and reports. To that extent it is bound to be partial, as the sources of evidence these days are so numerous.

The sample group for the interviews was made up of Chinese accountants and managers who were interviewed in 2010 and 2011. The sample was selected by two Chinese academics who were briefed on the aims and objectives of the research (at that stage simply to find out (1) what environmental sustainability accounting was going on in Chinese organizations and (2) the influences on the accountants who were implementing these initiatives). Based on the brief, the two academics selected accountants in their region (Liaoning Province and Shanghai and Zhejiang Province) who were known to them and who would most likely be involved in environmental accounting initiatives. The main limiting factor was time as the researcher was completing the visits during the Easter vacations of the two years in question.

The sample group for the case studies was made up of organizations from the interviews that were judged by the researcher to be able to provide enough data for mini-case-studies that showed approaches to sustainability accounting and accountability in a Chinese context. Mini-case-studies mean that evidence was obtained from more than one source – for example: interviews, observation and documentary evidence. Three organizations were selected as having the ability to at least partially triangulate using evidence of different types (see Section 3.3.2.4 for full details of the case study companies). Data was gathered from 2010 through to 2015 but there was only a limited longitudinal study of one of the cases (the major steel company and its CSR reporting). The other two cases allow a presentation of the overall impressions as interpreted using the Foucaultian episteme change lens with data not being gathered in a longitudinal but rather at one or two points in time.

The sample groups for the 2014/5 surveys was again selected in a purposive way: (1) Chinese accounting academics who were members of the Chinese committee of the Centre for Social and Environmental Accounting Research (CSEAR) that is based at St Andrew's University in the UK; (2) Chinese accountants in a variety of positions in China and overseas based on the researcher's professional network; and, (3) Chinese accounting students at De Montfort University and the University of Sheffield (both in the UK and Singapore). All the sampled individuals were likely to help in the answering of the research questions and to that extent were selected purposively.

3.3.2.2 Textual data

This part of the research is essential in a Foucaultian-based study as so much of Foucault's own work was based around texts (Foucault, 1972, Foucault, 2002).The texts in this research are: academic papers both in Chinese and English; press coverage in China (English language based); NGO websites and internet communications (in English); and, a local government publication. The analysis looks in particular for texts that support the view that China has particular characteristics that make it possible for episteme change to take place.

3.3.2.3 Interviews (25)

In the early stages of this research the focus was particularly on environmental sustainability management (and its accounting and reporting) in Chinese organisations. Twenty-five interviews were carried out in Shenyang, Shanghai and Zhejiang Province in 2010 and 2011. The interviews were of a semi-structured type with a schedule of questions but allowance made for digressions and interesting leads to be followed (see Appendix 1 for schedule of questions). In several of the interviews the researcher had to change the line of questions where a stakeholder interviewee did not fit the interview schedule and the interview became a largely unstructured one around themes linked to the research.

The interviewees were mainly with accountants (20) but also included some managers (3) and also two representatives from the local environmental protection agencies (part of the Ministry of Environmental Protection (MEP)). The organizations represented ranged in size from major quoted companies through

to an accountant in practice as a sole practitioner (for table showing details of interviewees and their organizations see appendix 2).

Before the live interviews, pilot interviews (three in number) were carried out using Chinese colleagues at De Montfort University in small focus groups so that the questions could be adapted to make them more understandable and easier for the interpreter to translate into Chinese Mandarin. Further to this the interview schedule was translated into Chinese by one of the interpreters and where possible a copy of the translated instrument was sent to interviewees prior to the date of the interview.

The interviews were carried out where possible in English, but in several cases this was not possible and an interpreter was used (a Chinese accounting academic who was sympathetic to the aims of the research). Interviews were recorded where possible but, as many of the interviews were carried out away from the workplace in cafes and restaurants, it was always not possible to record them and the researcher had to content himself with notes taken during the interview and written up in detail after the event. In all cases the interview transcript was checked by the interpreter for accuracy. In several cases the interviewees brought with them corporate literature and other information that was useful in the research and this has been incorporated into the findings.

The interviews sought to find out about developing environmental sustainability accounting initiatives, the accountants' role and the influences on these initiatives. Based on the literature review that revealed a considerable literature which argued that traditional Chinese philosophy and religion is influential in modern China (see for example: Bell, 2008, Yue, 2011, Yu, 2009) accountants were questioned on their personal philosophies on the environment and sustainability and whether these philosophies were influential in environmental sustainability accounting initiatives. As discussed in the literature review there are many parallels between ancient Chinese philosophy and Primal epistemic thinking mooted by Birkin and Polesie (2012) and the notion of "Ecological Civilization" promulgated in recent years by the Chinese Communist government (BritishChamber, 2011, Tu, 2013). The supposition is that if evidence can be found of the modern day influence of ancient Chinese philosophy that this would indicate that there is the possibility of the new metaphysics (or reinterpretation of an older metaphysics) which would provide evidence of an emerging episteme in a Chinese setting – manifesting itself in developments in accountability for sustainability.

Bryman and Bell (2011) discussed generalization in qualitative research involving semi-structured interviews such as in this research. They argued (ibid) that where the people who are interviewed are not meant to be representative of a population and indeed, in some cases, like accountants and managers, it may be more or less impossible to enumerate the population in any precise manner. Instead, the findings of qualitative research are to generalize to theory rather than to populations (ibid). Hence it is the quality of the theoretical inferences that are made out of qualitative data that is crucial to the assessment of generalization (ibid). It is considered that this research is of this type where the generalizing is to the Foucaultian theoretical model of episteme change.

3.3.2.4 Case studies (interviews, observation and documentary evidence)

How the case studies were chosen is discussed in section 3.3.2.1 on sampling. In the three cases the interviews led on to more evidence being gathered about the particular organizations. These types of evidence are outlined in Table 1 below. This additional evidence enabled cases to be developed. The three cases are summarized below:

Case study 1 – Mining safety company - Shenyang

The case study is of a Chinese company (a state-owned SME with a turnover in 2010 of around RMB500 million (approximately 10RMB to £1) and 1,200 employees, based in Liaoning Province in North West China).

Case study 2 – Dairy company – multiple sites with Head Office in Shanghai

At the first visit in 2010 this company had a turnover of 10 billion RMB and 20,000 employees across 20 factory sites across China. The situation was broadly the same at the second visit in 2011. It is quoted on the Shanghai Stock Exchange.

Case study 3 – Steel company multiple sites with Head Office in Shanghai

In 2011 when this visit took place the company had 130,000 employees and annual turnover of $30-40 billion. Production was 30-40 million tonnes of steel. The company was included in the Fortune 500 World's most admired companies. It is also quoted on the Shanghai Stock Exchange.

Using Yin's (1999) sources of evidence the following sources were obtained for the three mini-cases:

Table 1 Sources of evidence for mini-cases

Sources	Dairy company	Steel Company	Mining safety Co
Documentation	Annual Reports. Press reports.	Annual reports. CSR reports from 2008-2013.	None
Archival records	None	None	None
Interviews	Two	One (two persons)	Four
Direct observations	Nothing significant although did visit the company's head office	None	Tree planting around the factory. Posters in the foyer. Lighting and aircon policies in action
Participant observation	None	None	None
Physical artefacts	None	None	None

Hence they are titled mini-cases because the researcher did not have the detailed access to sites, personnel and documentation that a full-blown case should have. However, they provide a medium for identifying

insights that – together with the other sources of evidence – will help to answer the main and supplementary research questions.

Commenting on the use of case study method Piekkari et al. (2009) argued that Yin (1984) and Eisenhardt (1989) tended to take a positivist stance as opposed to alternative, interpretivist approaches. Positivistic approaches, they argued, have the goal of extracting variables from their context in order to generate generalizable propositions and build theory (ibid). Whereas with what they termed alternative approaches, the aim is to produce rich, holistic, and particularized explanations that are located in a situational context using multiple methods of data collection to uncover conflicting meanings and interpretations. Their alternative approaches fit closely to the interpretivist approach of this research.

Ideally, case study research is based on a detailed and intensive analysis of a single case (Bryman and Bell, 2011). In this research this was not possible due to Chinese cultural issues. On only one occasion did the researcher have more than one visit (the dairy company) and in the other two cases (the Steel company and the mining safety equipment company) one visit was accompanied by other data as noted in Table 1.

Stake (1995) distinguished between three types of case study research: (1) intrinsic cases undertaken to gain insights into the peculiarities of a situation i.e. not generic; (2) instrumental cases using a case to understand a broader issue or allowing generalisations to be challenged; and, (3) multiple or collective cases to explore a general phenomenon. He further noted that the goal of case study analysis should be to concentrate on the uniqueness of the case and to develop a deep understanding of its complexity, avoiding pretending external validity or generalizability (ibid).

Yin (2009) put forward five types of case: (1) the critical case – based on a hypothesis so as to better understand the circumstances in which the hypothesis will or will not hold; (2) the unique case – or extreme case; (3) the revelatory case – with qualitative case study research using an inductive approach - then single cases are broadly revelatory; (4) the representative or typical case - this has been argued against above and is not the type in this research; (5) the longitudinal case – which analyses a process of change over several periods. He further suggested that case studies fulfil two purposes – instrumental and expressive - instrumental in the sense that they aim to help to develop general principles and expressive in the sense that they highlight the unique features of a particular company which may or may not be generalizable (Yin, 2009).

It is the instrumental and expressive typologies that are most useful in this research. These case studies are instrumental in that they are used to explore general notions of episteme change and the emerging ecological civilization in China. They are also expressive in that they are each very different – with different data sources and possibly different motivations for their positions in terms of an ecological civilization.

3.3.2.5 Survey(s) (100+ responses)

The use of survey method has been discussed in Section 3.3.2 on the subjectivist epistemology used in this research. The survey data collection has been carried out using three surveys to:

(1)   database of Chinese academics with an interest in social and environmental accounting (SEA) (sample size 57 responses 13)

(2)   personal database on the business networking site LinkedIn made up of 47 Chinese accountants who are known to the researcher (responses 10).

(3)   sample of Chinese undergraduate accounting and finance students at De Montfort University, Leicester and the University of Sheffield (sample size 171 responses 81).

Using a survey administered by Surveymonkey (with slight differences according to which group surveyed (see Appendix 5 for questions in the three surveys). The questions were taken from the literature review and from generally accepted current thinking. The surveys asked questions of two types – informational and attitudinal. An example of an informational question is to the student group where a question sought to find out whether ethics and philosophy had been studied by the respondents. An example of an attitudinal question is to all three groups and asks for the respondents' attitudes towards the natural environment using several statements and the respondent scoring each statement using a five point Likert scale.

The informational questions varied between the three groups of respondents and so are dealt with by group. The main purpose of the questions was to find out whether environmental and sustainability issues (and accounting for these issues) were being addressed by each group and the organizations that they work for or study in and the extent of the individuals' involvement in their organizations' initiatives. In terms of the archaeological method the answers to these questions can be added to the findings from the interviews and mini-case studies and help to see where the individuals/organizations are currently in terms of environmental and sustainability issues (concentrating on environmental sustainability as already addressed in the literature review).

The attitudinal questions derive from three sources:

1. From China the notion of a new ecological civilization that requires that humans live in harmony with the (natural) environment, because the environment is the foundation of very existence (Ma, 2007). It has been argued in the literature review that Chinese government ideas of ecological civilization are informed by modern interpretations of ancient religions and philosophies: Buddhism – aspiring to oneness with the natural environment (Sponsel and Natadecha-Sponsel, 2003); Daoism – ideas of the harmony between heaven, earth and humans (Miller, 2003); Confucianism – human flourishing can only take place within the larger matrix of Nature (Berthrong, 2003).

74

2. From Birkin and Polesie (2011) the notion of episteme change taking place now with a new metaphysics (with strong connections to Chinese philosophical traditions based around a life-centred morality (with Nature seen as active and self-regulating)). Their ideas and suggested new "primal" episteme have been fully discussed in the literature review and methodology chapters and the links to ecological civilization explained and compared.

3. Generally accepted opinions about the environment from the popular press and literature on environment and sustainability as discussed in the literature review.

Bryman and Bell (2011) discussed survey-based research and made several important points:

(1) Surveys are normally cross-sectional in design in that they are carried out at a particular point in time (ibid). In this research the surveys were administered over a three month period from December 2014 to February 2015. This was to allow for follow up twice after the initial invitation to complete the survey.

(2) Data is normally based on structured research instruments (ibid). In this case the surveys were structured and only allowed respondents to add their own answers when none of the choices offered were appropriate. The most important questions were attitudinal and based on a Lickert 5 point scale.

(3) Surveys normally look at several variables (ibid). In this case, rather than variables the researcher is looking for contingencies and actors. It may be possible to suggest substantive relationships between contingencies and actors but it is not possible to test statistically significant associations or causality.

(4) When carrying out a survey the researcher must consider *reliability, replicability and validity*: *Reliability* is about the quality of the measures made (ibid). In this research attitudes are measured using a Lickert five point scale – Strongly Agree, Agree, Neither Agree nor Disagree, Disagree and Strongly Disagree – in answering questions as to the value or significance (in the non-statistical sense) of a particular philosophy or statement. Lickert five point scales are an established method of asking closed questions although seven point scales have been used (ibid). In this research strongly agree is given a score 1 and agree 2 so that percentage of respondents scoring 1 or 2 can show all those who agree with a particular statement for example.

Replicability issues are about whether another researcher could replicate the study using the methods as outlined by the researcher and are judged by how well the researcher spells out procedures for (ibid):

- selecting respondents: in this research this has been done using purposive sampling.
- designing measures of concepts: the derivation of the questions in this research has been discussed earlier in this section.
- administration of research instruments: Survey Monkey is generally available for surveys of the type in this research and the email message asking the sampled individuals to complete the survey and the follow ups were tested on a pilot group of Chinese accounting academics and the supervisors with changes being made as recommended.

- analysis of data: the analysis using thematic analysis around Foucault's theory of episteme change – looking for evidence of the loss of viability of the modern episteme and the possibility of episteme change to ecological civilization as outlined in Section 3.3.1.

Validity for the purposes of this research refers to measurement validity – whether or not an indicator that is devised to gauge a concept really measures that concept (ibid). In this research the most contestable questions measure the respondents' attitudes towards sustainability and the natural environment and in particular the statements derived from philosophical literature. To ensure validity the statements are reproduced exactly from key references in the Buddhism, Daoism and Confucianism literature.

Other types of validity are not so relevant in this research (ibid):

internal validity concerned with causality - this research makes no such claims;

external validity is concerned with generalizability of the findings beyond the specific research context - in this research it is not even possible to generalize to the populations sampled, for example the population of Chinese accountants is so big (Chinese CPA alone has 300,000 members) that the research can never claim generalizability; and,

ecological validity about whether the findings are applicable to people's everyday natural social settings – in this research surveys cannot be guaranteed to capture reality in the way that observation for example can do.

(5) Structure of the design – each person becomes a case with observations made about the case and displayed in a grid or matrix with each cell containing data.

To reiterate, inferences should not be made beyond the population from which the sample was selected (Bryman and Bell, 2011p163). In no way could the study make claims of being representative of a greater population beyond the samples selected (members of China CSEAR; Chinese contacts of the researcher working as accountants; and, accounting and finance undergraduate students from University of Sheffield and De Montfort University). Although statistical analysis using descriptive statistics is carried out it is only possible to make inferences based on the responses and to support analysis of themes from other sources such as interviews and mini-case studies.

Another important point to be made about "China" is that it is made up of at least two very distinct populations – (1) those living in the countryside with low levels of education and still living a more traditional lifestyle based around agriculture; and, (2) those living in the cities[16] with more access to education, higher disposable incomes and access to the trappings of a consumer-based lifestyle Then of course the city dwellers are very varied – ranging from migrant workers from the countryside to the

---

[16] China demographics 2013 showed urban population making up 53.17% of the total population IndexMundi. (2015). Chinese urban population 2013. *Index Mundi* [Online]. Available: www.indexmundi.com/facts/china/urban-population [Accessed 20 August 2015].

educated middle and upper classes (by income). In this research the participants come almost exclusively from the city dweller group and within that the educated middle-class group. Hence the findings – although interesting – will never be able to claim generalizability across China.

3.4 Methods of analysis

The analysis is based around the research questions. Each question is answered based on the evidence of contingencies in place and considering the network at play. All the four sources of evidence are examined in the light of each question as appropriate and also to the Foucaultian notion of episteme change – viability of the old episteme and the possibility of a new episteme.

3.5. Overall summary of the methodology, theoretical basis and methods used

This research looks at change and uses an interpretivist research philosophy – the key to which is that it does not seek universal truths or causality between variables and allows multiple perspectives on reality. This ties in closely with the relativist ontology which seeks to improve understanding of reality but again does not attempt to find truths. The subjectivist epistemology attempts to understand what people think – again allowing for multiple realities. The key justification is that the world is complex and that these methodological approaches allow the researcher to gain understanding of this complexity.

The theoretical basis for the research is the Foucaultian theory of episteme change as it allows the researcher to identify the likelihood of change taking place in a particular culture and then consider the implications of change for accountability practice. Leading on from this theoretical basis is the Foucaultian archaeological method employed. This is operationalized by attempting to gather data so as to establish the likelihood of episteme change in China to ecological civilization. This likelihood is based on questions of viability of the modern episteme and evidence of change to an emerging episteme.

Data is gathered using mixed methods: (1) analysis of textual sources which seeks meanings from a range of different sources; (2) interviews in China with accountants and managers to establish existing sustainability accountability practice and the motivations for this practice and the philosophies of the interviewees; (3) mini-case studies so as to develop interviews with additional evidence from for example documents and observation; and (4) surveys of Chinese: accountants, accounting academics and accounting students; so as to establish practice, philosophies and attitudes towards issues linked to the environment and ecological civilization. A common theme of the analysis is to use the data to help answer the questions of viability and provide evidence for change.

3.6 Discussion of ethical issues

The key issues have been: anonymity; data storage confidentiality; participants' understanding the nature of the research; and, participants' voluntary consent to being involved (Denscombe, 2007). Each is briefly discussed in terms of this research:

Anonymity – with the interviews, cases and surveys the names of the individuals and organizations have not been recorded with interviews and cases numbered and surveys administered by SurveyMonkey never capturing the names of the respondents;

Data storage confidentiality – data has not been shared with any other party and has always been kept in locked rooms and/or cabinets with access only by the researcher;

Participants' understanding the nature of the research – all participants were fully briefed as to the nature of the research either verbally (interviews and cases) or in writing by email request (surveys);

Participants' voluntary consent – all participants were fully aware of their involvement with no data obtained using third parties.

3.7 Summary

This chapter has explained and justified the methodological framework for the research. It started with a general discussion of the research philosophy (interpretivism) and the ontological (relativist) and epistemological (transactional or subjectivist) stances that support the philosophy. It also explained and justified why the chosen research philosophy is most appropriate in seeking answers to the research questions. Next it justified the chosen theory – Foucaltian episteme change - to help explain epistemological change and the methodological implications of this. Then it outlined and justified the mixed methods in use in this study – textual analysis, interviews, mini-case studies and surveys – and explained how the data generated is to be analysed using Foucaultian archaeological method based around episteme change and the notion that such change is more likely in certain social groups or cultures (in this case broadly China and therefore its accountants).

4. Findings and Analysis

This research is based on findings and analysis of data from four sources:

1. Textual sources providing evidence of linkages to the research questions.

2. Interviews carried out in China in 2010 and 2011 with 25 accountants and managers.

3. Case studies (3) developed from the interviewee organizations where additional data was gathered. Case study data includes observation where possible, in addition to interviews and documentary evidence.

4. Surveys administered online to three groups: Chinese social and environmental accounting academics (13 responses); Chinese managers and accountants (10 responses); and, Chinese accounting students studying for British qualifications at two UK universities (81 responses).

The findings from the four sources are summarised with initial analysis of the particular source. The data is analysed using qualitative thematic analysis and using (non-statistically significant) quantitative measures. The analysis uses Foucaultian archaeological method in that it seeks evidence that in Chinese society (including amongst accountants) the existing modes of thinking are changing and that a new episteme is emerging around a new ordering of knowledge based on the notion of ecological civilization. To this end evidence is sought that there are particular features of the Chinese situation that make a change to a new episteme possible.

This is followed in Chapter 5 by an integrated discussion around the research questions and in Chapter 6 the overall conclusions around the research aim.

4.1 Data source 1: Textual sources findings and analysis

Much of Foucault's work was based on textual analysis of documentary evidence (Fairclough, 2003). As this thesis is using Foucault's archaeological method, textual sources are central to the analysis. This section of findings is organized as follows: (1) academic papers and books; (2) newspapers; (3) digital sources; and (4) a local government publication.

4.1.1 Academic papers and books

In the literature review common themes emerged from ideas such as: Tian Xia (harmony of all under heaven); Confucian (and other ancient and modern philosophies) notions of harmony and reciprocity; current thinking on ecological civilization; and, from Birkin and Polesie (2012) ideas about the emerging "primal" episteme. This section takes the literature review forward by seeking these common themes around environmental sustainability and the way that these themes have developed in China (via government plans and other influences) over the last ten years.

4.1.2 Newspapers

Foucault described his archaeological method as being made up of a search for "fragments, outlines, pieces, shards" (Foucault, 1972). In this thesis the data comes from many sources over a six year period since the commencement of formal studies. In the case of newspapers the data is from a visit to China in April 2010 for two weeks, when the English language newspapers, China Daily and Global Times, were obtained and articles with an environmental and/or sustainability interest extracted. The titles of the articles were: Poor effort to curb desertification – *Excessive mining fuelling sandstorms – desertification blamed on excessive mining. Chimney Down – An abandoned chimney at a local brick kiln gets demolished in Hefei, Anhui Province yesterday. Villagers dry but soaking in frustration. China cracks down on heavy metal pollution. More help to battle desertification urged. Flour investigation underway in Jiangsu Province. Foxconm rocked by latest suicide attempt. Thousands of dead fish found in contaminated reservoir. Coal dust fire kills one; two missing. We must practise what we preach. Green NGO drives change at grass roots. Blazing new technology trails – Promoting self-innovation is key for sustainable development. Reflecting on Earth Day for the nation. Closer ties on renewable energy technology beneficial: Danish PM. Leaders of China and Denmark witnessed the signing of an agreement on a new Sino-Danish Center for Research and Education (expected to become operational by 2013). Climate envoys agree to disagree, hold further talks ahead of Cancun. China surpasses Germany's wind power. Electric cars to get a lift up from new policy measures. Asia should stay on green path. Sustainability makes business sense. Media has a social responsibility in guiding the public to live environmentally friendly lives. China not to blame for drought along Mekong: Thailand. Nation bets it all on green – developing a low-carbon model, promoting environmentally safe lifestyles will open up economic opportunities. Crops 'doomed' as fields go thirsty. Face-saving green schemes won't stop new dust bowls* (see Appendix 3 for summaries and full references).

This selection of articles only represent a snapshot of two publications over a short period in 2010. They are in no way seen as representative of Chinese views on sustainability. However, they represent a noteworthy contribution to the evidence in this thesis when the textual sources are analysed.

4.1.3 Digital sources

It has been estimated that there are in excess of 5,000 environmental NGOs in China (Gao, 2013). There are also networks of environmental NGOs and internet-based environmental publications. In this section examples of: the NGOs (2); networks (1); and, publications (1) are reviewed in terms of their visions or objectives. No claims can be made about representativeness to the population but representativeness to the theory (in this case Foucault's theory of episteme change) is possible.

4.1.3.1 Chinese environmental NGOs

Friends of Nature is the oldest environmental NGO in China, established in 1993 (FON, 2015). It is officially sanctioned by the State Ministry of Civil Affairs. It sees its greatest achievement in helping to

foster a growing network of grassroots environmental NGOs throughout China (ibid). Through participation of all citizens that, it argues, China can finally achieve the dream of a society in harmony with nature (ibid).

The Global Environmental Institute was established in 2004 (GEIchina, 2015). Its official status is not clear from its website. Its vision is "a diverse and healthy world shaped and shared by all, in which economic well-being is directly linked to ecological and social well-being, industry is accountable and clean, and rural communities flourish at the local level (ibid)."

4.1.3.2 NGO environmental networks

The network selected is the China Civil Climate Action Network (c-can, 2015). Its membership is thirteen environmental NGOs including Friends of Nature (ibid). Its objectives are to strengthen the knowledge base and capacity of NGOs to work on climate change science, policy and public involvement; to participate in international NGO discussion forums on climate change topics; to improve the understanding of policy processes and participation in decision making; and, to improve the capacity of NGOs for joint cooperation (ibid).

4.1.3.3 Environmental publications

The organization chosen as an example is China Dialogue – based in China and London (chinadialogue, 2015). It aims to promote common understanding about environmental challenges through the publication of high quality, bilingual information, direct dialogue and the search for solutions (ibid). It states that the rise of China gives these challenges a new urgency. It has four funding partners in China, Asia and the West who provide the funds for its activities.

4.1.4 Local government publication

At the interview with the local government director of finance in 2010 he provided a copy of the 2008 Official Report of the Environmental Circumstances of Liaoning Province (LiaoningEPB, 2008). This was produced in colour, in Chinese over 24 A4 pages. The document has been substantially translated into English. Some observations about this document are noted below:

Inside the front cover is a modern photograph of the Liao River flowing past sheer cliffs with trees and lush vegetation (reproduced in Figure 3 below). The photo is very reminiscent of the sort of romanticized landscape paintings that have been found going back to 10th century CE (see Figure 4 below):

Figure 3 Landscape photograph in Liaoning Province (LiaoningEPB, 2008)
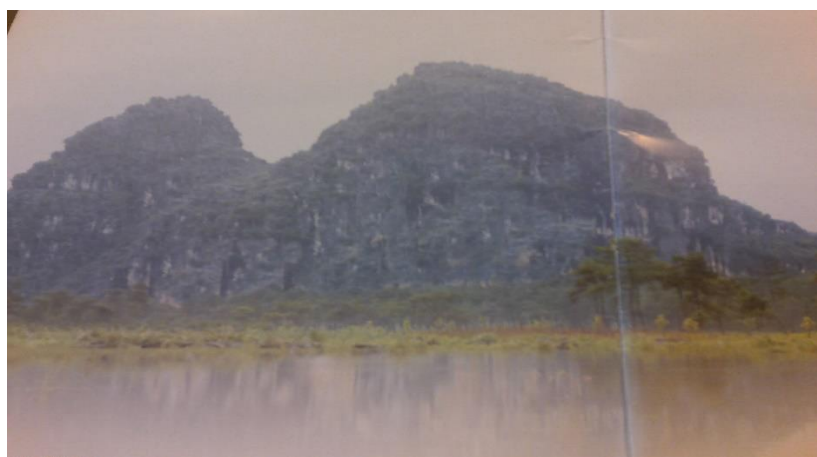
Figure 4 Landscape painting in ancient style (CNArtGallery, 2013)

The appreciation of natural beauty and love of the countryside are highlighted in these landscapes.

The report contained narrative and quantitative information (graphs and tables) covering for example: the overall environmental quality; condition of air in urban environment; acid rain frequency; quality of drinking water sources; pollution levels in rivers; offshore and beaches' water quality; ecological conditions; measures in place and action taken by the EPB to control and prevent pollution; and, management of solid waste. Data was provided for a four or five year period on many of the areas covered.

Details were also provided on: number of law enforcement officers (66,988); number of companies inspected (22,780); companies closed down (258); companies where operations suspended (760); and, fines collected of RMB 55.27 million.

