Environmental Revolutions in Australian SMEs and their Supply Chains: A Mixed Method Investigation of the Greater Melbourne Region

Abstract

The last decade has challenged Australian SMEs with droughts, water restrictions, rising energy costs and increasing pressures for reforming their environmental practices. Australian Federal Government funding has permitted a 2008-2012 study to address these issues. The findings from quantitative and qualitative research in the Greater Melbourne Regions reveals the early dawn of an environmental revolution that has significant ramifications for greening SME sectors and their supply chains. SMEs are shown to have responded to these issues by tracking energy and water costs, recycling a range of waste materials and generally becoming more aware of environmental issues. Amidst a majority of SMEs who implement a range of basic environmental initiatives, is the emergence of a select few who are leading a new breed of SMEs. This proactive set are implementing environmental certification and responding to supply chain and other stakeholder pressures for change. This paper also describes a mixed-method methodology that recognizes the complexities of sustainability research. SME owner/manager information was captured through a quantitative survey of 354 companies followed by qualitative investigation.

Introduction

Environmental sustainability is increasingly influencing socio-economic considerations in Australia. Climate change and environmental degradation are increasingly impacting Australia's regions and driving change within the Australian political arena. Adaptation to this new world order brings significant challenges for society and business.

Public awareness of the environmental impacts of corporate organisations has for several decades necessitated the development of environmental practices. More recently the scale and scope of corporate environmental behaviour has been, extenuated by increasing demands for the reduction of global warming gases and biodiversity impacts.

The Australian government has responded accordingly with a set of environmental policy initiatives designed for the top Australian corporations. To

the contrary, environmental policy in the small and medium-sized enterprise sector, however, has been rather lacking.

Nevertheless, the majority of world pollution is reportedly generated by the SME sector (Hillary, 2000). A recent study by Expedia Creda (2009) also links Australian SMEs with particular high levels of carbon dioxide emissions. Considering too that this sector represents 97% of all Australian businesses, 50-60% of a nations employment (Blackburn, 2007) and half of a nations GDP (Vives 2010, p.108) not only are the environmental credentials of this sector of relevance to environmental policy makers they are, also inextricably linked with sustaining economic growth and regional development.

Most SMEs are directly managed by owners, are closely linked to regional business partners and to the local community, hence they often implement corporate social responsibility (CSR) practices even if they are not aware of that. (Cilibertis et al 2011).

Due to their central role in shaping sustainable development outcomes, a need has arisen, therefore, for Australian government policymakers to generate new understandings in order to develop appropriate policies that may instigate better environmental performance within the Australian context.

Environmental Behaviour and SMEs

In response, an Australian Government initiative to address the environmental performance of SME was instigated through National Heritage Trust funding to the Swan Catchment Council[1] of Western
Australia. In partnership with regional stakeholders, between 2005-2009 they have made more than site visits to 4500 light industrial SMEs. This initiative has generated significant insights into the behaviour of these business enterprises. Other researchers in Australia have also reported similar findings to the Swan Catchment Council. Most notably, is the 'institutional context' within which SMEs operate (Birch, 2003). Whilst, Australia is increasingly becoming more focused on regulating the environmental activities of business (Pain, 2003,

---

[1] The Swan Avon Integrated Catchment Management (SAICM) coordinating group was established in 1994, following an Australian Government move towards regional natural resource management (NRM). The Swan and Avon Working Group's were created to coordinate the delivery of NRM across the Swan and Avon regions. The Swan Working Group was expanded and renamed in 1998 as the Swan Catchment Council and in 2009 as Perth Region Natural Resource

McKeiver and Gadenne, 2005; McGeoch, 2007) there remains significant challenges to assert regulatory pressure to improve the environmental performance of Australian SMEs.

The challenge for Australian policymakers is to overcome existing structural and cultural legislative considerations and to overcome the lack of regulations targeted specifically at SMEs (D'Souza and Peretiatko, 2002). Instead SMEs are left floundering in the complexity of Federal, State and local legislation (Geoch, 2007).

Another challenge for policy makers is to tackle perceptions that surround the manner by which environmental issues are managed in SMEs. With each individual SME producing significantly less pollution than their corporate counterparts, perceptions abound that SMEs have minimal impact on the natural environment (Masurel, 2007). An attitude commonly reported therefore, that many SMEs view environmental issues as almost insignificant to their operations (Biondi, et al., 2002; Petts 2000; Madsen and Ulhøi 2001; Friedman and Miles, 2002; The Australian experience reflects this trend. with an awareness of environmental issues failing to transpire as business-relevant (Andrews; 2002; Birch, 2003, Condon, 2004; Howgrave-Graham and van Berkel, 2007; Gadenne, 2009).

In contrast, there is sufficient evidence that SMEs can achieve cost savings and profit from increased productivity (Hitchens *et al.*, 2003; Revell and Blackburn, 2004; McKeiver and Gadenne 2005; Walker, 2007; Aragon et al 2008). Nevertheless, lacking the resources available to larger organisations (Atkinson *et al.*, 2000, Gadenne 2009) SME owner/managers are shown to distort perceptions of the time and costs to tackle environmental issues (Grayson and Dodd, 2007).

Owner/Manager and Environmental Reform

The individual values of owner's are a critical element of the leadership process in SMEs, and are essential in creating responsible business (Murillo and Lozano, 2006; Grayson and Dodd, 2007; Weisner et al., 2007; Gadenne, 2008; Allen Consulting Group, 2008). In the context of larger organizations, Mintzberg and Gosling (2003) state that 'the separation of management and leadership is dangerous' but the SME owner/manager needs to be both 'a good manager' and 'a great leader' and to 'change, perceptually.' Changing the manager's mindset is therefore a key aspect in the environmental reform of SMEs demanding new paradigmatic discourses and revelations (Ruegg-Strum, 2005 p. 69).

Gagnon et al., (2000) reveals how a minority of entrepreneurial SMEs have been leading the way for environmental renewal in the SME sector. Certainly, some of these companies are socially responding beyond mere profit-maximization objectives (Vives, 2010). In consequence, SME managers may enamor their 'corporate morality' via a practice of social entrepreneurship that associates responsible concern with the adoption of novel and innovative technologies (Masurel, 2007).

Masurel (2007) and Schaper's (2002) 'ecopreneurs' Nevertheless, 'eco-preneurs' and 'pioneers' (Schubert and Sedlacek, 2006) are instrumental in developing environmental behaviour within the SME sector. This reveals these managers to differ from the administrators of larger entities, who may "construct organizational environments in which the intended rational behaviour of the participants is enabled more closely to meet their basic psychic and emotional behaviour" (Ericson, 1962). Furthermore, the characteristics of SME organizations may be supportive of environmental management innovations and competencies (Condon, 2004; Aragon-Correa et al, 2008). Small-scale can, therefore, be advantageous, for example: 'reducing environmental impact, waste reduction and recycling' (Vives, 2010, p.110).

