What are the Barriers to imparting Sustainable Development Education to SMEs in the East Midlands?

Alastair Allen

A thesis submitted in partial fulfilment of the requirements of Nottingham Trent Universityfor the degree of Doctor of Business Administration

ABSTRACT

This thesis looks at the Barriers to Small and Medium-sized Enterprises (SME) based in the East Midlands accepting free environmental training and advice. The literature consistently maintains that SMEs are a substantial part of any economy with the capacity to have a negative environmental impact disproportionate to their size. Earlier research had established six Barriers that a Service Provider of free environmental training and advice needs to minimise or overcome if SMEs are to improve their environmental awareness and impact. This thesis uses regression analysis to establish if any of the six barriers can act as predictors to the behaviour of the SME Owner Managers (OM) with regards to an invitation to undertake environmental training. The research establishes that the strongest predictor is whether or not the SME OM accepts any advice at all from any source. The perceived lack of awareness of their environmental impact within the SME is a secondary predictor.

DEDICATION

This thesis – and the entire DBA project – is dedicated to the memory of my Mother who encouraged me all the way, but died before she could see its fruition and me in a floppy hat.

It is also dedicated to my family – and particularly my wife – who put up with so much. They can have me back now.

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Glossary

B2B – Business to business

B2C – Business to Consumer

DM – Direct mail

emda – East Midlands Development Agency

EMS – Environmental Management System

ISDB –the Institute for Sustainable Development in Business

ISO – International Standards Organisation

OM – Owner Manager

SME – Small and Medium-sized Enterprises

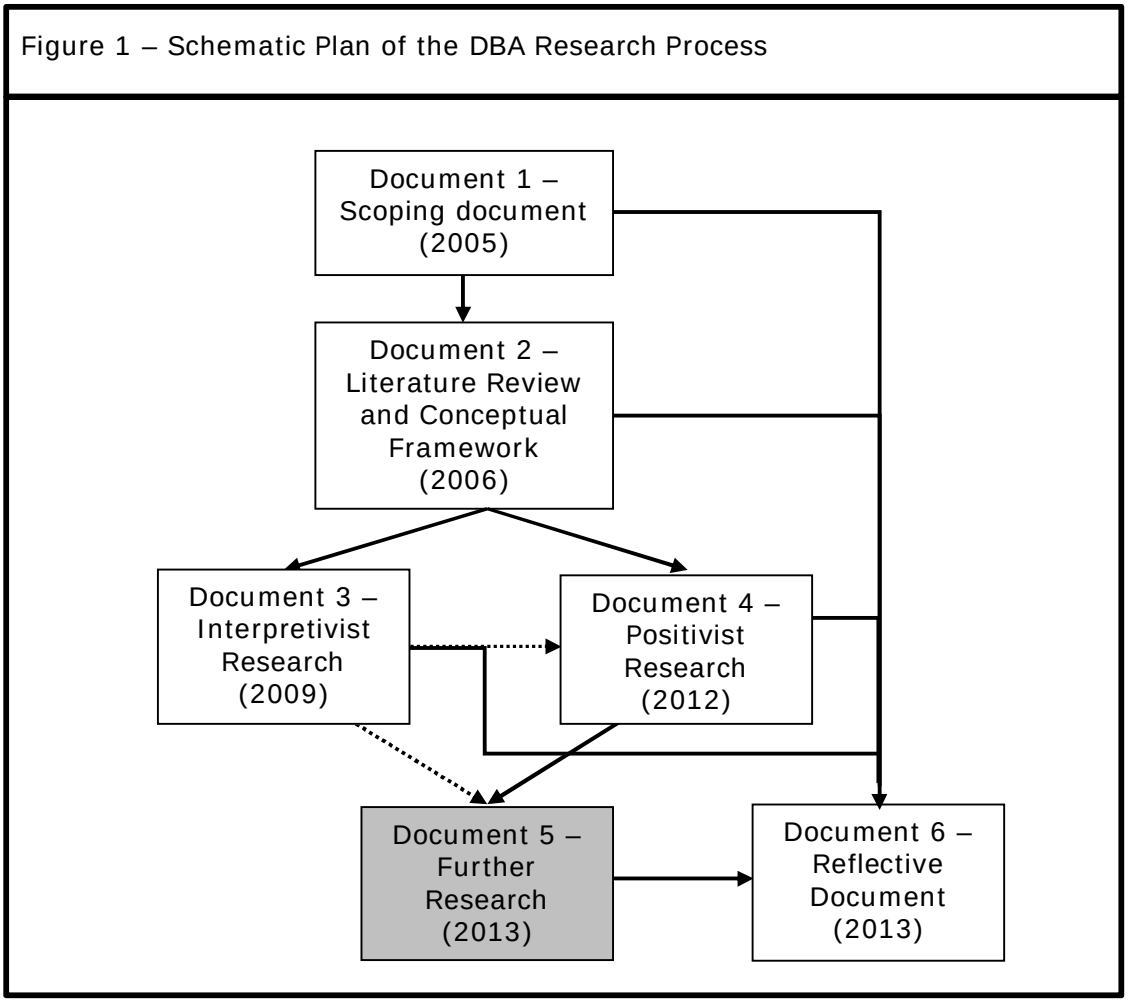
SP – Service Provider

1 – Introduction

1.1 Preamble and background

This document, together with Document 6, are the fifth and sixth in a series of related documents which are being submitted towards a DBA at Nottingham Trent University – Figure 1 below shows the plan for the DBA indicating a flow of work from the initial scoping document through to these final documents. A discussion of the work done in Documents 2, 3 and 4 will follow in the appropriate following chapters.

Figure 1 – Schematic Plan of the DBA Research Process



The genesis of the DBA occurred when the author was working for the Institute for Sustainable Development in Business (ISDB) in March 2003. The ISDB provided free environmental advice and assistance to small and medium-sized enterprises (SMEs) in the East Midlands: particularly work on Environmental Management Systems (EMS), resource management and waste minimisation. Research at that time (Fay, 2000, in Hillary, 2000) had shown how important it was for – in particular – SMEs to improve their environmental performance. Then, as now, SMEs are a huge sector within the UK economy: comprising

at that time 99% of all UK companies, 58% of employment and 38% of GDP and in spite of their size (employing fewer than 250 people and mostly 'micro-businesses' of five or fewer) were responsible for 70% of carbon dioxide emissions and 80% of all pollution incidents in the UK (Netregs, 2003). In spite of this disproportionality SMEs were ill-informed about their environmental responsibilities (Bayliss et al, 1998; James et al, 1999). Only 18% could name unprompted a single piece of environmental legislation and only 6% thought that they contributed to the overall effects of pollution (Netregs, 2003).

The Institute's advice was *not* presented to SMEs as advice intended to 'save the planet' or 'improve the environment' as this was not felt to be the best way to gain the attention of SME owner/managers (OMs). Instead the approach taken was that the advice would improve the profit performance of the organisation, specifically through:

- *Cost reduction* – through using less resources (i.e. energy and water); less money spent on consultants; less waste (including money spent on the Landfill Tax); lower insurance premia;
- *Compliance* – lessened risk of action by such bodies as the Environment Agency which may result in fines or imprisonment;
- *Competitive advantage* – more and more larger companies were then 'greening their supply chain' and demanding improved environmental performance from their suppliers; other stakeholders (e.g. employees, local residents, environmental pressure groups) were demanding a 'cleaner neighbour';
- *Embedding skills* – supplying all employees with knowledge and skills to be aware of environmental issues, which will reinforce the benefits of the other three reasons above.