An overall principle was outlined: "to accelerate the protection and control of the Liao River region and intensify the improvement of emissions control, based on the scientific concept of development and taking the construction of an ecological province as the aim (LiaoningEPB, 2008)."

4.1.5 Analysis of Textual sources

In terms of Foucault's analysis of episteme change, in a Chinese setting, answers to several of the questions on viability of the modern episteme and themes indicating the possibility of episteme change can be seen

from the various references in the literature review and also from the newspaper cuttings and other sources.

4.1.5.1 The viability of the modern episteme

There is an acceptance of the need for change from the status quo – high levels of pollution; resource depletion; inequality in society; economism with its associated evils of corruption and financial malpractice (Economy, 2010). The Modern episteme can be seen as fundamentally flawed in its creation of unsatisfactory relations between humans and the planet and its other species (Tu, 1998). This need for change has been acknowledged by a minority in the West since Rachel Carson (1962) pointed out the dangers of crop spraying with DDT chemical insecticides. It has been continued in the West by a stream of ecologists and environmentalists and politicians (Goldsmith, 1972, UNWCED, 1987 , Dobson, 1991). But the radical changes they advocated have not taken place and it is argued that humans are leading the planet and all the species of flora and fauna to catastrophe (Ahmed, 2014, WBCSD, 2010).

In China calls for change can be evidenced by the rapid growth in the number of environmental NGOs with the first established in 1993 (FON, 2015) to over 5,000 by 2013 (Gao, 2013). Also the newspaper cuttings review in April 2010 (Appendix 3) provided many examples of problems and environmental initiatives by government, companies and NGOs in China, for example: calls for more local government investment to curb desertification; government demolition of potentially polluting structures; government measures not being applied in practice; crackdown on heavy metal pollution; green NGO driving change at grass roots; calls for incentives for new technology; calls for a major investment of GDP in order to clean up air, water, soil; moves to develop international partners by government in areas such as renewable energy; huge development of wind-power; the need for companies to take the initiative in green technology; sustainability – the business case; and, the move towards a green, low carbon economic model via developments in science.

In the literature Tu (1998) has argued for Confucian values to replace the rampant self-interest of the modern era via a return to ideas of harmony between humans, the earth and heaven. Daoist philosophy acknowledges the importance of a balance between yin and yang and hence the idea of harmony similar to that in Confucian teachings (Palmer and Finlay, 2013). Buddhist thinkers have rejected the modern hierarchical dominance of humans over nature and emphasised the need for a transformation of values and lifestyles if the ecological crisis is to be overcome (Swearer, 1998). Pan (2011) has argued that with Tian-xia thinking that fuses the three ancient philosophies the concept of the harmonious unity of man and Nature is central.

There is evidence from the textual sources that there have been viability problems in China that would fit with the viability questions discussed in the literature review and the methods chapter. There is also evidence that an emerging ecological civilization will overcome these viability problems. In particular: (1) right and proper conduct – a morality based around harmony and reciprocity with a deep-seated reverence

of nature going back thousands of years; (2) specialization – a move away from the modern dominance of economics towards a wider appreciation of the need for all disciplines to work together in harmony to solve sustainability problems; and, (3) antropologization – moves away from thinking that humans are seen to be in control of the planet and its species towards an anthropocosmic world view where humans are part of a greater cosmos or universe (Tu, 2001) and so more holistic solutions are forthcoming.

4.1.5.2 The possibility of episteme change

The textual sources support the notion of China having special characteristics that make the possibility of episteme change more likely:

(1) the emergence of a new metaphysics based on a life-centred morality - around modern interpretations of ancient philosophy in the literature, with a strong emphasis on harmony between humans and nature (Pan, 2011, Miller, 2003, Sponsel and Natadecha-Sponsel, 2003).

(2) invention linked to new science - the notion of scientific development is central to CCP ideas of ecological civilization and includes the embracing of new technologies and the move to a low carbon society with China at the centre of invention and new science as evidenced in the literature (Chan, 2014);

(3) the disappearance of specialization; and, (4) a more integrated view of the universe - the way in which China and its government have encouraged a holistic, whole society moves towards change – with a cross-disciplinary approach - as opposed to the economics-based, over-specialized approaches of the Modern episteme (Ma, 2007). At local level this is evidenced in the report by Liaoning EPB (2008) that has been outlined above with the ideas of a scientific concept development and the construction of an ecological province demonstrating the fusing of many disciplines and a whole society initiative to preserve nature.

4.2 Data source 2: Interview findings and analysis

Twenty-five interviews were carried out in China in April 2010 and April 2011. Methodological issues around these interviews and the rationale for the interviewees' selection have been discussed in the methods chapter 3. In this section the findings from the interviews will be outlined and then in a later section the findings are incorporated into the analysis.

The interviews can be grouped as follows (all interviewees based in China):

1. Interviews with accountants in companies (18)
2. Interviews with managers in companies (3)
3. Interviews with officials of local Ministry of Environmental Protection offices (2)
4. Interview with local government finance officer (1)
5. Interview with senior representative of Chinese CICPA organization (1)

4.2.1   Interviews with Chinese accountants and managers

The findings from the interviews are split into five areas: (1) environmental accounting in the interviewees' organisations; (2) organisations' environmental policies and underlying philosophy; (3) accountants' personal philosophical ideas about environmental matters; (4) reporting on environmental sustainability; and, other influences on environmental sustainability accounting.

4.2.1.1 Environmental accounting in the interviewees' organisations

A common feature of environmental accounting in most of the organisations was the accounting to the government – in China represented by the Provincial or State Environmental Protection Agency (SEPA now Ministry of Environmental Protection (MEP)) – a report being be made annually on environmental aspects and impacts and the relevant levy paid to the government. In the case of the animal feedstuff manufacturer the annual levy or taxation was in the region of 100,000RMB (approximately £10,000) for a small part of the business involved with pigs. The electronics company paid fees of 130,000RMB in 2010 and 110,000RMB in 2009. None of the respondents were prepared to show the researcher a copy of any submissions to MEP.

A number of other environmental accounting activities were described by the interviewees:

- information on costs involved with waste water treatment;
- measurement of pollution related costs of new factories in business planning;
- identification of costs of equipment recycling;
- estimates of remediation costs associated with incineration plants with associated liabilities;
- accounting and reporting on bottle recycling projects (see case study 2 at Section 4.3.2);
- measurement of energy reduction initiatives and the reporting thereon based on tonnes of coal saved per annum;
- detailed data generated on energy usage and pollutants;
- accounting for planned introduction of thermal pumping and associated reduction in coal burned annually;
- costing of tree planting programmes;
- costing of energy saving and emissions treatment programmes;
- costing of dust control measures;
- measuring carbon dioxide emissions of the company for a year in terms of how many second's worth of the emissions by all the earth's human activity in a year it represents;
- life cycle assessment project and reporting by a major steel producer together with full reporting on environmental measures (see case study 3 at Section 4.3.3).

In most interviews the accountant interviewed could identify environmental accounting activities in addition to the reporting around the MEP levy. In two interviews - at the dairy company and the steel

producer - public reporting of the environmental accounting information did take place in newspaper reports and CSR reports - with minimal quantitative information disclosed (see case studies at Section 4.3).

The accountants were asked about their role in relation to environmental accounting and whether they saw themselves as being champions in the environmental accounting carried out by the company. 56% (9 out of 16) replied that they were involved in the EA but only 38% (6 out of 16) considered that they were champions. Another way of looking at this is to say that 67% of those accountants with an involvement with environmental accounting also considered themselves to be a champion for EA.

4.2.1.2 Organisations' environmental policies and underlying philosophy

Most of the organisations had policies to reduce pollution and emissions; also to minimise energy use. One company's clear policy was formulated into four words: "respect, responsibility, reduce and recycle". A recurrent theme was that the policy reflected what government required and did no more. Government was seen as the arbiter of environmental standards and the companies followed these standards. In terms of an underlying philosophy, interviewees made statements such as: "outside, inside, whole society, sustainable development of China"; "seeking to maximise social benefit from our activities"; "follow legal requirements and do good for society"; "maintain harmony and unity with the natural ecological system". One interviewee said that his organisation was motivated by the market and followed the practices of competitors and responded to the demands of customers (this equated closer to institutional theory and mimetic isomorphic activities (Larrinaga-Gonzalez, 2007)). None of the companies' policies were overtly identified as having links to ancient Chinese philosophies but notions of harmony and holistic ideas did resonate with ancient philosophy. At the same time the fact that the organizations followed government requirements would suggest that communist philosophical influences were apparent in most of the organizations.

4.2.1.3 Accountants' personal philosophical ideas about environmental matters

If the organisations' philosophies could be equated with communist philosophy and touched on ancient philosophy, it was interesting to see whether there were parallels in the philosophies of the accountants interviewed and the extent to which their personal philosophies appeared to be influential in the organisations' policies and environmental accounting activities.

Personal philosophies were for example: "a strong desire to keep the earth beautiful"; "if you want to do things – do good deeds"; "the environment is important to everybody and needs protecting"; "human beings should live harmoniously with Nature"; "Nature will punish mankind if yin and yang are not kept in harmony"; "we must preserve the environment for our children"; "Nature must be respected"; "I would stress the harmony between humans and Nature from ancient times"; "Confucian notions of harmony so that workers work in a safe and green environment"; "Save water, save electricity – do something useful for society – love China"; "Do our best to save energy, lessen CO2 emissions, avoid pollution – don't

waste anything, save as much as possible"; "It is very important that everyone protects the environment"; "We should all minimise our effect on the environment". There are strong parallels in these statements with modern interpretations of ancient philosophy and also of the recent CCP policy move towards ecological civilization.

Only three of the interviewees could be drawn into identifying one of the ancient philosophies (one Buddhism and two Daoism). Another of the interviewees mentioned the influence of Feng Shui that he had learned from his father, particularly in terms of humans' position on the Earth. When asked, almost all the interviewees acknowledged ancient roots to their philosophies but they were not able to identify the roots in any particular philosophy. It can be concluded that all the accountants exhibited personal philosophical values on environmental matters and that these were almost all subliminally rooted in modern interpretations of ancient Chinese philosophy in the sense that they could not be directly linked to particular philosophies.

4.2.1.4 Reporting on environmental sustainability

Three of the fifteen companies from which the interviewees were drawn carried out reporting on environmental sustainability:

1. Dairy company (see case study 2 at Section 4.3.2) – via national newspaper and staff communications. The interviewee was very interested to know how the company could be more proactive in this area. In this case legitimacy theory (Deegan, 2002) seemed to come into play as a way of explaining the proactive behaviour of this company in a sensitive industry which had recently been beset by scandals. The company appeared to seek to legitimise its activities through environmental reporting based on environmental accounting data.

2. Opto-electronics company – via website. This interviewee made it clear that their international customers demanded that they had an ISO14001 system in place. The website did no more than outline the environmental policy of the company.

3. Steel company – via CSR reports from 2008 to 2013 (see case study 3 at Section 4.3.3 and Appendix 4). The company appeared to be anxious to be seen as one of the major companies in the world (450th in the Fortune 500). So institutional forces could be used to explain the reporting in both Chinese and English across the whole range of sustainability matters. The key institutional force being mimetic isomorphism whereby the company copies its peers internationally (Larrinaga-Gonzalez, 2007).

4.2.1.5 Other influences on environmental sustainability accounting

Government

This has already been discussed in terms of environmental reporting – that is the accounting for and reporting on environmental impacts to MEP at provincial level. This was mentioned by all the

interviewees to some extent. In particular one interviewee said that the policy on environmental matters was shaped by the requirements of MEP. Another interesting feature of government is the apparent benevolent nature of government in China – this is strongly influenced by and derives from Confucian thinking (Dao, 1996).

Another strand of government influence is the Ministry of Finance (MOF). One interviewee said that at present there are no MOF accounting standards on the accounting for and reporting on environmental impacts. The implication was that if the MOF standardised this area then companies would be forced to follow the standards.

Although it was clear from the interviews that reporting to government was an important part of the environmental management systems of the interviewee organizations, it was not possible to obtain copies of any reports of this type. For this reason textual analysis of the reports was not possible.

Sector scandals

The dairy company interviewee referred particularly to the recent scandals in China - mainly around the poisoning of babies drinking factory produced dried baby milk. He was at pains to assure me that his company was not involved in these scandals and that the company went to enormous lengths to ensure that its products were clean and healthy, without pollutants.

Markets

Several of the interviewees stressed that companies in general were profit seeking and that it was the role of the State to ensure compliance with environmental regulations rather than voluntary compliance by companies. This suggests that the market is a not a strong driver towards environmental accounting and its reporting. However one interviewee stressed the business case for, for example, energy use reduction and control over pollutants. Customers produced standards for the company that it had to follow if it wanted to remain an approved ISO14001 supplier. This interviewee described this as the company being a market follower.

Western parent companies' values

Two of the organisations involved in this study were Chinese foreign owned enterprises. One of these interviewees stressed that: "the mother company has a strong philosophy on environmental matters so that a no pollution policy is written into our Articles of Association". The other interviewee stated that the US company culture was a driver for her thinking and that of the behaviour of the Chinese enterprise on environmental matters. This suggests that organisations with strong ownership links to Western parents may be more environmentally aware and have policies that reflect Western values.

4.2.2 Interviews with officials of local MEP offices

Two interviews were carried out at different local offices of the MEP. The interviews were unstructured with the researcher seeking to establish the systems in place and the penalties for non-compliance by companies.

The system for compliance and sanctions for non-compliance was outlined: All companies had to pay fees based on the levels of routine pollution as reported by the company and checked by local MEP office during random, unannounced checks. These fees were paid to the Department of Finance of the provincial government (so not sent directly to MEP). Non-compliant companies were identified by MEP local inspectors and seen as operating illegally. Sanctions ranged from closure (258 such companies in 2008 in Liaoning Province); temporary stoppage of production whilst performance is improved (760 such companies in 2008 in Liaoning Province); and, fines (55.27 million RMB in 2008 in Liaoning Province).

This system has been outlined in the literature by Economy (2010) with the top of the pyramid in China now being occupied by the Ministry of Environmental Protection (since 2008) and underneath at local level Environmental Protection Bureaux (EPB). Companies are required to pay a fee to the local government based on a self-declaration of discharges of pollutants each year. These declarations are audited by the local EPB. In addition to these fees/levies there are also fines for excessive discharge of pollutants which, although set at relatively low levels, act as a deterrent and can be supplemented with public disclosure of fines in blacklists. It can be seen that the sanctions available according to the interviewees were stronger than in Economy's description.

Both the interviewees commented on the tendency for a sizeable minority of companies to fail to report honestly (40% was suggested by one interviewee). Hence the MEP had increased the capacity of local offices (Shenyang Bureau of MEP had 300 staff in 2011) so that a rigorous system of evaluation and checking was possible, with all factories in the city visited at least once a year.

One point raised was about shared responsibility. One of the interviewees referred to a recent pollution incident involving China Petroleum Company at Dalian petroleum pipelines where the company shared responsibility with the MEP. This suggests a more co-operative approach than would typically be the case in the West. This was borne out by Birkin (2007) when he outlined that there were possible stronger "hidden" political penalties for those MEP local managers that were responsible for significant non-compliance of firms in their areas. A bad case of accidental river pollution could for example mean not only financial penalties but also court action for both firm and EPB official and even the expulsion of the MEP official from the Communist party (an effective end to that person's career) (ibid p78).

Another issue raised by one interviewee was his interpretation of the philosophy on environmental protection in China. This philosophy was to develop first, then remedy (clean-up for example). This is

seen to be what the West did – with very little emphasis on the environment until late in the 20th century whilst development proceeded unchecked from 1800 onwards.

4.2.3 Interview with local government finance officer

The official concerned was the Director of Finance in the Shenyang provincial government Department of Finance. The interview first established the local government's environmental policy which was stated as: "Outside and inside – whole society – sustainable development of China". In terms of what the provincial government does, the greatest emphasis was on the work of the local agencies of the MEP. Also mentioned was the 1 billion RMB that the provincial government had invested in planning to reduce pollution in the Liau River basin in 2009. Government policy was seen to be that humans should live harmoniously with Nature which the interviewee attributed to Daoist philosophy.

In terms of personal philosophy the official stated that he loved to be in the countryside with clean air and that this love was influenced by a whole raft of philosophies – Buddhism, Daoism, Confucianism, Feng Shui, Socialism, Communism and Western influences.

Overall he emphasised the role of government in ensuring sustainability- with the reconnection with Chinese traditions over 1000 years old maybe providing the solutions to modern problems.

4.2.4 Interview with senior representative of Chinese Institute of Certified Public Accountants (CICPA) organization

This interview was also carried out in an unstructured way. The correspondence prior to the interview asked for information on environmental accounting initiatives by the CICPA.

During the interview the following substantive points were made by the interviewee:

1. As yet there were no mandatory reporting rules on environmental or sustainability matters in China. However, interest in environmental accounting (EA) is great in China. The 2011 meeting of the International Integrated Reporting Council (IIRC) was held in Beijing and much was learned about EA. The emphasis on aligning Chinese accounting standards with International Financial Reporting Standards in recent years had led to a gap as IFRS do not cover environmental or sustainability accounting and reporting.

2. He said that due to the influences from the National Audit Office, Ministry of Environmental Protection, National Asset Supervisory Commission and Chinese Securities Regulatory Commission there had been a growth of the number of companies making a CSR reports (10 companies in 2006, 465 companies in 2009).

3. CICPA auditing standards relate to environmental matters as follows: requirement for auditors to report on measures to alleviate environmental destruction; the consequences of breaking relevant laws and regulations; the consequences of environmental destruction; and, any claims against the entity.

4. Personal philosophical influences were highlighted, from his office bookshelf, by a book of Lau Tzu where humans should respect Nature and follow the rules of Nature. The official said that the consequences of not following this rule could be grave with humans being punished by Nature.

5. He cited the 12th 5 year plan (2011-2015) in which is incorporated the need to: protect nature, reduce pollution and reduce the use of resources and suggested that developments in environmental accounting should go hand in hand with such developments.

6. Overall the importance of government in this sphere was emphasised.

4.2.5 Analysis of interview findings

The interviews provided opportunities to consider several actors in environmental sustainability in China: accountants; companies; managers; government (both MEP and local government); and, the Chinese Institute of Certified Public Accountants organisation. Once again the information gathered is considered in terms of episteme change.

4.2.5.1 The viability of the modern episteme

Here the evidence was mainly based on what was already going on. The first observation is that the companies represented were using many and varied environmental accounting initiatives ranging from EMA through to sophisticated LCA techniques. This suggested that many of the companies had already acknowledged the need for change and had taken steps to develop EA to varying degrees. However, the pressures for change appeared to be mainly institutional from government in the form of levies and fines

In terms of the companies' policies and philosophies on environmental sustainability there was no real evidence of a change away from economic considerations with legitimacy and institutional pressures more in evidence than serious engagement with ancient philosophies.

Where things became more interesting was the evidence that the interviewees had personal philosophies that resonated with ancient philosophical ideas – for example: "human beings should live harmoniously with nature." Although only three of the interviewees were able to overtly link their views with a particular philosophical tradition, in most cases the philosophical values could be linked closely with the traditional philosophies via the rhetoric used.

The two local officers of the MEP showed that there was an increased emphasis on environmental protection, with advanced systems in place to ensure that non-compliant companies were fined or subject to more dramatic penalties (closure or temporary stoppage). However there was no evidence of ancient philosophy influencing the local MEP office in its work (this was different at the top of the MEP where ecological wisdom from ages past is a key factor driving policy according to the Vice-Minister of MEP (Pan, 2011)).

The senior official of CICPA displayed sophisticated understanding on environmental matters and showed this via his knowledge of ancient philosophy and of government initiatives such as ecological civilization. The need for change was discussed in terms of whether CICPA was taking any initiatives in the environmental accounting area and here CICPA was waiting and looked to follow international accounting standards and government regulations in the area.

In summary, the interviewees had personal philosophies that had strong links to modern interpretations of ancient philosophy – evidence of a metaphysical continuum – but these personal views did not appear to be feeding into company behaviour which was driven by many other factors. In essence there was a 'business as usual' feel to the organizations represented in the interviews. To that extent there are clear viability problems that would indicate that the Modern episteme is under threat.

4.2.5.2 The possibility of change to a new episteme

The interviews mainly supported the possibility of episteme change through the sophisticated philosophies of the accountants and managers – making them open to ideas of harmony and ecological civilization. There were strong parallels in the interviewees' philosophies with ecological thinking in the three central strands of Chinese philosophy. However, it was often stated that change would only take place when the government introduced laws and regulations in the sustainability area. The interviews mainly showed that limited change had already taken place to increase and develop environmental accounting (although there was plenty of evidence of EMA). There was little evidence of new accounting beyond fairly unsophisticated ideas of opportunity cost, based on tonnes of coal saved by the use of renewables such as thermal pumping. Only the steel company (Case 3) used sophisticated life cycle assessment (LCA) accounting (see case study at Section 4.3.3).

One important finding to come from the interviews was that only a minority of the interviewee companies engaged in public reporting about their environmental and other sustainability activities. There is not a tradition of public reporting in China aside from quoted companies that are only reporting at a fairly basic level. This is discussed further when analysing the case studies in Section 4.3.4.

Overall the interviews showed the interplay between the various actors in the sustainability network: accountants; companies; managers; government (both MEP and local government); and, the Chinese Institute of Certified Public Accountants organisation. Most powerful was seen to be government (with sanctions available and used) with, at this stage, accountants and their professional body appearing to play a waiting game – waiting for government and international accounting standards to force change. As with the situation in the West, in one company ISO14001 certification was seen as necessary for supply chain purposes and to ensure that onward sales markets looked favourably on the company and its products. As to whether there was evidence of the possibility of episteme change, the key findings were the strong philosophical orientation of the interviewees and the good progress in EMA in all the interviewee organizations and some progress in more sophisticated external SAR.

4.3 Data source 3: (Mini) Case study findings and analysis

This section outlines the findings from three mini-case studies:

Case study 1 – Mining safety equipment company

Case study 2 – Dairy and food company quoted on the Shanghai Stock Exchange

Case study 3 – Major steel company quoted on the Shanghai Stock Exchange

The data collection for the three cases were not carried out in a uniform fashion. In each case it started with an interview with a company official (in two cases an accountant and in one case two economists) and then further data was gathered on the direction of the official(s). In summary the additional data was: Case 1. observation during visit to the company's premises and surroundings (including photographs), additional interviews, data supplied by the accountant; Case 2. further interviews, company publications, press cuttings, website; and, Case 3. CSR reports from the company's website. The cases were chosen as they provided more data than an interview and could be used in the analysis in a stronger way because they represent data from several sources.

4.3.1 Case study 1 – Mining safety equipment company

This was a Chinese state-owned enterprise with a turnover in 2010 of RMB 500 million and 1,200 employees, based in Liaoning Province in NW China. Its major products were safety reinforced pods which are located underground with miners sheltering in them if there is an explosion or a rock-fall.

A visit took place in early April 2011.

The data came from four sources:

1. Observation of posters in the foyer

2. Observation of physical environment

3. Data on a proposed thermal pumping project

4. Interviews

4.3.1.1 Observation of posters in the foyer

On arrival, in the foyer there were three posters prominently displayed (there were no other posters in evidence). The posters were produced by the Liaoning Provincial Government and had been displayed by the company. The dominant colour for the posters was green. Poster 1. showed a bicycle; Poster 2. a shopping bag; and, Poster 3. a stylized planet Earth with interactions between nature and people:

Figure 5 Poster 1

Figure 6 Poster 2

Figure 7 Poster 3

The posters each contained a slogan (in translation):

Poster 1. Save energy. Let everybody take action now.

Poster 2. Have you used a green bag today?

Poster 3. An environmentally friendly life starts from me.

The overriding impression given by the posters was that the company had an interest in green issues and the environment. As the company is state-owned it could be argued that it had to follow government initiatives (an institutional theory approach with coercive isomorphism (Larrinaga-Gonzalez, 2007)) but these posters were still on display in April 2011 when the government initiative was promoted in the week 12-18 June 2010.

4.3.1.2 Observation of physical environment

On proceeding from reception into the factory and office complex there was evidence of extensive, recent tree planting around the buildings making up the company. This was corroborated by the Chief Accountant during an interview when he mentioned that RMB 500,000 had been spent in the last two or three years on tree planting and the introduction of grasses.

On arrival at the offices for the interviews it was noted that in mid-morning the lights were switched off. The Chief Accountant during the interview stated that it was the policy of the company to have no lights during the day. This was accompanied by a policy of not switching on the air conditioning until the temperature went above 25 degrees Centigrade.

4.3.1.3 Data on a proposed thermal pumping project

In terms of environmental accounting, an investment appraisal activity was noted around a thermal pumping project to which the company had committed. This involved expenditure of RMB 7.8 million and had been justified partially in terms of an annual saving of coal for heating of 5,000 tonnes. Although it was acknowledged on being prompted that this also led to a saving of carbon dioxide emissions, this was not uppermost in the minds of the accountants and no data had been prepared on this saving. The accountants were able to provide additional environmental accounting data after the visit which supported the information given at the interviews.

4.3.1.4 Interviews

It was established during the three interviews with the company's accountants that the company also had a policy of minimising water usage and energy saving. The reasons put forward for these policies were twofold: the business case in reduced costs; but also the company culture of responsibility to employees and society that came down from the Chairman of the company.

Overall the evidence presented was of a company which was taking an interest in environmental initiatives and had an accounting system that could help with planning, appraisal and with day to day recording of spending on environmental matters. There was plenty of evidence both from interviews and additional data provided that internal environmental accounting mechanisms were strong and that they provided assistance in decision-making and allowed spending to be monitored and controlled.

However, another strand of the interviews was to ask the accountants whether their personal philosophy on the environment influenced their environmental accounting work. The answers to this question demonstrated that each of the three accountants held deep-seated philosophical values. The chief accountant cited Buddhist and Socialist values with an emphasis on harmony and the sense that the company is an extension of the family, so that everyone should be comfortable working at the company. The second accountant cited Communist values with a desire to do something for Society. The third accountant cited an old Chinese tradition where waste was minimised and one saved as much as possible.

They all saw environmental accounting as an important part of ensuring that environmental management activities were planned and managed and that these activities stemmed in part from the desire to maintain a harmonious society. The chief accountant said: "Accounting is an instrument for more environmental activities, it helps us to make a case to our leaders" and "provision of better data – on money saving for example – means that we can tell our leaders and have more developments in the future to save energy and have environmental protection" and "accounting is hand in hand with environmental protection." There was a real sense of social and environmental responsibility which was supported by the accounting function along with a strong desire to reduce costs (possibly for a business-case reason) and to account for these reductions. The environmentalism of the company was stimulated by government (see the posters above). Government as represented by the Ministry of Environmental Protection (at city, province and national levels) was acknowledged by interviewee 3 as an important influence on environmental management activities by the company and also the key to encouraging more environmental accounting through legislation and accompanying regulation. The accountants understood that their role was to provide accounting information on the company's environmental activities and they did this both for business reasons and also for philosophical reasons.

4.3.2 Case study 2 – Dairy and food company quoted on the Shanghai Stock Exchange

At the first visit in 2010 this company had a turnover of 10 billion RMB and 20,000 employees across 20 factory sites across China. This case study is based on two visits to the company head office in Shanghai in 2010 and 2011. The data for this case study is as follows:

1. The website of the company.

2. The CSR report of the company (2010) (this document was not publicly available and was obtained after the interview direct from the interviewee).