Supply Chain and Certification

Scandinavian private and public organisations have been actively asking questions about the environmental credibility of their suppliers for over a decade (Christensen and Kardel, 2005). Influential stakeholder pressures upon corporate organisations to improve environmental performance (Kurland and Zell, 2011) is now beginning to ripple down corporate supply chains on a more global scale. Central to this practice is the assessment of supplier operations in guiding purchasing arrangements (Keating, 2008). Walmart's for example, has taken a leading role in the US retail sector. A cornerstone to their sustainability strategy is to collect an inventory on their vast supplier network. Using a supplier sustainability assessment tool, Walmart is able to capture asking key performance metrics of their tier one suppliers associated with 'energy and climate, material efficiency, natural resources and ethical production' (Denend and Plambeck). A 2007 incident concerning forestry practices by a Woolworths supplier has generated interest by the Australian retailer to follow suit. Collins (2009) reports that this is repositioning the sustainability within the purchasing function. Significant challenges lay ahead in developing inventories and life cycle assessments across its supply chain. In the Australian banking sector, Westpac has developed a code of conduct that across environmental, economic and social behaviours of an organisation. Meeting the codes standards is rewarded with

Westpac's "Gold Standard" award and preferred supplier status .p.177. (Keating et al 2008).

The international environmental management standard ISO 14001 has similarly been used by larger organisations to enhance their environmental credentials through their supply chains. Adherence to this standard proves to business customers that a company may be serious about their environmental intent but can be problematic in bringing together purchasing and environmental activities. In addition, resource limitations may restrict effective auditing of supply chains. (Nawrocka et al., 2009). This may be prohibitive to SMEs lacking the resource capacity to implement standards within their organisations (Ciliberi et al., 2011). In addition, the barriers to environmental reform in the SME sector, i.e. cost, lack of regulatory pressure and commitment, and industry barriers are factors cited by Walker (2008) as key barriers to greening supply chains. Andrews' (2002) research on Geelong SMEs provides evidence of poor comprehensive technical assistance, insufficient legislative practices, and low levels of knowledge surrounding cleaner production principles in SMEs. Furthermore, a study on ISO14001 implementation demonstrates the need to educate and train smaller sized suppliers concerning implementing and practicing environmental management (Zutzhi and Sohal, 2004). Faced with significant challenges for environmental reform in the SME sector, however, 82% of SME owner/managers reportedly would comply with requirements by their business customers to improve their environmental performance (Baden, 2009). Nonetheless the majority of supply chain greening activities has been undertaken by larger organisations (Walker, 2008).

Codes of conduct by larger organisations nevertheless may be beneficial to resource poor SMEs and allow for mutually beneficial relationships. Codes permit all stakeholders involved in the relationship to evoke trust that all participants are behaving according to expected norms (Ciliberi et al., 2011). The concept of developing shared understandings and trust through mutual learning in greening supply chains is demonstrated through a New South Wales initiative 'Sustainability in Supply Chains'[2]. A multi-stakeholder approach to respond to climate change and its implications was established throughout NSW. Woodhead, et al, (2009) describes how mutual understanding between organisations also sets direction, develops the place and space of learning required to exchange information, establishes commitment, use tools and frequent workshops; and have a facilitated learning process.

---

[2] 'Sustainability in Supply Chains'Funded by the Australian Government Department of the Environment Water, heritage and the Arts (DEWha), and supported by Macquarie university

The growing importance of tackling climate change is also the focus of a study by Lee (2011) whose grassroots research aims to understand the mitigation of carbon emissions within supply chains and strategies for measuring carbon footprints.

Woodhead, et al., (2009) and Lee's (2011) studies reveal's the importance of multi-stakeholder involvement in greening supply chains. The network that can bring together stakeholders able to diffuse environmental management practices to SME's, is often lacking (Masurel, 2007). Nevertheless, Andrews, (2002) Geelong study, shows that the involvement of EPA, local councils and industry bodies can act as a key conduit to diffusing environmental knowledge to small businesses

To date, the academic response to understanding the issues of environment and SMEs has been characterised by only a small number of scholars contributing to the area. Aragon-Correa et al., (2008) criticise this lack of academic engagement especially as their research indicates that that SMEs may adopt strategies to limit their impact. Those authors, however, acknowledge the focus taken by most researchers on eco-efficiency solutions rather than on a more concerted effort to understand environmentally oriented organisational change processes, best practice, and innovation in SMEs. Furthermore, the emergence of environmental management within supply chains is an emerging area of research (Keating et al, 2008; Koh et al, 2012,; Lee, 2011, Hajmohammad, 2013).

Methodology

A Mixed Method Rationale

Geographically, the emphasis of this research was toward environmental behaviour of small light industry in the Greater Melbourne Region. The purpose of the study was to trial an existing survey instrument that has been developed and comprehensively employed within the Swan Catchment Area of Western Australia (see Walker 2008). The use of this survey has collected comprehensive quantitative data on the environmental perceptions and attitudes of some 4500 industrial SME owner/managers and their energy, water, and waste behaviours. The Melbourne study is augmented further through qualitative interviews to seek more in-depth information to this initial survey.

The use of quantitative and qualitative data provides for a richer set of results than the use of one methodological approach alone (Tashakkori and Teddlie, 1998). By supporting or refuting the results of different methodologies therefore mixed methods research enables the research to provide robustness, validity and context to the research undertaking (Greene and Caracelli, 1997; Collins, Onwuegbuzie and Sutton, 2006). Furthermore, the sparse literature on SME and environment behaviour lends well to the development of a research approach that goes beyond problem quantification delving deeper through qualitative exploration. The study presented in this paper, therefore, goes beyond the trialling of the Swan Catchment survey tool within a new geographical setting. It also enriches the quantitative findings through a comprehensive qualitative investigation.

The focus of the project is to gather quantitative and qualitative information concerning the energy, water and waste behaviour of Melbourne SME light industry.

Primarily to answer the following questions:

1. What is the usage of energy and water use?
2. How do small light industries in Melbourne make use of energy and water?
3. To what extent are the waste streams of Melbourne light industry significant?
4. Why do managers recycle or do not recycle waste materials?
5. What are the manager's environmental behaviours, attitudes and perceptions?
6. How are managerial behaviour, attitudes and perceptions influential on environmental performance in this sector?
7. How do stakeholders influence environmental practice in the sector?

The questions are critical as they underpin exploration as to how Australia is able to combat key issues facing Australia today such as climate change, drought, carbon emissions, landfill impacts and land availability. Light industry is a key player in the supply chain of most Australian corporate players and their environmental impact is proven to be highly significant.

Survey Geographical Scoping and Sample Selection

The first stage of the project sought to identify the regional scope of the investigation across the Greater Melbourne Region, with the purpose of

conducting on-site surveys of up to 400 SMEs. Clusters of industrial SMEs by geographical location were generated through the use of a database provided by VECCI and the Yellow Pages business directory. Whilst useful in adding companies to the sampling frame, the majority of addresses and details proved to be out of date. As a complement, the use of Google Earth's satellite maps and imagery helped to identify company locations.

The subsequent collection of industrial and business parks and SME groupings was subsequently divided into geographical clusters of SMEs according to their positioning within and around the Melbourne region. As described below, an on-the-ground research team was able to verify the accuracy of the locational data, and to report whether each targeted business was currently an operating concern and indeed that the company was an SME as defined by the number of employees.

The purpose of defining the geographical clusters was to arrange for planned site visits by a team of researchers equipped to deliver an environmental survey developed by the Swan Catchment Council and their partnering stakeholders. Visits to approximately 3000 SME light industrial companies allowed for a research team to ask each company if they wished to participate with the project. From these companies, 354 companies agreed to be included in the sample population.

The survey, comprising some 40 questions on SME business characteristics, environmental perceptions, energy, water, and waste matters had been fine-tuned through delivery to some 4500 light industrial concerns within the Swan Catchment Area of Western Australia.