This would generate a 'win-win' opportunity: improving company *financial* performance and improving company *environmental* performance (Elkington, 1994). There was, however, at that time no properly researched approach to the market. As with a lot of small organisations (which the Institute itself effectively was), a lot of the offering was based upon 'gut feel' and anecdotal evidence (Tilley, 2000, in Hillary, 2000).

The author was charged with marketing the ISDB's services and was surprised and particularly interested to discover how difficult it was to communicate with SMEs and to market to them the free services. This began the thought processes that led to undertaking a DBA. The focus of the research was to be on education and training and the barriers to SMEs accepting free training from the various service providers who supply it. The strategic question to be answered via the DBA was: "**What are the barriers to imparting sustainable development education to SMEs in the East Midlands?**"

1.2 Planned outcomes of the DBA

The overall outcomes for the DBA 'project' at the time of the scoping document (Allen, 2005) were fivefold and are detailed below. An analysis of whether or not these outcomes have been met will be discussed in this document and in document 6. Each individual document within the DBA also had outcomes and these will be covered in the relevant chapter.

Outcome 1 – the ISDB

By answering the strategic research question – and any supplementary ones that the research would inevitably identify – it was hoped that the author and his employer would develop an organisational understanding of the ISDB's core clientele, and in so doing increase the effectiveness and efficiency of the Institute. The funding bodies judged the Institute on its 'outputs' which, generally speaking, were the number of organisations (or their employees) that the Institute 'assisted'. Being able to understand SMEs and their wants, needs and how they think and operate would allow the Institute to meet their needs better. This in turn would satisfy the funding bodies, who could see a more effective use of their money. To maintain the virtuous circle the funders would consider the Institute an effective and efficient user of the (limited) available funds and give them more to reach and benefit the region's SMEs.

Outcome 2 – SMEs in the East Midlands

SMEs were the main contributor to employment in the East Midlands region with 16,553 organisations representing 98.9% of all people employed (emda, 2005:5)[1]. The author planned to discover what the barriers are that prevent SMEs from taking up the offers of free environmental assistance in the East Midlands. Following on from this he hoped to be able to formulate strategies for the ISDB to break down these barriers. In so doing he hoped that the SMEs in the region could reap the benefits described above – namely reducing costs, complying with their legal requirements, generating or increasing their competitive advantage and embedding skills in their workforce.

Outcome 3 – Business

It can also be argued that the topic has wider practitioner relevance too. There are many organisations that strive to communicate with – and gain the attention of – SMEs on a

[1] Strictly speaking the figures given in this reference do NOT correspond to the standard definition of an SME being less than 250 employees as the compilers of the data used a cut-off point of 300 employees for the classification, however a strict adherence to this definition would not have altered the figures in any consequential way.

national basis and if the results can be replicated nationally, then these organisations may be able to take advantage of this project. Also it is documented that larger companies depend on smaller companies for their supplies. Many of these larger organisations now want or need to demonstrate their 'green credentials'. This may be due to a desire to develop or maintain their Corporate Social Responsibility and a wish to demonstrate to their stakeholders that they are a responsible organisation. It may also be a desire to protect a supply chain which may become disrupted if a supplier were forced out of business through non-compliance or was unable to supply because of an environmental incident such as a chemical spillage. Either way, if their suppliers are able improve their environmental performance, it will be to the benefit of larger organisations.

There will also be benefits for the Service Providers too: the organisations – often funded by Government – who strive to communicate with SMEs and provide free environmental advice. The intention is to provide a template or a 'toolkit' for them to use to break down the barriers and so contribute to business practice.

Outcome 4 – Academia

The author planned to be able to disseminate information and knowledge through conference papers and publications, presenting the findings for wider circulation and so contribute to learning. It is hoped that the various outputs will inform debate in the area of communicating with SMEs and taking the issues of Sustainability to them.

Outcome 5 – The Author

The author planned to gain through the following areas: develop a thorough understanding of a topic in which he had a great professional and personal interest; to learn and perfect practical research skills; to use the research gained in his professional work environment; and to achieve a Doctorate in Business Administration.

The topic was of great interest to the author. Quite apart from possibly allowing him to improve his own job performance through a greater understanding of the SME situation, he was also a part-time Marketing lecturer in Nottingham Trent University, specialising in Communications, an area not unconnected with the topic. His personal outcomes were not only to achieve a DBA, but to complete each element on time and to balance the complexities of family, work and social life. He wanted to develop a better understanding of the processes and needs of the region's SMEs to increase his own knowledge and understanding.

1.3 Validity of the research and overview

In Document 2 the author detailed the importance of inculcating greater environmental knowledge within the SME body. This is important as such environmental issues as Climate Change were topical and remain so (Devlin, 2011), there is legislation that an SME can transgress due to ignorance of it (Netregs, 2009) and there are opportunities for greater profit if SMEs can harness them (Sweeney, 2007; Revell and Blackburn, 2007). Allen (2006) noted that many SMEs do indeed adopt policies which minimise their environmental impact, but that due to the sheer size of the SME sector and the speed with which they grow and die – 71,000 enterprises went out of business during 2009, whilst 119,000 came into being (Department for Business Innovation and Skills, 2011), there is a continuing need for ongoing environmental education. There are many organisations who provide paid-for training (e.g. IEMA, BSI, Pera), but through European wide schemes (for example ERDF) there are also many government agencies who fund – or indeed provide – free environmental training. This training is aimed mainly at the SME sector as it is assumed that larger companies can afford to pay for their own training.

The overall DBA project looks at the provision of free environmental training and wishes to understand the reasons why the OMs of SMEs frequently do not take up the offer of this training. By 'provision of free environmental training' the author means the formulation and delivery of education/training to cover such disparate issues such as environmental auditing, training in ISO14001, waste management and transport management. The DBA's ultimate aim is to provide guidance for providers of free environmental training to use in order to achieve their goal of engagement with, and education of, SMEs.

The research element of the DBA (Documents 3 and 4) had two purposes. Firstly to achieve milestones in the DBA process, but more importantly to develop a professional understanding into the issue under discussion. Document 5 will focus on developing a deeper understanding and its findings will be shared with service providers directly and with the academic community through articles, so that the service providers can prepare themselves better to overcome the barriers. This Document 5 will undertake further positivist research, which will build on earlier pieces of research (Allen, 2009; 2012).

Although the DBA has been a long process, the author contends that the Research is still relevant. Indeed, the environment is still a major concern for society (Kinver, 2011) and the added influence of the current economic situation means that there is continued pressure on organisational budgets, training and, in particular, environmental training (Brass, 2009; Groundwork, 2010; Learndirect, 2011).