3. Two interviews (one in 2010 and one in 2011) at the head office of the company.

4. Press cuttings from a national newspaper and an internal company newspaper.

Some background to dairy products in China is necessary. Since before 2010 and continuing to the present, dairy products in China have had a credibility crisis due to scandals where melamine had been added to powdered baby milk. Officials of some companies have been imprisoned and in some cases executed (Huang, 2014). These scandals did not involve this company but were seen to affect it by association

4.3.2.1 Company web site

Starting with the company website (in English) (accessed 16 March 2015) the opening statement stresses the importance of food to society and the vital importance of food safety. It goes on to state the importance of energy conservation and environmental protection. In terms of social responsibility it highlights two important philanthropic projects – ophthalmics for children and earthquake relief.

4.3.2.2 The 2010 corporate social responsibility report

This was in Chinese but in translation the following is highlighted:

- The concept of sustainable development is advocated with a win, win for company, society and environment with a harmonious development for all.

- Emphasis on the welfare of employees

- Emphasis on protecting customers' legal rights

- The company strives to economise the use of energy, to reduce waste and live with the environment. Within this section an emphasis on measureable targets for environmental protection and energy usage (aim for a saving of 42,000 tonnes of coal in 2010) together with investment in environmental techniques and construction of environmental equipment to deal with wastes including recycling and reusing.

- Overall advocating a green, harmonious life.

4.3.2.3 The interviews (April 2010 and April 2011)

The first interview followed the standard interview schedule (see Appendix 1). The second interview sought to find out more about the environmental accounting initiatives of the company and specifically why they were carried out.

Interview 1 – Senior Manager in Asset and Investment Management department

The environmental policy of the company was stated as being to provide healthy products and to be environmentally friendly – specifically by reducing energy use. This translated into education for all staff so that practice matched the policy on paper and so that all staff appreciated the importance of environmental protection.

In terms of environmental accounting the company was waiting for guidance from government. Although there were a number of projects (for example converting methane from cows into energy) the accounting lacked precision and particular headings for environmental spending. However in investment decisions the need to reduce energy use and pollution were important criteria that were factored into any decision.

The interviewee's philosophical background was said to be based on many influences from parents and those during education. The key influence from his father was that on Feng Shui with a strong affinity with the countryside in the locating of the family home. Also mentioned was respect for nature and its power and the powerlessness of the individual. The recent earthquakes in Iceland were attributed to industrialization.

Interview 2 – Director and Senior Manager in Asset and Investment Management department (two persons)

97

The key finding from this interview was that the company was guided in its environmental protection activities by central government targets – particularly for energy reduction. These targets were taken very seriously even though they were not mandatory. The other driver of environmental activities was cost reduction – which was seen to be hand in hand with the government targets. In terms of reporting and accountability this was seen to be the responsibility of the public relations department with the Asset and Investment Management department merely the implementer of policy with no interest in publicizing the activities or achievements. In fact it was stated that if other competitor companies were able to obtain data about the interviewees' company this could compromise confidentiality – hence the apparent policy of secrecy.

Key figures provided related to savings of coal in tonnes and this was converted into savings of carbon dioxide emissions.

4.3.2.4 Press cuttings

At the time of this first interview with the company two documents were furnished by the interviewee to demonstrate environmental management and accounting in action. The first document was an extract from the company's internal staff newspaper and the second was a press release for a national newspaper – Liberation Daily (both in Chinese). On translation the following points can be made:

Document 1 (2010 2 9)

Specifically this document referred to energy reduction initiatives. Two features of this document were (1) statistical/accounting data on spending on environmental protection and on reduction in costs through energy saving coupled with reduction in coal usage and related carbon dioxide emissions (2) statements from the CEO on the responsibility of the company to society – consumers, employees, stockholders, communities, government and the environment. The promotion of these responsibilities was based on the understanding of relations between humans, nature and society through the organization's culture.

An interesting accounting concept was the idea that the company's carbon dioxide emissions for a year represent three second's-worth of the emissions from the whole earth in a year.

Document 2 (2010 5 1)

Specifically the document referred to a bottle recycling project. It sought to raise awareness of the importance of environmental protection during the time of the Shanghai Expo 2010 with its green theme. Schools were sent boxes to fill with used bottles and in return were provided with desks and chairs. As can be seen, environmental protection was linked to philanthropic social responsibility. The company was seen to be endorsing the key themes of the green Expo – green food, recycling, green living.

4.3.3 Case study 3 – Major steel company – Quoted on the Shanghai Stock Exchange

In 2011 when this visit took place the company had 130,000 employees and annual turnover of $30-40 billion. Production was 30-40 million tonnes of steel. The company was included in the Fortune 500 World's most admired companies.

The case study materials are based on:

A presentation by two representatives of the Sustainable Development Research Division in April 2011 (this was based on the 2010 CSR report (in English).

Questions asked during and after the presentation.

CSR Reports from 2008 to 2013 (in English) freely available on the company's website.

4.3.3.1 Presentation

The two representatives were from the Sustainable Development Research Division of the company's Economics and Management Research Institute. This division had seven staff members with the focus of research on: energy economics industry research; environmental economics industry research; low carbon ecology; and, corporate social responsibility. The division had recently carried out an analysis of environmental risk in its Shanghai operations and noted a higher environmental awareness amongst stakeholders as a result of: air pollution; noise; dust; and social risks. The aim of the research division was explained as supporting decision making.

During and after the presentation a number of questions were asked (digressing from the interview schedule due to the unusual nature of the visit to the company):

What environmental accounting and reporting is going on?

Accounting for and reporting on: energy use efficiency; reduction of waste in production; intensity of waste recycling and reuse; and promotion of a sustainable society. Measuring environmental performance against ISO14001 (the first Chinese steel producer to be certified). Benchmark of 5% environmental outlay on all projects. Reporting on green operations – particularly in procurement and marketing. Lifecycle assessment (LCA) – a joint research project with the World Steel Association – working on this for 10 years up to 2011 and ongoing. For LCA the establishment of a platform and system to identify whole life costs and carbon dioxide emissions with the aim of improving efficiency of energy use.

Why is the company engaged in these environmental initiatives?

- To save costs.

- It is projected that government will in future make environmental standards higher – so the company is preparing for this in advance.

- Responding to competitor pressure.

- Managing the complaints from an ever more dissatisfied group of citizens living ion proximity to the company.

What is the company philosophy on the environment?

"To maintain harmony and unity with the natural ecological system. Do everything possible to improve the environment. The company's duty to protect the environment as a social citizen".

The presentation was mainly based on extracts from previous CRS reports. These will are summarised in Section 4.3.3.2 with detailed extracts in Appendix 4.

The two representatives were asked about their personal philosophy on the environment. Their responses were: Representative 1 – To reduce the impact on the environment. To take account of society and local communities; and Representative 2 – To maintain the company with a sustainable long term future.

4.3.3.2 CSR Reports 2008-2013

This set of reports are summarized in Appendix 4. Key findings were:

The CSR report became bigger year on year with the environmental report also becoming longer and more technically sophisticated.

The environmental performance reporting started in 2008 as a discursive report but from 2009 included quantitative information on key environmental performance indicators.

Also from 2009 the report noted the use of Life Cycle Analysis (LCA). In 2009 a particular project to reduce materials used in tin can production; in 2010 a transformer using silicon steel; 2012 won "Steelie" award for excellence in LCA.

From 2010 the use of tables and pie charts to illustrate quantitative data.

From 2010 mention made of ISO 14001 certification and from 2011 percentage certification of suppliers.

In 2012 a green vision expounded by the Chairman – to become the most competitive, resource-conserving and environmentally friendly iron and steel group in the world.

In 2013 the environmental management part of the report was renamed "Being part of Nature."

These reports are referred to in the analysis of the mini-case studies in Section 4.3.4 below:

4.3.4 Analysis of the mini-case studies

In this section the cases are analysed using the Foucaultian themes – (1) questioning the viability of the modern episteme and (2) the possibility of change to a new episteme.

4.3.4.1 The viability of the modern episteme

The core activities of the three case study companies were all very much based around modern ideas of economic growth from neo-classical economics. The two quoted companies were guided by stock market

rules and all three companies were strongly influenced by government regulations and accounting standards. The uneasy relationship between the Communist values of China's government and the market-driven capitalism of its companies since the opening up which followed the Cultural Revolution was still apparent in the values of the case study companies with doing good for society being a key value.

Case study 1 (mining safety equipment): the company appeared to be benefitting from the increased emphasis on safety in mining industries. But the whole extraction industry is seen by more radical thinkers as being based on the exploitation of finite resources of the planet (see for example the Guardian newspaper "keep it in the ground blog" (Guardian, 2015). So, in terms of right and proper conduct on the face of it the company is modern – it seeks to improve life opportunities for miners through improved safety in mines whilst at the same time it helps coal mining and its fossil fuels to continue to be the main source of power in China - with all the associated problems of pollution, respiratory diseases and global warming.

Case study 2 (dairy producer): revenue growth was seen to be hand in hand with sustainability in that if there were health fears in the minds of customers this would affect revenues. A clean and safe company was seen to be essential to future success. But in terms of modern character the so called good behaviour of the company seemed to be only to avoid serious legitimacy issues. Philanthropy and efforts to improve energy conservation and environmental protection were in evidence, but the advocacy of a green, harmonious life appeared to be less important than the need to maintain market share in the face of corporate poisoning scandals in the sector.

Case study 3 (steel producer): on the one hand the company was presented as a member of the Fortune 500 World Companies listing (Fortune500, 2015). This listing is based purely on revenues with absolutely no reference made to the sustainability of the business model employed. On the other hand the representatives for the presentation were from the Sustainable Development Research Division of the company. This suggests that sustainability is an important issue for the company – but not at the expense of revenue growth. This was backed up at the interview where the first motivation for environmental accounting activities was to reduce costs and the second to pre-empt future government legislation in the area of EM and reporting.

So the three case study companies can be seen as being primarily guided by modernity in their operations. This modernity is questioned in the literature as being non-viable for the future – unsustainable (Birkin and Polesie, 2011). Here the three cases become interesting as the possibility of change is considered.

4.3.4.2 Possibility of change to a new episteme

Development of a life-centred morality

Case study 1 – there is evidence from: (1) the environmental posters in the foyer of the company head office; (2) the tree planting and introduction of grasses that gave the impression of a company that considered issues beyond the traditional profit motive; and, (3) the philosophical orientation of the

interviewees with the emphasis on harmony and doing good for 'society' showed a possible return to traditional philosophical notions of life-centredness with humans being seen as just one species sharing the planet with myriad others. However, it should be stressed that it would be easy to interpret the evidence in other ways – for example: the posters had been in the foyer for a long time after the MEP campaign that they related to; this could just be inertia rather than a conscious desire to retain the posters for ethical reasons.

Case study 2 – there is evidence from: (1) the CSR report with emphasis on measurable targets for environmental protection based on a green, harmonious life; (2) the press cuttings showed that the CEO talks about responsibility towards the environment. Striving for environmental sustainability appears to have the potential to have a much greater role and influence than it had at the time of the interviews. The systems for measuring coal savings and CO_2 emissions demonstrated that the measurement systems were in place and ready for a greater role for EA.

Case study 3 – the Sustainable Development Research Division had a stated aim of supporting decision-making, mainly in terms of environmental risk assessment. This was at odds with the company philosophy on the environment – to maintain harmony and unity with the natural ecological system. No doubt there can be seen to be links here with ancient philosophy but the impression gained in the interviews was of a company seeking to improve economic measurements. So, there were systems in place to measure environmental impacts and personal philosophies that suggested links to ancient philosophy but these present only potential for major changes in the future.

Invention as in the emerging mathesis

Case study 1 - it is interesting to note that in terms of social accountability the highly developed technology around safety equipment helps to ensure that miners are protected from life-threatening disasters. The development of thermal pumping systems was an example of the use of new technology in the area of thermodynamics. This is one of the new scientific areas referred to by Birkin and Polesie (2011).

Case study 2 – this company was publicizing its environmental activities but there is no sense of new science or ways of thinking. Some limited science around methane capture was outlined but the impression given was that it was minimal when the company as a whole was considered.

Case study 3 – extensive use of new science was evidenced in the CSR reports in the systems for measuring environmental aspects and impacts and in the development of new products with less weight of steel; prolonged service life and reduction in waste. An example of accounting metrics is reduction in carbon emissions shown as tons of CO_2 equivalent and also hectares of forest equivalent (an example of an ecological footprinting adaptation).

Overall across the three cases it was hard to identify revolutionary applications of new science, but the science of measurement and order (emerging mathesis) was evidenced by the sophisticated measurement systems in place.

Disappearance of specialization

Case study 1 - the comments made about the role of accountants (traditionally a very narrow area of specialization) reinforced the idea that the accountant in this company was also involved with environmental management. The accountant's role was becoming more diverse and less specialized. The way that the company presented itself during the visit was one where all had an interest in sustainability, indicating that environmental concerns were not the preserve of a special department but rather the concern of all employees, with a strong message to this effect coming down from the Chairman.

Case study 2 – here the contact was with accountants in the Asset and Investment Management Department. The accountants interviewed had a broad remit to implement policy on environmental protection in all projects approved by the company. This suggests a broader remit than the traditional accountant with the emphasis on economic measurements. However, the reporting on EA and EM was the remit of the public Relations Department and to that extent there is seen to be specialization in operation.

Case study 3 – the managers interviewed were researchers in the company's Sustainable Development Research Division of the Economics and Management Institute. Research was across a broad range of topics but still specialized into the economics sphere. In the CSR reports for example the Chairman stated that "We shall....guide the industry on to a sustainable development path" suggesting a broader base of expertise was needed by company managers to understand sustainability matters. This is certainly evidenced in the CSR reports in the statements by senior management.

Disappearance of 'anthropologization'

Case study 1 - Tu (1998) introduced the concept of 'the anthropocosmic spirit' with its notion of harmony between the human species and nature. In this case it is possible to find evidence of this notion in the philosophical orientations of the interviewees. Traditional philosophical views were held by the interviewees. Also the action on environmental matters yet a lack of reporting suggested a deeper understanding and more altruistic reasons for the initiatives rather than seeking to reduce reputational risk or marketing gains.

Case study 2 – the notion of a win, win for the company, society and environment suggested a less human centred approach. Relations between humans, nature and society were stressed in the press cuttings and these relations were central to the company's culture.

Case study 3 – the company philosophy on the environment was outlined as: "To maintain harmony and unity with the natural ecological system" provides evidence of an anthropocosmic spirit with humans as social citizens with a duty to protect the environment. The 2013 CSR report re-named its environmental section: Being Part of Nature suggesting the company and its employees were part of a greater natural world.

So all three of the cases evidenced a move away from anthropologization with a more harmony-based approach whether it was in the personnel's philosophies; the philosophy of the company or the reporting.

4.4 Data source 4: Survey findings and analysis

The survey findings are split into informational and attitudinal findings.

4.4.1 Informational findings

The informational findings are split between the three groups – accountants; academics; and, accounting students.

4.4.1.1 Accountants - informational questions

These questions sought to find out about work location, work role, size of organization worked for and work specialisms. The results are tabulated in Appendix 5. The key informational findings were that 80% of the group worked in China and that none of the group had a work involvement in environmental accounting or sustainability accounting.

4.4.1.2 Academics – informational questions

These questions sought to find out about work role; subject specialisms; and, at their university: which environmental /sustainability topics are taught; and, which environmental / sustainability topics are researched. Finally how influential the respondents had been in environmental / sustainability teaching or research at their university.

The results on Q1 and Q2 on work role and subject specialisms are tabulated in Appendix 6. In summary: 62% of the respondents were senior academics (professor or associate professor) and 69% had a specialism in environmental management and its accounting or sustainability management or its accounting. So this group of respondents, as expected because of being members of a social and environmental accounting group (CSEAR), had a potentially high level of interest in the ideas behind ecological civilization. Question 3, 4 and 5 are tabulated below:

Table 2 Question 3 In your university which of the following sustainability/environmental topics are subjects taught to students?

	Yes	% yes	No	Total
Environmental management	8	62%	5	13
Sustainability management	6	46%	7	13
Environmental accounting	7	54%	6	13
Environmental management accounting	4	31%	6	10
Sustainability accounting	4	31%	9	13
Environmental reporting	7	54%	6	13
Sustainability reporting	6	46%	7	13

The observation from Question 1 is that there are Chinese universities where the students get exposure to environmental/sustainability topics. In this set of responses this is the case in 62% of responses.

Table 3 Question 4 In your university which of the following sustainability/environmental topics are the subject of research activities?

	Yes	% yes	No	Total
Environmental management	10	77%	3	13
Sustainability management	7	54%	6	13
Environmental accounting	11	85%	2	13
Sustainability accounting	7	54%	6	13
Environmental reporting	9	75%	3	12
Sustainability reporting	8	67%	4	12

The observation from Question 2 is that at least in this sample there are a substantial number of Chinese universities where environmental/sustainability topics are the objects of research. In this set of responses this is the case in 85% of responses.

Table 4 Question 5 How influential have you personally been in the sustainability/environmental teaching and research activities of your university?

	Percentage	Number
Very influential	7.7%	1
Quite influential	15.4%	2
Some influence	38.5%	5
Limited influence	30.8%	4
No influence	7.7%	1

The observation from Question 5 is that because 92% of respondents were at best quite influential; therefore there must be other academics in all these Chinese universities who were very influential – suggesting that there are several academics in each university with an interest in subjects relating to sustainability/environment.

4.4.1.3 Accounting Students – informational questions

These questions sought to: confirm that the students were Chinese and studying accounting at a UK university (all confirmed this); that they were students of De Montfort University (63) and University of Sheffield (18); that they were undergraduates (Year 2 / 34, Year 3 / 47). The next question is shown in tabular form below:

Table 5 Question 4 Please indicate whether the following topics have been studied by you during your education (both in China and in the UK).

	Yes in China	Yes in the UK	No	% yes	Total responses
Philosophy	33	2	35	50%	70
Ethics	34	17	26	66%	77
Sustainability	21	24	30	60%	75
Environmental management	17	22	37	51%	76
Accounting for sustainability	14	34	30	62%	78
Environmental accounting	7	28	42	45%	77

This question showed that in all cases except environmental accounting (45%) at least 50% of the students had studied the topic and that in terms of philosophy, ethics and sustainability a sizeable proportion had studied the topic in China before commencing studies in the UK university. So many of the Chinese accounting students sampled had had exposure to areas that would resonate closely with ideas of ecological civilization.

4.4.2 Attitudinal findings

The attitudinal findings are split between those questions common to the three survey groups, followed by additional questions for the accountant and academics groups.

4.4.2.1 Attitudinal questions common to the three survey groups

The responses were based on a five-point Lickert scale: (1) strongly agree, (2) agree, (3) neither agree nor disagree, (4) disagree, (5) strongly disagree. The numbers can be used to score each response and to calculate mean scores. In this research for illustrative purposes means can provide interesting comparisons between responses to the various statements. A second way to provide numbers from the responses is to say what percentage of respondents answered (1) strongly agree or (2) agree in answer to a particular question. In no way do these percentages provide any measure of statistical significance – rather they enable the analysis to compare typical responses across the various questions and to use these as part of the archaeological method carried out. Percentages can be misleading and it should be stressed that the three sets of responses were 13 Chinese academics (acad), 10 Chinese accountants (account) and 81 Chinese accounting students (stud). Hence, any suggestions of representativeness are avoided. Also an overall result for the three sets added together has not been done, as the interest comes from the similarities and differences between the three sets (or groups) rather than some overall average which is in danger of being looked at pseudo-statistically.

The two questions that were common across the three surveys are:

Question 1 - Please indicate the extent to which you agree or disagree with each statement about your attitude towards the natural environment.

Question 2 - Do any of the following religions and political philosophies have any value or significance to you personally in your attitude to sustainability and the natural environment?

The answers to these two common questions are summarized in tabular form below:

Table 6 Summary of responses to Question 1

Statements about your attitude towards the natural environment	Account % 1 or 2	Account Mean	Acad % 1 or 2	Acad Mean	Stud % 1 or 2	Stud Mean
(R1) Humans should be one with the natural environment (Buddhist philosophy)	90%	1.7	100%	1.38	84%	1.91
(R2) There should be harmony between heaven, earth and humans (Daoist philosophy)	80%	1.8	92%	1.46	78%	1.91
(R3) Human flourishing can only take place within the larger matrix of nature (Confucian philosophy)	60%	2.3	54%	2.23	64%	2.26
(R4) Human technological ingenuity will find the solution to all environmental problems	30%	3.1	39%	2.85	23%	3.24
(R5) Careful use of natural resources will enable future generations to enjoy the same benefits from the earth that we have enjoyed	100%	1.5	84%	1.77	80%	1.91
(R6) Current patterns of consumption, economic growth and population growth are unsustainable	80%	2.0	92%	1.62	69%	2.19
(R7) Radical change is needed to avoid severe, negative effects on future generations	90%	1.8	92%	1.77	61%	2.33
(R8)Attitudes in society are changing that could lead to a sustainable future	60%	2.4	69%	2.31	82%	1.93
(R9) China can take a global lead in sustainability based on new science	50%	2.6	31%	2.69	44%	2.63

This table concentrates on the responses "Strongly Agree" and "Agree" showing what percentage of respondents answered either response. The means are arrived at by scoring responses strongly agree with one through to strongly disagree with five. The higher the mean figure and the less emphatic is the

agreement with the statement. In terms of the first three statements that come from modern interpretations of each of the three ancient Chinese philosophies the Buddhist and Daoist statements resonate strongly across all three groups. The Confucian statement is agreed with by at least 54% of respondents. The other statements show that (R4) a technological solution is not seen as the way to solve environmental problems and that (R9) the respondents tend not see China as taking a lead in sustainability. The other responses – particularly R6 on sustainability and R7 on the need for radical change – show a keen awareness and agreement on the issues that would most likely see the successful transition to ecological civilization.

Table 7 Summary of responses to Question 2

Religions and political philosophies that have any value or significance to you personally in your attitude to sustainability and the natural environment (1 and 2 are strongly agree and agree):

	Account % 1&2	Account Mean	Acad % 1&2	Acad Mean	Stud % 1&2	Stud Mean
(1) Buddhism	60%	2.4	45%	2.6	40%	2.9
(2) Daoism	40%	2.8	54%	2.4	40%	3.0
(3) Confucianism	40%	2.9	45%	2.6	41%	2.9
(4) Feng Shui	20%	3.5	18%	3.5	19%	3.3
(5) Christianity	20%	3.9	27%	3.2	23%	3.4
(6) Islam	20%	3.8	9%	3.6	7%	3.9
(7) Judaism	10%	4.0	9%	3.6	10%	4.0
(8) Capitalism	20%	3.5	18%	3.0	22%	3.4
(9) Communism	0%	4.2	18%	3.1	23%	3.4
(10) Socialism	10%	3.5	27%	2.8	34%	3.1

The key observation from this set of responses is that the three ancient religions/philosophies resonate much more strongly than all the others. But not as strongly as the agreement with the statements derived from the religions in Table 6. This suggests that many of the respondents who agree with a statement do not necessarily link it to a particular philosophy or religion.

The next table 8 tests this linkage of an attitude to a particular religion by looking at the relationship (correlation) between those who agree or strongly agree with an attitude statement and who also agree or strongly agree with the relevant philosophy or religion:

Table 8 Relationships between (1) attitudes towards the sustainability and the natural environment and (2) religions/philosophies

	Accountants Percentage scoring 1/2 and 1/2 for both attitude and religion/philosophy	Account Correl	Academics Percentage scoring 1/2 and 1/2 for both attitude and religion/philosophy	Acad Correl	Students Percentage scoring 1/2 and 1/2 for both attitude and religion/philosophy	Stud Correl
(1) Humans should be one with the natural environment / (2)Buddhism	60%	+0.4487	50%	+0.624	36%	+0.1102
(1) There should be harmony between heaven, earth and humans / (2)Daoism	30%	+0.1985	58%	+0.626	35%	+0.2335
(1)Human flourishing can only take place within the larger matrix of nature / (2)Confucianism	20%	-0.0824	18%	+0.0395	32%	+0.281

This table supports the previous observation – that there is only a limited linkage between statements and philosophies/religions. The inference being that statements from religions or philosophies resonate in a way that the actual religions or philosophies do not.

Table 9 tests the notion from the literature that in China the three ancient philosophies flow into one (Clayre, 1976). This would suggest that the respondents would have an agreement with more than one statement and religion/philosophy:

Table 9 Respondents who considered more than one from Buddhism (B), Daoism (D) and Confucianism (C) to have value or significance to them personally in their attitude to sustainability and the natural environment (i.e. strongly agree or agree) (Table 6) and more than one attitude to the natural environment R1-R3 (Table 7) (Buddhist, Daoist and Confucian)

	Accountants More than one score 1/2	Academics More than one score 1/2	Students More than one score 1/2
Religions/philosophies Buddism, Daoism, Confucianism	50% of those who scored at least one at 1/2	38%	34%
Attitudes to natural environment	80%	100%	81%

This table shows that although most respondents only scored highly for one religion or philosophy, a high proportion of respondents agreed with more than one of the statements derived from different religions or philosophies. A smaller percentage agreed that more than one religion or philosophy was valuable to them.

4.4.2.2 Additional attitudinal questions for accountants

The question was as follows:

Table 10 Possible reasons for accounting for sustainability/environmental matters. For each say whether you agree or disagree that the reason could apply from your experience:

Answer Options	Strongly agree (1)	Agree (2)	Neither agree nor disagree (3)	Disagree (4)	Strongly disagree (5)	Response Count	Mean Ave
(R1) There is an increased awareness of sustainability / environmental matters	3	6	1	0	0	10	1.8
(R2) Ancient Chinese philosophy advocates a harmony approach which leads to awareness of sustainability / environmental matters	3	4	3	0	0	10	2.0
(R3)Sustainability/environmental matters are an essential part of management and accounting today	1	7	1	1	0	10	2.1
(R4)Sustainability/environmental matters are accounted for and reported on by our competitors around the world so we must follow	2	4	3	1	0	10	2.3
(R5)Government is encouraging us to manage and account for sustainability / environmental matters	1	8	1	0	0	10	2

This table shows that this group of respondents tended to agree or strongly agree with all the statements. There is insufficient variation in the means to identify a particular reason. However it is interesting that the scores for R2 on ancient Chinese philosophy are on a par with the other scores.

4.4.2.3 Additional attitudinal questions for academics

Table 11 Do any of the following religions and political philosophies have any value or significance to you in your work as an academic when dealing with teaching and research on accounting for sustainability and the natural environment?

Answer Options	Very strong value or significance	Strong value or significance	Some value or significance	Very limited value of significance	No value or significance	% 1/2	Mean
Buddhism	2	4	4	2	1	46%	2.69
Taoism	3	4	4	1	1	54%	2.46
Confucianism	1	6	3	2	1	54%	2.69
Feng Shuai	0	1	4	4	4	8%	3.85
Christianity	0	4	3	3	3	31%	3.38
Islam	0	1	2	6	4	8%	3.76
Judaism	0	0	3	6	3	0%	4
Capitalism	1	0	9	2	0	8%	3
Communism	1	3	3	5	1	31%	3.15
Socialism	1	4	4	3	1	38%	2.92

In this table it is clear that the first three ancient religions or philosophies have much higher scores in terms of agreement than any of the others. Also they have the lowest means which indicate again that the ancient religions/philosophies have the greatest value or significance in teaching or research on sustainability and the natural environment.