Selection and Training of Research Assistants

The research personnel were selected based upon an appropriate scientific background, an understanding of the issues involved in the survey questions, as well as a demonstration of the personnel qualities required for on-site interviews with owner/managers and managers. The researchers were required to be comfortable with technical and scientific terminology. As the researchers were also graduate students, they were well versed in the need for accuracy in collecting data.

Initially, four part-time research assistants were provided with a training day workshop by a qualified Swan Catchment Council employee. This focused on demonstrating how to use the survey for data collection through an uploaded version on a hand-held Personal Digital Assistant (PDA). A PowerPoint

presentation describing the step-by-step process and a pilot trial by the research assistants quickly developed their skills in using the PDA.

The workshop also provided a forum for the researchers to learn how they should engage with SME owners/managers and the way in which the survey should be delivered. Especially important during the training was the emphasis placed on approaching companies. The research assistants were trained to approach companies with the aim of registering appointments for the interviews and, as casual employees of Swinburne University of Technology, were provided with employee identification cards. The training helped to stress the importance of revealing these cards to potential survey respondents. Finally, the workshop provided an opportunity for role-plays of the survey delivery.

Survey Delivery and Regions

The survey was initially delivered during June and July, of 2008, by 4 part-time researchers. A further 5 part-time researchers were trained by these persons and extended the delivery of the survey throughout August and September of 2008.

In the outset, the project manager (chief investigator) led the research team around the first day of surveying. As new team-members came aboard, the project manager also spent a day out surveying with them to expedite the learning process.

Considering the part-time nature of the employees, a weekly schedule was administered to allow for sets of paired research assistants to visit strategically important light industry locations. Using motor vehicle transport each research pair would visit particular regions within Greater Melbourne.

These areas covered areas from Campbellfield in Northern Melbourne, through to Bayswater in the Eastern Suburbs and Frankston in the far Southeast of Melbourne. The project manager maintained close contact with each research pair and co-ordinated approaches to companies with respect to the clusters of industrial SMEs across the Greater Melbourne Region. Site visits were registered on a map of the Greater Melbourne Region in order to track progress. Given that the 4-month period generated visits to several thousand companies (as described in the sample selection procedure above) management of the project needed to be highly organised.

Each research pair worked independently on the ground, deciding whether to approach companies as a pair or as individuals depending upon the local

environment and their level of experience with the survey. As experience with administering the survey increased, researcher pairs were able to split up and make more independent visits and survey deliveries to premises. Generally, each survey delivery took around 20-30 minutes.

Overall, therefore, several paired teams delivered 354 on-site surveys to light industrial companies. Using the survey uploaded to the PDA enabled close control of the process of real-time data collection and entry, and reduced data error and researcher bias. The data were then sent directly to a server and uploaded as an Excel sheet to ioGlobal's secure website. Access through the website to the Excel sheet, also allowed the project manager to monitor the performance of each research assistant. Statistical analysis using SPSS 17 software was used to generate a data set pertaining to the environmental perceptions and attitudes of these companies, and to their behaviour regarding energy, water, and waste.

Interview Selection and Delivery

From the 354 companies, a subset of 77 was taken, representing those companies who had originally agreed to be recontacted after the survey to discuss environmental issues. From those 77 companies, 20 companies were chosen that best fit the interview criteria based on survey responses and company characteristics.

The level of company environmental behaviour (from reactive to proactive) was then scaled using cluster analysis allowing the interview set of companies to reflect a range of:

1. Level of environmental concern from low to high (based upon their rating of environmental issues, environmental decision making, and internal operations).
2. Tendency to either, employ more people and own their premises or to employ fewer people and lease their premises.
3. Establishment size from smaller to larger.
4. Level of knowledge of how to reduce energy and water use.
5. Implementation of energy and water reduction practices.
6. Types of waste materials produced.
7. Degree of knowledge and practice of recycling and land-filling of waste materials.

Within each of these categories, where possible a variety of responses to water, energy, business type and environmental concern clusters was selected. Further details concerning the cluster analysis can be found in Appendix 2.

From these 20 companies, 14 companies agreed to participate in face-to-face interviews scheduled for 45 minutes.

During the interviews a Sony hand-held Dictaphone and detailed hand-written notes were used to collect data. The digital recordings were subsequently fully transcribed. A coding methodology as described in Appendices 1-3 was used to elucidate key themes and patterns from the transcriptions and hand-written notes, which generated a matrix used for the data analysis protocol. For example, the codes 1-9 for wastes (right-hand column of Appendix 3, allowed for a coding set that could flag appropriate responses throughout the interview transcripts. Themes and patterns pertaining to ease/difficulty in waste management could then be established and appropriate quotes developed to support/refute the analysis of the quantitative data. The same approach was used for business typology, water and energy. Appendices 2 and 3 indicate the codes were developed from the themes of the survey questions, thereby maintaining both the phenomena of interest throughout the investigation and the robustness and validity of the resultant data set. Another set of codes were also developed to analyse the respondents perception to a range of stakeholder influences.

Interview Selection and Delivery 2012

The 2008 face to face interviews asked the 14 participating owner/managers (OMs) if they would willingly be involved in further participation at a future date. All 14 managers agreed to this request. Allowing for a period of time to assess change in the sector, all 14 OMs were approached during October 2012. 4 OMs had either left the business or the business did not exist anymore. All 10 agreed to interviews sometime in November/December 2012. 6 participated in early November 2012. Telephone interviews of duration 20-40 minutes were recorded and transcribed. In addition to the same coding set used for the 2008 qualitative set, several new codes pertaining to certification and stakeholder influences were included. These developed from the findings of the 2008 analysis. The codes were used to provide validity to the 2008 data and to reveal any changes in behaviour in the 2012 responses.

Results

Climate Change and Energy

The cost imperative through energy savings is indicated through the 2008 finding that 81 per cent (n=212) of owner/managers (OMs) track energy costs against those 46 per cent (n=212) who only check energy usage. This was also supported by the 2012 qualitative analysis of the six interviewed managers. For example: 'look at bills and compare … must read a meter.' Another manager of the 2012 interviewees commented: 'We do keep an eye on electricity accounts … usage but cant do cost savings…can't cut down.'