1.4 Document 5 structure

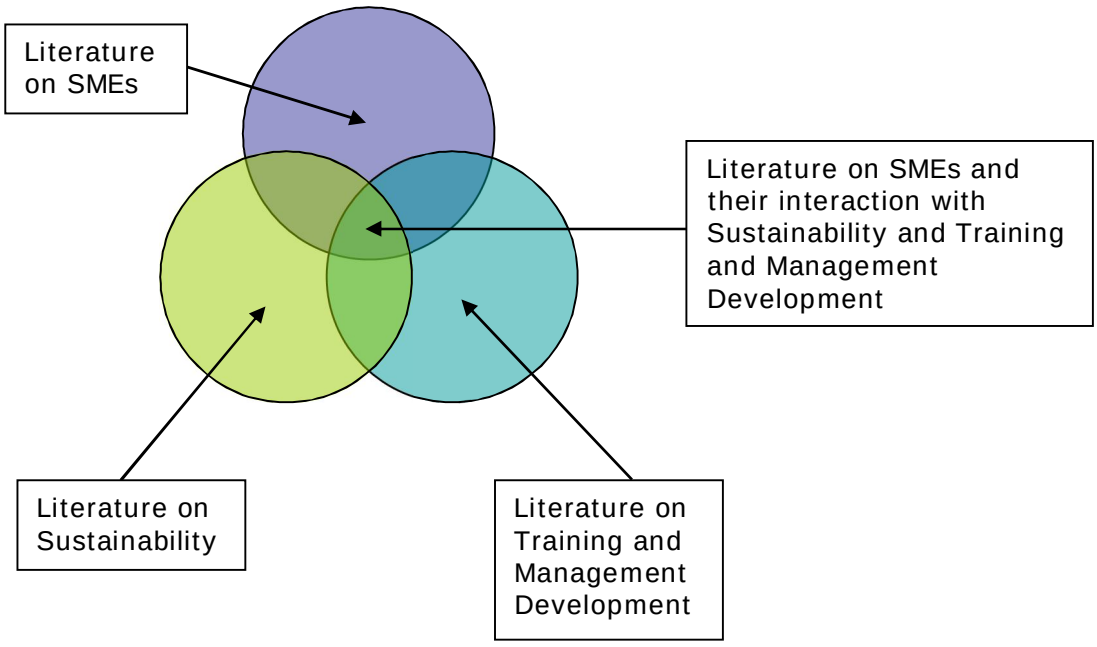
The next chapter reprises the literature originally reviewed in 2006 and explains the Conceptual Framework developed from it (Allen, 2006). A resumé of the two pieces of research carried out for Documents 3 (Interpretivist) and 4 (positivist) follows in Chapters 3 and 4 and there will be a discussion after each chapter of the development of the Conceptual Framework. Chapter 5 will update the literature since the original one took place and 6 and 7 explore the Author's Research Philosophy, the research strategy and the data analysis for the thesis. That will be followed by the interpretation and findings of the research, before going on to elaborate on the implications of the research. The Document will end with some reflections on the Document 5 process and some ideas for future research.

2 – Summary of the Literature Research from Document 2

2.1 Background

Allen (2006) reviewed the then-current literature on SMEs, training and management development (TMD) and sustainability in order to understand better the three areas individually and the point at which they overlap. These three areas were selected as it was felt they would give the greatest depth of understanding to the multifaceted problem that the DBA project raises. Although the title of the DBA may appear simplistic, it is clear that the analysis of the issue and the solutions to it are anything but. The literature topics are shown graphically in Figure 2

Figure 2 – Diagrammatic Representation of the three Areas of Literature searched and their Confluence



(Allen, 2006)

What emerged from the literature search was a much closer link between the literature on SMEs and TMD to the extent that, for the purposes of the DBA, they could be viewed as one body of literature. As the following discussion notes there is much similarity between that joint body of literature and that of Sustainability and for the purposes of the summary the author compared the literature on SMEs and TMD with the literature on SMEs and TMD and Sustainability (to be discussed in 2.2).

What follows in this chapter is a summary of the findings of the literature at the time. The author acknowledges that some of the literature may lack currency and this issue will be addressed in Chapter 5 when the relevant literature will be revisited to gain the latest thinking in these areas.

2.2 Comparisons and summary of the findings of the literature review

As noted there were certain similarities between the two sets of literature. For example all the literature highlighted the importance of the SME sector to business and to the economy. The importance of the SME OM is another such theme. Table 1 shows a comparison between the two sets of literature. The table appears to demonstrate a simplicity of 'isolated' statements. However this is misleading: for example, the inability of Advisors to engage with SMEs may well be a result of the lack of a major resource – time – that an SME OM has, or the poor communications' techniques employed by the service provider. This in turn may be a result of the perceived lack of benefits that TMD or environmental investment brings.

Table 1 – A Comparison of the Summaries of the Literature reviewed

Literature on SMEs and TMD	**Literature on SMEs and TMD viewed through the Literature on Sustainability**
SMES are a very important part of UK industry (e.g. Chaston and Baker, 1998) but are an exceptionally wide and diverse sector of business (e.g. Beaver and Hutchings, 2004). Any attempts to interact with them should be on *their* terms within *their* context (Dalley and Hamilton, 2000).	**SMES are a very important part of UK industry** (e.g. Tilley, 1999) and so can have a dramatic impact on the Environment (e.g. Netregs, 2003). However they are largely unaware of this impact (e.g. Hillary, 2000) and of the relevant legislation (e.g. Clement and Hansen, 2003).
The high influence of the OM within the SME (e.g. Culkin and Smith, 2000) and their (often negative) attitude to TMD (e.g. Wilson and Homan, 2004) mean that OMs have to be convinced that TMD is beneficial.	**The high influence of the OM within the SME** (e.g. Quinn, 1997) and their (often negative) attitude to environmental action (e.g. O'Laiore and Welford, 1996) mean that OMs have to be convinced that it is beneficial.

Table 2 – A Comparison of the Summaries of the Literature reviewed (cont.)	
Literature on SMEs and TMD	**Literature on SMEs and TMD viewed through the Literature on Sustainability**
The perception that TMD brings few benefits to an SME (e.g. Beaver, 2002), in spite of the large amount of support available (e.g. Johnson and Loader, 2003) means that SMEs are more likely to ignore TMD opportunities.	**The perception that environmental investment brings few benefits to an SME** (e.g. Stanwick and Stanwick, 2005), in spite of the large amount of support available (e.g. Toms, 2000) means that SMEs are more likely to ignore sustainable opportunities.
TMD tends to offer 'big company' solutions to 'small company' problems (e.g. Hill 2001a) and so are not perceived to be relevant to SMEs.	**Environmental advisors tend to offer 'big company' solutions to 'small company' problems** (e.g. Westhead and Storey, 1996) and so are not perceived to be relevant to SMEs.
The limited resources that SMEs have – particularly time and money (e.g. Hill, 2001b) – lead to OMs being very wary about allocating them to TMD.	**The limited resources that SMEs have** – particularly time and money (e.g. Petts et al., 1999) – lead to OMs being very wary about allocating them to environmental improvements.
The difficulty that Support Agencies face in trying to interact with SMEs (e.g. Devins and Johnson, 2003) and trying to develop trust with the SME (e.g. Bennett and Robson, 1999) means that some SMEs will not be aware of the TMD opportunities and be wary of those that they do know.	**The difficulty that Support Agencies face in trying to interact with SMEs** (e.g. O'Laiore and Welford, 1996) means that some SMEs will not be aware of the environmental opportunities.

The marked degree of commonality that **Table 1** shows is quite startling. However on reflection, this is not that surprising, as discussed below.