Table 12 The following are possible reasons for teaching and research on sustainability / environmental matters. For each say whether you agree or disagree that the reason could apply to your university's provision:

a) There is an increased awareness of sustainability/environmental matters that should be encouraged in future generations.
b) Ancient Chinese philosophy advocates a harmony approach which leads to teaching and research on sustainability/environmental matters.
c) Sustainability/environmental matters are an essential part of management and accounting education today.
d) Sustainability/environmental matters are taught and researched in our competitor universities around the world so we must follow.
e) Government is encouraging us to teach and research on sustainability/environmental matters.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	% 1/2
Reason a)	5	8	0	0	0	100%
Reason b)	0	7	5	1	0	54%
Reason c)	3	5	5	0	0	62%
Reason d)	1	4	6	2	0	38%
Reason e)	1	5	5	2	0	46%

Reason a) on increased awareness has 100% agreement (agree or strongly agree), with reasons b) and c) gaining substantial agreement. So once again the academics place ancient philosophy in an important position in terms of reasons for teaching and research on sustainability/environmental matters.

4.4.3 Analysis of Surveys

The surveys were a systematic attempt to find out about the respondents' existing engagement with and about their attitudes to sustainability and its accountability. In terms of episteme change and its possibility the main viability issue was around right and proper conduct and the possibility of a metaphysical continuum – a new metaphysics with strong connections to Chinese philosophical traditions.

4.4.3.1 The informational questions established the following about the respondents:

1. The accountant group was split 50:50 between accountants working in accounting firms and accountants working in industry.

2. 60% of the accountant group worked for organizations with more than 500 employees.

3. None of the accountant group had direct involvement in environmental or sustainability accounting work.

4. 61% of the academics were Associate Professor or Professor (senior academics)

5. The subject specialism most common to the academic group was environmental management and accounting (seven out of the thirteen respondents)

6. 69% of the academics taught environmental management and accounting or sustainability management and accounting

7. 85% of the academics were engaged in research on environmental accounting
8. All of the students were Chinese students studying at a UK university
9. 50% of the students had studied philosophy and 66% ethics (mainly in China before studying in the UK university)
10. 45% of the students had studied sustainability, environmental management and 60% their accounting (mainly in the UK).

In summary the answers to the informational questions showed that there were several biases in the samples – the accountant group was dominated by respondents who worked for larger firms; the academic staff group was dominated by senior academics who had a particular interest in sustainability and its accounting (with an emphasis on environmental sustainability). But in spite of these biases it is interesting to note that:

(1) there is a group of interested Chinese accounting academics;

(2) that Chinese accounting students are likely to have a background in ethics and philosophy during their Chinese education;

(3) there is evidence of a turning towards sustainability matters (and accountability thereof) in Chinese higher education; and

(4) that Chinese accounting students returning from the UK are likely to have had exposure to topics such as sustainability accounting and environmental accounting.

4.4.3.2 Attitudinal questions: The viability of the modern episteme

The key statement looking at viability was the question on attitude to the natural environment – "Current patterns of consumption, economic growth and population growth are unsustainable". 80% of accountants, 92% of accounting academics and 69% of accounting students scored 1 or 2 (Strongly agree or Agree). This would suggest in these groups of respondents that there is a serious questioning of viability.

The statement: "Human technological ingenuity will find the solution to all environmental problems" scored very low in this group of respondents – 30%/39%/23% scored 1 or 2. This is considered to be a typical "modern" anthropocentric statement – the notion that humans can control nature - and has been largely rejected by the respondents. Again this suggests that in these groups there is a rejection of Modern thinking.

4.4.3.3 Attitudinal question: The possibility of change to a new episteme

There were two key statements on change: (1) "Radical change is needed to avoid severe, negative effects on future generations" and (2) "Attitudes in society are changing that could lead to a sustainable future". The respondents scoring 1 or 2 (Strongly agree or Agree) for these questions were (1) 90%, 92%, 61% (Accountants/Academics/Students) and (2) 60%, 69%, 82%. These results suggested that a large majority of respondents saw the need for radical change in attitudes if sustainability is to be achieved.

In terms of a metaphysical continuum there were three statements from ancient Chinese philosophy (as adapted by modern interpretations) about attitude towards the natural environment: (1) Humans should be one with the natural environment (Buddhist philosophy); (2) There should be harmony between heaven, earth and humans (Daoist philosophy); and, (3) Human flourishing can only take place within the larger matrix of nature (Confucian philosophy). The number of respondents giving scores of 1 or 2 (Strongly agree or Agree) were from 54% to 100% with the scores for the Buddhist statement the highest at 90%/100%/84% (Accountants/Academics/Students). These scores indicate that in the respondent groups the statements about the environment derived from ancient philosophy resonated strongly. This was particularly the case in the academic group and was expected as they are a group of Chinese accounting academics with a specific professional interest in sustainability and environmental accounting.

In addition the respondent group was asked if particular religions or philosophies had any value or significance to them personally in their attitude to sustainability and the natural environment. The only religions or philosophies where a score of 1 or 2 (Strongly agree and Agree) was given by the respondents in 40% or more of the responses were Buddhism (60%/45%/40%), Daoism (40%/54%/40%) and Confucianism (40%/45%/41%) (in the order Accountants/Academics/Students). This would suggest that for large numbers of respondents statements derived from ancient philosophies were influential in their attitudes on sustainability/environment.

Another analysis has been done which looked at those scoring 1 (Strongly Agree) or 2 (Agree) for Buddhist (B), Daoist (D) or Confucian (C) attitudes to the environment to see how many of these respondents also scored 1 or 2 to the actual religion or philosophy (B,D or C). Here the scores for Buddhism were 60% (Accountants)/50% (Academics)/36% (Students) showing that in particular many of those with Buddhist attitudes from ancient philosophy could identify with that particular religion or philosophy. For Buddhism the correlations between these two sets of scores were +0.4487 (Accountants), +0.624 (Academics) and +0.1102 (Students). These correlations were positive and in the cases of the accountant and academic groups, strongly positive showing that attitudes and the religion that the attitude comes from are in many cases closely related in the minds of the respondents. The scores for Daoism were 30%/58%/35% with correlations of +0.1985/+0.626/+0.2335, still positive but not as strongly so as Buddhism. The scores and correlations for Confucianism were lower than the other two religions and philosophies. Overall these results would indicate that from the respondent groups there are large number of respondents who can link statements of attitudes pertaining to particular religions and philosophies – both the attitude and the religion it comes from are influential.

The final analysis on metaphysical continuum looked at the respondents who scored more than one attitude (B,D,C) at 1 or 2 and more than one actual religion or philosophy from B,C,D at 1 or 2. The results showed that of those scoring 1 or 2 for one attitude 80%/100%/81% scored at least 1 or 2 for one more attitude. The results for actual religions where more than one is scored highly was 50%/38%/34%.

This further supports the sense of a metaphysical continuum in that more than one ancient Chinese religion or philosophy resonates with the respondents. In the literature review the notion of the three great philosophies flowing into one has already been discussed (Clayre, 1976).

Moving on from metaphysics, the other evidence of an emerging episteme – (1) the notion of invention in an emerging mathesis linked to new science; and, (2) the disappearance of specialization and (3) a more integrated view of the universe (Birkin and Polesie, 2011) were only tackled peripherally in the surveys. The subjects studied by the accounting students – philosophy, ethics, environmental management, accounting for sustainability and environmental accounting show a breadth that students in earlier generations would have been surprised at. This indicates less specialization in Chinese accounting students of today. Also the breadth of subjects taught and researched by accounting academics indicates that the old accounting specializations are in some cases making way for the accounting academic to incorporate ethics (including the whole sustainability area) into their portfolio both for teaching and research.

In terms of new science the question on attitude towards the natural environment had a statement: "China can take a global lead in sustainability based on new science". The number of respondents in the three groups scoring 1 or 2 for this statement were 50%/31%/44% (Account/Acad/Studs). Perhaps these relatively low scores indicate a pessimism in the respondents or perhaps it is just a lack of knowledge of new science. Certainly this statement resonated much less than the philosophical statements from ancient philosophy. The notion of China taking a global lead in accounting was touched on in the interview with the senior official of the CICPA organisation when he stated that China would watch developments elsewhere (in SEA) and then act later – suggesting that to lead developments was not culturally apt.

4.5 Summary

This chapter has presented the findings from the research. Each data source has been dealt with separately – textual sources; interviews; case studies; and surveys. The presentation of the findings was influenced by the nature of the data and so each data source is presented differently. For example: the survey findings lent themselves to a tabular format with sums, percentages, averages and even correlations whereas the case studies were presented discursively based on documents, interviews and observations.

At the end of each set of findings the particular data source has been analysed around the viability questions and the possibility of a new episteme emerging. In summary the key findings were:

- There is evidence from the textual sources that there are viability problems in China that would fit with the viability questions discussed in the literature review and the methods chapter.
- The textual sources supported the notion of China having special characteristics that make the possibility of episteme change more likely.
- The interviews showed the interplay between the various actors in the sustainability network: accountants; companies; managers; government (both MEP and local government); and, the

Chinese Institute of Certified Public Accountants organisation. As to whether there was evidence of the possibility of episteme change, the key findings were the strong philosophical orientation of the interviewees and the good progress in EMA in all the interviewee organizations and some progress in more sophisticated external SAR.

- The three case study companies were primarily guided by modernity in their operations. This modernity is questioned in the literature as being non-viable for the future – unsustainable. All three of the cases evidenced a move away from anthropologization with a more harmony-based approach - whether it was in the personnel's philosophies; the philosophy of the company or the external reporting.

- The surveys found that in these groups of respondents (academics, accountants and students) that there was a serious questioning of viability and a rejection of Modern thinking.

- The surveys also strongly supported the notion that episteme change is likely in China based around a metaphysical continuum that relates back to ancient Chinese philosophies. All three respondent groups identified with both the philosophies (Buddhism, Daoism and Confucianism) and the attitudes towards the natural environment based on those philosophies.

The next chapter brings together all the sources of evidence in a discussion around the research questions.

5. Discussion

This chapter discusses the findings and analysis from all the sources of evidence in an integrated way around the key themes from Foucault's work via the five research questions. Each research question is discussed using the findings from the various sources. It is also important that where findings do not support a particular research question that these disparities are also discussed. This should allow the analysis to be balanced with the conclusions drawn being based on all the evidence to hand.

As discussed in the methods chapter, this analysis also seeks to identify contingencies (accidents of history) in place and also the relations between the various actors in the Chinese sustainability (or un-sustainability) network. These contingencies could be linked to the questioning and possibilities below, but it should be accepted that there could be other explanations and that a neat analysis is unlikely. In practice the world and its contingencies lead to a messy reality with few neat answers to questions.

The discussion also seeks to provide readers with a model for episteme change using the key contingencies in place in China. This model is discussed in terms of the research that has been carried out.

5.1 Integrated discussion around the research questions

To recap, this thesis is looking at accountability in the context of civilization change in China. The emphasis is on accountability of organizations for sustainability (with social and economic sustainability seen as secondary to environmental sustainability, because without a sustainable natural environment the other two would not be possible). The contention underpinning the answer to this question is that China has special characteristics (particularly the philosophical underpinning of its population and institutions) that make it possible for episteme change to take place there. This episteme change could be taking place now and is based on modern interpretations of ancient ideas together with new science. This connection with ancient philosophy in China is considered to provide a metaphysical continuum that has been absent in the Modern episteme. These ideas are encapsulated in recent official pronouncements in China about a change to "ecological civilisation." If Chinese accountants have similar philosophical views to the Chinese population in general, then it is possible that these views will feed into their sustainability accounting work and so new accountability for sustainability could emerge.

The main research question was:

What are the prospects for changes in accountability in China as it moves towards ecological civilisation?

This question has been answered using the chain of subsidiary questions below:

1. Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy (principally Buddhism, Daoism and Confucianism)?

2. Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into *episteme change*?

3. Does Chinese philosophy influence Chinese accountants?

4. If 21ˢᵗ century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations?

5.1.1 Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy?

The evidence to answer this question comes mainly from the literature review. Ancient Chinese philosophy is a source of much debate by modern-day philosophers. On the one hand there are those who have argued that ancient sages were not knowingly ecological or environmental (Goldin, 2005, Miller, 2003). Whilst on the other hand there are those who have argued that the traditional philosophies offer many insights that could be referred to as ecological and that these have been used my modern philosophers to develop a true ecological ethic and critique of the status quo (Tu, 2001). Overall the literature review found that existing scholarship has stated that the central strands of Chinese philosophy (Confucianism, Daoism and Buddhism) have strong links to ecologism in their ideas

Recent interpretation of the rhetoric (and actions) of "ecological civilization" in China have identified its characteristics as being firmly rooted in the ancient philosophies and their emphasis on harmony between humans and nature (including non-human sentient beings). This harmony is characterized in the 12ᵗʰ five year plan by the proposed development model that "should adopt resource reduction, recycling, remanufacturing, zero emissions and industry links and popularize the classical recycling economic model (BritishChamber, 2011)." Further to this Chinese leaders have explicitly referred to ideas of harmony between humans and nature in their speeches about harmonious society (Chan, 2014).

It must be emphasised that this harmony with nature approach by the CPP is very new. Until the last ten years in China the prevalent view was that developed from the "Enlightenment" in Western thought – that there was a conceptual divide between humans and nature, with nature providing the means to humans' ends (Tu, 1998). This nature also being seen as passive and therefore to be forced into obedience (Shapiro, 2001).

Pan (2011) the vice minister of MEP wrote: "China is unique and its most extraordinary characteristic is that, for thousands of years, it has maintained a nation state united by roots, language and ethnicity. This was possible only because of the deep ecological wisdom contained within the country's cultural ideals. This wisdom permeates China's ethics and institutions, is practiced in its way of life and perpetuated by its historical traditions". This deep ecological wisdom is taken to be a direct reference to the ancient philosophies and he has specifically referred to Confucian, Daoist and Buddhist traditions (ibid).

To sum up, evidence from the literature and official pronouncements of CCP finds that China's politicians - in developing the notion of ecological civilization – have used modern interpretations of China's ancient philosophies. Although much of the rhetoric has been based around practical measures to improve the environment and reduce resource use, there is no doubt that ancient Chinese philosophy (based particularly on notions of harmony between humans and nature) and its modern interpretations are strongly linked to the CCP's pronouncements. However the notion of ecological civilisation is one that is still developing with different interpretations being suggested. The CPP does not specifically mention ancient philosophy as a source of its pronouncements on EC, but senior MEP politician Pan Yue's article from 2011 made it clear that the ancient philosophy is at the root of recent CCP pronouncements on ecological civilisation.

5.1.2 Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into episteme change?

This question is a complex one and is best split into at least three sub-questions: (1) Could the change to an emerging ecological civilisation in China be seen in Foucaultian terms as an episteme change? (2) Does ecological civilisation have parallels with Birkin and Polesie's (2012) notion of a primal episteme? (3) Are the interactions of the actors likely to lead to a successful transition to ecological civilisation?

5.1.2.1 Could the change to an emerging ecological civilisation in China be seen in Foucaultian terms as an episteme change?

The answer to this question is based on: the literature on Foucault's notion of episteme change; the literature on the application of Foucault's method; and, from the four data sources - the analysis of the empirical evidence of episteme change.

Foucault's notion of episteme change was based on a new ordering of knowledge, but only when the viability of the old episteme was undermined (Foucault, 2002). Viability of the old episteme is assessed using four sets of questions: (1) around right and proper conduct; (2) around specialisation; (3) around anthropologization; and, (4) around mathematicization (Birkin and Polesie, 2011). In the case of an episteme change to ecological civilisation in China it is the viability of the existing industrial civilization (IC) (Pan, 2011) (with strong links to Modernity) that first must be addressed. There is plenty of evidence that IC in China has led to unsustainability – pollution (including particulates, CO_2 and SO_2 emissions); resource depletion; population growth; inequality; soil erosion; desertification (Economy, 2010) as can also be evidenced from the press cuttings in Appendix 3. In terms of the Foucaultian questions, the data provided evidence particularly of; a lack of a metaphysical continuum with economism and markets the basis of growth and industrialisation; over-specialisation with all market participants taking specialised positions; loss of connection to nature with loss of habitats and species extinctions; and, an over-reliance on mathematical models in areas such as finance.

The empirical evidence from the four sources has been set down in detail in Chapter 4. In summary there is strong evidence from the empirical work that the special characteristics of Chinese people are mirrored in the accountants, managers, accounting academics and accounting students. With a caring view of the planet and its species; harmony approaches gaining high scores; together with high levels of environmental accounting practice already in place.

5.1.2.2 Does ecological civilisation (EC) have parallels with Birkin and Polesie's (2012) notion of a primal episteme (PE)?

A more positive relationship with nature with humans and nature in harmony and nature seen as active and self-regulating are all central to both EC and PE. To that extent there are strong parallels and clear signs of a new metaphysics based on ancient philosophy. The emerging mathesis based around new science is harder to detect from the data collected. However, in the case studies the development of carbon replacement with renewables such as thermal pumping and the use of measures such as tons of coal saved and seconds' worth of total carbon dioxide emissions of the earth showed that the new science of carbon dioxide reduction is being taken seriously.

5.1.2.3 Are interactions of the actors likely to lead to a successful transition to ecological civilisation?

The actors are discussed below:

1. *Companies and their accountants*

   Evidence from the interviews of company accountants and the case studies showed that this actor (or group of actors) is heavily influenced by the government actor. There was also evidence that the accountants had sophisticated views on environmental matters – often going back to philosophical roots. Also there was plenty of evidence of environmental management accounting (EMA) in action (as evidenced in the findings chapter). To this extent the companies can be seen to be an important actor in the network.

2. *Human society (made up of individuals in their families)*

   Society in China (as with natural environment below) has an advocate in the 5,000+ NGOs that fight for environmental justice – both for the planet and for the people. To that extent society is an important actor. In addition there is evidence of popular protests by the public who are affected by existing or proposed developments causing pollution (Economist, 2014).

3. *Government (1) Central government of the Chinese Communist Party and Ministry of Environmental Protection (MEP). (2) MEP is also at local office level along with local government*

   The key interaction identified in this group of actors was the important role of government in moving the environmental sustainability agenda forward in companies. The interviews in particular had a recurring theme that companies carried out environmental management and

reporting to government so that the relevant fees could be calculated and so that sanctions such as fines could be avoided. The interviews with the MEP officials showed that great efforts were being made at a local level to ensure that all companies were visited periodically and that measures of the quantities of for example pollutants were carried out satisfactorily. The pronouncements by the CCP, MEP and in particular articles by Mr Pan (the vice minister of MEP) have shown that government is taking a lead in moves towards an ecological civilization and as such is a key actor in the Chinese sustainability network.

4. *Scientists*

This group was not included in the empirical work for this thesis. An in depth study by KIC InnoEnergy and Questel Consulting showed that Chinese research institutions were considerably ahead of their European and US peers in sustainable energy innovation (Beckman, 2015). Also in a recent report China was seen to be a world leader in renewables (IRENA, 2014) and this is reflected in huge investment both in the renewables equipment and also in the science to develop the renewables.

5. *The natural environment (with all the non-human flora and fauna)*

It may seem strange to class the natural environment as an actor, but the growth in the number of environmental NGOs - from 1993 when the first NGO was set up to over 5,000 in 2012 - shows that there is an advocate for the natural environment and that this advocacy is great and growing. This makes the natural environment a key actor in the network. Also the interviewees in many cases voiced their love of the beauty of the countryside and Nature.

6. *Chinese Institute of Certified Public Accountants (members and executive)*

The interview with the senior official of CICPA showed an actor that is "waiting and seeing" before taking serious action in the environmental accounting area. So this actor was relatively inactive at the time of the interview and there is no further evidence of action or leadership beyond the involvement of CICPA at the meeting of The International Integrated Reporting Committee (IIRC) held on January 17 2011 in Beijing just before the interview.

7. *Modern day philosophers (interpreting ancient Chinese philosophy)*

Philosophy is part of everyday life in China in a way which surprised this researcher. The CICPA official went to his office and brought back an ancient Daoist text. Philosophy – its teachings and the attitudes coming from them were apparent in responses to the survey and in the interviews. The researcher's interest in Chinese philosophy was often commented on positively during interviews and also in emails from respondents to the survey.

8. *Pressure groups (NGOs)*

As already discussed in terms of their inter-relationship with society and the natural environment.

So in answer to the question: it is possible that the actors on sustainability (and its accountability) in China have the potential to enable a transition to ecological civilization? There is already evidence that

the transition is taking place and is more than mere official rhetoric. The actors identified – in particular the natural environment, government and scientists are interacting in a way that is not burdened by democratic, short termism and instead by longer term notions of ecological civilization.

5.1.3 Does Chinese philosophy influence Chinese accountants?

From interviews in 2010 and 2011 it was clear that in the personal philosophies of the accountants there were strong parallels with the ecological thinking in the three central strands of Chinese philosophy. This was reinforced in the surveys in 2015 where high scores (in terms of strongly agree and agree) were found in the attitudes of the respondents that were from ancient (and modern interpretations of) Chinese philosophy.

As to whether these influences on the accountants were likely to lead to them taking a lead in sustainability accounting in their organizations – evidence of this is much harder to provide. Several of the accountants interviewed were the champions of EA in their company and were seen to be influencing the EMA activities. The LCA accounting in the steel company was not being carried out by the accountants – rather by researchers in the Sustainable Development Research Division of the company's Economics and Management Research Institute. At the 6th China BELL Annual Conference in Beijing in 2007, the theme was "Corporate environmental responsibility and the role of the accountant" (ICAEW, 2007), it was apparent that for many of the Chinese accountant delegates it was still an area that they were not involved with. This research has shown that many of the accountants interviewed and surveyed still have no involvement in EA or SA activities – with none of the accountant group of survey respondents having an involvement. It is the transition from strongly held personal views to action in the workplace that is not strongly evidenced from the empirical findings. The tendency has been for the interviewees to defer to government for guidance on their accountability practice.

5.1.4 If 21st century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations?

To recap, the largely textual evidence suggests that there are strong parallels between modern interpretations of ancient Chinese philosophy and notions of ecological civilisation (and the proposed primal episteme of Birkin and Polesie (2012)). Key elements where parallels have been seen are notions: (1) of harmony between humans and Nature (or the Earth) including all species; (2) reciprocity in that the relationships are circular; (3) Nature seen as active and with the potential to self-regulate (not necessarily to the benefit of humans).

If it is accepted that measures proposed for ecological civilisation[17] make good sense, then for Chinese people who have been educated about ancient philosophy there is no need for scientific justification. Policies on harmonious society and ecological civilization have been set out by Chinese government in the last three five year plans. So the sort of debate in the West where climate change science is at odds with climate change deniers is not apparent in a Chinese context; rather, the philosophy guides and supports policies for action towards sustainability.

Ecological civilisation is now considered in terms of the episteme change of Foucault's work (2002). Of course Foucault did not predict change, he looked at episteme changes from history and then suggested the contingencies (or themes) in place in order for episteme change to take place – mainly around loss of viability of the existing old episteme and those suggesting an emerging episteme. The contingencies for a new episteme have been identified by Birkin and Polesie (2011), in summary: (1) emergence of a new metaphysics; (2) invention linked to new science; (3) disappearance of specialisation; and (4) disappearance of anthropologization.

Evidence from the four empirical sources in this research point to the conclusion that there is potential for episteme change in China from Modern to something new called ecological civilisation. This evidence is summarised below:

Textual sources – Clear evidence that Chinese philosophers with roots in ancient philosophy view the existing episteme as fundamentally flawed (Tu, 2001). This has manifested itself in the rapid growth of environmental NGOs in China and the activism of the press in advocating a low carbon economic model using new science. Other developments in philosophy argue for a life-centred morality. In politics the moves towards scientific development and ecological civilisation. An apparently more holistic view on how to solve problems with less specialisation and a more integrated view of the Universe (Chan, 2014).

I*nterviews* – In terms of viability the interviewees' companies were already taking steps towards environmental accounting and sustainability accounting. The interviewees also showed evidence of personal philosophies based on ancient ideas. The interviews with MEP officials showed an increasing role for government. The EA already in place showed a sophistication that had not been found in previous studies that concentrated on reporting.

Case studies – These found evidence of viability problems around an awareness of the environmental aspects from burning fossil fuels and the negative impacts caused by them. Also fundamentally the three cases were all based on the industrial civilisation and capitalism – guided by modernity. But this was causing problems – revenues affected by overcapacity for example. Change was taking place in the case

---

[17] In transforming the economic development mode, the importance of building a resource-saving and environment-friendly society should be stressed to save energy, reduce greenhouse emissions and actively tackle global climate change. We should develop circular economy and low carbon technologies. Through striking a balance between economic development and population growth, sustainable development will be enhanced (BritishChamber 2011).

study companies – tree planting; education of employees via posters; philosophical views of the employees (right up to the chairman) leading to new company philosophies based on harmony approaches.

Surveys – Specific questions on viability and the need for change provided positive responses. Modern ideas of science solving all problems were largely rejected by the respondents. The metaphysical continuum was borne out by strong responses to the attitudes based on ancient philosophy and the philosophies themselves. The respondents also demonstrated that they were open to more cross-disciplinary approaches.

The accountants in the interviews, case studies and surveys provided strong evidence of the influence of Chinese philosophy in their lives but it was much harder to see this in their sustainability accounting work. However, there was evidence of a move towards more sustainability accounting (particularly EMA)[18]. These represent the clearest evidence of SAR in action in this research. The findings lead to the conclusion that given more State guidance and guidance from the CICPA organisation there is potential for a rapid increase in accountability for sustainability initiatives. What this accountability could be is discussed in Section 5.2 that follows this section and concluded on in Chapter 6.

---

[18] From the findings chapter: (1) information on costs involved with waste water treatment; (2) measurement of pollution related costs of new factories in business planning; (3) identification of costs of equipment recycling; (4) estimates of remediation costs associated with incineration plants with associated liabilities; (5) accounting and reporting on bottle recycling projects (see case study); (6) measurement of energy reduction initiatives and the reporting thereon based on tonnes of coal saved per annum; (7) detailed data generated on energy usage and pollutants; (8) accounting for planned introduction of thermal pumping and associated reduction in coal burned annually; (9) costing of tree planting programmes; (10) costing of energy saving and emissions treatment programmes; (11) costing of dust control measures; (12) life cycle assessment project and reporting by a major steel producer together with full reporting on environmental measures.