Nevertheless, the natural environment is significantly valued amongst the OMs of the sample companies so that cost alone is the only factor in environmental decision-making (LIKERT scale 0-6 rating of environmental concern, rating 5 - 30per cent, rating 6 – 30 , n=209). This is shown by the relatively higher interest, by all respondents (OMs and non-decision makers in the business) toward buying environmentally sound products and including the environment within business decisions (Figure 1). This appears to be at odds with the rather lower response to reducing greenhouse gas emissions, also shown in Figure 1. Equally, this does not translate into any actionable evidence through the purchasing of green energy. Significantly the qualitative analysis of one interviewee transcript reveals that green energy was a more costly option than brown coal because there are: 'no deals on green energy … the more you use, the cheaper that it becomes. To do the same on green energy … that is a barrier for us.'
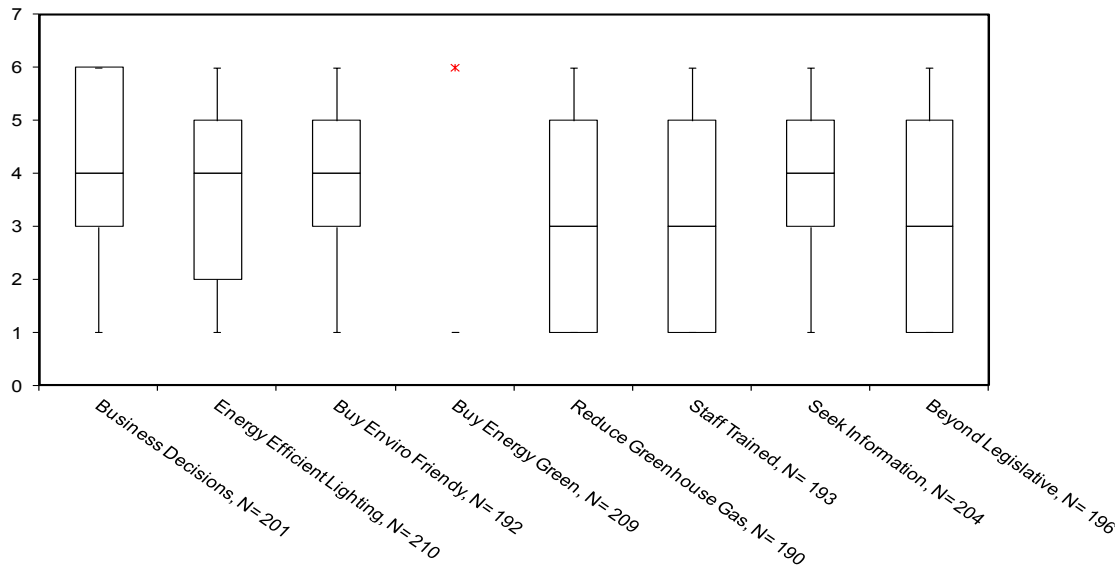
Figure 1: Environmental behaviours and perspectives of all respondents (Owner/Managers OMs and Non-Decision Makers)

For example, one OM, the qualitative interviews also teased out altruistic sentiments that influenced carbon management practice beyond the cost incentive. For example citing two proactive sample members:

> We did it [environmental initiatives] because we wanted to do it ... we try to get a green rating on the building but couldn't get one because we are manufacturing … it cost us a lot of money. We did it because we wanted to do it.

The 2008 results also shows that although 60per cent of companies are interested in environmental issues, only half suggested a positive environmental impact and almost 60per cent a negative impact (*n=213*). Responses to improving this impact are shown in Figure 1. 40per cent of SME owner/managers are aware of switching off lights and/or machinery, with 34per cent doing so. 37per cent are aware of efficient processes and machinery with 23per cent doing so. 25per cent are aware of efficient lighting, and 18per cent implement efficient lighting practices. 5per cent are aware of lighting efficiency modifications, with 4per cent doing so.
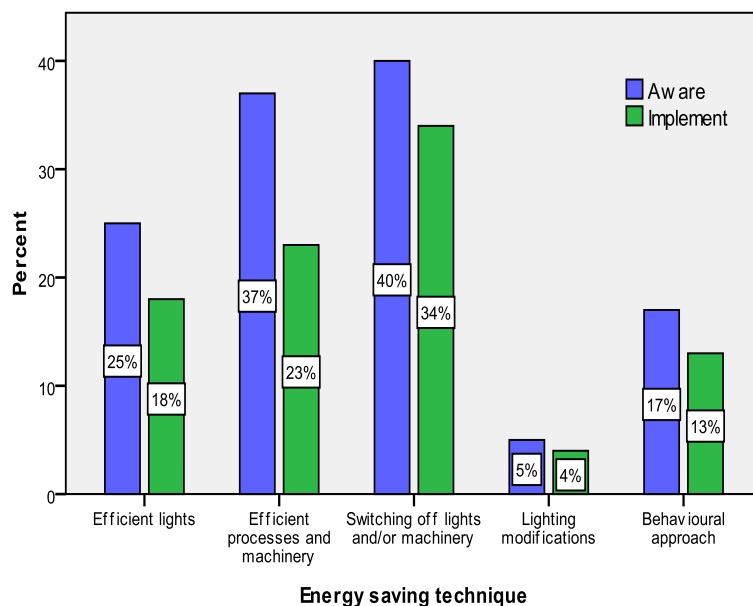
Figure 2: Illustration of specific energy efficient awareness and practice[3] response by Owner/Managers (n=115; n=87).

Importantly too, 17 per cent of respondents demonstrated a behavioural dimension to being energy efficient through the consciousness of their actions, for example one respondent stated that: 'it is important to be energy efficient and this is a good way to help the environment' Only 13 per cent, however, implemented a behavioural approach. By 2012, two OMs when asked about the affect of the carbon tax commented how they dealt with the cost. Whilst the first interviewee stated that the influence of carbon tax was 'just past onto the consumer', the second stated that 'Costs gone up, can't pass it on … efficiencies in our workforce.'

The OM who commented 2008 that cost affected buying green energy also stated in 2008 cost influenced buying green energy was similarly aware of the need to reduce energy consumption. Instead, however, of absorbing these costs within the workforce this OM described how 'we have a plan for reduction ... would like to reduce energy bills for the ISO 14001 accreditation.' The interviewee went on to explain how they have used an environmental consultant: 'We can't get it, these are the sorts of things,

---

[3] Due to the large number of multiple responses to awareness of Q30b of the survey (21.7% of respondents who knew of some energy efficiency technique gave multiple answers), a separate variable was set up for each response, indicating degree of awareness of each technique. All % values are based on the 115 companies who reported knowledge of saving energy.

Tim [the consultant] looks to see if we can be more efficient and use less energy'. By 2012, the same OM described how they had implemented ISO14001 but found it 'difficult to work out how we will fit into the carbon tax … look at bills'.

The 2012 interviews did however show that since 2008 more SMEs were measuring usage, for example one interviewee described the importance of using 'SMART meters.' Whilst one OM described tackling the 'cost of electricity going up' as 'We looked at solar panels' a more proactive 2012 interviewee who not only had accreditation to ISO14001 but used to a range of SMART meters and solar power to combat rising electricity costs and the carbon tax.

He described how:

> Using a new meter to monitor the solar…only done that in the past month … more of an understanding of our energy usage need to keep an eye on it. Invested in the solar panels and cooling and the lighting to be more energy efficient back 5 years ago. More bearing now with electricity carbon tax.

He went on to describe:

> Drivers, carbon neutral … gathering that data in the correct manner to measure the carbon footprint. Help have an influence on peoples buying green in the world but not just price, it's a mixture of influence on peoples decision making. Appeal to peoples environmental side. A lot of people who don't.