Importance of SMEs

Without exception *all* the literature mentioned that SMEs are a large, important and vibrant sector of the UK economy (e.g. Tilley, 2000; Beaver, 2002; Friedman and Miles, 2002; Revell and Rutherfoord, 2003; Spence, 2004). It is a sector that the United Nations, the UK Government and Support Agencies all wish to make aware of their environmental obligations. Small businesses are a "vital spark in the economy" (Barrow, 1998:24). They are important due to their responsiveness to change, being a major source of innovation and job creation and so it is not surprising that successive Governments have tried to reach out to them and develop training schemes that provide knowledge transfer, enhance their skills base and maintain their pre-eminent position as "the backbone of most economies" (Chaston and Baker, 1998:np). However SMEs are an exceptionally wide and diverse sector of business (e.g. Beaver and Hutchings, 2004). Any attempts to interact with them should be on *their* terms within *their* context (Dalley and Hamilton, 2000) and a 'one size fits all' risks satisfying no-one.

The high influence of the OM

Again there is unanimity regarding the influence of an SME's Owner Manager (OM) (Beaver 2002). An SME is inextricably linked with the life and identity of the OM who often takes a hands-on approach to running all aspects of the business. This poses a problem of focus for the OM, who may have multiple priorities on his time, amongst which may be Training and his firm's environmental impact (Wilson and Homan, 2004; Haugh and McKee, 2004). The values of an SME are predominantly those of the OM: the OM plays a critical role and their personality is crucial in aligning employees to the organisation's values. This is particularly true for companies with under 50 employees (Stewart and Beaver, 2004). If an OM decides that sustainability and environmental training is not an important issue personally, then it is very unlikely that it is an important issue for their company.

The perception that there are few benefits

This view holds true for both TMD and environmental investment – whether it be capital investment or training. Training in environmental issues is considered a specialised form of TMD and one which has to compete with all other training priorities for an SME OM (O'Laoire and Welford, 2005). Linking back to the Resources issue, Beaver (2002:60) notes:

> "[SME] managers do not take the same long-term view of training and management development [as larger companies], nor are they prepared to spend time and money on any form of training that does not have an immediate payback."

Advisors tend to offer 'big company' solutions to 'small company' problems

As long ago as 1996, Westhead and Storey, (1996:18) wrote that

> "the small firm is not a "scaled-down" version of a large firm. In short, theories relating to SMEs must consider the motivations, constraints and uncertainties facing smaller firms and recognize that these differ from those facing larger firms".

This has since been borne out by Hill (2001a; 2004:9) who says "the application of 'large-organisation' logic…in small organisation is mistaken". As noted earlier, the subject matter is immaterial: the literature shows that most advice and training schemes for SMEs tend to be 'cut-down' versions of those developed for non-SMEs (Ammenberg and Hjelm, 2003; Netregs, 2003). SME OMs *perceive* that this is so and evaluate environmental advice as being irrelevant to their needs.

SME limited resources

This is another extremely commonly cited reason for SMEs not engaging in either TMD or environmental action. The two main areas cited are cash and – particularly – time (Clement and Hansen, 2003; Wilson and Homan, 2004). For the self-employed (i.e. the very smallest organisations), the key managerial issues are those to do with effective time management and the ability to acquire the necessary financial and marketing skills (Hall, 1989; Freel, 2000; Hillary, 2000; Hill, 2001a; Hill, 2001b). Again, there should be no surprise here: environmental issues have to justify their share of an SME's limited resources just as any other issue might (e.g. capital investment, recruitment or marketing).

The difficulty that Support Agencies face in trying to interact with SMEs

This issue links to several of the above (Bennett and Robson, 1999; Starkey, 2000). If an SME OM only has limited available time and does not consider TMD or environmental investment as beneficial and is being offered 'solutions' that are perceived to be developed for big companies, then why should they give attention to support agencies who want to address these issues? The difficulty that Support Agencies face in trying to interact with SMEs (e.g. Devins and Johnson, 2003) and trying to develop trust with the SME (e.g. Bennett and Robson, 1999) means that some SMEs will not be aware of the TMD opportunities and be wary of those that they do know. A consistent theme in the literature is that the sector is difficult to engage with *en masse* due to its heterogeneous nature (Barber *et* al, 1989; Barrow, 1998; Fay, 2000; Devins and Johnson, 2003; Ammenberg and Hjelm, 2003). Organisations such as the Government (on a national level) or Business Links (on a local level) trying to reach the sector find it problematic as the sector is comprised of organisations operating under fundamentally different conditions. Beaver

(2002:6) emphasises that "small firms are not an homogenous entity and to think otherwise is both dangerous and naïve". Another key issue is that the SME sector has such heterogeneity and disparate needs that it is futile to try to satisfy them with programmes intended for larger organisations, but this occurs frequently (Wilson and Homan, 2004).

As well as these six key themes which were common across both the bodies of literature, there were three further ones which occurred almost wholly within the sustainability literature.

Supply chain pressure

Surprisingly this was not as strong a driver for undertaking environmental training as originally anticipated by the author and the literature was divided over how strong a driver this was. There was also disagreement over the source of the pressure and its effect:

- O'Laoire and Welford (1996) and Revell and Rutherfoord (2003) argued that larger firms will force SMEs to engage with EMS (Environmental Management Systems) thus 'greening' their supply chain by exerting pressure on smaller suppliers to improve their environmental performance;
- Friedman and Miles (2002) said that this pressure will be from larger businesses and regulation equally;
- Simpson *et al.* (2004) said that SMEs will be driven to adopt environmental policies in order to foster better relationships with their customers;
- and Preuss (2005) contended that it is only the larger non-SME customers who will insist on SME compliance as these tend to be the organisations whose activities come under close scrutiny from shareholders and pressure groups.

Awareness of environmental legislation

SME OMs know little about their own industry's legislation and think that their level of activity is not worthy of regulatory control, perceiving enforcement to be low, as are potential fines (*inter alia* Netregs, 2002; Clement and Hansen, 2003; Clarke, 2004). All of this encourages deliberate non-compliance as this course of action will be less costly (in the event that they *are* caught) than compliance. This attitude is supported by low standards of 'eco-literacy' and awareness levels which promotes 'accidental' non-compliance (Netregs 2003).

Opinion of ISO14001

OMs consider that environmental quality assurance standard ISO14001 has been developed for larger organisations and so is largely irrelevant to them (Ammenberg and

Hjelm, 2003). It is considered costly in terms of both money and time to achieve and maintain and that it is an exercise which incurs greater sacrifices than benefits (O'Laoire and Welford, 1996). Few SMEs proactively pursue achieving ISO14001, but are encouraged or forced into achieving it by their customers (EIB 2005). This again links back to the supply chain pressure mentioned above.

What these summaries highlight is that, according to the literature, SMEs – this important sector that the United Nations, the UK Government and Support Agencies all wish to make aware of their environmental obligations – patently view their environmental obligations (if they are aware of them at all) as nothing exceptional and will treat them as equally as any other facet of their business. The 'Environment' will have to fight for priority amongst all the other competing priorities. Unless the OM is unusually altruistic, the topic will not generally be considered until it becomes a *commercial* issue (Supply Chain Pressure), or until the OM is driven to consider it by Legislation (or the threat of a fine or imprisonment).

The summaries also highlight that SMEs patently view their environmental obligations (if they are aware of them at all) as nothing exceptional and will treat them as equally as any other facet of their business. The 'Environment' will have to fight for priority amongst all the other competing priorities. Unless the OM is unusually altruistic, the topic will not generally be considered until it becomes a *commercial* issue (Supply Chain Pressure), or until the OM is driven to consider it by Legislation.