5.2 Summary discussion

If it accepted from the foregoing analysis and discussion that in this research evidence of viability problems for the Modern episteme has been found, then it allows for a change to a new episteme. There follows a diagram to illustrate the key factors or contingencies leading to change from the discussion using Foucault's ideas on episteme change and the application of this to China:

Figure 8 Contingencies in place in China that could lead to episteme change and hence changes in accountability
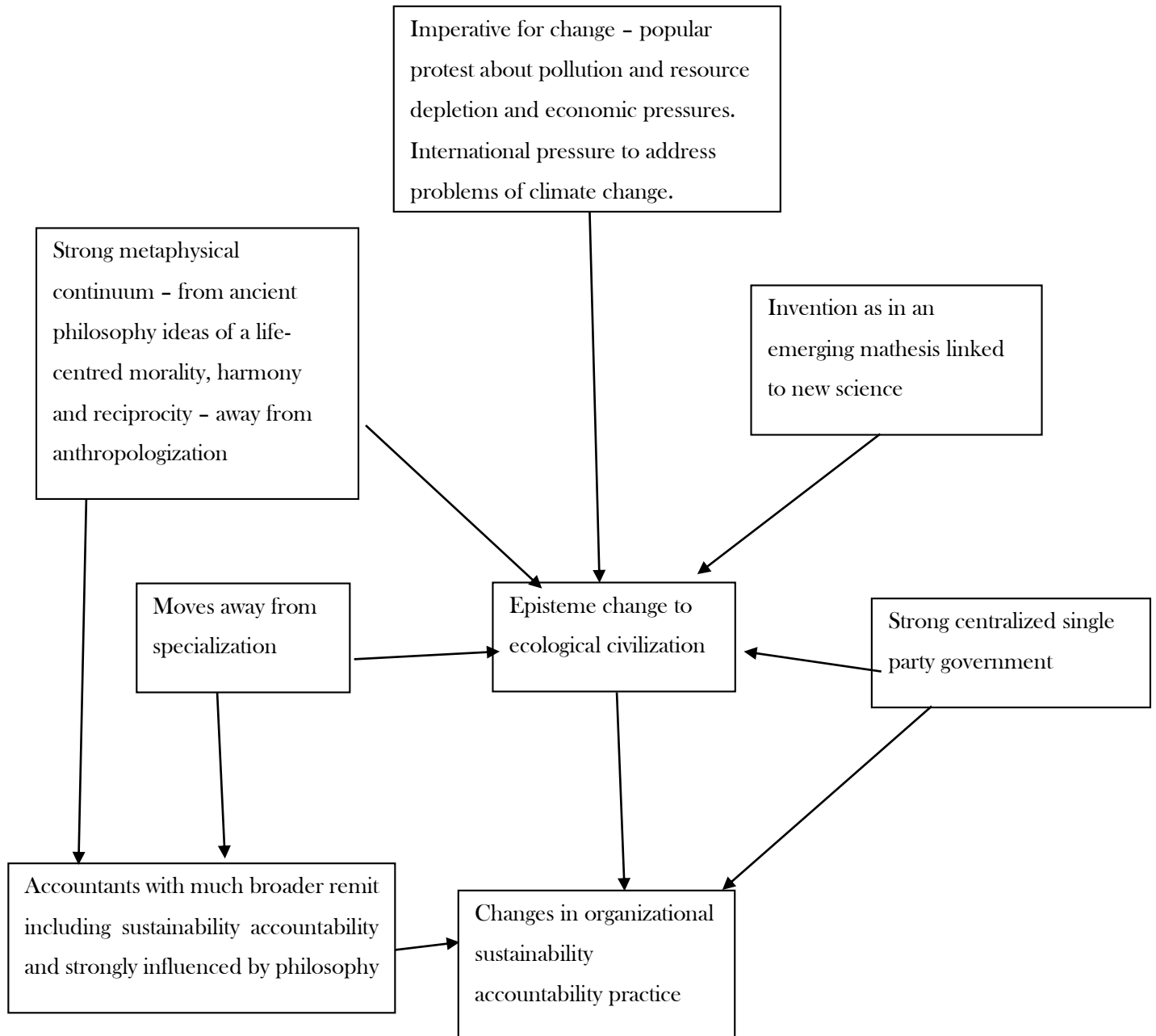
The first point to make is that there is plenty of evidence of sustainability accountability practice from the organizations visited during this research: the firstly strand being accounting and reporting internally on sustainability initiatives and on emissions and resource usage, including reporting to employees and to foreign partners (EMA); the second strand being accountability to government in the form of returns to the local MEP office and the payment of levies and fines to the local government finance office; and the third strand of accountability to external stakeholders such as shareholders in the form of CSR reports and also to the public through newspaper articles. Strand 3 on external accountability to parties other than government was the weakest based on the evidence. This is the sort of accountability that has become very common amongst larger firms in the West in the last twenty years, whilst in China it has been slow to develop. However, evidence from the literature does suggest that there has been a rapid take-up of standalone CSR reporting in China amongst large companies since 2005 (Du and Gray, 2013, Patten et al., 2015). At least one of the companies included in this research was large by any measure yet did not report formally and none of the medium-sized companies had any external reporting. One of the arguments for this lack of external accountability – its absence – could be a tradition of trust (Choudhury, 1988). It can also be argued that there is a tradition of secrecy (Gray, 1988) in China which has not changed significantly in the Communist era. Certainly the evidence from the interviews and case studies bears this out, with a large number of the companies visited very reluctant to provide any documentary evidence. In fact in this research the secrecy extended in most cases to meetings being held away from the company premises, so that it was not possible to observe practices such as tree planting and other visible forms of sustainability management.

This research has provided evidence of organizational accountability for sustainability in China – but primarily internal (EMA) and to government. The question is – *will this accountability practice develop in new ways in the future?* The answer to this question is based on whether the conditions and contingencies in place in China are such that there could be an episteme change from Modern to a new episteme. For the purposes of this thesis the new episteme is titled ecological civilization – a term used by the Chinese Communist Party Central Committee and by senior Chinese politicians in the MEP to describe an aspiration, but also backed up with clear plans in the 12th Five Year Plan (2011-2015) and by its preliminary pledges before the Paris Climate Change Conference in November 2015.

The danger with this naming of the new episteme is that it is clear from Foucault's analysis of episteme change that the change is not one that can be knowingly brought about. The supposition is therefore that the Chinese government is tapping into the zeitgeist, that episteme change is taking place independently of government actions in that it represents a change in the way people think and act[19]. This change, it is

---

[19] Episteme change where our interpretation and ordering of knowledge changes radically.

argued is more likely to take place in cultures where certain contingencies[20] are in place. The diagram above contains the key contingencies that come mainly from Foucault's analysis of earlier episteme changes in Western society and have been developed by Birkin and Polesie (2012) in their monograph about an episteme change taking place now which they title the Primal Episteme. To this have been added several contingencies in a Chinese setting observed by the researcher such as the imperative for change and the strong centralized government. This collection of contingencies make episteme change probable in China.

The empirical research for this thesis has sought to establish, based on the evidence gathered, whether episteme change based on the contingencies in the diagram is probable. So, did the contingencies exist when accountants are questioned (interviews and surveys), organizations observed and documents textually reviewed? Based on the samples for this research no claims to representativeness can be made – all that can be done is to say that the findings are interesting and support the theoretical basis on episteme change. All the methods used have produced data that would benefit from more extensive research in the future and this will be discussed in the concluding chapter.

In this discussion each contingency is reviewed and the data to support it is outlined:

Imperative for change – this is supported by documentary evidence and also observation – not least the researcher's own experience of tasting the airborne pollution in Shenyang and Shanghai. Statistics about the number of people who die from respiratory diseases are also frightening – a recent study found that nearly 4,500 people die in China each day from diseases related to air pollution (Phillips, 2015).

Strong metaphysical continuum – from ancient philosophy ideas of a life-centred morality, harmony and reciprocity – away from anthropologization – this is supported by the interviews and surveys carried out with Chinese accountants, Chinese accounting academics and Chinese accounting students. In the interviews in most cases the interviewee professed strong views based on Chinese philosophies[21]. In the surveys, questions about philosophies and about attitudes based on those philosophies scored highly. In most cases there were strong correlations between high scores for philosophies and high scores for the attitudes to the environment based on the philosophies.

Invention as in an emerging mathesis linked to new science – this is supported mainly by textual evidence with China leading the world in research into and production of non-fossil fuel energy. One of the case study companies was installing thermal pumping to provide heat energy in its factory and offices. The full extent of China's development of new science has not been established in this research but from the textual evidence there is an embracing of new science of thermodynamics that can lead to the successful achievement of government targets in this area. The evidence in this research was limited to one case study where a move towards thermal pumping had been proposed. However, China is a world leader in

---

[20] Contingencies – accidents of history

[21] Primarily Confucianism, Daoism and Buddhism

renewable energy investment (based on 2013 figures of $56.3 billion spending on wind, solar and other renewables (Perkowski, 2014)) and this demonstrates the embracing of new science in this area.

Strong centralized single party government – strong single party government with a long-term outlook and the ability to make policy work is evidenced by the CPP five year plans and the great progress made in China since opening up under President Deng. Its recent pronouncements on ecological civilisation are a clear indication that China's government is taking the need for change seriously. This is evidenced by its recent pledge that China will reduce carbon intensity by 2030. It will aim to cut its greenhouse gas emissions per unit of gross domestic product by 60-65% from 2005 levels under a plan submitted to the United Nations ahead of crucial climate change talks in Paris later in 2015 (Reuters, 2015). It has also pledged that its CO2 emissions will also peak by 2030 (ibid).

Further it should be noted that the Chinese government's emphasis on ecological civilization may change as it is faced with growing economic and fiscal pressures. However, it is the thesis of this research that the imperatives for change, linked to the other contingencies, will cause episteme change in Chinese society that will be unstoppable – regardless of the government policy of the day. Episteme change is not something that will come about as the result of government policy and the ecological civilization policy since 2007 is a manifestation of episteme change taking place rather than the driver of that change.

Moves away from specialization – the interviews and the surveys showed that the Chinese accountant of today and tomorrow in the case of the students has an interest in sustainability and the accountability around this. This demonstrates that accountants have moved away from narrow specialization into a particular traditional branch of accounting.

Accountants with much broader remit including sustainability accountability and strongly influenced by philosophy – the literature found that the role of the accountant in sustainability accounting and reporting should be an important one, but that the existing practice was very patchy with accountants still very resistant to change and therefore reluctant to be involved in the implementation of EAR and SAR initiatives. This research has produced patchy results when looking at this contingency. 56% of the accountants interviewed had an involvement in environmental accounting initiatives but this was mainly the provision of information for internal management purposes. Of those with an involvement 67% considered themselves to be champions of environmental accounting in their company.

In terms of Chinese philosophy, all the accountants interviewed exhibited personal philosophical values on environmental matters and that these were often rooted in ancient Chinese philosophy. The surveys provided more evidence with a high proportion of respondents identifying the influence of Chinese philosophies and their attitudes to the environment based on the philosophies as strongly agree or agree. So, the evidence from this research shows accountants strongly influenced by Chinese philosophy.

In terms of involvement in accountability for sustainability by their organizations the situation is similar to existing research with involvement and championing of accountability for sustainability by accountants still patchy. There was a sense from the interviews that companies and their accountants were waiting for government or CICPA to introduce new accounting for sustainability – they were waiting and watching. This was the same view at CICPA who were again watching and waiting, which suggest that the two groups are both waiting for government.

Based on the evidence gathered this discussion has led to the conclusion that there is potential for sustainability accountability practice to develop in China. But in what forms will this accountability practice develop? The empirical research on which this thesis is based lead to the following possibilities:

1. All the evidence points towards an episteme change which in China has been termed ecological civilization. If this change takes place it follows that accountability will move more into sustainability areas – social, environmental and economic – in a more balanced way with a more cross-disciplinary approach to sustainability and accountability by organizations.

2. The notion of organizational sustainability is perhaps inappropriate as it is impossible for a single company to say whether sustainability has been achieved. The example of the Liaoning Province EPB report shows a way forward, where sustainability could be measured in a geographical area using data gathered by government from companies and from observations of the local environment (river water quality for example).

3. The notion of corporate responsibility for environmental sustainability - with its tendency to see the directors of companies as responsible - appears to be different in China. Examples were quoted by EPB staff of where companies and the Ministry of Environmental Protection officials had taken a joint responsibility for environmental problems. This means that there is the potential for accountability to be shared – an important move away from organizations being wholly responsible for environmental incidents.

4. At a company level it has been argued that a tradition of secrecy has tended to lead to an absence of publicly available reports and information on sustainability matters. It seems unlikely that this tradition will be overturned as it predates the Modern episteme. Bigger companies can be expected to continue the CSR reporting that has emerged over the last ten years. Small and medium companies have an opportunity to vastly improve internal accounting and reporting on sustainability issues. This includes: (A) Straight forward tools to measure negative and positive environmental impacts. Many of the companies visited were already using one or more of these tools but there was no consistency or standardization. (B) Special tools to show how companies are sustainable. Many of these have been developed in the last 20 years in the West but their use has been very limited – for example Full Cost Accounting (FCA) which would measure almost all companies as unsustainable in that the full cost of remediation at the end of each period would cause bankruptcy.

5. A key area of accountability by all companies will be the sophistication of reporting to government that has already partially developed. As has been noted, government has a special role in China and is still the key actor in accountability by companies and then by the government itself in regional accountability reporting.

6. Conclusions

This research was stimulated by the author's time working in China from 2006 to 2008. Several observations were made: (1) high levels of pollution made day to day living uncomfortable and dangerous; (2) huge levels of development of cities and industry with the attendant problems of resource use and loss of green spaces; (3) a prevailing attitude amongst my Chinese students that China should be allowed to catch up with the West even if this meant environmental problems; (4) an awareness in the accounting community (practitioners, professors and students) about climate change and environmental matters and the need to be accountable for them; (5) high levels of awareness and practice around ancient Chinese religions and philosophies; for example festivals, temples and holy places.

With these observations in mind the author's own interest in environmental accounting led to the normative proposition that if China does not change course and begin to embrace notions of sustainability (in particular environmental sustainability) and account for it in new ways, then the situation could become intolerable for humans and non-humans alike both in China and in the world; because China is so important globally.

The project started as an exploration of developments in environmental accounting taking place in China and an attempt to explain the reasons for them – with a hypothesised explanation around accountants' being influenced by ancient Chinese philosophy. 25 interviews carried out in 2010 and 2011 found extensive use of environmental accounting (mainly environmental management accounting internal to the organization). The interviews also found that Chinese accountants interviewed had deep connections to ancient Chinese philosophy. Connecting this early stage research and making sense of it around the normative perspective of the researcher was problematic and the over-riding questions after the interviews were – What is the usefulness of the research? What is the theoretical basis for the research?

A major change in the theoretical basis of the project took place when the researcher discovered the recent work by Birkin and Polesie (2011). Earlier research into environmental sustainability accountability had a strong grounding in critical and practical approaches but it had not led to the sort of fundamental changes in practice that were suggested in the research. In summary the literature on ecology and accountability responses has been Western dominated and although often inspiring (Harding, 2006, Carson, 1962) it is apparent that in spite of research and publications from the 1960s the ecological crisis is becoming more critical and popular opinion has been dominated by climate change denial. The notion that China could be a fertile ground for episteme change – civilization change – gave the research on which this thesis is based a new earth changing relevance, usefulness and impact.

6.1 Summary of research questions and methods used

The main research question was:

What are the prospects for changes in accountability in China as it moves towards ecological civilization?

The subsidiary questions were:

1. Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy (principally Buddhism, Taoism and Confucianism)? RQ1
2. Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into *episteme change*? RQ2
3. Does Chinese philosophy influence Chinese accountants? RQ3
4. If 21st century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations? RQ4

Chapter 3 explained and justified the methodological framework for the research. It started with a general discussion of the research philosophy (interpretivism) and the ontological (relativist) and epistemological (transactional or subjectivist) stances that support the philosophy. It also explained and justified why the chosen theoretical basis of Foucaultian *episteme change* was most appropriate in seeking answers to the research questions. Next it outlined and justified the mixed methods in use in this study – textual analysis, interviews, mini-case studies and surveys – and explained how the data generated was to be analysed using Foucaultian archaeological method based around viability issues and episteme change and the notion that such change is more likely in certain social groups or cultures (in this research broadly China and therefore its accountants).

6.2 Summary of key references in the literature

The theoretical basis of this thesis is around Foucault's (2002) work on episteme change. Now it was possible to imagine the future where a new episteme could emerge that would include a new way of thinking about the planet and its sustainability. Importantly Birkin and Polesie's (2012) ideas saw parallels between their notion of an emerging primal episteme and thinking in China. In particular ideas of Tian Xia – all under heaven - and harmony approaches, with nature seen as active and self-regulating (Zhao, 2005). At around this time also Chinese government rhetoric and action began to seriously develop notions of a move to a new ecological civilization also with strong roots in ancient Chinese philosophy (Pan, 2011).

In terms of accountability for sustainability the key references are from Gray, R. (1994, 1995, 2002, 2010) and Bebbington, J. (1997, 2007a, 2014) mainly from the journals Accounting, Organizations and Society; and, Accounting, Auditing and Accountability. The overriding impression from this literature was that accountability had been hijacked by those who were in fact held accountable; that there is no such thing as sustainable organizations except in very rare cases; and that the accountability mechanisms developed to date have not led to serious changes in behaviour by organizations.

6.3 Conclusions

From the evidence it is clear that Government rhetoric and action on ecological civilization in China has parallels with modern interpretations of ancient Chinese philosophy. The evidence for this comes mainly from the literature review. Ancient Chinese philosophy has an emphasis on harmony between humans and nature. The proposals for ecological civilization are all practical (for example: reduction and recycling of resources) but they also allude to the "classical recycling economic model" which harks back to ancient ideas of thrift. Also the articles by the Vice-Minister at the Ministry of Environmental Protection have suggested that harmonious society and harmony between humans and nature comes from the ecological wisdom of the ages. The interview with the senior official of CICPA also showed that at the highest level of the institute there is awareness of ecological civilization and an underpinning in ancient philosophy.

The move towards ecological civilization in China has close parallels to Foucaultian notions of *episteme change* with the viability of the Modern episteme called into question and the contingencies and actors in place to enable change to take place. The evidence from the literature and textual sources provided a strong lead that the existing industrial civilization in China has viability problems. Environmental degradation and resource over-use are going hand in hand with serious social problems caused by the exodus to the cities from the country and are all unsustainable. Added to this has been the lack of a metaphysical continuum in that capitalism and neo-classical economics have influenced a "growth at all costs" mentality.

The episteme change in China that this thesis has concentrated on is open to the criticism that globalization will drive all nations on a similar path and that therefore China cannot develop in a different way toward ecological civilization. In answer to this criticism it should be noted that the whole basis of this research is that a new episteme would see "Modern" explanations and solutions as fundamentally flawed. This includes notions of globalization - exemplified by global trade agreements and international accounting standards - which are marked in reality by high levels of separation and independence. This provides clear evidence that "Modern thinking" is dangerous and based on a mistaken view of the world, that the sort of episteme change mooted in China (and ultimately surrounding countries with Confucian roots) will address. Foucault (2002) always argued that episteme change could take place in different places in different ways and it is this argument that has been used in looking at episteme change in a Chinese context.

Based on the samples obtained (interviews, cases and surveys), Chinese accountants were influenced by ancient philosophy on the environment and human's relationship with it, with an emphasis on harmony with nature. The evidence for this comes from the interviews and surveys.

The interviews and case-studies also provided evidence that there were a range of environmental accounting and sustainability responses (mainly EMA) already being effected by companies. These responses were very much in line with existing thinking and scholarship in the West. However the lack of public reporting on SA raises issues of absence and the trust that goes along with a reduced need to report.

Overall it has been very hard to see ancient philosophy influencing Chinese accountants in their SAR work, at this stage, based on the evidence of the interviews and case-studies. The existing SAR responses were mainly internal accountability in the form of environmental management accounting and external accountability to government. This thesis is very much about possibility. At present it would seem that there is no compelling evidence that Chinese accountants are developing new accountability for sustainability issues. But such is the apparent influence of ancient Chinese philosophy on Chinese accountants and the contingencies in place are such that new accountability responses are possible in the emerging episteme – ecological civilization.

So to the overall aim of this research:

To contribute to the understanding of accountability in the context of civilization change in China.

This research has provided a wide-ranging look at accountants and other actors in the Chinese sustainability network - in for example: companies; government; and in higher education. The accountants interviewed and surveyed showed an appreciation of environmental problems and a special way of thinking about their world in philosophical terms. These accountants could break free from Modern accounting based on neo-classical economics and financial capital and move towards new forms of accountability. Developments in accountability in China would be built around key actors with the most important actor being government that is expected to take a lead by both companies and accountants.

In the short term this accountability will probably mirror developments in the West with straight forward tools to measure negative and positive environmental impacts. Many of the companies visited were already using one or more of these tools but there was no consistency or standardization. Reporting to MEP at local level has already led to the development of measurement systems for pollutants to air, water and land.

In the medium term there could be the emergence of special tools to show how companies are sustainable which take into account externalities that at present are rarely accounted for. Many of these have been developed in the last 20 years in the West, but their use has been very limited. For example: Life Cycle Assessment (LCA) tools and greater EMA and external reporting on sustainability matters; and Full Cost Accounting (FCA) which would lead to almost all companies being deemed as unsustainable in

that the full cost of remediation for environmental damage at the end of each period would cause bankruptcy.

In the longer term new forms of accountability could develop but only when the viability of the existing Modern episteme is undermined and it ceases to be viable. There is evidence that this undermining is taking place but the process of episteme change could take many years to work through. These new developments in accountability will be based on the contingencies and actors identified. As has been discussed this could be based on a move away from the company as the key organization in accountability for sustainability. Instead the geographical region – for example a province or river basin – could be the basis for accountability, with the companies and other organizations in the region all feeding into reporting by government. There is evidence of this development in the Liaoning Province environmental report (LiaoningEPB, 2008) obtained whilst in Shenyang in 2010. These reports at regional level would then be used to produce national sustainability reports. So accountability for sustainability becomes a national endeavour. This could then be developed into geographical groupings of countries (for example those countries feeding into the Mekong Delta). Accountability to government by organizations is already taking place in China and this will have to continue and develop if there is any prospect for the achievement of the stated government aim of ecological civilization.

6.4 Contributions and impact of the thesis

This thesis argues and supports with empirical evidence that in China the contingencies in place allow the possibility of episteme change. It also argues that with this change will also come new accountability for sustainability. The change in China has already been voiced by the Chinese Communist Party in its 12th five year plan and called "ecological civilization" (BritishChamber, 2011) (see Section 2.2.5). This is mirrored by the work of Birkin and Polesie (2012) who have proposed an emerging "primal episteme" based on a return to intrinsic values. Intrinsic value is the value placed on what we currently do not value such as the ecosystems that provide all our resources and a sink for all our waste (ibid).

The questions of viability above and the evidence of an emerging episteme are based on the theoretical deductions and observations of Birkin and Polesie (2011) and have not previously been applied in an empirical sense. The notion that China could be a fertile ground for episteme change – civilization change – gave the research on which this thesis is based a new relevance, usefulness and impact.

There are three main areas of contribution: (1) theoretical, (2) on accountability and (3) empirical –

THEORETICAL – the research has developed existing ideas on episteme change and applied them to China and its actors and contingencies. The diagram in Section 5.1 added several new contingencies to the model of episteme change developed from Foucault (1972) by Birkin and Polesie (2011, 2012) – notably the imperative for change and the strong centralized single party government. Furthermore in the discussion Section 5.1.2.3 the actors in the Chinese sustainability network have been identified from the

literature and empirical work and the inter-relations discussed. This applied theoretical work is the first main area of contribution.

ACCOUNTABILITY FOR SUSTAINABILITY – the evidence gathered on existing accountability for sustainability in China made an interesting contribution on the lack (absence) of reporting by companies and also on the highly innovative region-based reporting in Liaoning Province. Accountability moving away from the notion that companies can lead the planet to sustainability is a key contribution which backs up empirically earlier critical theoretical work on the role of the state in accountability for sustainability.

EMPIRICAL – it has been found that most of the existing literature of both China and episteme change is of a theoretical or anecdotal type with little attempt having been made to test the ideas using empirical data. In this research an attempt has been made to address this in the empirical work using textual sources, interviews, case studies and surveys. Although the empirical work attempted makes no claim to representativeness to a population (of Chinese accountants), it has been useful in linking back to and developing the theory of episteme change.

In terms of the overall aim and research questions the contribution is highlighted below:

The main research question was:

What are the prospects for changes in accountability in China as it moves towards ecological civilization?

The contribution in terms of this main question is best broken down into the subsidiary questions below.

The subsidiary questions were:

RQ1 Are there parallels between recent Chinese ideas on ecological civilisation and modern interpretations of ancient Chinese philosophy (principally Buddhism, Taoism and Confucianism)?

Existing research has looked at ecological ideas in modern interpretations of ancient Chinese philosophy. This thesis has extended this research by linking it to the recent Chinese government policy towards ecological civilization. Further to this in interviews with local representatives of the Chinese MEP the structures in place to move China towards ecological civilization have been examined in an innovative way.

RQ2 Do ideas of a change to an ecological civilisation in China have links to Foucault's archaeological insights into episteme change?

This thesis has developed theoretical thinking on episteme change by applying it to China and its possible change to ecological civilization. An important insight is that it is not the government policy that will cause change to take place – rather that government is tapping into a zeitgeist and that if the contingencies are in place there will be an episteme change and this change will not be forced, it will be a natural outcome based on the contingencies and the interactions of the actors around them.

RQ3 Does Chinese philosophy influence Chinese accountants?

This thesis has gathered empirical evidence to test this question using interviews, case studies and surveys. It represents a novel examination at Chinese accountants and tests the extent that they are influenced by Chinese philosophy. Again no claims to representativeness are made but the findings showed clear empirical evidence of the influence.

RQ4 If 21st century Chinese culture provides a potentially fertile ground for a change to ecological civilisation, is it possible that this could lead to new accountability by Chinese organizations?

On this question the thesis research found some insights that are part of the contribution. These insights around existing internal accountability, absence of reporting, regional accountability and the powerful influence of government have been discussed innovatively around the Foucaultian framework. These insights open up the way to a stream of research that is discussed in the next section.

Finally, the overall aim was to contribute to the understanding of accountability in the context of civilization change in China. The research has been able to examine and test the notion of civilization change in China using an epistemic theoretical framework and empirical findings. These findings, although not representative to a population, have largely supported the Foucaultian theoretical ideas. This empirical testing to a theory in this context provides an original set of insights on accountability for sustainability in a Chinese setting (see above).

In terms of impact – it is hoped that the ideas in this thesis can be developed and disseminated to a wider Chinese audience – policy-makers; companies; MEP at local level; accounting institutes and standard setters. Understanding their responses would make a further research project (see also Section 6.6 on opportunities for further research). It should be added that the ideas on episteme have potential interest to policy-makers in other countries – in particular emerging economies and developing countries.

6.5 Limitations of the study

This section explains several limitations to the work done for this thesis. All research has limitations and this research is no exception.

6.5.1 Evidence from four sources

Textual, Interviews, Mini-Cases and Surveys. For each source the data was relatively limited. This was partly because gaining access to respondents in China is strongly linked to guanxi where a contact is based on friendship or favours. If a respondent is not either known to the researcher or a guanxi contact of a person known to the researcher it is highly unlikely that he/she will respond. This limited the potential interviewees and cases to ones identified by the researcher's contacts as fulfilling the research aims and objectives.

6.5.2 Language

The researcher does not speak or read Chinese. Using either English language sources/instruments or interpretation loses many of the nuances of the language. All documents in Chinese were translated by Chinese nationals but meanings can be lost in translation. The interviews were carried out using several different Chinese interpreters and in some cases in English. Even though the transcripts or summaries were checked by the interpreters it is still possible that some of the meanings could be have been lost.

6.6 Opportunities for further research

The most important opportunity is for Chinese accounting academics and academics from other disciplines, preferably Chinese nationals with strong cultural and philosophical awareness, to develop this research along several strands. This thesis and the research that underpinned it relied on English language reports, translation of Chinese language documents, and interpretation of interviews. A Chinese speaker has an additional advantage in being able to fully understand all contributions in Chinese and also be more in tune with Chinese culture and business methods.