Water

Water usage is reportedly very low water across the interviewees. Five companies (A, D, I, G, and J) discussed low-level usage of water for 'showering, the toilet, and the making of drinks.' Equated in monetary terms as: 'We looked at our water bills, 40 bucks.' Although the only interviewee to comment on tracking costs, the survey shows that 53per cent of OMs (*n=209)* do so. 67per cent (n=199) of businesses, however do not check their water use at all. Figure 21 indicates that only awareness of water recycling is reported by more than a third of OMs (44per cent n=59) with less than a third of OMs implementing water recycling (29per cent) or have knowledge of, or implement other water saving techniques.
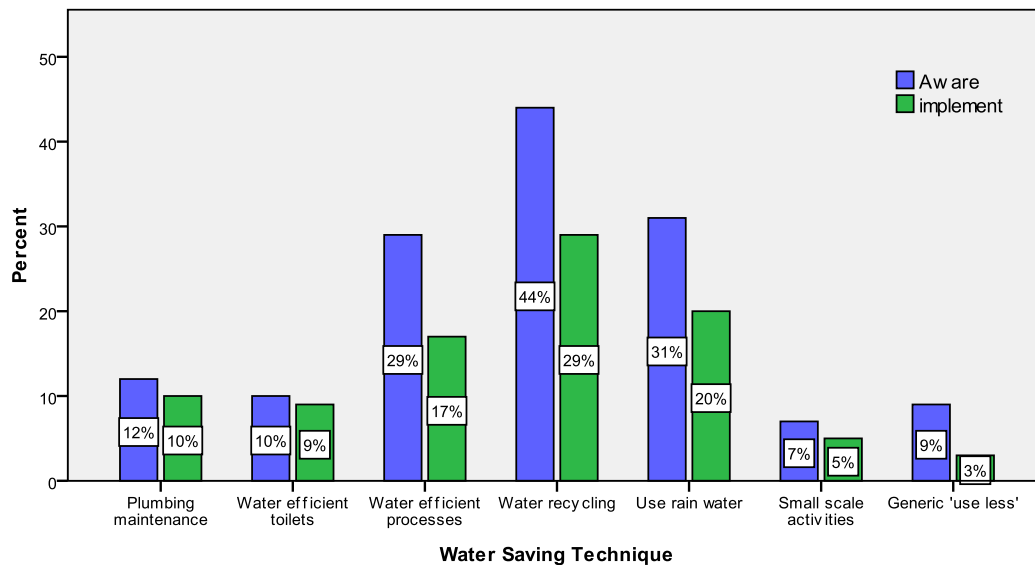
Figure 3: Illustration of the specific awareness and practice of saving water provided by Owner/Managers (OMs) (Aware n=59 and Implemented n=43).

The 2012 interviews supported the low water usage in the sector as one OM describes that: 'Water is no big drama. Not used in our production, actually use less than at home.' The questions about water usage however induced various responses from four different OM who each stated that:

'Could improve … We had to do water testing from time to time … leaks and that'

'Sort of make you more aware, always in your face … take that more time to think about thing … recycling water usage in the business kinda has yes.'

'Not really probably … fitting water tanks don't want to spend money definitely'

'Water tanks would like to do that'

More proactively another OM described the implementation of a 'triple interceptor for car washing which is careful with chemicals, biodegradable.'

Waste Management

Overall, OMs demonstrate that steel, polystyrene, other plastics, pallets, thinners, waste oil, oil filters, and cardboard are significantly recycled. The cash incentive for using

steel and the high levels of cardboard produced are supported by the attention shown to these two waste streams during the interviews. For example, one OM reported: 'Feel we are on top of wastes. Most go for recycling taken by CMA Corp. All the metals and separate bins for cardboard and obviously, all our offices have recycling bins'. In addition, 'we constantly pick up stuff that can't be lifted, store of cardboard boxes all our packaging is re-used. When we design packaging for tank in-fills for cardboard there is a high recycle content. Prefer to send, particularly the tank kits, together in one single box and in-fills in cardboard'.

Another interviewee referred to cardboard, and also discussed how they 'recycle all our cardboard and our steel and any fabric and materials that we can ... Cardboard and steel that gets picked up and the fabric. What we can get sent off to the stores.' A further, OM continued the theme of focusing on the wastes that are recyclable, such as car bumpers, other plastics, car panels, and vehicle batteries, hence:

> Deal with a lot of damaged motorcars ... we have a lot of damaged panels, mudguards, doors, roof etc right through to the repair of the motorcars, and masking plastics, new cars come in cardboard containers, batteries and radiators damaged. And there is an enormous amount of waste products and waste materials.

Supporting this commentary, one respondent pointed out that there is 'a lot of waste, sunroofs, old headings, composite materials, just garbage: nobody wants it, no use for it.'

Finally, through an evolution of recycling practices, one OM also explains that 'since the 70s we have been recycling tins and glass and stuff but years ago we worked for EcoRecycle Victoria. A lot of work on recycled papers, some 15 years ago.'

A key reason for approximately 60per cent of the respondents claiming a negative impact on the environment is through the production of waste materials, material impacts, chemical usage, and land-filling. In particular, polystyrene, shrink-wrap, solid timber, particle board, MDF, dust, radiator coolant, paint, and glass pose significant problems for these companies in terms of land-filling and associated costs. Costs also appear as a problem for other materials such as cardboard/paper, tyres, and drums/containers. A significant number of respondents also explain that the non-recyclable nature of waste materials, as well as the small quantity of those wastes, render recycling unfeasible, and these are the key reasons why they do not recycle these wastes

By 2012, OMs were continuing to cite problems with certain materials. Paper was a problem for some managers as one OM claims: 'Look at paper is one of our major wastes'. However he did state about paper and manufacturing wastes generally that 'people more conscious.' But environmental concern was not the only reported feature. Similarly to 2008, cost plays a significant role in manufacturing and wastes. As one OM reports, 'Cost, just want to get that squeeze manufacturing being conscious of it.' More systematically another OM purports that its the 'Production efficiency between raw materials and waste … an on-going oversight on your production.'

The price of metals that have 'peaked' and left according to one manager has left another OM reflecting that 'scrap metal remains unchanged'. This has influenced the monies obtainable from dismantling batteries. The 'peak' according to this manager has affected income streams from waste 'white aluminum or steel.' He also complained about the 'suppliers, annoys me the way they pack things over-packed. Always chop up and put in recycling.'

Drivers for Certification

The owner/managers overwhelming believe that Government is accountable for environmental responsibility (49per cent) and that individuals play a role too (29per cent) (Figure 3). The OM of Company E, for example discussed environmental responsibilities of government within the context of 'products that come in from China get analysed to adhere to the ISO standards need re-working to come up to standards otherwise get told off by Government.' This firmly places responsibility on Government for ensuing that consignments entering Australia should adhere to international environmental standards such as ISO 14001. The 2012 follow up interview revealed that OM also believes that 'Government sets tone in the economy … does filter down to us.' This has driven developments in the supply chain 'because of requirements of certification. Without that can't work with councils … through councils any tenders new procurement'
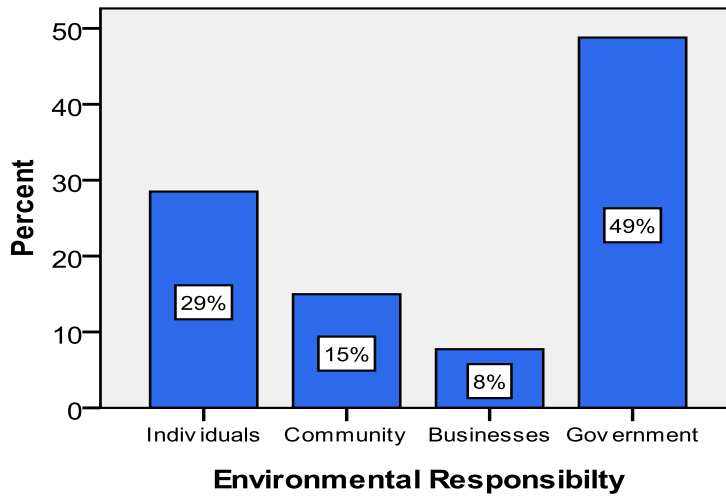
Figure 4: Environmental responsibility: OMs perspectives (n=207).

The owner/manager of Company M more broadly aligns the role of the industry body with Government and individuals: 'The industry itself is proactive in that respect and the only other one is Government … reasonably accountable for what you do but if nobody is giving you any help then you ... keep on using what you are using.' This resonated throughout all 14 interviewed companies as the OM of Company A states: 'No-one is going to do it themselves.'