2.3 Development of a Conceptual Framework

Overall the literature revealed 35 Drivers and 57 Barriers to SME OMs to accepting free Environmental advice[2]. These were analysed, grouped into themes and thus a 'Forcefield' Conceptual Framework was developed (see Table 3). The Forcefield was based on Tilley's (1999) Forcefield analysis which had been discovered during the literature search. Forcefield Analysis was pioneered by Lewin (1951) for analysing change and he proposed that the patterns of behaviour observed were not fixed, but a dynamic balance of forces working in opposite directions. For the purposes of the DBA, the author wished to use the model to display the various forces acting on the SME OM to show the complexity of the balance. A Forcefield analysis assumes that any social situation is a balance between these forces (Jones and Pfeiffer, 1973).

The Conceptual Framework demonstrated that there were pairs of Forces which could be both drivers and barriers and these are shown by the complementary colours. The first

[2] For a detailed explosion of how the individual elements uncovered in the Literature Review relate to the Barriers and Drivers, please see Appendix 1.

three of the Forces are considered to be both resistant *and* driving Forces. For example Quinn, (1997) recognises that an SME OM can be an altruist and drives and embeds sustainability into his organisation, whereas Simpson *et al*. (2004) maintain that an SME OM may well be a person who does not believe in training his staff in any area, let alone environmental practices.

Similarly:

Increased financial performance and *Costs of investment/training* and

Benefits of Training and *Do not seek advice on training*

can be considered pairs of opposites and the remaining four Forces have no direct correlation to one another, although a Force like *Lack of resources* containing, as it does money, has links to *Costs of investment/training*.

Table 3 – Conceptual Framework: Forcefield showing driving and resisting Forces to implementing Sustainable Development Training

Driving Forces →	The Small Firm	← Resistant Forces
OM attitude		OM attitude
Legislation		Legislation
ISO14001		ISO14001
Increased financial performance		Costs of investment/training
Benefits of training		Do not seek advice on training
Competitive advantage		Lack of awareness of Environment/Environment a low priority
Stakeholder pressure		Lack of resources

2.4 Next steps

This Conceptual Framework, however, did not show the *weighting* or *importance* of each Force. Nor did the fact that there are numerically more Barriers than Drivers mean that the latter can never overcome the former. Although the literature may lead one to believe that the attitude of the OM may be the most important *driver*, it may not be the most important *barrier*. As a result, one of the aims of Document 3 was to assess the validity

of the list of Driving Forces and attempt to assess their importance to the SME OM. The aim of Document 4 was to carry out the same exercise for restraining forces.

3 – Summary of the Interpretivist Research from Document 3

3.1 Background and details

Positivist research predominates amongst SME research (Howarth and Melton, 2001; Anderson and Boocock, 2002; Haugh and McKee, 2004; Blackburn and Smallbone, 2008) however such approaches "provide limited scope for analysis of the subtle learning processes associated with business development (Anderson and Boocock, 2002:11). Some authors, however, maintain that in order to really understand SMEs and their decision-making processes, Interpretivist research is needed (Deakins *et al.*, 2000, Ekanem, 2007). Such an approach though can lead to difficulties in generalising with any level of confidence to the greater population (Gill and Johnson, 2005). Many studies (e.g. Anderson and Boocock, 2002) use a mixed methods approach. Whilst the Author's work cannot hope to match Matlay's (2004) SME research (6000 telephone interviews and 600 in-depth interviews), it is hoped that a modest level of triangulation can be achieved as it is possible to complete successful research amongst SMEs by holding semi-structured interviews, the results of which then inform a survey research instrument for the Positivist research in Document 4 (Hogarth-Scott and Jones, 1993, Gummesson, 2005).

During the period March to June 2009 eleven SME OMs based in the East Midlands were interviewed in order to elicit their views on free environmental training. In spite of the importance of SMEs to the UK economy (as noted in Chapter 2) they are a sector that is difficult to research. Using purposive sampling, over 80 SME OMs of companies who had received such training were contacted and only eleven positive responses were achieved. The aim of the research was to ascertain and evaluate the drivers behind their decision to undertake free environmental training. The participants represented a range of size (from four employees to over 100) and the sample had representatives of both service and manufacturing industry (for a breakdown of participants see Appendix 2). The interviews took place with the owner or a current director who had the ability to comment on the organisation's training needs and activities. Each of the participants was given an Identifier name to protect their anonymity which is the name given in the following discussion to indicate the source of the quote. A semi-structured Interview schedule was prepared to achieve the Research Questions (see Appendix 3) and adhered to for all eleven interviews.

3.2 Document 3 Research Questions

The overall question for this Document's research was:

> "What are the Drivers that persuade SME OMs to accept free environmental advice?"

and there were three individual research questions that attempted to answer this:

> Research question one: "What do SME OMs consider to be the reasons why they have undertaken free environmental training"?

This was to establish what SME OMs consider to be the reasons why they have undertaken environmental training. The six major Drivers detailed in Allen's (2006) Conceptual Framework were used to develop the interviews. Another outcome of this question would be to validate the Conceptual Framework and to see if there were other drivers not revealed through the literature search.

> Research question two: "How do the SME OMs view these drivers in order of importance?"

The literature had not identified the relative importance of the drivers. The order of elements on the Driver side of the Conceptual Framework was a convenient one to demonstrate the dichotomous nature of Drivers that could also be Barriers. This could be important for Service Providers (SPs) of free environmental training as these bodies might like to know what elements to emphasise in their marketing communications when promoting their services and the benefits of such training.

> Research question three: "Is it correct to show the same issue being a barrier AND a driver?"

As demonstrated in the Conceptual Framework SME OMs have to evaluate the pros and cons of environmental training: there appears to be a dichotomy between pairs of drivers/barriers and so knowing how SME OMs do this will, similarly, aid SPs to be focussed in their marketing communications.

The findings of the research questions are below, but it should be noted that all respondents said that it was a particularly harsh business environment at the time and that environmental improvements were considered to be low on the list of priorities at a time when the company's very survival could be at stake.

3.3 Discussion of the interpretive research – drivers for undertaking environmental training

The interviews confirmed the strongly deep-rooted view that the OM is the most important entity within an SME and can thus be considered the most important driver. Such statements as '*nothing happens around here without me knowing about it*' (Ed) were typical and this was enforced by the interview circumstances and the language used. None of the interviews took place in a quiet office away from distractions and every interview was interrupted by something occurring that demanded the attention of the participant. However the OMs had trouble articulating what they considered to be the reasons why

they had undertaken environmental training. All of the drivers listed in the Conceptual Framework were mentioned. All influenced the decision-making process and there were no other ones besides these.

Contrary to early research (Tilley, 1999; Netregs, 2009) many of the participants were able to name relevant pieces of *environmental legislation* but it was clear that that awareness had been due to the training received and not a driver to *engaging* with training. There was little evidence that the industry environmental accreditation *ISO14001* was a driver. None of the participants mentioned it voluntarily and two claimed initially not to know what it was. Those who had heard of it viewed the accreditation negatively, if they had a view at all ('*irrelevant'* (Dave) and '*a waste of time and money'* (Adam)). The topic of *increased financial performance* was close to the heart and mind of all participants. All participants said that they had less business than last year however very few of them were actually taking steps to improve their environmental performance and thereby save money. All were using recycled paper for their printers and photocopiers but all initiatives were developed with the intention of cutting costs not using fewer resources. Ed gave a typical response: '*we are constantly looking at ways to reduce our costs… But I'm afraid that if I am buying a smaller sheet of steel, it's because I want to waste less and have lower waste bills than preserving precious resources.*' All participants agreed broadly with the benefits of *training*. Harry said that he felt that staff retention was better for those that had had training to improve themselves and their effectiveness in the company. Having a well-trained – and thus well-motivated – team increased their competitiveness in the marketplace and that in turn led to increased customer satisfaction. However it was difficult to find out if *any* of the participants had undertaken any environmental training other than that which qualified them for inclusion in this research. All of the participants were acutely aware of the competitive environment in which they currently traded, but only one of them claimed that they made any attempt to make their environmental credentials a key selling point and use them to their competitive advantage. As that participant said '*Can our competitors match those* [environmental credentials]*? It's taken me a long time to build them up. It will take them a long time to do the same thing too*' (Dave). This leads on to the subject of *stakeholder pressure*. The participants were in agreement that there is little pressure from stakeholders such as their local council or 'green lobbies'. As Jill said '*I don't think that pushing us to become more green is a priority for our council…As long as I pay my business rates, I don't think they care*'. There was some evidence of employees applying pressure but it was clear that the main pressure comes from customers.