A further opportunity is to develop the research using cross-disciplinary groups of researchers. For example: accounting academics (both Chinese and Western), politics academics, sociology academics, philosophy academics, ecology academics. It has been suggested by Birkin and Polesie (2011) that the key characteristic of a new episteme is the removal of specialization. Hence, cross-disciplinary teams of researchers avoid the modern tendency towards specialization.

There is also an opportunity for academics in many countries to develop the theoretical contribution of this thesis whilst looking at other countries and cultures. It would be interesting to look at African countries that have been big recipients of foreign direct investment from China. As China is seen to be a major emerging country it makes sense to develop the research by looking at one or more from the other BRICS emerging nations (Brazil, Russia, India, [China], South Africa) in terms of sustainability accountability responses.

Whilst academics are the important group in terms of developing streams of research it is also vital that future research involves practitioners - possibly through links with: the Chinese MEP; regional governments in China; Chinese companies and the big accounting firms. There is a need to disseminate findings and ideas throughout the accounting profession. The reaction of practitioners to the ideas of episteme change and changing accountability responses would make an interesting research project in itself.

Six strands of opportunities for further research:

Strand 1: SUSTAINABILITY ACCOUNTING AND REPORTING IN CHINA AND OTHER COUNTRIES – The research in this thesis looked at a sample of less than twenty companies. In a Chinese context it would be possible to expand the number of companies sampled into several groups:

quoted companies (Chinese owned); branches or subsidiaries of Western companies; state owned enterprises; small and medium enterprises. The research could be based on case studies or on documentary analysis of larger groups of companies. Sustainability accounting and reporting initiatives could be examined and the reasons put forward for the initiatives could be analysed using episteme change theory, institutional theory, legitimacy theory and/or reputational risk theory. This type of research would be appropriate for final year undergraduate or Masters' students as it could be successfully pursued using a desk-based strategy with an emphasis on what is going on.

Strand 2: ACCOUNTABILITY FOR SUSTAINABILITY DEVELOPMENTS EXAMINED USING AN ACTOR NETWORK THEORY METHODOLOGY – In a Chinese setting there would be a benefit from closer examination of the relationship between companies and the Ministry of Environmental Protection (MEP) local offices. The feasibility of obtaining reports by companies to the MEP and assessing the status and prospects in terms of sustainability and sharing of responsibility. Also there is potential to analyse reports prepared by the Ministry of Environmental Protection for political regions on environmental sustainability. In other countries an identification of the important actors in the sustainability network and the interactions of the actors would be of interest. This research should help to understand why accountability initiatives take place and the pressures for change and how the key actors push this change agenda.

Strand 3: EDUCATION ON SUSTAINABILITY ACCOUNTABILITY – Again this could be carried out in any country. From this research there is potential to increase the sample of Chinese accounting students. A finding from this research was that Chinese nationals have significant exposure to ethics in their education in China. This could be more fully assessed both in China and for then for Chinese nationals attending Western universities. How this ethical training links with the education on sustainability accounting and accountability could be tested using Foucault's ideas on episteme change and in particular the notion of a metaphysical continuum. The type of research is more likely to be appropriate for post-doctoral academics.

Strand 4: ECOLOGICAL CIVILIZATION – As a Chinese government concept this provides evidence of changing thinking. However it is only if the dominant way of thinking changes across society that episteme change will take place. Research could be carried out that gathers evidence about (Chinese) accountants' thinking in new ways and moving towards ecological civilization. In particular in China accountants' sympathy with modern interpretations of ancient Chinese philosophy would benefit from cross-disciplinary research teams – philosophy, accounting, ecology.

Strand 5: MODES OF EXISTENCE - This research has referred to the work of Latour (2014 (1)) on modes of existence. This could be much more fully developed using cross-disciplinary teams so as to examine the modes of existence around accounting and accountability in particular settings (notably China). Changing modes of existence have strong parallels with episteme change and to that extent this avenue of research comes from this thesis and its contribution.

Strand 6: CHINESE PHILOSOPHY FOR THE MODERN WORLD – This research concentrated on testing empirically the philosophical views of Chinese accountants. This could be expanded to other groups in Chinese society as it represents a rare empirical attempt to gather data on such matters. It could also be expanded to other countries – allowing for comparisons of philosophical influences. In each case the researcher teams should include nationals of the relevant countries.

Appendices

Appendix 1 Interview Schedule

For Chinese accountants in Shanghai and Shenyang

Group 1 questions (the interviewee – background information)

> Position held
>
> How long in that position
>
> Previous position
>
> Qualifications
>
> Date started work

Group 2 questions (the company)

> Industry in which company operates
>
> Size of company (number of employees)
>
> Environmental policy of the company
>
> Philosophy underlying environmental policy
>
> What environmental accounting does the company do:
>
> Management accounting (budgeting and costing)
>
> Project appraisal
>
> Financial accounting and reporting
>
> Ecological accounting and reporting

Group 3 questions

> Are you involved in any of the environmental accounting?
>
> Are you a champion of environmental accounting or are you merely doing what you are told to do?
>
> Does your personal philosophy of life influence you in your environmental accounting work?
>
> Include in question on personal philosophy – Buddhism, Daoism, Confucianism, Feng Shui, Socialism/Communism, Western influences.
>
> What is your view on the position of humankind in relation to Nature? Are humans at the centre of the universe?
>
> Should Chinese companies do more in the environmental accounting area?

Appendix 2 Summary of organisations from which data gathered via interviews:

Number	Location	Ownership	Industry	Employees in China
1	Shenyang	Chinese company – part of German multinational	Engineering	200
2	Shenyang	Chinese owned	Automobile parts	65
3	Shenyang	Chinese owned	Animal feedstuffs	5,000
4	Shenyang	Provincial government department	Finance	9
5	Shanghai	Chinese owned	Building	500
6	Shanghai	American owned enterprise	Engineering	100
7	Shanghai	Chinese quoted	Dairy products	20,000
8	Shanghai	Chinese quoted	Electronics	4,000
9	Beijing	Professional body	CICPA	Not given
10	Shenyang	Chinese government	Environmental protection bureau	1,200
11	Shenyang (Fushun district)	State Owned enterprise	Mining safety	1,200
12	Shenyang (Fushun district)	State Owned enterprise	Mining safety	1,200
13	Shenyang (Fushun district)	State Owned enterprise	Mining safety	1,200
14	Shenyang (Fushun district)	Chinese government	Environmental protection bureau	Not given

15	Shenyang	State Owned enterprise	Electronics	470
16	Shenyang	State owned enterprise	Waste management	Not given
17	Shenyang	State owned enterprise	Engineering materials	300
Number	Location	Ownership	Industry	Employees in China
18	Shenyang	State owned enterprise	Engineering materials	300
19	Shenyang	State owned enterprise	Engineering materials	300
20	Shanghai	Chinese quoted	Dairy products	20,000
21	Shanghai	Chinese quoted	Steel producer	130,000
22	Shanghai (Zhejiang province)	Chinese unquoted	Metal products manufacturer	75
23	Shanghai (Zhejiang Province)	Chinese unquoted	Real estate investment	8
24	Shanghai (Zhejiang Province)	Chinese quoted	Cigarette producer	7,750
25	Shanghai (Zhejiang Province)	Chinese private business	Tax advisers	1

Appendix 3 Summary extracts from Chinese English language newspapers in April 2010

April 7, 2010 Global Times (page 6) – Zou Le – Poor effort to curb desertification – Excessive mining fueling sandstorms – desertification blamed on excessive mining. Government funding of Yuan130 million ($19million) had been used in Xinghe county to plant trees but of the 136,000 acres planted only 60% thrives and 50,000 acres have died due to droughts. This county's desertification has been blamed for much of the sandstorms affecting Beijing. Comments from local government officials as to the lack of funding to ensure saplings are maintained and watered.

April 7, 2010 Global Times (page 6) – Chimney Down – An abandoned chimney at a local brick kiln gets demolished in Hefei, Anhui Province yesterday. The government demolished the chimney, located near a water reservoir, to avoid possible pollution.

April 7, 2010 Global Times (page 6) – Xu Shenlan – Villagers dry but soaking in frustration. A collapse of a mineral plant's waste container led to a massive flood. Government safety regulation is for such a container to be at least 3 kilometers from a large-scale drinking water source, major historic sites and residential neighbourhoods – this waste container was only 500 meters from a village.

April 10-11, 2010 China Daily (page 3) – Wang Qian – China cracks down on heavy metal pollution. Growing number of lead poisoning cases. Zhou Shengxian, head of Ministry of Environmental Protection said that avoiding emissions of heavy metals would be top on their agenda. 900 tonnes emitted every year of heavy metals – lead, mercury and chromium Public protest by 92,000 people across the country in 2009 in a nationwide campaign against factories operating illegally. Of a total of 9,123 companies emitting heavy metals, 2,183 were found to be harmful to the environment, with officials closing 231 and suspending 641, the statistics showed (source not clear). A similar picture for factories emitting arsenic with 36 shut down and 248 suspended. Examples of lead poisoning cases are outlined together with effects on humans. Farmland and water also polluted. A study by the Research Center for Eco-Environmental Sciences showed that 20% of the country's farmland was polluted by heavy metals – causing crop output to be decreased by more than 10 million tonnes. In order to fight heavy metal pollution, China will launch a regulation on recycling and dealing with electronic waste in 2011.

April 10-11, 2010 China Daily (page 3) – Xin Dingding – More help to battle desertification urged. Based on call by a senior UN official (Luc Gnacadja executive secretary of the UN Convention to Combat Desertification (not Chinese)) for developed countries to boost technical and financial support to help developing countries (implication that China is in this category) fight desertification and sandstorms. Highlight recent sandstorms in China. China seen to be making headway in combatting desertification – area of degraded land was reduced by on average 7,500 square kilometres each year between 1999 and 2004 – the official said based on a global assessment (source not given). In 2010 China had 2.6 million square kilometres of degraded dryland, accounting for 27% of the country's land territory. China lauded

by Gnacadja as being a strong supporter of the desertification convention. Negative impacts of desertification outlined.

April 10-11, 2010 China Daily (page 4) – No author – Flour investigation underway in Jiangsu Province. Law enforcement authorities (city government) were investigating reports that an East China food additive maker added pulverized lime, an inedible ingredient, to flour bleaching agents. Possible effect5s include lung damage. An investigation team ordered the company to suspend production, sealing off its raw materials and products, and sent samples for testing. The company denied the report.

April 8, 2010 China Daily (page 5) – Chen Hong - Foxconn rocked by latest suicide attempt. Company was a major manufacturer for Apple Corp. In the past month, four Foxconn employees had either ended their lives or attempted suicide. Calls by the private Shenzhen Yiquan Psychological Consultation Company for companies to pay more attention to the mental health of their employees.

April 8, 2010 China Daily (page 5) – Xinhua – Thousands of dead fish found in contaminated reservoir. Used for irrigation and flood control (implication that not used for human consumption directly). Liaoyang county government has decided to seal up the reservoir's overflow gate to stop the polluted water from flowing onto farmland. Reservoir owned by the water conservancy bureau of Liaozhong county in Shenyang, Liaoning Province. Quote from a farmer – "My cropland will suffer this year if the water problem is not solved quickly."

April 8, 2010 China Daily (page 5) – No author – Coal dust fire kills one; two missing.

April 8, 2010 China Daily (page 6) – Cheng Guangjin – We must practise what we preach. Report on the Asia News Network meeting in Beijing. Wong Chun Wai, who was the editor of the Star in Malaysia, believed that media organizations have a dual role in addressing climate change and environmental protection: First reporting the issues; then internally, having supportive policies.

April 20, 2010 China Daily (pages 1 & 6/7) –Li Jing – Green NGO drives change at grass roots. Environment: Farmers' NGO taking polluters to task. How citizen groups are helping to clean up the countryside. Report from Henan Province. Features Tian Guirong who as well as being a farmer also runs a successful battery business. She read Rachel Carson and was moved firstly to tears, then mobilized local farmers and others to set up an NGO to deal firstly with waste batteries and then, more generally, pollution by local factories. Given scientific studies that show that 600,000 litres of water can be polluted from then discharge from one leaking battery the group had collected 70 tons of waste batteries since 2002 (from its 3,000 members). The group boasts that it has been successful in closing 100 polluting factories. Her NGO is called Xinxiang Environmental Protection Volunteers. Mentions a Beijing-based NGO called Green Beagle that aims to advocate popular science among the public – using expert citizens and journalists to find out more about the environment. Cites example of an expert citizen on radiation. Another NGO is the volunteers in Aobei district of Beijing set up to protest about the use of incinerator

plants in cities. Has developed a detailed policy proposal for government on garbage treatment – a way for the public to engage in the policy- making process.

April 20, 2010 China Daily (page 8) – Hu Shaowei – Blazing new technology trails – Promoting self-innovation is key for sustainable development. Argues that a number of developed countries have argued that technological competition is a priority. China has failed to take hold of several opportunities to keepits science and technology in step with the rest of the world. Tendency to depend on traditional industries in achieving growth targets. Argues that there has been inadequate policy support from government for new industries. Sustainable development should be put on firm strategic direction – with utmost importance being attached to self-innovation as well as home-grown technologies, patents and technical standards. Argues for special funding regime to support new industries (implication that government would be the source of such an initiative.

April 20, 2010 China Daily (page 8) – Chen Weihua – Reflecting on Earth Day for the nation. Argues for the importance of clean air, water and soil – these resources being in short supply in China now. Lack of reporting on the environmental crisis in past decades. Half of waterways severely polluted with hundreds of millions of rural Chinese with no access to safe drinking water. Over half of 600 major cities facing water shortages. Desertification creeping upwards. Air pollution so bad that many urban residents do not remember blue skies. 20 million extra cases of respiratory diseases each year due to air pollution. As China has achieved an economic miracle in the last 30 years, it has also been destroying nature at an unprecedented speed and scale. Calls for major investment of GDP in order to clean up air, water and soil. Refers to inter-generational legacy – this generation not to be remembered for turning beautiful natural landscaped into uninhabitable areas. Calls not just for Earth Day but Earth Century 21.

April 13, 2010 China Daily (page 11) – Wang Chenyan and Hu Haiyan – Closer ties on renewable energy technology beneficial: Danish PM. Leaders of China and Denmark witnessed the signing of an agreement on a new Sino-Danish Center for Research and Education (expected to become operational by 2013). The Center is to focus on five areas including: clean technology, renewable energy, bio-science and medicine, nano-science and technology, and, innovation and welfare. Full acknowledgement that Denmark has much to learn from China on knowledge-intensive industries.

April 13, 2010 China Daily (page 11) – Wang Chenyan and Hu Haiyan – Climate envoys agree to disagree, hold further talks ahead of Cancun. A general article about the disagreement between the rich nations and the developing nations on a way forward.

April 13, 2010 China Daily (page 12) – No author – China surpasses Germany's wind power. China is now the second largest producer of wind power behind the US. Based on research by the Global Wind Energy Council, which represents companies that make and manage wind power stations. Total capacity from wind turbines now 25.8 gigawatts.

April 8, 2010 China Daily (page 14) – Lan Lan – Electric cars to get a lift up from new policy measures. Auto-makers to benefit from a much-awaited stimulus plan that encourages production of fuel-efficient vehicles. – called the Green auto plan. Awaiting government approval. Subsidies for electric cars assembled in China – all manufacturers included – where a government production license has been issued. Incentives also given to private electric car buyers in five chosen cities. Mainly based around pure electric cars (as opposed to hybrids and fuel cells and hydrogen fuel) – according to Xu Changming, a senior economist of the State Information Center, a think-tank under the National Development and Reform Commission. In the long-run reliance on government stimulus for progress has to be superseded - according to Frank Liao, chief engineer of Chery's automobile engineering research institute. Sense that Chinese manufacturers have been slow to take on new technologies.

April 9, 2010 China Daily (pages 6/7) – Fu Jing – Asia should stay on green path. Official figures show that more than 30% of China's stimulus spending has been injected into sustainable development (compared to the rate of 80% in South Korea). Comments by Pan Jiahua, China's leading climate change policy advisor with the Chinese Aademy of Social Sciences: Asian group of countries has already started to play a global role. To make the role bigger he advised understanding of the challenges in tackling climate change – for example the need for economies to expand where they are in the early- and mid-stages of urbanization and industrialization. Asian countries remain vulnerable to climate change and extreme weather conditions, such as typhoons, floods and droughts. Argues that Europe and the US are talking more than they are doing.

April 9, 2010 China Daily (pages 6/7) – Andrew Moody – Sustainability makes business sense. Quotes Brenda Lee, VP of Coca Cola China – major savings had been made in China by implementing environmentally-friendly measures; water utilization and energy consumption in China both cut by 35% in the previous five years; using new technology and more efficient and productive processes; she even said that Coca Cola would have3 embarked on this strategy even if there were no cost savings involved – 'This is the way forward.......We believe that trying to achieve sustainability in the long term is the right approach for any company to take.' Christian Clickn at Star Alliance on the airline industry said that China was a model example of how emissions reductions could be achieved with a properly integrated aviation transport system with modern energy efficient airports and better ground handling systems, meaning fewer delays which often contribute to wasting fuel. Chinese airlines also invest in modern fuel efficient aircraft and have a fully integrated air traffic control system which reduces journey times and fuel use. Felix Soh of Singapore Press Holdings said that a big problem is companies not using the media effectively to get across what they are doing on climate change. Stressed the importance of public perception. Soh also challenges China to lead the world in green technology, whilst noting the Chinese government target of 20% of energy to come from renewable sources by 2020.

April 9, 2010 China Daily (page 6) – Wang Qian and Karen Yip – Media has a big role. Yu Wei, VP of Sohu Media said: 'Media should be a bridge between China and the world, and project China's position

on climate change....'. (Chinese) Media has a social responsibility in guiding the public to live environmentally friendly lives. Dai Yuqing, President of Guanzhou Daily Press Group says that Guangzhou Daily is active in reporting issues such as climate change.

April 9, 2010 China Daily (page 7) – Zhang Jin – China not to blame for drought along Mekong: Thailand. This has been proven by China using data modelling. The emphasis is now on joint efforts in dealing with the drought along the Mekong River. Chinese Vice-Foreign Minister Song Tao has said that China wilol strengthen cooperation with downstream Mekong River countries to fight the drought, share hydrological information and techniques, and promote exchanges of experts. Suwit Khunkitti, Thailand's minister of natural resources and environment alluded to the conflict between emission reduction efforts and   economic growth, whilst showing appreciation for China's efforts to cut GHG emissions. He also urged rich countries to provide financial and technical support to developing countries.

April 9, 2010 China Daily (page 8) – Qin Xiaoying (researcher with the China Foundation for International and Strategic Studies) – Nation bets it all on green – developing a low-carbon model, promoting environmentally safe lifestyles will open up economic opportunities. Since the global financial crisis, the Chinese government has made the development of science a major priority to pursue a people-oriented, healthy and sustainable economic model, Government awareness that the long-held economic model built on high-energy consumption and high pollution is not sustainable. A scientific economic policy is inseparable from a scientific environmental policy and the two together can lead to a green, low-carbon economic model – the only path for China to develop sustainably. Of the $586 Billion stimulus package launched by government in late 2008, more than $200 billion has been used for green development such as: the energy-saving sector, public transportation, recycling, waste, sustainable forestry and environmental services. A green, low-carbon and healthy lifestyle is a new symbol of our civilization.

April 9, 2010 China Daily (page 8) – Op Rana – Trivialize climate data at our own peril. Syndicated article about the IPCC's head R. K. Pachauri and the scandal surrounding incorrect data on Himalayan ice melt projections. Argued that climate change sceptics are mainly from developed countries and they are very happy if the IPCC is discredited.

April 9, 2010 China Daily (page 5) – No author - Drought: Crops 'doomed' as fields go thirsty. 916,000 hectares of crops affected by drought in Guizhou province; 3 billion Yuan direct economic loss due to the drought; 1.7 million tons of grain shipped to drought-hit regions.

April 7, 2010 Global Times (page 11) – Michael Knapp – Face-saving green schemes won't stop new dust bowls. Argues that tree planting is often in visible sites like alongside roads and makes no real difference to desertification and dust storms.

Appendix 4 Extracts and summaries of the CSR reports of the Steel producing company

2008 CSR Report (this was the first such report by the company)

Report length 56 pages. The report was compiled with reference to: the Guideline on Fulfilling Social Responsibility by Central Enterprises (2008 No. 1 document of State-owned Assets Supervision and Administration Commission of the State Council); the Guide to Sustainable Development Report GRI (G3 version); the Ten Principles of UN Global Compact; the theoretical research results of company's Economics & Management Research Institute; and, the actual conditions of the company.

The environmental performance report is 6 pages from the 56. A key heading is: Building a World-Top Clean Steel Enterprise.

Environmental management in action: energy centre; residual energy recycling; energy monitoring; energy audit; cyclic utilization of water; environmental monitoring; improving the environmental appearance of factories; ecological rehabilitation; green building; and, automotive light-weight technology.

Supply chain performance is looked at in terms of green procurement chain and environmentally friendly products.

2009 CSR Report

Report length 80 pages. Additional guidelines for compilation - the Guidelines of the Chinese Academy of Social Sciences for the Compilation of Social Responsibility Reports by Chinese Enterprises.

In the Chairman's statement to this second CSR report he states "As a bell-weather in the Chinese steel industry (the company) has realised that the recycling, ecological and low-carbon development is and inevitable trend in this field which represents the new direction in steel industry's sustainable development. (The company) will take the environmental management as the company's strategy through all aspects of the enterprise's operation including product R&D, purchase of raw materials, production, packaging, delivery, marketing, usage, recycling .... to make efforts for a more wonderful world."

The President's address outlines the three bases of social responsibility, one of which is environmental improvement.

The company profile states that (the company) attaches great importance to environmental performance and pursuit of sustainable development via clean production and recycling economy. To this end the company joined the UN Global Compact in 2004 and in 2006 the World Business Council for Sustainable Development. The social responsibility strategy emphasises green operations and upholds concepts of environmental friendliness and ecological civilization.

This detail included for 2009 only: energy indicators; emissions indicators; emission intensity indicators; and, solid waste resource reutilization indicators across the three main operating companies in the group in absolute terms such as: Gross energy consumption; New water consumption; Gross SO2

emissions; Gross waste water emission; Gross waste water; COD (Chemical Oxygen Demand) emissions; Gross dust emissions. Intensity measures for: SO_2 emission (kg/t); Waste water emissions; COD emissions; Dust emissions; Solid waste resource reutilization rate; and, Solid waste recycling rate.

In terms of the environmental management system: ISO 14001 certification; environmental risk management; energy and environmental system; technology exchange and popularization; response to climate change; progress in energy-saving projects; key energy and environmental projects; progress in environmental protection projects; and, landscaping.

Supply chain performance is looked at in terms of Life Cycle Analysis (LCA) and environmentally friendly products. The LCA methodology is explained as: "…..refers to calculating and evaluating a given product's environmental impact by analysing the utilization process of relevant resources and energy from conceptual design, production ……. utilization, recycling and disposal." In 2009 the company had worked with a subsidiary in tin can production and had worked out LCA changes due to decreasing the thickness of tin used in the cans. By continuously reducing thickness over a ten year period the CO_2 emission from the product were reduced by 15 % over the period. This was the only example of LCA in the report. Environmentally friendly products included: reduced weight; increased safety; environment-friendly materials; prolonged service life and reducing waste. No accounting numbers were used to show the effect of these measures on the sustainability of the company.

2010 CSR Report

Report length 74 pages.

The Chairman's statement reemphasises that environmental management is one of the three bases on the road to sustainable development. For the first time the "nature and human" relation is seen to need a substantial adjustment. A strong argument is made that due to the 100% recyclability of steel and iron there would be no savings in resources or emissions if substitutes were used.

The corporate vision and goal states that the company will become a driver for green industry by enhancing capability of environmental management.

Key performance indicators or summarised near the beginning of the report. The KPI's on the environment are the ISO14001 certification rate of the company's suppliers and new water consumption.

6 pages on environmental performance with much more detail and quantitative information than in 2008.

Environmental performance 5 pages including a full page photo of trees at a company site. Reduction in detail in all areas of the report. The data covers the same topics as in 2009 but is shown using tables and pie charts for the three main operating companies with the reductions in percentage terms from 2009 to 2010. The percentages are all shown in figures as well as in the charts. Main claims about continuous improvement. CO_2 emissions compared from base of 2005 showing a decline in emissions year on year. Life cycle assessment is represented in the supply chain performance part of the report as follows:

"In 2010, the company joined hands with the two downstream transformer manufacturers to conduct the whole-process LCA, analyzed and fixed the target and roadmap of carbon emission reduction of silicon steel products, which provided technical support for the design, production and employment of environment-friendly silicon steel products. Besides, the company took the production and application of a transformer as the case to analyze the environmental function of new products made of B30P110 silicon steel. The research revealed that from the perspective of the life cycle, when the B30P110 silicon steel, rather than B30G130 silicon steel, is used to produce the transformer, their carbon emissions are equivalent in the production process while 15% carbon emission was reduced in the process of operation."

So as with 2009 this report used one example of LCA and gave no indication as to how far reaching the LCA project had actually been.

2011 CSR Report

The report is in a new double page format which takes up 92 pages.

The President states the corporate vision which included the company being a driver of green industry – with enhancing environmental management capability central to this (one of five key capabilities).

The Chairman stated that systematic environmental management is a sacred mission.

Summary key performance indicators included for the second time: ISO14001 certification rate amongst suppliers; and, new water consumption per tonne of steel produced.

In 2011, the company published a Green Declaration to society which committed it to energy conservation and emissions reduction during its production processes; to carrying out environmental-friendly design; development of environmental-friendly products; integrating environmental-friendly technology and developing an environmental-friendly industry to provide the society with better, reliable, environmental-friendly and constantly improving products and services in a new era.

In the 14 pages of the environmental management part of the report a much more detailed set of data in graphical form for the three years 2009/10/11 is presented with percentage amounts using 2009 as the base year on each graph bar showing: Comprehensive energy consumption per ton steel; Total amount of waste energy; Fresh water consumption per ton of steel; CO2 emission per ton of steel; COD (Chemical Oxygen Demand) emission per ton of steel; Fume dust per ton of steel; and, Comprehensive utilization ratio of solid wastes. This data is presented for the three main operating companies in the group.

The report also outlined discursively (i.e. no quantitative data) about the company's engagement in a project on Environmental Accounting Research Project: The project involved the SASAC (State Owned Assets Supervision and Administration Commission) and the Ministry of Finance, with the National Accounting Institute in charge of research works and the company as the responsible party. One and half years later, it came up with the Report of the company on Environment Accounting Theory and Practice (consisting of analysis and result application), which met domestic and international accounting theories and highlighted the operational practices of the company. The research for the first time the role of

environment management in both financial accounting and management accounting, provided favourable advice on macro policy and implementation, and would serve as guidance for environment accounting practices of domestic enterprises.

In terms of LCA for the first time this report includes it in the Environmental Management part of the report where previously it was in the Supply Chain Management part. It is stated that the company made a breakthrough in 2011 but still it only gives one example of the use of a better quality steel in the manufacture of air conditioning compressors. The LCA for these compressors showed that the CO_2 emissions in production increased by 0.09% but the emissions over the whole life of the product in use were reduced by 3.8%. This is illustrated by showing that 1 million compressors produced using the better quality steel will give a reduction in CO_2 of 875,000 tonnes in one year.