Similarly, four of the OMs interviewed worked in the automotive services sector also expressed the need for external assistance and would look to the Victorian Automobile Chamber of Commerce (VACC).[4] As a body 'VACC sets the standards' (Company H), with the intention of demonstrating that this would also be the driver for developing their sense of environmental responsibilities. Although none of these companies were conscious of energy costs and implemented recycling programs, in 2008 they were not aware of the VACC's green stamp that had been initiated by the association in 2005.

---

[4] VACC represents the interests of over five thousand small and medium sized businesses in regional and metropolitan Victoria. "The Australian Motor Industry Federation is important because the RS&R industry is the nation's largest small business industry sector representing 100,000 businesses, 310,000 employees and an aggregated turnover of $160billion per annum.

VACC and The Green Stamp 2012

By 2012, one of the interviewees described how they have 'affiliated to the green standard … One of those things that they assess to minimize waste … from VACC'. This OM commented further, however, that 'Things like that the green stamp initiative in our industry, a lot of paperwork so very difficult … a lot of stuff … the bureaucracy puts people off a lot.'

Website analysis demonstrates that of the thousands of VACC only 16 automotive service SMEs, across regional and metropolitan Melbourne has achieved Level 2 accreditation (VACC Green Stamp Plus Environmental Accreditation, 2012). Contact with the body now shows this has increased to 32 certificate holders. Box 1, however, reveals through further website analysis that the environmental behaviour of Victorian automotive SMEs has been improving.

Box 1 Influence of Green Stamp on Australian Automotive SME

Over the last three years there have been many improvements to sustainable practices within the industry. **Key drivers** for the industry to make improvements to their environmental management include **money savings** that can be made by carrying out efficient sustainable practices. Also consumers are choosing products and services based on cost and the **environment.** VACC has seen improvements to waste management, spill management, storage practices, and awareness of energy, greater staff training, water saving techniques and the implementation of environmental plans and policy.

MTA **SA** noted an obvious increase in member interest and awareness in environmental management over the last year. Members are installing rainwater tanks to collect rainwater for use within the business and installing energy efficient lighting to conserve energy. Other management initiatives include the protection of storm-water and recycling of waste products.

In NSW member businesses are generally aware of the basic legislative requirements. Most are separating wastes and having them removed by licensed carriers. Spill management is improving. Some businesses are recycling solvent in-house. Many businesses are aware of reducing energy consumption.

Some sustainable strategies employed by businesses in **WA** include having water recycling systems that recycle wastewater from wash-bays for re-use.

The majority of MTA **NT** members have been reducing their energy usage by installing energy efficient lighting and where new workshops have been constructed, the opportunity has been taken by members to include skylights to reduce the need for artificial lighting (National Public Environment Report, 2009).

Discussion

The 2008 Melbournian survey instrument provided a baseline of the environmental behaviours of manufacturing SMEs. Whilst the owner/managers of these businesses differed in their stance towards environmental behaviour, overwhelmingly a cost-prerogative was reported. Cost as driver for the more efficient use of resources was supported further by the qualitative analysis of interview series both in 2008 and 2012. Most companies make a conscious effort to switch lights and machinery off, as well as to install simple and cost-effective energy saving devices. The 2012 interviews also showed there is gradual awareness that the use of SMART meters can be used to not only track cost but usage too. This development can also be a conduit to developing a more emphatic role in the uptake of ISO14001 and carbon foot-printing practice.

In addition, since 2008, the recently introduced carbon tax is influencing the pricing strategies of SMEs, with most companies passing the tax onto the consumer. The 2008-2012 data also reveals that low-level water initiatives such as water tanks, dual-flush toilets, and efficient water heating devices are slowing gathering traction but are not common practice across the sector. With regard to wastes too, simple to recycle materials and those with a cost income such as steel and certain woods and plastics are all recycled. Nonetheless, the majority of companies struggle with complicated wastes and those with little or no associated income. This is especially evidenced in the 2012 interviews that show the sensibility of the metal markets to environmental behaviour. Since 2008 for example there appears to be a slow down in recycling scrap metal to the fall in certain metal prices.

Instead of any effort therefore to combat climate change and its impacts, and to reduce resource impacts, needs to recognise that the relationship between use and cost drives a cost-focus strategy, over organizational reform. The majority of SME OMs are therefore responding to changing costs rather than leading proactive change towards improving environmental outcomes. This finding concurs with Williamson *et al*., (2006) insight that leadership in Australia is driven more toward improving business performance than toward meeting the needs of the broader community.

The greening of small and medium-sized businesses is, however, highly dependent upon the ability of the owner/manager to champion environmental change within his/her organization, and not only business performance. Decision-making within SMEs is also a determinant of the perceptions and cognitive processes of the owner/manager. Faced with uncertainty concerning risks and ambiguity surrounding environmental issues and business decisions, the perceptual processes of the owner/manager is critically important to the greening of the organization.

This is especially the case given the lack of broad corporate infrastructure in SMEs and sources of external and internal influences. Both Andersson and Bateman (2000) and Cote, et al. (2008) alludes to this key personal feature in the environmental change process. The literature on SME environmental behaviour reveals that this change agent is a rarity, with many companies choosing to be rather passive decision-makers when faced with uncertainty and ambiguity (Heavey, et al. 2009).

The SME literature identifies that owner/managers are generally not risk takers (Levy & Powell, 2005) and have been reportedly hesitant to invest in environmental innovations. Resources may equip an organization to become more comprehensive in their search for information determining the effectiveness of environmental decision-making (Tonn et al., 2000) and drive the innovation process. Nonetheless, the lack of critical resources reported throughout the SME literature that may hinder the search for new information may be a reason for a low response by all respondents to the issue of gaining more knowledge about environmental issues (Figure1).

Almost half of the Melbournian SMEs see government as responsible for environmental issues and also seek assistance and education. The survey response for educational assistance was 37 per cent in Melbourne and Walker (2008) reports 40 per cent using the same instrument in Western Australia. As Revell (2007) demonstrates, however, government programs aspiring to a win-win business-environment situation have not been successfully supported by SMEs. Instead, as Hume (2010) postulates, governments need to shift to a new business environment at bureaucratic, industry and societal levels.

That 13 per cent of owner/managers are implementing a behavioural practice, beyond merely a techno-centric cost-saving approach and that several interviewees display altruistic tendencies in their business decision-making suggests that a small set of proactive light industrial SMEs are emerging. This compares strongly with recent empirical work by Revell (2010) in the UK. Effective resource usage, leadership and organizational characteristics, such organizations have gained inertia and have developed a 'herd mentality' towards organizational reform throughout the sector (James *et al*, 2007, p.307).

Reflection and action, rather than the team leadership behaviour of larger organization, shapes OMs decisions concerning cost and practices to reduce energy. Implementing energy efficiency lighting, low-cost energy technologies, as well as certification to ISO14001 and 'Green Stamp Plus' may indicate 'an infectious adoption of an approach or technology that somehow comes to seem the only way to go'. James *et al*. (2007) refers to this as a 'contagion.' Rogers (1983) explains how the uptake of such technologies, shadow the early adopters until the new practice is fully adopted.

The adoption of ISO14001 and Green Stamp by a select few of the owner/managers may therefore provide evidence of environmental reform in the Australian SME sector. As this study shows SMEs have historically been reactive to change and significantly concerned regarding cost. Two companies in the study have implemented ISO14001. They were generally larger than most of the companies undertaking the study, with approximately 25 employees. Size may be significant in determining available resources for certification. Nevertheless, both companies have reported great difficulties in achieving certification between 2008 and 2012. Without doubt the 2012 investigation has shown a very slight change in interviewees perceptions regarding the environment. Increasingly companies are undertaking more and more ad hoc solutions to making cost savings and reducing environmental impact. Interestingly, this is exactly the same process that the two ISO14001 holders underwent to attain certification.