3.4 Summary of the Interpretivist research

The researcher had fully expected the Interpretivist research to show some variance from the literature review: times change and so do the individuals that make up the body of SMEs. However it was very surprising how much variance was found. It has to be remembered that this was a group of participants who *had* received free environmental training and so the premise had been that they would be extremely positive about it. Whilst it would be wrong to say that the participants were negative about environmental training, they were generally lukewarm to the concept unless they could gain direct financial benefit from it.

3.5 Results of the Interpretivist research

Research question one set out to find out what the SME OMs considered to be the reasons why they had undertaken free environmental training. Although it was quite difficult to get to the OMs to articulate what they considered to be the reasons, all of the drivers listed in the Conceptual Framework were mentioned – either prompted or unprompted – with the exception of the first one: the attitude of the OM. This, however, was surmised to be the most important driver because the only common factor in all the interviews was that the OMs were the ultimate arbiters of what happened in the organisation, even though not one of them actually said 'we undertake free environmental training because I say so'.

Therefore the author concludes that the drivers shown in the Conceptual Framework are sound and a complete list.

Research question two attempted to find out how the SME OMs viewed the drivers in order of importance. This question was not answered fully in this research. Indeed it is arguable that the interpretive research paradigm is the best paradigm to use to answer it and research of a more positivist nature may yield more meaningful results. The researcher did not ask the participants to rank the Drivers explicitly, yet from the interviews he was able to draft a ranking that may be tested by subsequent positivist research. Using this ranking a revised Conceptual Framework can be derived (Table 4):

Table 4 – revised Conceptual Framework: Forcefield showing driving and resisting Forces to implementing Sustainable Development Training following Interpretivist Research

Driving Forces →	The Small Firm	← Resistant Forces
OM attitude		OM attitude
Competitive advantage		Legislation
Increased financial performance		ISO14001
Benefits of training		Costs of investment/training
Legislation		Do not seek advice on training
Stakeholder pressure		Lack of awareness of Environment/Environment a low priority
ISO14001		Lack of resources

Research question three attempted to find out how the SME OMs decide between the competing barriers/drivers. The OMs came across as a pragmatic group of people. They were all aware that training benefitted their organisation with none of the cynicism of Hill (2004) who claimed that SME OMs did not undertake training lest their staff defect for better paid jobs elsewhere. Their pragmatism was shown in them having to be convinced firstly of the benefit of training of any sort – environmental or not – and then to weigh up the advantages and disadvantages of carrying it out. They would consider training as carefully and to the same extent as any investment that they undertook. The benefit of it being free was weighed against the time needed to complete the training course. The issue with environmental training is more basic in that they do not perceive any need for it. It may be free to them, but no benefit was deemed to accrue from it in the short term. It was this cost/benefit analysis – often of a short term nature – that was the primary reason for deciding upon a course of action. Training is rarely short-term (Devins and Johnson, 2003) as often the skills that the training aims to improve develop over time.

3.6 Next steps

Having undertaken Interpretivist research to verify the existence and the relative importance of the Drivers in the Conceptual Framework, the next chapter covers the Positivist research intended to analyse the Barriers.

4 – Summary of the Positivist Research from Document 4

4.1 Details

As the Interpretivist research had focused on the Driving Forces to the uptake of free environmental advice, so the Positivist research focused on the Resisting Forces. On the basis that no new Drivers were uncovered during the Interpretivist research, it was assumed that no new Barriers would be added to the list. The problem with this assumption is acknowledged, nevertheless Positivism only allows for the 'testing' of what we know, not what we do not know (Bryman and Bell, 2011). The Conceptual Framework had highlighted seven restraining forces which stopped SMEs from undertaking free environmental training. The purpose of this research was to establish if the SME OM recognised the seven restraining forces and then to develop a ranking to establish their relative importance. The two research questions were:

> Research Question 1: "What do SME OMS consider to be the barriers to undertaking free environmental training"?
>
> Research Question 2: "How do the SME OMs view these barriers in order of importance?"

The overall null hypothesis was that none of the various barriers (e.g. not accepting external advice, the OM's attitude to training, the SME's resources and awareness of environmental legislation etc.) represented a barrier to accepting free environmental advice, so using the Conceptual Framework, detailed earlier, the following seven directional research hypotheses (Salkind, 2011) were developed.

- H_1 – Not accepting advice is a key barrier to accepting free environmental advice
- H_2 – The attitude of the OM is a key barrier to accepting free environmental advice
- H_3 – Lack of knowledge of the relevant legislation is a key barrier to accepting free environmental advice
- H_4 – The costs of achieving ISO14001 is a key barrier to accepting free environmental advice
- H_5 – The costs of investing in the recommendations of the environmental training is a key barrier to accepting free environmental advice
- H_6 – Lack of resources is a key barrier to accepting free environmental advice
- H_7 – Lack of/low awareness of the Environment is a key barrier to accepting free environmental advice

Each hypothesis had four statements used to provide information (for further details see Appendix 4). The resultant 28 statements were then put into a *research instrument*[3], offering a five point Likert scale response mechanism, together with some identification questions for classification purposes and placed on the Internet using *Survey Monkey*. The research instrument is in Appendix 4. The survey was promoted via a local service provider to 4,125 SMEs which had not received any environmental training. A total of 206 usable responses were received.

4.2 Statistical analysis of the Positivist research

Various methods (e.g. Cronbach's α-test) showed that the research instrument had reliability, validity and replicability. It was noticed however that the sample size was not representative of the universe of East Midlands SMEs as there were insufficient companies in the 1-9 employee size. However when the sample was assessed by its organisational sector there was a very strong correlation and so the sample was deemed to be representative of the total population of the East Midlands SMEs by industrial sector (see Appendix 6 for details).

Further statistical tests showed that the data were suitable for FA.

> "Factor analysis is a statistical technique that essentially reduces the set of variables to a smaller number of underlying factors and detects structure in the relationships between the variables" (Muijs, 2011:199).

The intention of running the factor analysis was to identify if the 28 components could be reduced to the seven factors hypothesised (as shown in Table 5) below. For a full view of the Component Matrix showing all Factor Loadings, see Appendix 7). As can be seen from the Table 5 most of the components loaded satisfactorily onto the factors, with six exceptions.

[3] Technically speaking it is a 'research instrument' and not a 'questionnaire' as no questions are asked, so the rather more prosaic term 'research instrument' (Bryman and Cramer, 2005) is used for the 'questionnaire' and 'item' for 'question'.