2012 CSR Report

The report takes up 108 pages.

A green vision is expounded in which the company targets becoming the most competitive, resource-conserving and environmentally friendly iron and steel group in the world.

The Chairman's statement emphasises that advances are needed: "we need to continue implementing environmentally aware operations and become a driver of the green industry chain. We shall forge the iron and steel operations into an energy-conserving and environmentally friendly green business......guide the industry on to a sustainable development path."

He also states that in 2012 there was total investment of RMB1,522 billion in energy conservation and emission reduction projects. This has led to a year on year energy conservation of 483,000 tons (coal equivalent) and major reductions in sulphur dioxide chemical oxygen demand. Carbon emissions were down by 17 million tons carbon dioxide equivalent (representing 560,000 hectares of forest equivalent).

The President states the same core values and capabilities as the previous year. There is an emphasis on co-operation with sincerity, endearment and creativity and core values of integrity and synergy.

The KPIs chosen in the summary at the beginning of the report are the same as the previous years. Added is the energy conservation shown as tons of coal equivalent. Recycling of solid waste resources is given in millions of tons.

The environmental management part of the report took up 20 pages.

Green vision was stated as "Becoming the most competitive, resource-conserving and environmentally friendly iron and steel group in the world."

Environmental protection is illustrated in two projects – exhaust gas to ethanol and mineral wool from blast furnace slag as insulation.

New in this report is a table of green achievements in actual figures for the three sub-sections: green manufacturing; green products; and, green industry.

Green manufacturing performance was shown for four years across four main companies in the group across the same headings from previous years with 2009 as the base year and percentages shown for each year compared with the base of 100%.

The LCA is outlined mainly in words. The company won the International "Steelie" Award for excellence in LCA. The products for which LCA has been done are: hot-rolled plate; cold-rolled plate; galvanized steel; silicon steel; and, stainless steel. The company also helped to create a national standard: Technical Norms for Life Cycle Assessment of Iron and Steel Products. An example of LCA is the use of steel in motor manufacturing – using the company's high-strength steel, for each tonne of the product used instead of more conventional steel 0.72 litres less of fuel is used per 100 kilometres and over the life of the car 5.2 tons of CO_2 equivalent of emissions are saved.

Downstream industry use of the company's products are considered in terms of energy efficiency and resource utilization rate; environmental protection in terms of extended service life and convenient recycling.

2013 CSR Report

The report extended to 110 pages.

The KPIs are: % of supplier with ISO14001 certification; Annual energy conservation (in tons of coal equivalent); Recovery volume of solid waste resources; Industrialization rate of solid waste resources; and, net water consumption.

The Chairman makes no reference to environmental performance. Instead the stress is on economic problems of overcapacity in the industry. New state regulations on air pollution are referred to.

The environmental management part of the report is given a new title – *Being Part of Nature* - and covers 27 pages. Starting with the statement: "True love of environment means reduction in resource consumption. As well as offering nourishment and feedback to nature we abide by the symbiosis rule of human and nature. A new green (company) exhibits the beauty of life harmony."

Green vision is given as: become a driver of the green industrial chain.

LCA is stressed but for the first time no examples are given. A project in 2013 was to look for major issues of China's steel industry in 2020 working with the China Iron and Steel Association – emphasising the use of LCA for energy saving across a greater range of products. In 2013 the company was instrumental in the development of the first national LCA standard related to environmental features of oil and steel products to quantitatively evaluate the influence of products on the environment during their lifecycle

Environmental performance indicators are the same as in previous years but now for six operating companies in the group with 2009 as the base of 100%.

Appendix 5 Survey instruments

Survey to Chinese accounting academics

(1) What is your work role? Professor /Associate professor / Assistant professor / Lecturer /Teaching assistant / PhD student/candidate

(2) Please indicate your subject specialisms: Financial accounting / Management accounting / Financial management / Auditing / Environmental management and accounting / Sustainability management and accounting

(3) Please indicate the extent to which you agree or disagree with each statement about your attitude towards the natural environment:

Humans should be one with the natural environment (Buddhist philosophy)

There should be harmony between heaven, earth and humans (Daoist philosophy)

Human flourishing can only take place within the larger matrix of nature (Confucian philosophy)

Human technological ingenuity will find the solution to all environmental problems

Careful use of natural resources will enable future generations to enjoy the same benefits from the earth that we have enjoyed

Current patterns of consumption, economic growth and population growth are unsustainable

Radical change is needed to avoid severe, negative effects on future generations

Attitudes in society are changing that could lead to a sustainable future

China can take a global lead in sustainability based on new science

Other (please specify)

(4) Do any of the following religions and political philosophies have any value or significance to you personally in your attitude to sustainability and the natural environment? (From very strong to no value or significance)

Buddhism / Daoism / Confucianism / Feng Shuai / Christianity / Islam / Judaism / Capitalism / Communism / Socialism / Other (please specify)

(5) Do any of the following religions and political philosophies have any value or significance to you personally in your work as an academic when dealing with teaching and research on accounting for sustainability and the natural environment?

Buddhism / Daoism / Confucianism / Feng Shuai / Christianity / Islam / Judaism / Capitalism / Communism / Socialism / Other (please specify)

(6) In your university which of the following sustainability/environmental topics are taught to students (Yes/No)

Environmental management / Sustainability management / Environmental accounting / Environmental management accounting / Sustainability accounting / Environmental reporting / Sustainability reporting / Other (please specify)

(7) In your university which of the following sustainability/environmental topics are the subject of research activities?

Environmental management / Sustainability management / Environmental accounting / Sustainability accounting / Environmental reporting / Sustainability reporting / Other (please specify)

(8) The following are possible reasons for teaching and research on sustainability/environmental matters. For each say whether you agree or disagree that the reason could apply to your university's provision:

There is an increased awareness of sustainability/environmental matters that should be encouraged in future generations

Ancient Chinese philosophy advocates a harmony approach which leads to teaching and research on sustainability/environmental matters

Sustainability/environmental matters are an essential part of management and accounting education today

Sustainability/environmental matters are taught and researched in our competitor universities so we must follow

Government is encouraging us to teach and research on sustainability/environmental matters

Other (please specify)

(9) How influential have you personally been in the sustainability/environmental teaching and research activities of your university? (From very influential to no influence)

Survey to Chinese accountants

(1) At which location do you work? Please state country and city.

(2) What is your work role?

Practising accountant working for an accounting firm / Accountant working in industry or commerce for a company / Manager / Academic / Other (please specify)

(3) What is the approximate size of your organization in number of employees?

Less than 50 / 51-250 / 251-500 / 501-1000 / More than 1000

(4) Please indicate your work specialisms: Financial accounting / Management accounting / Financial management / Auditing / Taxation / Environmental management and accounting / Sustainability management and accounting / Other (please state)

(5) Please indicate the extent to which you agree or disagree with each statement about your attitude towards the natural environment:

Humans should be one with the natural environment (Buddhist philosophy)

There should be harmony between heaven, earth and humans (Daoist philosophy)

Human flourishing can only take place within the larger matrix of nature (Confucian philosophy)

Human technological ingenuity will find the solution to all environmental problems

Careful use of natural resources will enable future generations to enjoy the same benefits from the earth that we have enjoyed

Current patterns of consumption, economic growth and population growth are unsustainable

Radical change is needed to avoid severe, negative effects on future generations

Attitudes in society are changing that could lead to a sustainable future

China can take a global lead in sustainability based on new science

Other (please state)

(6) Do any of the following religions and political philosophies have any value or significance to you personally in your attitude to sustainability and the natural environment? (From very strong to no value or significance)

Buddhism / Daoism / Confucianism / Feng Shuai / Christianity / Islam / Judaism / Capitalism / Communism / Socialism / Other (please specify)

(7) Do any of the following religions and political philosophies have any value or significance to you personally in your day to day work as an accountant or manager? (From very strong to no value or significance)

Buddhism / Daoism / Confucianism / Feng Shuai / Christianity / Islam / Judaism / Capitalism / Communism / Socialism / Other (please specify)

(8) The following are possible reasons for accounting for sustainability/environmental matters. For each say whether you agree or disagree that the reason could apply from your experience:

There is an increased awareness of sustainability/environmental matters

Ancient Chinese philosophy advocates a harmony approach which leads to awareness of sustainability/environmental matters

Sustainability/environmental matters are an essential part of management and accounting today

Sustainability/environmental matters are accounted for and reported on by our competitor around the world so we must follow

Government is encouraging us to manage and account for sustainability/environmental matters

Other (please specify)

(10) How influential have you personally been in the sustainability/environmental accounting by your organization (including work with clients)?

Survey to Chinese accounting students

(1) Please confirm that you a Chinese student studying accounting in a UK university (Yes/No)

(2) Please confirm at which university you are studying: (Uni of Sheffield; De Montfort Uni)

(3) Please confirm at what level you are studying: Undergraduate Year 1 / Year 2 / Year 3 / Masters studies / Doctoral studies

(4) Please indicate whether the following topics have been studied by you during your education (both in China and in the UK): (Yes in China, Yes in the UK, No) Philosophy / Ethics / Sustainability / Environmental management / Accounting for sustainability / Environmental accounting

(5) Please indicate the extent to which you agree or disagree with each statement about your attitude towards the natural environment:

Humans should be one with the natural environment (Buddhist philosophy)

There should be harmony between heaven, earth and humans (Daoist philosophy)

Human flourishing can only take place within the larger matrix of nature (Confucian philosophy)

Human technological ingenuity will find the solution to all environmental problems

Careful use of natural resources will enable future generations to enjoy the same benefits from the earth that we have enjoyed

Current patterns of consumption, economic growth and population growth are unsustainable

Radical change is needed to avoid severe, negative effects on future generations

Attitudes in society are changing that could lead to a sustainable future

China can take a global lead in sustainability based on new science

Other (please state)

(6) Do any of the following religions and political philosophies have any value or significance to you personally in your attitude to sustainability and the natural environment? (From very strong to no value or significance)

Buddhism / Daoism / Confucianism / Feng Shuai / Christianity / Islam / Judaism / Capitalism / Communism / Socialism / Other (please specify)

Appendix 6 Informational findings for accountant survey group - Questions 1-4

Question 1 At which location do you work?

China 8

USA 1

Australia 1

Question 2 What is your work role?

Practising accountant working for an accounting firm	3
Accountant or manager working in industry or commerce for a company	3
Academic	3
Other (IT professional)	1

Question 3 What approximate size is your organization in number of employees?

Less than 50	11.1%	1
51-250	0.0%	0
251-500	22.2%	2
501-1000	22.2%	2
More than 1000	44.4%	4

Question 4 Please indicate your work specialisms:

Financial accounting	1	10%
Management accounting	3	30%
Financial management	1	10%
Auditing	3	30%
Taxation	0	0
Environmental management and accounting	0	0
Sustainability management and accounting	0	0
Other (please specify) Management and marketing Information Technology		20%

Appendix 7 Informational findings for academics survey group – Questions 1 and 2

Question 1 What is your work role?

Professor	23.1%	3
Associate Professor	38.5%	5
Assistant Professor	0.0%	0
Lecturer	23.1%	3
Teaching Assistant	0.0%	0
PhD student/candidate	7.7%	1
Other (did not answer)	7.6%	1

Question 2 Please indicate your subject specialisms.

As there was more than one response for several of the academics percentages are not useful so the counts are displayed only:

Financial accounting	3
Management accounting	1
Financial management	1
Auditing	2
Taxation	0
Environmental management and accounting	7
Sustainability management and accounting	2
Non response	1

List of references

Adams, C. A. (2002). Internal organisational factors influencing corporate social and ethical reporting - beyond current theorising. *Accounting, Auditing and Accountability,* 15, 2, 223-250.

Adams, C. A. (2008). A commentary on: corporate social responsibility reporting and reputation risk management. *Accounting, Auditing and Accountability Journal,* 21, 3, 365-370.

Adams, C. A. & Roberts, C. B. (1995). Corporate ethics: an issue worthy of report? *Accounting Forum,* 19, 2/3, 128-142.

Agger, B. (1991). Critical Theory, Poststructuralism, Postmodernism: Their Sociological Relevance. *Annual Review of Sociology,* 17, 105-131.

Ahmed, N. (2014). Nasa-funded study: industrial civilisation headed for 'irreversible collapse'? *The Guardian* [Online]. London. Available: http://www.theguardian.com/environment/earth-insight/2014/mar/14/nasa-civilisation-irreversible-collapse-scientists [Accessed 14 March 2015].

American Accounting Association (1973). Report of Committee on Environmental Effects of Organizational Behavior. *The Accounting Review,* 48, 75-119.

Amernic, J. C. & Craig, R. J. (2010). Accounting as a Facilitator of Extreme Narcissism. *Journal of Business Ethics,* 96, 79-83.

Annandale, D., Morris-Saunders, A. & Bouma, G. (2004). The impact of voluntary environmental protection instruments on company environmental performance. *Business Strategy and Environment,* 13, 1-12.

BBCNews. (2009). *The arguments made by climate change sceptics* [Online]. Available: http://news.bbc.co.uk/1/hi/sci/tech/8376286.stm [Accessed Date Accessed].

Bebbington, J. (1997). Engagement, education and sustainability: a review essay on environmental accounting. *Accounting Auditing and Accountability,* 10, 3, 365-381.

Bebbington, J., Brown, J. & Frame, B. (2007a). Accounting technologies and sustainability assessment models. *Ecological Economics,* 61, 224-236.

Bebbington, J., Brown, J., Frame, B. & Thomson, I. (2007b). Theorizing engagement: the potential of a critical dialogic approach. *Accounting Auditing and Accountability,* 20, 3, 356-381.

Bebbington, J. & Gray, R. (2001). An Account of Sustainability: Failure, Success and a Reconceptualization. *Critical perspectives on Accounting,* 12, 557-587.

Bebbington, J., Gray, R., Hibbitt, C. & Kirk, E. (2001). Full Cost Accounting - An Agenda for Action. *Certified Accountants' Educational Trust* [Online].

Bebbington, J., Gray, R., Thomson, I. & Walters, D. (1994). Accountants' attitudes and environmentally-sensitive accounting. *Accounting and Business Research,* 24, 94, 109-120.

Bebbington, J. & Larrinaga, C. (2014). Accounting and sustainable development: An exploration. *Accounting Organizations and Society,* 39, 395-413.

Bebbington, J., Larrinaga, C. & Moneva, J. M. (2008). Corporate social reporting and reputation risk management. *Accounting, Auditing and Accountability Journal,* 21, 3**,** 337-361.

Beckman, K. (2015). Meet the world's number 1 R and D player in sustainable energy: the Chinese Academy of Sciences. *Energy Post.*

Belal, A. R. (2000). Environmental reporting in developing countries; empirical evidence from Bangladesh. *Eco-Management and Auditing,* 7, 3**,** 114-121.

Belal, A. R. & Momin, M. (2009). Corporate social reporting in emerging economies: a review and future direction. *1st South American Congress on Social and Environmental Accounting Research - CSEAR.* Rio de Janeiro.

Belal, A. R. & Owen, D. L. (2007). The views of corporate managers on the current state of, and future prospects for, social reporting in Bangladesh: an engagement-based study. *Accounting Auditing and Accountability,* 20, 3**,** 472-494.

Bell, D. A. (2008). *China's New Confucianism: Politics and Everyday Life in a Changing Society,* New York, Princeton University Press.

Berthrong, J. (2003). Confucian views of nature. *In:* Selin, H. (ed.) *Nature across cultures: views of nature and the environment in non-western cultures.* London: Kluwer Academic Publishers.

Berthrong, J. (2005). Confucianism for the Modern World. *The Journal of Asian Studies,* 64, 4**,** 994-996.

Best, S. & Kellner, D. (1991). *Postmodern Theory: Critical Interrogations,* New York, The Guilford Press.

Bhaskar, R. (1978). *A Realist Theory of Science,* Brighton, Harvester Press.

Bhaskar, R. (1979). *The Possibility of Naturalism: A Philosophical Critique of the Contemporary Human Sciences,* Brighton, Harvester Press.

Bhaskar, R. (1986). *Scientific Realism and Human Emancipation,* London, Verso.

Birkin, F. (1996). The ecological accountant: from the cogito to thinking like a mountain. *Critical Perspectives on Accounting,* 7**,** 231-257.

Birkin, F. (2000). The art of accounting for science: a prerequisite for sustainable development? *Critical Perspectives on Accounting,* 11**,** 289-309.

Birkin, F. (2007). Final Scientific Report of APE Project: Building Capacities for Corporate Environmental Management: A Study of Experiences in the Yunnan and Jiangsu Provinces of the People's Republic of China. . Asia Pro Eco Programme. Available: www.iuee.eu [Accessed 7 April 2014].

Birkin, F. (2014). Sustainable business transformations: epistemic analysis and science. *CSR Workshop.* DMU Leicester.

Birkin, F. & Polesie, T. (2011). An Epistemic Analysis of (Un) Sustainable Business. *Journal of Business Ethics,* 103**,** 239-253.

Birkin, F. & Polesie, T. (2012). *Intrinsic Sustainable Development - Epistemes, Science, Business and Sustainability,* Singapore, World Scientific.

Blaza, A. J. (1992). Environmental management in practice. *In:* Owen, D. L. (ed.) *Green Reporting: Accountancy and the Challenge of the Nineties.* London: Chapman and Hall.

Brammer, S. & Pavelin, S. (2008). Factors influencing the quality of corporate environmental disclosure. *Business Strategy and the Environment,* 17, 120-136.

BritishChamber. (2011). Full translation of 12th 5 year plan or PRC CPC 2011-2015 British Chamber of Commerce in China. Available: http://www.britishchamber.cn/content/chinas-twelfth-five-year-plan-2011-2015-full-english-version [Accessed 12 June 2015].

Brown, A. M. (2007). Natural environmental disclosures: strategic responses by Port Moresby Stock Exchange entities. *Business Strategy and Environment,* 16, 75-89.

Brown, J. & Fraser, M. (2006). Approaches and perspectives in social and environmental accounting: and overview of the conceptual landscape. *Business Strategy and Environment,* 15, 103-117.

Bryman, A. & Bell, E. (2011). *Business Research Methods,* Oxford, Oxford University Press.

Burnside, J. (2014). John Burnside on Nature - the Threat to Scotland's Wild North. *New Statesman.*

Burritt, R. L., Hahn, T. & Schaltegger, S. (2002). Towards a comprehensive framework for environmental management accounting - links between business actors and EMA tools. *Australian Accounting Review,* 12, 27, 39-50.

Burritt, R. L. & Schaltegger, S. (2010). Sustainability accounting and reporting: fad or trend? *Accounting Auditing and Accountability,* 23, 7, 829-846.

c-can. (2015). China Civil Climate Action Network. 20 June 2015. Available: http://www.c-can.cn [Accessed 20 June 2015].

Callon, M. (1986). Some Elements of a Sociology of Translation: Domestication of Scallops and the Fishermen of St Brieuc Bay. *In:* Law, J. (ed.) *Power, Action and Belief.* London: Routledge and Kegan Paul.

Carrington, G. (2014). World population to hit 11bn in 2100 with 70% chance of continuous rise. *Guardian* [Online]. Available: http://www.theguardian.com/environment/2014/sep/18/world-population-new-study-11bn-2100 [Accessed 18 September 2015].

Carson, R. (1962). *Silent Spring,* Boston USA, Houghton Mifflin.

Chan, G. K. Y. (2008). The Relevance and Value of Confucianism in Contemporary Business Ethics. *Journal of Business Ethics,* 77, 3, 347-360.

Chan, K. M. (2014). Harmonious Society. *International Encyclopedia of Civil Society* [Online]. Hong Kong: Springer. Available: https://www.cuhk.ecu.hk/cenmtre/ccss/publications/km....../CKM_14.pdf [Accessed 12 June 2015].

Chen, S. & Bouvain, P. (2009). Is corporate responsibility converging? A comparison of corporate responsibility reporting in the USA, UK, Australia, and Germany. *Journal of Business Ethics,* 87, Supplement 1, 299-317.

Cheung, T. S. & King, A. Y.-C. (2004). Righteousness and Profitableness: The Moral Choices of Contemporary Confucian Entrepreneurs. *Journal of Business Ethics,* 54, 3**,** 243.

chinadialogue. (2015). China Dialogue. Available: https://www.chinadialogue.net [Accessed 20 June 2015].

Cho, C. H. & Patten, D. M. (2007). The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society,* 32**,** 639-647.

Choudhury, N. (1988). The seeking of accounting where it is not: Towards a theory of non-accounting in organizational settings. *Accounting Organizations and Society,* 13, 6**,** 549-557.

Chowdhury, M. F. (2014). Interpretivism in aiding our understanding of the contemporary social world. *Open Journal of Philosophy* [Online], Vol 4 Issue 3. Available: http://file.scirp.org/Html/20-1650412_48986.htm [Accessed 27 March 2015].

Chung, K. Y., Eichenseher, J. W. & Taniguchi, T. (2008). Ethical perceptions of business students: Differences between East Asia and the USA and among "Confucian" cultures. *Journal of Business Ethics,* 79**,** 121-132.

Clayre, A. (1976). *The Heart of the Dragon,* London, Collins Harvill.

CNArtGallery. (2013). The origin of Chinese landscape painting. *Chinese Painting Blog* [Online]. Artisoo Paintings. Available: www.artisoo.com/blog/the-origin-of-chinese-landscape-painting/ [Accessed 27 August 2015].

Collier, A. (1994). *Critical Realism: An Introduction to Roy Bhaskar's Philosophy.,* New York City, Verso.

Collinson, D., Ferguson, J. & Stevenson, L. (2007). Sustainability Accounting and Education. *In:* Unerman, J., J., B. & O'Dwyer, B. (eds.) *Sustainabiltity Accounting and Accountability.* Oxford: Routledge.

Collinson, D., Ferguson, J. & Stevenson, L. (2014). Sustainability Accounting and Education. *In:* Unerman, J., Bebbington, J. & O'Dwyer, B. (eds.) *Sustainability Accounting and Accountability.* 2nd ed. Oxford: Routledge.

Coupland, C. (2006). Corporate social and environmental responsibility in web-based reports: currency in the banking sector? *Critical Perspectives in Accounting,* 17**,** 865-881.

Craig, W. L. (2008). God Is Not Dead Yet. *Christianity Today* [Online]. Available: http://www.christianitytoday.com/ct/2008/july/13.22.html [Accessed 27 March 2015].

Dao, M. C. (1996). Administrative concepts in Confucianism and their influence on development in Confucian countries. *Asian Journal of Public Administration,* 18, 1**,** 45-69.

De Villiers, C. & Van Staden, C. J. (2006). Can less environmental disclosure have a legitimising effect? Evidence from Africa. *Accounting Organizations and Society,* 31**,** 763-781.

Dean, M. (2009). *Governmentality: Power and rule in modern society,* London, Sage.

Deegan, C. (2002). The legitimising effect of social and environmental disclosures - a theoretical foundation. *Accounting, Auditing and Accountability Journal,* 15, 3**,** 282-311.

Deegan, C., Geddes, S. & Staunton, J. (1995). A survey of Australian accountants' attitudes on environmental reporting. *Accounting Forum,* 19, 2/3**,** 143-163.

Deegan, C. & Rankin, M. (1996). Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority. *Accounting, Auditing and Accountability Journal,* 9, 2**,** 50-67.

DEFRA (2006). Environmental key performance indicators - reporting guidelines for UK business. London: Department for Environment, Food and Rural Affairs.

Denissen, A. K. (2012). Climate Change & its Impacts on Bangladesh. Available: http://www.ncdo.nl/artikel/climate-change-its-impacts-bangladesh [Accessed 6 December 2014].

Denscombe, M. (2007). *The good research guide for small-scale social research projects,* McGraw Hill/OUP.

Dey, C. (2003). Corporate 'Silent' and 'Shadow' Accounting. *Social and Environmental Accountability Journal,* 23, 2**,** 6-9.

Dias-Sardinha, I. & Reijnders, L. (2005). Evaluating environmental and social performance of large Portuguese companies: a balanced scorecard approach. *Business Strategy and Environment,* 14**,** 73-91.

DiMaggio, P. D. & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review,* 48, 2**,** 147-160.

Dobson, A. (ed.) (1991). *The Green Reader,* London: Andre Deutsch.

Dobson, A. (2007). *Green Political Thought,* Abingdon, Routledge.

Du, Y. & Gray, R. (2013). The emergence of stand alone social and environmental reporting in Mainland China: an exploratory research note. *Social and Environmental Accounting Journal,* Forthcoming.

Dudovsky, J. (2015). Interpretivism (interpretivist). ResearchMethodology.net. Available: http://research-methodology.net/research-philosophy/interpretivism/ [Accessed 27 March 2015].

Easterby-Smith, M., Thorpe, R. & Jackson, P. R. (2008). *Management Research,* London, Sage.

Economist (2012). The rotten heart of finance. *The Economist.* London.

Economist (2014). Environmental protest in China: Volatile atmosphere. *The Economist.* 4 April 2014 ed.

Economist (2015). Why China's economy is slowing. *The Economist.*

Economy, E. C. (2010). *The River Runs Black - The environmental challenge to China's future,* Ithaca and London, Cornell University Press.

Eisenhardt, R. (1989). Building theories from case study research. *Academy of Management Review,* 14**,** 532-550.

Elkington, J. (1997). *Cannibals with forks: the triple bottom line of 21st century business,* Oxford, Capstone.

Erdener, C. B. (1998). Confucianism and business ethics in contemporary China. *International Journal of Management,* 15, 1, 72.

Everett, J. & Neu, D. (2000). Ecological modernization and the limits of environmental accounting? *Accounting Forum,* 24, 1, 5-29.

Fairclough, N. (2003). *Analysing discourse: Textual analysis for social sciences,* Oxford, Routledge.

Fan, R. (2005). A reconstructionist Confucian account of environmentalism: toward a human sagely dominion over nature. *Journal of Chinese Philosophy,* 32, 1, 105-122.

Fan, Y. H., Scully, G., Woodbine, G. F. & Addison, P. (2008). The impact of Chinese auditors' values on their ethical decision-making. *AFAANZ/IAAER Conference.* Sydney.

Fang, T. (2003). A critique of Hofstede's fifth national culture dimension. *International JournaL of Cross Cultural Management,* 3, 3, 347-368.

Fang, X. (2011). Rethinking Tianxia. *China Heritage Quarterly No26.*

FEE (2002). Guidance manual - accounting and financial reporting for environmental costs and liabilities. Federation des Experts Comtables Europeens.

Finnveden, G., Hauschild, M., Ekvall, T., Guinee, J., Heijungs, R., Hellweg, S., Koehler, A., Pennington, D. & Suh, S. (2009). Recent developments in life cycle assessment. *Environmental Management,* 91, 1-21.

FON. (2015). Friends of Nature (China). Available: http://www.fon.org.cn [Accessed 20 June 2015].

Fortune500. (2015). Fortune 500 listing. Available: http://fortune.com/fortune500/ [Accessed 28 June 2015].

Foucault, M. (1972). *The Archaeology of Knowledge and Discourse on Language,* New York, Pantheon Books.

Foucault, M. (2002). *The Order of Things - An archaeology of the human sciences,* London, Routledge Classics.

Frost, G. R. & Wilmshurst, T. D. (2000). The adoption of environment-related management accounting: an analysis of corporate environmental sensitivity. *Accounting Forum,* 24, 4, 344-365.