Meanwhile, the Victorian Automobile Chamber of Commerce (VACC) initiative 'Green Stamp Plus' demonstrates that with zero members in 2005, 16 members by last year and this year 32 members certified that a contagion certainly maybe catching. Of four automotive SME OM, one discussed the certification. Green Stamp Plus report a significant increase in interest in environmental management of the sector. So, although the 2008 survey suggests a generally low-level set of actions by SMEs to improve their environmental performance, the uptake of environmental certification would certainly improve the sectors overall environmental credentials.

Strengths and Limitations of Study

The 2008 survey instrument was designed to benchmark environmental activity in Australian SME manufacturing enterprises. The survey tool is descriptive in nature limiting the correlations that can be made across the population. The statistical tool has however permitted a cluster analysis of business typology and environmental behaviours that have allowed a sampling procedure for a significant qualitative investigation. The addition of two rich sets of qualitative interviews with the owner/managers has paved the way for an exploration of an SME sector undergoing profound change in the manner by which environmental issues and perceived and addressed. A limitation to the qualitative work is that further qualitative research across Australia to substantiate the claims made through the Melbourne investigation.

Policy Implications

The sector would benefit substantially from a set of policy directives that focus on providing financial incentives towards reducing energy consumption and waste generation. Improving the business performance through cost savings and income

streams must also be coupled with policies that drive innovation within SMEs. SMEs can be highly innovative through their close owner/manager and employee relationship.

Policies that can couple highly specific and targeted environmental programs to the working structure and cost restrictions of SMEs should engage owner/manager with their employees and drive innovation. A second level policy should ensure a successful uptake of carbon management practices, through a rebate system for those companies rising to the environmental challenge. This would be paid for not only by collected carbon taxes but also by taxation on increased profits, a result of improved eco-efficient practice.

A lack of activity toward imparting environmental awareness into production processes and toward modifying lighting systems, suggests a greater understanding of the role educational services, training and incentives to further reduce energy consumption is necessary. These incentives would seek to: reduce process consumption and instigate modifications in lighting arrangements. Such incentives would have multiple gains, such as, waste minimisation, carbon management and life cycle management.

The role of Government in working in multi-stakeholder activities that bring their knowledge and capability to aiding corporations green their supply chains is worthy of policy development. Government and industry can work together to bring important resources and know-how to SMEs. Government for example harbours great educational know-how while corporates enable market growth and product capability.

Conclusion

The Federal government initiated an investigation into the environmental behaviours of Australian SMEs that has culminated in a 2008-2012 study of Melbournian manufacturing SMEs. 354 companies took part in the initial 2008 survey and revealed a sector that although aware of humankind's impact on the natural environment, generally did not identify that small businesses contributed significantly to current global crisis. Nevertheless, most companies were seeking to reduce their energy costs and handle wastes appropriately. Few however take a concerted strategic approach to incorporating environmental activities within their core business activities. The 2012 interviews may indicate that the tide is about to turn and that some leading SMEs towards an environmental revolution. The catalyst for this revolution is shown to be both internally and externally driven, both by green champions and multiple external stakeholders.

References

Allen Consulting Group. (2008). *Small and Medium-sized Enterprises and Responsible Business Practice: An Initial Investigation*, Report prepared for the St James Ethics Centre, May.http://thehub.ethics.org.au/uploads/files/St%20James%20Ethics%20Centre_report_stage1final.pdf. date accessed 11/12/2009.

Andrews, S.K.T., Stearne, J. and Orbell, J.D. (2002). Awareness and adoption of cleaner production in small and medium-sized businesses in the Geelong region, Victoria, Australia, *Journal of Cleaner Production*, 10(4), pp. 373 – 380.

Aragon-Correa, J.A., Hurtado-Torres, N., Sharma, S, and Garcia-Morales, V.J (2008). Environmental strategy and performance in small firms: A resource-based perspective', *Journal of Environmental Management*, 86(1), pp. 88-103.

Atkinson, S., A. and Schaefer, Viney, H. (2000). Organisational structure and effective environmental management. *Business Strategy and the Environment*, 9(2), pp. 108-121.

Baden, D.A., Harwood, I.A. and Woodward, D.G. 2009 The effect of buyer pressure on suppliers in SMEs to demonstrate CSR practices: An added incentive or counter productive? *European Management Journal* 27(6), pp. 429-441.

Birch, D. (2003). Corporate social responsibility: some key theoretical issues and concepts for new ways of doing business, *Journal of New Business Ideas and Trends* 1(1), pp. 1–19.

Biondi, V., Iraldo, F. and Meredith, S. (2002). Achieving sustainability through environmental innovation: the role of SMEs. *International Journal of Technology Management*, 24,(5,6), pp. 612-626.

Blackburn, W.R. 2007. *Approach to sustainability for small and struggling companies, The sustainability handbook: the complete management guide to achieving social, economic and environmental responsibility*, Earthscan, Abingdon, Oxfordshire

Bubna-Litic, K. and de Leeuw, L. (1999). *Adding the Green Advantage: A Survey of Australian SMEs*, EcoBusiness Consultants Pty Ltd, Adelaide. Accessed 11th November 2009.http://www.ecobusiness.com.au/sme/survey.pdf.

Castilla Strategic Advisors.(2009). *Securing SMEs in Australia's Low Carbon Future: The Cost of the Carbon Pollution Reduction Scheme for Australia's Small and Medium-sized Businesses*, Report to the Australian Chamber of Commerce and Industry, Accessed 15th June 2010: http://www.castaliaadvisors.com/contact_details.php.

Christiansen K and Kardel, D. (2005). Environmental Certificates – Danish Lessons. *Journal of Cleaner Production*, 13(8), pp. 863 – 866.

Ciliberti, F., de Haan, J., de Groot, G. and Pontrandolfo, P. (2011). CSR codes and the principal-agent problem in supply chains: four case studies. *Journal of Cleaner Production* 19(8), pp. 885 -894,

Collins, R. (2009). The Purchasing Push. *Waste Management and Environment*, 20(9), pp. 27-28

Collins, K.M.T., Onwuegbuzie, A.J., and Sutton, I.L. (2006). A model incorporating the rationale and purpose for conducting mixed methods research in special education and beyond. *Learning Disabilities: A Contemporary Journal*, 4, pp. 67-100.

Condon, L. (2004). *Sustainability and small to medium-sized enterprises: how to engage them*. Concurrent paper session, *Effective Sustainability Education: What Works? Why? Where Next? Linking Research and Practice*, 18-20th February, Sydney, Australia

Denend, L. and Plambeck, E. (2010) 'Walmart's Sustainability Strategy 2010 Update', Case OIT-71B, 10/15/10. Stanford Graduate School of Business.

D'Souza, C. and Peretiatko, R. (2002). The nexus between industrialization and environment. *Environmental Management and Health*, 13(1), pp. 80 – 97.

Experto Crede. (2009). *UK Business Carbon Top 3 Map.* Report prepared for the UK Government Department for Business, Innovation and Skills. Accessed 3rd March 2010. http://www.berr.gov.uk/files/file52077.pdf

Friedman, A. L., and Miles, S. (2001). SMEs and the environment: two case studies, *Eco-Management and Auditing*, 8(4), pp. 200-209

Gadenne, L.D., Kennedy, J. and McKeiver, C. (2009). An empirical study of environmental awareness and practices in SMEs, *Journal of Business Ethics*, 84(1), pp. 45-63.