Table 5 – Grouping of the Components into Factors

	Component	Factor Loading	Decision
1	Don't trust TRAINING advice	0.755	All factor loadings are sufficient to allow these four components to be considered as one factor
2	TRAINING staff is a waste of money	-0.794	
3	TRAINING courses are for big companies	-0.816	
4	No trouble identifying TRAINING courses	0.857	
5	OK to pay for outside ENVIRONMENTAL ADVICE	0.357	The factor loadings, components 6, 7 and 8 are sufficient to allow these three components to be considered as one factor. Component 5 will be ignored
6	OK to take free outside ENVIRONMENTAL ADVICE	0.584	
7	Keen to limit negative impact through ENVIRONMENTAL ADVICE	0.901	
8	ENVIRONMENTAL ADVICE has no real benefit for the company	0.888	
9	Important that we comply with ENVIRONMENTAL LEGISLATION	0.807	All factor loadings are sufficient to allow these four components to be considered as one factor
10	Up to date with ENVIRONMENTAL LEGISLATION	0.811	
11	Cost of complying with ENVIRONMENTAL LEGISLATION is too much	0.767	
12	Not aware of any ENVIRONMENTAL LEGISLATION	0.911	
13	ISO14001 is for big companies	-0.780	All factor loadings are sufficient to allow these four components to be considered as one factor
14	ISO14001 is too hard to maintain	0.929	
15	ISO14001 is a worthwhile investment	0.826	
16	ISO14001 is too much paperwork	0.552	

Table 5 – Grouping of the Components into Factors (Continued)			
Component		Factor Loading	Decision
17	INVESTMENT goes into other areas first	-0.155	No factor loadings are sufficient to allow these four components to be considered as one factor. Additionally, none of the components loaded onto any other factor. And so these four components will be ignored.
18	Environmental INVESTMENT will cut costs etc.	0.123	
19	Cannot pass on the INVESTMENT costs to customers	-0.102	
20	Environmental INVESTMENT will bring lower operating costs	<.100	
21	Cannot afford the money RESOURCE	-0.800	All factor loadings are sufficient to allow these four components to be considered as one factor
22	No skills RESOURCE to take environmental action	-0.734	
23	No knowledge RESOURCE to take environmental action	0.912	
24	No time RESOURCE to take environmental action	0.788	
25	No impact on the ENVIRONMENT	0.243	The factor loadings, components 26, 27 and 28 are sufficient to allow these three components to be considered as one factor. Component 25 will be ignored.
26	ENVIRONMENT is a high priority	-0.676	
27	Only big companies have an effect on the ENVIRONMENT	0.764	
28	ENVIRONMENT and green issues have had their day	-0.754	

The exceptions were components 5 and 25 (relating to *OK to pay for outside environmental advice* and *impact on the environment*) and 17 to 20 (components which all related to H_5) and so these six components were ignored. The fact that components 17 to 20 did not load onto a single factor did not necessarily mean that H_5 – *The costs of investing in the recommendations of the environmental training is a key barrier to accepting free environmental advice* – is rejected, it may just mean that the items used to test it are not valid. Explanations could be that – as noted – the research instrument is faulty (and given the Researcher's relative lack of experience, this cannot be discounted), but also that the SME OM was confused between these four statements. For clarification purposes, it must be noted that it is not the costs of the environmental training that is at issue here it is the

costs of *investing* in the recommendations of the service provider. As a result H_1 to H_4 and H_6 and H_7 are supported as their nul hypotheses are rejected.

The final statistical analysis carried out was to see if the mean scores of each factor can be used as a ranking of the barriers – as outlined in research question. A one-sample T-test showed that the scores from the research were significant and so it is valid to give a revised ranking of the barriers as shown in Table 6.

Table 6 – Revised Ranking of the Barriers

Factor	Mean
Lack of resources	3.79
Not accepting advice is a key barrier	3.54
The attitude of the OM is a key barrier	3.36
Lack of knowledge of the relevant legislation	3.34
The costs of achieving ISO14001	3.34
Lack of/low awareness of Environment	3.09

4.3 Discussion of the Positivist research – barriers to undertaking environmental training

In order to do discuss the results, the Research Questions need to be considered.

> Research Question 1: "What do SME OMS consider to be the barriers to undertaking free environmental training"?

As was discussed earlier, six of the seven null hypotheses were rejected and so almost all of the hypotheses have been accepted. The exception was hypothesis 5 which focused on the costs of investing in the recommendations of environmental training. The other six hypotheses confirm that all six factors each represents a barrier to accepting free environmental advice.

> Research Question 2: "How do the SME OMs view these barriers in order of importance?"

Using the results of the t-test (Table 6) the ranking of the barriers can now be arranged in the Conceptual Framework and the following revised Conceptual Framework emerges (Table 7).

Table 7 – revised Conceptual Framework: Forcefield showing driving and resisting Forces to implementing Sustainable Development Training following Positivist Research

Driving Forces →	The Small Firm	← Resistant Forces
OM attitude Competitive advantage Increased financial performance Benefits of training Legislation Stakeholder pressure ISO14001		Lack of resources Do not seek advice on training OM attitude Legislation ISO14001 Lack of awareness of Environment/Environment a low priority

One of the appeals of the original Forcefield analysis was the way in which issues could be both a driver and a resistant force. The different colours above indicate the pairs of opposites. An example of this would be the SME OM who can either be an altruist who drives and embeds sustainability into his organisation (Quinn, 1997) or a person who does not believe in training his staff in any area, let alone environmental practices (Simpson *et al*., 2004). Although this revised Conceptual Framework is nowhere near as "neat" as the original Conceptual Framework, it does, nevertheless, reflect the reality as demonstrated by the two pieces of research. Therefore the most powerful driving force to *accepting* free environmental advice is the attitude of the SME OM: he has to be convinced of the benefit of the training and if this is achieved then it should be relatively easy to overcome the barriers.

4.4 Results of the Positivist research

Concentrating on the barriers ('resistant forces' in Table 7 above), it is not surprising that *the lack of resources* is the most important one. This factor looked at money, skills, knowledge and time. Considering that the research instrument looked at "accepting free environmental advice", the conclusion is drawn that it is the financial costs of people being *away from the office* to be trained that is a key factor. This confirmed the work of Beaver (2002) and Wilson and Homan (2004). The current economic climate is adversely affecting

SMEs disproportionately hard as banks are not maximising their facility to loan money to them (BBC News, 2012a) and rising costs puts pressure on cash flow (FSB, 2011a). Therefore all organisations were mindful of their expenditure. This clearly has an impact on cash flow and, indirectly, on the ability to recruit new staff or release current staff for training, which means that both the 'money' and 'time' elements of resources, which the author hypothesised would be barriers are indeed such. It is worth noting that in the correlated component analysis (See Appendix 8), one of the items regarding environmental issues loaded onto this factor too. This indicates that the more an SME OM is aware of the environment the more he will consider it when allocating resources. This is an important finding and forms part of the main research questions for the research in Document 5 and will be discussed in the Chapter 6.

Not undertaking training is a key barrier to accepting free environmental advice may well be a reflection of lack of resources – knowing that they cannot afford to pay for training – or it may be a reflection of the fact that SME OMs do not trust or value the training that they get (e.g. Starkey, 2000, Netregs, 2003). In either case, the findings were that SME OMS consider advice or training to be merely large company solutions foisted onto them confirming the findings of Netregs (2003).