Gallhofer, S. & Haslam, J. (1997). The direction of green accounting policy: critical reflections. *Accounting Auditing and Accountability,* 10, 2, 148-174.

Gao, R. (2013). Rise of Environmental NGOs in China: Official Ambivalence and Contested Messages. *Journal of Political Risk,* 1, 8.

Gao, S. S. & Handley-Schachler, M. (2003). The influences of Confucianism, Feng Shui and Buddhism in Chinese accounting history. *Accounting, Business and Financial History,* 13, 1 41-68.

Gao, Y. (2009). Corporate social performance in China: evidence from large companies. *Journal of Business Ethics,* 89, 23-35.

Gauntlett, D. (2008). *Media, Gender and Identity: An Introduction,* London, Routledge.

Gay, P. (1995). *The Enlightenment (The Rise of Modern Paganism),* London, W.W. Norton and Co.

GEIchina. (2015). *The Global Environmental Institute* [Online].   [Accessed Date Accessed].

Gibson, R. & Guthrie, J. E. (1995). Recent environmental disclosures in annual reports of Australian public and private sector organisations. *Accounting Forum,* 19, 2/3, 111-127.

Giddens, A. (1991). *Modernity and Self-Identity,* Cambridge, Polity Press.

Gladwin, T. N., Kennelly, J. J. & Krause, T. (1995). Shifting paradigms for sustainable development: implications for management theory and research. *Academy of Management Review,* 20, 4, 874-907.

Gleick, J. (1988). *Chaos - making a new science,* London, Cardinal - Sphere Books.

GlobalReportingInitiative (2013). G4 Sustainability Reporting Guidelines. Amsterdam.

Goldin, P. R. (2005). Why Daoism is not Environmentalism. *Journal of Chinese Philosophy,* 32, 1, 75-87.

Goldsmith, E. R. D. (1972). A Blueprint for Survival. *The Ecologist,* 2, 1.

Gray, R. (1994). Corporate reporting for Sustainable Development: Accounting for Sustainability in 2000AD. *Environmental Values,* 3, 1, 17-45.

Gray, R. (2002). The social accounting project and Accounting Organizations and Society. *Accounting Organizations and Society,* 27, 7, 687-708.

Gray, R. (2010). Is accounting for sustainability actually accounting for sustainability......and how would we know? An exploration of narratives of organisations and the planet. *Accounting Organizations and Society,* 35, 47-62.

Gray, R. & Bebbington, J. (2000). Environmental accounting, managerialism and sustainability: is the planet safe in the hands of business and accounting? *Advances in Environmental Accounting and Management,* 1, 1-44.

Gray, R., Dey, C., Owen, D. L., Evans, R. & Zadek, S. (1997). Struggling with the praxis of social accounting: Stakeholders, accountability, audits and procedures. *Accounting Auditing and Accountability,* 10, 3, 325-364.

Gray, R., Kouhy, R. & Lavers, S. (1995). Corporate social and environmental reporting; a review of the literature and a longitudinal study of UK disclosure. *Accounting Auditing and Accountability,* 8, 2, 47-77.

Gray, R., Owen, D. & Adams, C. (2010). Some theories for social accounting?: A review essay and a tentative pedagogic categorisation of theorisations around social accounting. *Advances in Environmental Accounting and Management,* 4, 1-54.

Gray, R., Owen, D. L. & Adams, C. A. (1996). *Accounting and Accountability,* Harlow, Essex, Pearson Education.

Gray, S. J. (1988). Towards a theory of cultural influence on the development of accounting systems internationally. *Abacus,* 24, 1, 1-15.

GreenParty. (2014). Core Values. The Green Party. Available: http://policy.greenparty.org.uk/core-values.html. [Accessed 27 March 2015].

Guardian. (2015). Keep it in the ground. *The Guardian* [Online]. Available: http://www.theguardian.com/environment/keep-it-in-the-ground-blog [Accessed 28 June 2015].

Guo, P., Zhong, C., Chen, Y., Wang, X. & Li, W. (2008). A journey to discover values 2008 - Study of sustainability reporting in China. *In:* SynTao (ed.).

Hammond, G. P. (2004). Engineering sustainability: thermodynamics, energy systems, and the environment. . *International Journal of Energy Research,* Vol 28**,** pp613-639.

Hammond, G. P. & Winnett, A. B. (2009). The influence of thermodynamic ideas on ecological economics: an interdisciplinary critique. . *Sustainability Journal,* Vol 1**,** pp1195-1225.

Harding, S. (2006). *Animate Earth - Science, Intuition and Gaia,* Totnes, Devon, Green Books Ltd.

Harrabin, R. (2014). Climate change remedies 'affordable', says global body. *BBC News.*

Harte, G. & Owen, D. L. (1991). Environmental disclosures in the annual reports of British companies: a research note. *Accounting Auditing and Accountability,* 4, 3**,** 51-61.

Hartman, P. V. (1996). What is "Postmodernism". Naciente.com. Available: www.naciente.com/essay15.htm [Accessed 28 August 2015].

Harvey, D. (1990). *The Condition of Postmodernity - An Enquiry into the Origins of Cultural Change,* Cambridge, MA, Blackwell.

Hines, R. (1988). Financial accounting: In communicating reality, we construct reality. *Accounting, Organizations and Society,* 13, 3**,** 241-251.

Hofstede, G. & Bond, M. H. (1988). The Confucius connection: From cultural roots to economic growth. *Organizational Dynamics,* 16, 4**,** 4-21.

Holland, L. (2003). Can the principle of the ecological footprint be applied to measure the environmental sustainability of business? *Corporate Social Responsibility and Environmental Management,* 10**,** 224-232.

Holland, L. & Foo, B. Y. (2003). Differences in environmental reporting practices in the UK and the US: the legal and regulatory context. *The British Accounting Review,* 35**,** 1-18.

Hopwood, A., Unerman, J. & Fries, J. (2010). *Accounting for Sustainability - Practical insights,* London, Earthscan.

Huang, Y. (2014). The 2008 Milk Scandal Revisited. *Forbes Asia* [Online]. Available: http://www.forbes.com/sites/yanzhonghuang/2014/07/16/the-2008-milk-scandal-revisited/ [Accessed 27 July 2015].

ICAEW. (Year) Published. Corporate environmental responsibility and the role of the accountant The 6th China BELL Annual Conference, 18,19 May 2007 2007 Beijing.

IFAC (2005). International guidance document - environmental management accounting. International Federation of Accountants.

Imam, S. (2000). Corporate social performance reporting in Bangladesh. *Managerial Auditing Journal,* 15, 3**,** 133-141.

IndexMundi. (2015). Chinese urban population 2013. *Index Mundi* [Online]. Available: www.indexmundi.com/facts/china/urban-population [Accessed 20 August 2015].

Ip, P. K. (2008). Corporate Social Responsibility and Crony Capitalism in Taiwan. *Journal of Business Ethics,* 79, 1-2, 167.

IRENA (2014). Renewable Energy Prospects: China - REmap 2030 anaysis. International Renewable Energy Agency.

IUCN (1980). World Conservation Strategy - Living Resource Conservation for Sustainable Development. International Union for Conservation of Nature and Natural Resources.

IUCN. (2015). *Our mission* [Online]. [Accessed Date Accessed].

Jacobs, L., Guopei, G. & Herbig, P. (1995). Confucian roots in China: A force for today's business. *Management Decision,* 33, 10, 29.

Jaggi, B. & Zhao, R. (1996). Environmental performance and reporting: perceptions of managers and accounting professionals in Hong Kong. *The International Journal of Accounting,* 31, 3, 333-346.

Jallow, K. (2010). Education for ethics and socially responsible behaviour. *In:* Aras, G. & Crowther, D. (eds.) *A Handbook of Corporate Governance and Social Responsibility.* Farnham: Gower.

Jasch, C. (2003b). The use of Environmental Management Accounting (EMA) for identifying environmental costs. *Journal of Cleaner Production,* 11, 667-676.

Jones, M. J. (2003). Accounting for biodiversity: operationalising environmental accounting. *Accounting, Auditing and Accountability Journal,* 16, 3, 762-789.

Jorgensen, H. B. (1993). The "green account" of the Danish Steel Works Ltd. *Social and Environmental Accounting Journal,* 13, 1, 2-5.

Kamuf, P. (2007). Accounterability. *Textual Practice,* 21, 2, 251-266.

Kendall, G. & Wickham, G. (1999). *Using Foucault's Methods,* London, Sage.

Kolko, J. (2012). *Wicked problems: problems worth solving,* Austin, Texas, Austin Center for Design.

Komjathy, L. (2013). *The Daoist Tradition: An Introduction,* London, Bloomsbury Academic.

Kuhn, T. S. (1962). *The Structure of Scientific Revolutions,* Chicago, University of Chicago Press.

LaBounty, J. F. (1984). Assessment of the Environmental Effects of Constructing the Three Gorge Project on the Yangtze River. *Water International,* 9, 1, 10-17.

Lamberton, G. (2005). Sustainability accounting - a brief history and conceptual framework. *Accounting Forum,* 29, 1, 7-26.

Lan, G., Ma, Z., Cao, J. & Zhang, H. (2009). A Comparison of Personal Values of Chinese Accounting Practitioners and Students. *Journal of Business Ethics,* 88, 59-76.

Larrinaga-Gonzalez, C. (2007). Sustainability reporting: insights from neoinstitutional theory. *In:* Unerman, J., Bebbington, J. & O'Dwyer, B. (eds.) *Sustainability Accounting and Accountability.* Oxford: Routledge.

Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-Network-Theory. ,* Oxford, Oxford University Press.

Latour, B. (2013 (1)). *An Inquiry into Modes of Existence: An Anthropology of the Moderns,* Harvard, Harvard College.

Latour, B. (2013 (2)). Biography of an inquiry on a book about modes of existence. *Social Studies of Science,* 0, 0, 1-15.

Latour, B. (2014). On some of the affects of capitalism. Copenhagen: Danish Royal Academy.

Leopold, A. (1968). *A Sand County Almanac - and sketches here and there,* New York, Oxford University Press.

Lewis, L. & Unerman, J. (1999). Ethical relativism: A reason for differences in corporate social reporting? *Critical Perspectives on Accounting,* 10, 521-547.

Li, B. (2007). *Selected Poems of Li Bai,* Hunan, China, Hunan People's Publishing House.

Li, H.-l. (1998). Some thoughts on Confucianism and Eco-Feminism. *In:* Tucker, M. E. & Berthrong, J. (eds.) *Confucianism and Ecology - The interrelation of heaven, Earth and Humans.* Harvard University Press.

LiaoningEPB (2008). Official Report of the Environmental Circumstances of Liaoning Province. Liaoning Province China.

Lin, B. (2011). How can China achieve green development. *China Daily,* 19 July 2011.

Liu, Y. H. (2007). Life cycle inventory of Baosteel Power Station. Environment & Resource Institute, R&D Center Baoshan Iron & Steel Co., Ltd.

Llena, F., Moneva, J. M. & Hernandez, B. (2007). Environmental disclosures and compulsory accounting standards: the case of Spanish annual reports. *Business Strategy and Environment,* 16, 50-63.

Lu, S. & Zhang, H. S. (2014). A comparative study of education for sustainable development in one British university and one Chinese university. *International Journal of Sustainability in Higher Education,* 15, 1, 48-62.

Ma, J. (2007). Ecological civilisation is the way forward. *China Dialogue* [Online]. Available: https://www.chinadialogue.net/article/show/single/en/1440-Ecological-civilisation-is-the-way-forward [Accessed 27 March 2015].

MacKinnon, B. (2007). *Ethics: Theory and Contemporary Issues,* Belmont California, Thomson/Wadworth.

Maier, J. (1990). Green Parties in Western Europe - A Brief History, Their Successes and Their Problems Global Greens. Available: www.globalgreens.org/literature/mailer/westerneurope [Accessed 27 August 2015].

Martin, A. D. & Hadley, D. J. (2008). Corporate environmental non-reporting - a UK FTSE 350 perspective. *Business Strategy and the Environment,* 17, 245-259.

Mason, R. (2013). David Cameron at centre of "get rid of all that green crap" storm. *Guardian,* 21 November.

Mathews, M. R. (1997). Twenty-five years of social and environmental accounting research - is there a silver jubilee to celebrate? . *Accounting Auditing and Accountability,* 10, 4**,** 481-531.

Maunders, K. T. & Burritt, R. L. (1991). Accounting and ecological crisis. *Accounting Auditing and Accountability,* 4, 3**,** 9-26.

McDonough, W. & Braungart, M. (2002). Design for the triple top line: new tools for sustainable commerce. *International Journal of Corporate Sustainability - Corporate Environmental Strategy.,* 9, 3**,** 251-258.

Meade, J. E. (1960). *A neo-classical theory of economic growth,* London, George Allen and Unwin Limited.

Meadows, D. (1991). The limits to growth. *In:* Dobson, A. (ed.) *The Green Reader.* London: Andre Deutsch.

Meadows, D. H., Meadows, D. L., Randers, J. & Behrens, W. W. (1972). *The Limits to Growth,* New York, Universe Books.

Miller, J. (2003). Daoism and nature. *In:* Selin, H. (ed.) *Nature Across Cultures: views of nature and the environment in non-western cultures.* London: Kluwer Academic Publishers.

Milman, O. (2014). Clean energy and conservation cuts in budget broken promises. *Guardian,* 14 May.

Moletsane, M. S. & Margerison, J. P. (2009). Corporate Environmental Responsibility in China: Chinese multi-national company managers' perceptions about environmental practices and environmental reporting. *8th International Conference on Corporate Social Responsibility.* Cape Town, South Africa.

Moltmann, J. (1985). *God in Creation - An ecological doctrine of creation* London, SCM Press.

Monbiot, G. (2014). Why whale poo matters. *Guardian,* 12 December.

Myers, M. D. (2013). *Qualitative Research in Business and Management,* London, Sage.

Niu, D., Jiang, D. & Li, F. (2010). Higher education for sustainable development in China. *International Journal of Sustainability in Higher Education,* 11, 2**,** 153-162.

Nuyen, A. T. (2011). Confucian Role-Based Ethics and Strong Environmental Ethics. *Environmental Values,* Vol 20**,** pp549-566.

Nyquist, S. (2003). Environmental information in annual reports: a survey of Swedish accountants. *Managerial Auditing,* 18, 8**,** 682-691.

O'Donovan, G. (1999). Managing legitimacy through increased corporate environmental reporting: an exploratory study. *Interdisciplinary Environmental Review,* 1, 1**,** 63-99.

O'Donovan, G. (2002). Environmental disclosures in the annual report: Extending the applicability and predictive power of legitimacy theory

Accounting, Auditing and Accountability Journal, 15, 3**,** 344-371.

O'Dwyer, B. (2002). Managerial perceptions of corporate social disclosure: an Irish story. *Accounting Auditing and Accountability,* 15, 3**,** 406-436.

OED (2015). *Oxford English Dictionary.* Oxford: Oxford Dictionaries.

Oldstone-Moore, J. (2003). *Understanding Confucianism,* London, Duncan Baird Publishers.

OrganizingForAction. (2015). Call out climate change deniers. Illinois, USA: Organizing for Action. Available: https://www.barackobama.com/climate-change-deniers/ [Accessed 27 August 2015].

Oswald, J. P. F. (2014). What Does Eco-Civilisation Mean? *The China Story* [Online]. Canberra, Australia: Australian Centre on China in the World. Available: http://www.thechinastory.org/2014/09/what-does-eco-civilisation-mean/ [Accessed 27 March 2015].

Owen, D. L. (1992). *Green reporting - accountancy and the challenge of the nineties,* London, Chapman and Hall.

Owen, D. L. (2007). Assurance practice in sustainability reporting. *In:* Unerman, J., Bebbington, J. & O'Dwyer, B. (eds.) *Sustainability Accounting and Accountability.* Oxford: Routledge.

Owen, D. L. (2008). Chronicles of wasted time? A personal reflection on the current state of, and future prospects for, social and environmental accounting research. *Accounting Auditing and Accountability,* 21, 2**,** 240-267.

Owen, D. L., Gray, R. & Bebbington, J. (1997). Green accounting: cosmetic irrelevance or radical agenda for change? *Asia-Pacific Journal of Accounting,* 4, 2**,** 175-198.

Palmer, M. (1998). Chinese religion and ecology. *In:* Cooper, D. E. & Palmer, J. (eds.) *Spirit of the Enlightenment: religion, value and environmental concern.* London: Routledge.

Palmer, M. & Finlay, V. (2013). Faith in Conservation - New approaches to religions and the environment. Bath: The Alliance of Religions and Conservation.

Pan, Y. (2011). *Ecological wisdom of the ages* [Online]. [Accessed Date Accessed].

Parker, L. D. (2005). Social and environmental accountability research: a view from the commentary box. *Accounting Auditing and Accountability,* 18, 6**,** 842-860.

Patten, D. M. (1992). Intra-industry environmental disclosures in response to the Alaskan oil spill: A note on legitimacy theory. *Accounting Organizations and Society,* 17, 5**,** 471-475.

Patten, D. M., Ren, Y. & Zhao, N. (2015). Standalone corporate social responsibility reporting in China: An exploratory analysis in relation to legitimation. *Social and Environmental Accountability Journal,* 35, 1**,** 17-31.

Perkowski, J. (2014). China leads in renewable investment again. Forbes. Available: http://www.forbes.com/sites/jackperkowsky/2014/06/17/china-leads-in-renewable-investment-again/ [Accessed 30 June 2015].

Phillips, J. (2015). Killer air blamed for 4,500 deaths in China each day, study finds. *BusinessGreen.*

Piekkari, R., Welch, C. & Paavilainen, E. (2009). Case study as disciplinary convention: evidence from international business journals. *Organizational Research Methods,* 13, 3**,** 567-589.

Plumwood, V. (2002). *The ecological crisis of reason,* New York, Routledge.

Porritt, J. (2007). *Capitalism as if the world matters,* London, Earthscan.

Rahaman, A. S. (2000). Senior management perceptions of social and environmental reporting in Ghana. *Social and Environmental Accounting,* 20, 1**,** 7-10.

Rahaman, A. S., Lawrence, S. & Roper, J. (2004). Social and environmental reporting at the VRA: institutionalised legitimacy or legitimation crisis? *Critical Perspectives on Accounting,* 15**,** 35-56.

Reuters. (2015). China makes carbon pledge ahead of paris climate change summit. *The Guardian,* 30 June 2015.

Roberts, C. B. (1991a). Environmental disclosures: a note on reporting practices in mainland Europe. *Accounting Auditing and Accountability,* 4, 3**,** 62-71.

Roberts, J. (1991b). The possibilities of accountability. *Accounting Organizations and Society,* 16, 4**,** 355-368.

Roberts, J. & Scapens, R. (1985). Accounting systems and systems of accountability - Understanding accounting practices in their organizational contexts. *Accounting Organizations and Society,* 10, 4**,** 443-456.

Roper, J. & Weymes, E. (2007). Reinstating the Collective: A Confucian Approach to Well-being and Social Capital Development in a Globalised Economy. *The Journal of Corporate Citizenship,* 26**,** 135.

Rostow, W. W. (1990). *The stagesw of economic growth: a non-communist manifesto,* Cambridge, UK, Cambridge University Press.

Rowe, A. L. & Guthrie, J. (2010). The Chinese government's formal institutional influence on corporate environmental management. *Public Management Review,* 12, 4**,** 511-529.

Rowe, A. L. & Guthrie, J. E. (2009). Institutional cultural norms of Chinese corporate environmental reporting. *Interdisciplinary Perspectives of Accounting Conference.* Innsbruck, Austria.

Schaltegger, S. & Burritt, R. (2000). *Contemporary Environmental Accounting,* Sheffield, Greenleaf publishing.

Schaltegger, S. & Burritt, R. L. (2006). Corporate Sustainability Accounting: a Nightmare or a Dream Coming True? *Business Strategy and Environment,* 15**,** 293-295.

Schaltegger, S., Muller, K. & Hindrichsen, H. (1996). *Corporate Environmental Accounting,* Chichester, UK, Wiley.

Schaltegger, S. & Synnestvedt, T. (2002). The link between 'green' and economic success: environmental management as the crucial trigger between environmental and economic performance. *Journal of Environmental Management,* 65**,** 339-346.

Shapiro, J. R. 2001. *RE: Mao's War Against Nature: Politics and the Environment in Revolutionary China.* .

Smith, G. (2014). Tesco chairman resigns after $420 millin accounting scandal. *Fortune.* New York.

Spence, L. J. & Rinaldi, L. (2014). Governmentality in accounting and accountability: A case study of embedding sustainability in a supply chain. *Accounting Organizations and Society,* 39**,** 433-452.

Sponsel, L. E. & Natadecha-Sponsel, P. (2003). Buddhist views of nature and the environment. *In:* Selin, H. (ed.) *Nature across cutures: views of nature and the environment in non-western cultures.* London: Kluwer Academic Publishers.

Stake, R. E. (1995). *The art of case study research. ,* Thousand Oaks CA, Sage.

Staubus, G. J. (2003). Accounting, accountability and auditing and financial scandals over the centuries. *SSRN.* Berkeley, California: University of California.

Swearer, D. (1998). Buddhism and Ecology: Challenge and Promise. *Earth Ethics,* Vol10, No1 (Fall 1998)**,** 19-22.

Taylor, L. & Branigan, T. (2014). US and China strike deal on carbon cuts in push for global climate change pact. *Guardian,* 12 November.

Thring, M. W. (1990). Engineering in a stable world. *Science, Technology and Development,* Vol 8**,** 107-121.

Tinker, T., Lehman, C. & Neimark, M. (1991). Falling down the hole in the middle of the road: political quietism in corporate social reporting. *Accounting, Auditing and Accountability Journal,* 4, 2**,** 28-54.

Tu, W. (1998). Beyond the enlightenment mentality. *In:* Tucker, M. E. & Berthrong, J. (eds.) *Confucianism and Ecology - The Interrelation of Heaven, Earth and Humans.* Harvard University Press.

Tu, W. (2001). The Ecological Turn in New Confucian Humanism: Implications for China and the World. *Daedalus: Journal of the American Academy of Arts and Sciences,* 130, 4.

Tu, W. (2013). Understanding Ecological Civilization: The Confucian Way. *Hangzhou International Congress, "Culture: Key to Sustainable Development".* Hangzhou, China.

Tucker, M. E. & Berthrong, J. (1998). *Confucianism and Ecology - The Interrelation of Heaven, Earth, and Humans,* Cambridge, Massachusetts, Harvard University Press.

Uduigwomen, A. (2005). Philosophical Objections to the Knowability of Truth: Answering Postmodernism. *Quodlibet Journal,* Volume 7, Number 2.

Ullmann, A. A. (1976). The corporate environmental accounting system: a management tool for fighting environmental degradation. *Accounting Organizations and Society,* 1, 1**,** 71-79.

Ullmann, A. A. (1979). Corporate social reporting: political interests and conflicts in Germany *Accounting Organizations and Society,* 4, 1/2**,** 123-133.

Unerman, J. (2007). Stakeholder engagement and dialogue. *In:* Unerman, J., Bebbington, J. & O'Dwyer, B. (eds.) *Sustainability Accounting and Accountability.* Oxford: Routledge.

Unerman, J. (2014). Editorial - Academic contributions to enhancing accounting for sustainable development. *Accounting Organizations and Society,* 39**,** 385-394.

UNWCED (1987). Our Common Future. Oxford University Press: United Nations World Commission on Environment and Development.

Van Staden, C. J. & Hooks, J. (2007). A comprehensive comparison of corporate environmental reporting and responsiveness. *The British Accounting Review,* 39, 197-210.

Velibeyoghu, K. (1999). Post-Structuralism and Foucault. Angelfire. Available: www.angelfire.com/ar/corei/foucault.html [Accessed 22 July 2015].

Wackernagel, M. & Rees, W. (1996). *Our ecological footprint: reducing human impact on the earth,* British Colombia, Canada, New Society Publishers.

Wanderley, L. S. O., Lucian, R., Farache, F. & Filho, J. M. d. S. (2008). CSR Information Disclosure on the Web: A Context-Based Approach Analysing the Influence of Country of Origin and Industry Sector. *Journal of Business Ethics,* 82, 2, 369.

Wang, L. & Juslin, H. (2009). The impact of Chinese culture on corporate social responsibility: the harmony approach. *Journal of Business Ethics,* 88, 433-451.

Wang, Z., He, H. & Fan, M. (2014). The ecological civilization debate in China - the role of ecological Marxism and constructive post-modernism. *Monthly Review.*

WBCSD. (2010). *Vision 2050 - the new agenda for business - in brief* [Online].   [Accessed Date Accessed].

Whitcomb, L., Erdener, C. & Li, C. (1998). Business ethical values in China and the U.S. *Journal of Business Ethics,* 17, 8, 839-852.

Wilmshurst, T. D. & Frost, G. R. (2000). Corporate environmental reporting; a test of legitimacy theory. *Accounting Auditing and Accountability,* 13, 1, 10-26.

Wilmshurst, T. D. & Frost, G. R. (2001). The role of accounting and the accountant in the environmental management system. *Business Strategy and Environment,* 10, 135-147.

Wiseman, J. (1982). An evaluation of environmental disclosures made in corporate annual reports. *Accounting Organizations and Society,* 7, 1, 53-63.

WorldBank. (2008). Emerging economies remain robust amid global slowdown. *News and Broadcast* [Online].

WorldBank. (2015). *County overview: China* [Online]. Available: http://www.worldbank.org/en/country/china/overview [Accessed Date Accessed].

Xiao, H. (2006). Corporate Environmental Accounting and Reporting in China: Current status and the future. *In:* Schaltegger, S., Bennett, M. & Burritt, R. (eds.) *Sustainability Accounting and Reporting.* Dordrecht (London): Springer.

Xiaomei, L. (2004). Theory and practice of environmental management accounting. Experience of implementation in China. *The International Journal of Technology Management & Sustainable Development,* 3, 1, 47-57.

Xu, B. (2013). Is Zhao's Tianxia System Misunderstood? *Tsinghua China Law Review,* 6, 1, 95-108.

Yao, X. (2000). *An introduction to Confucianism,* Cambridge, UK, Cambridge University Press.

Yin, R. K. (1984). *Case study research: design and methods,* Beverly-Hills:CA, Sage.

Yin, R. K. (1999). Enhancing the quality of case studies in health service research. *Health Services Research,* 34, 5**,** 1209-1224.

Yin, R. K. (2009). *Case Study Research - design and methods,* Los Angeles, Sage.

Yu, D. (2009). *Confucius from the Heart - Ancient Wisdom for Today's World,* London, Macmillan.

Yu, K., Li, D. & Li, W. (2008). Recognition of the Holistic Values of The Grand Canal. *Progress in Geography,* 2.

Yue, P. (2011). Ecological wisdom of the ages. *chinadialogue* [Online]. [Accessed 04/06/2013].

Zhang, J. (2010). Probing into the environmental accounting information disclosure by Chinese companies. *Green Finance and Accounting.*

Zhao, T. (2005). *The Tianxia System: an introduction to the philosophy of a World Institution. : ,* Nanjing, Jiansu Jiaoyu Chubanshe.

Zhao, T. (2009). A Political World Philosophy in terms of All-under-heaven (Tian-xia) *Diogenes,* 56, 5.

Zu, L. & Song, L. (2009). Determinants of managerial values on corporate social responsibility: evidence from China. *Journal of Business Ethics,* 88**,** 105-117.