Grayson, D. and Dodd, T (2007). *Small is Sustainable (and Beautiful!!): Encouraging European Smaller Enterprises to be Sustainable*. Doughty Centre for the Corporate Responsibility, Cranfield University, Cranfield, UK.

Greene, J.C., and Caracelli, V.J., (1997). *Advances in mixed-method evaluation: The challenges and benefits of integrating diverse paradigms*. New Directions in Evaluation, 74. San Francisco, CA: Jossey Bass.

Hajmohammad, S., Vachon, S., Klassen, R.D and Gavronski, I. (2013). Lean management and supply management: their role in green practices and performance. *Journal of Cleaner Production* 39, pp. 312 – 320

Hillary, R. (2000). *Small and medium-sized enterprises and the environment: business imperatives*. Greenleaf Publications, Sheffield, U.K.

Hitchens, D., Clausen, J., Trainor, M., Keil. and Thankappan, S. (2003). Competitiveness, environmental performance and management of SMEs. *Greener Management International*, 44, pp. 45 – 57.

Howgrave-Graham. A. and van Berkel, R. (2007). Assessment of cleaner production uptake: method development and trial with small businesses in Western Australia. *Journal of Cleaner Production,* 15,(8-9), pp. 787 -797.

Keating, B., Quazi, A, Kriz, Coltman (2008) In pursuit of a sustainable supply chain: insights from Westpac Banking Corporation. *Supply Chain Management: An International Journal*, 13(3), pp. 175 – 179

Koh, S.C.L., Gunasekaran, A., Tseng, C.S. (2012). Cross-tier ripple and indirect effects of directives WEEE and RoHS on greening a supply chain, International Journal of Production Economics, 140, 1, 305-317

Kurland, B.N. and Zell, D. 2011. Green management: principles and examples, Organizational Dynamics, 40, pp. 49 – 56.

Lee, Ki-Hoon. 2011. Integrating carbon footprint into supply chain management: the case of Hyundai Motor Company (HMC) in the automobile industry *Journal of Cleaner Production*, 19(11), pp. 1216-1223

Madsen, H. and Ulhøi, J. P. (2001). Integrating environmental and stakeholder management. *Business Strategy and The Environment*. 10(2), pp. 77-88.

Masurel, E. (2007). Why SMEs invest in environmental measures: sustainability evidence from small and medium-sized printing firms. *Business Strategy and the Environment*, 16(3), pp. 190-201.

Mintzberg, H. and Gosling, J. 2003. The five minds of a manager. *Harvard Business Review*, pp. 54-63.

Murillo, D. and Lozano, J.M. (2006). SMEs and CSR: An approach to CSR in their own words, *Journal of Business Ethics*, 67(3), 227-240.

McGeoch, S. (2007). *The challenge of green tape: growth of environmental law and its impact on small and medium-sized enterprises*, NSW Business Chamber, August, 1-20. Accessed 11th December 2010
http://www.nswbusinesschamber.com.au/reference/influence_government/green_tape_report.pdf.

McKeiver, C. and Gadenne, D. (2005). Environmental management systems in small and medium-sized businesses, *International Small Business Journal*, 23(5), pp. 513-537.

National Public Environment Report (2009). Green Stamp Plus, Accessed 9th November 2012
http://www.greenstampplus.com.au/national_Public_Environment_Report%202009.html

Nawrocka, D., Brorson, T. and Lindhqvist, T. (2009). ISO 14001 in environmental supply chain practices. *Journal of Cleaner Production*, 17(16), pp. 1435-1443

Petts, J. (2000). Small and medium-sized enterprises and environmental compliance: attitudes among management and non-management. In R. Hillary (Ed.), *Small and Medium-sized Enterprises and the Environment - Business Imperatives* (49-60). Greenleaf, Sheffield, UK.

Revell, A. and Blackburn, R. (2004*). UK SMEs and their response to environmental issues*. Small Business Research Centre, Kingston University: Surrey.

Ruegg-Strum, J. (2005). *The new St. Gallen Management Model: Basic categories of an approach to intergrated management*. Palgrave MacMillan, London

Schaper, M. (2002). The essence of ecopreneurship. *Greener Management International,* 38, pp. 26–30.

Tashakkori, A and Teddlie, C. (1998). Mixed methodology: combining qualitative and quantitative approaches, *Applied Social Research Methods Series*, Vol. 46 Thousand Oaks.

Vives, A. (2010). *Responsible practices in small and medium-sized enterprises, Chapter 8*, in A handbook of corporate governance and social responsibility, Eds Aras, G. & Crowther, D. Gower, pp. 107 –130

Walker, H., Sisto, L. and McBain, D. (2008). Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors. *Journal of Purchasing and Supply Management*, 14(1), pp. 69-85

Walker, E., Redmond, J. and Goeft. U. (2007). *Final Report. Bellevue Sustainable Industry Project*. Report for Swan Catchment Council, Edith Cowan University, Perth, Western Australia

Wiesner, Rand., McDonald, J. and Banham, H.C. (2007). Australian small and medium sized enterprises (SMEs): A study of high performance management practices. *Journal of Management and Organisation*, 13(3), pp. 1-29.

Woodhead, A', Thomas, J. and Mah, J. (2009). *Sustainability in Supply Chains. Link Strategy*. The Australian Research Institute in Education for Sustainability and the Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra, Australia.

Zutshi, A. and Sohal, A. (2004). A study of the environmental management system (EMS) adoption process within Australasian organisations -2. Role of stakeholders, Technovation, 24, 5, 371-386.

Appendices

Appendix 1: Case Select Identification Table (Company Name Excluded)

Case Select

Use of collated information and a combination of low and high levels of environmental concern, and smaller/larger sized enterprises, enabled the establishment of case select categories.

This allowed for a range of companies drawn from the following clusters: business type, water, energy, and environmental concern. The coding is reflected as the following.

1. Good at recycling easily managed wastes.

2. Landfill most or all easily managed wastes.

3. Not aware of what happens to easily managed wastes.

4. Good at recycling moderately/difficultly managed wastes.

5. Landfill most or all moderately/difficultly managed wastes.

6. Not aware of what happens to moderately managed wastes.

7. Good at recycling difficultly managed wastes.

8. Landfill all or most difficultly managed wastes.

9. Not aware of what happens to difficultly wastes.

The results are shown in the following table.

Business Type	Water	Energy	Environmental Awareness	Case Select Wastes
2	0	0		9
1	0	2	High	8
1		2	low	8
2	1	0		7
1	1	2	high	7
2	0	2	low	7
1	0	0	high	7
1	2	2	high	6, 3, 9
2	2	0	high	6
2		2		5
1		2	high	5, 3, 8
1	2	2	low	5
1	0	0	low	5
2	2	2	low	5, 8
2	6	1		4
2	6	2		4
1	2	2		4
2	0	2	high	4
2	2	2	high	4
2		2	low	4
1	2	2	low	4
	0	2	Did not fit clustering	4
		2		3
2	2	2	low	3, 6
1	0	2	low	3
2	0	2	Did not fit clustering	3
	0	0		2
2	0	0	high	2
1		0	low	2
		1		1
1	0	0	high	1, 5
2	2	2	low	1, 6
1	0	2	low	1
2	1	1	low	1
	0	0	low	1, 4