Given the importance of the OM, it is surprising that *OM attitude* is not the most important barrier for an SME. Their almost total control of their organisation (*inter alia* Wilson and Homan, 2004; Haugh and McKee, 2004; Nielsen and Thomsen, 2009; Revell *et al*., 2010) would have led one to consider that this would have been the most important factor. From this it could be surmised that the OM does not consider him or herself to be as omnipotent as the literature would have us believe. This is unlikely, given the concurrence of almost all the literature and the findings of the Interpretivist research that the OM is such an important factor in the decision-making processes of an SME. So an alternative conclusion is that, whilst the OM is an important factor in accepting/forgoing free environmental training, the OM actually considers other factors more important.

The 'next least' – or fourth ranked – barrier is *Lack of knowledge of the relevant legislation.* This probably earns its place as a mid-ranked barrier as the SME OM may well be keen to demonstrate that they know the relevant environmental legislation that relates to their business. It will be far more likely that an SME OM will complain that that they have limited resources, rather than display any lack of knowledge of legislation, which is important to their business (Gadenne *et al*., 1998). There is also the issue of how quickly environmental legislation is changing and how complicated it is (FSB, 2011b; Wilson, 2012a): the SME OMs may well not feel confident in keeping up-to-date with it (Netregs, 2003; Netregs 2009) and so give this factor a low score.

Given the SME OM's attitude towards ISO14001 that its perceived disadvantages outweigh the perceived advantages (Ammenberg and Hjelm, 2003), it is interesting that the SME OM does not rank it as a higher issue. The way in which it is seen as a large company solution to small company problems (Halila, 2007) and the way it is often forced upon the SME organisation by larger suppliers who may well have significant leverage (Revell and Rutherfoord, 2003) may well lead one to believe that this is more of a problem than a help. However, this research indicates that this is not the case. This may well be because such accreditations as ISO14001 are becoming more and more commonplace and perhaps that the SME OM sees them as a competitive advantage, rather than a necessary evil (Ciliberto *et al*, 2008). Again it is worth noting that in the correlated component analysis (Appendix 6), one of the questions regarding environmental issues loaded onto this factor too. This indicates that SME OMs may well take the environment into account, when thinking about action on ISO14001, not just – for example – supply chain pressures. The relatively low ranking (versus the perception) of this barrier's importance may well show the literature used in Allen (2006) on ISO14001 to be out of date and this will be addressed in Chapter 5.

According to the research the least important barrier is *Lack of awareness of Environment/Environment is a low priority*. The 'environmental issues' factor had more higher scores than any other of the factors. This may well be because the Environment is a high profile topic and frequently in the news (BBC News, 2012b) and the responses of the OMs reflected this. This is confirmed in Netregs (2009:1):

> "The spread of examples of environmental measures is broader than in previous years and suggests not only an increasing awareness of the type of business activities that impact on the environment but also the specific nature of the environmental issues that have to be managed by businesses within each sector".

It must not be forgotten either that OMs themselves are citizens of 'Planet Earth' and so they themselves have a vested interest in ensuring that environmental issues are not forgotten (Revell and Blackburn, 2007; Gadenne *et al*., 2009).

It is also important to note that none of the components loaded onto the factor which covered the costs of investment in the environment or environmental training (H_5 – *The costs of investing in the recommendations of the environmental training is a key barrier to accepting free environmental advice*). This is interesting since clearly SMEs do invest in many areas of their business (Bevis, 2011), yet the four components did not load onto the same factor. Indeed, none of the four components loaded satisfactorily onto any factor. The conclusion was therefore made that the four statements used in the research

instrument were faulty and will be removed from the further analysis in Document 5's research.

4.5 Summary of the Positivist Research

The above indicates that the two research questions put forward in Document 4 have been answered. It has been established that there is a ranking to the barriers to undertaking free environmental training. The following bullet points are in ranking order and the bracketed numbers refer to the means derived from the t-test (Table 6):

- **lack of resources** is the worst hindrance (3.79/5). On the basis that the environmental advice and training they receive is free, it is posited that the major issue for SME OMs is the issue of time and releasing people to undertake training and perhaps the time taken to embed such training knowledge and skills to the detriment of their 'day job'.
- **not accepting advice** is a key barrier (3.54/5). There are many reasons why they may not accept advice, but the research instrument probed into trust, staff loyalty, big company solutions and needs identification as the key reasons. These are wide-ranging reasons.
- The **SME OM attitude** (3.36/5) has been well-discussed and it is hardly surprising that it is a high barrier. In SMEs – particularly the smaller ones – the attitude of the OM becomes the attitude of the organisation itself. It is only surprising that this barrier is not more highly ranked.
- **Lack of knowledge of the relevant legislation** (3.34/5), or a lack of a willingness to comply with it, is a key barrier to accepting free environmental advice. This is perhaps due to the changing nature of the legislation, its complexity and the speed with which it changes.
- **The costs of achieving ISO14001** (3.34/5) is one of the lower ranked barriers. The research instrument probed not just the cost of achieving the accreditation, but also the cost of maintaining it and the 'hidden' cost of the paperwork.
- The lowest ranked Barrier was the **lack of awareness – or the low awareness – of the Environment** (3.09/5). It is felt that this is a very weak barrier.

4.6 Areas for further research in Document 5

The overall aim of this DBA is not only to identify the Barriers to delivering free environmental advice to SMEs in the East Midlands (as it says in the title), but also to propose ways in which these barriers may be overcome. Looking at the six barriers above, it can be seen that the top two have a significantly higher score (3.79 and 3.54) than the next three, which all have scores in the 3.34-3.36 range.

As noted above there were some correlations between the 28 components of the research instrument, there was evidence of some components loading onto the factors that have not been hypothesised. For example Component 12 "Not aware of any environmental legislation" loaded onto factor 1 which dealt with the SME OM's attitude towards training. This indicated that an SME OM may well not seek advice on environmental training as he is not aware of any environmental legislation: this is confirmed by previous research (Netregs, 2009). Similarly components 14 and 15 "ISO14001 is too hard to maintain" and "ISO14001 is a worthwhile investment" loaded onto factor one as well. This may well indicate that the SME OM has been offered a training course to achieve ISO14001 but perhaps did not consider it appropriate for his organisation (Gelber, 2001). In any case, it is interesting to note that there is a correlation between lack of knowledge of environmental legislation and consideration of ISO14001 when SME OMs consider training as well as the other cross-factor correlations noted above.

One of the planned business outcomes of this DBA is to provide organisations imparting free environmental advice to SMEs a better understanding of their target market and thus improve the efficiency of the communications which will overcome the barriers that SME OMS present. Within the marketing communications literature there is a strong emphasis upon 'knowing your customer' and this DBA intends to help in that area. Given that the positivist research has thrown up that the key *barrier* is lack of resources – notably time – and the Interpretivist research indicated that the OM's attitude is a key *driver* Document 5 will analyse the barriers in more detail to find out if there are more specific barriers that can be addressed and if there exists any strong correlations between barriers.

4.7 Next Steps

Having reviewed the work of the first four documents in the DBA, the focus will now turn towards the research carried out for Document 5. This will take the form of a review of the literature in the areas of relevance and importance (chapters 5 and 6) and then a discussion of the primary research (chapter 7).

5 – Updated Review of the Literature

5.1 The process

The question of how to attempt a review of the literature already pored over was one that exercised the author. A rigorous review had taken place in 2006 and there were resource limitations that prevented a similar exhaustive review for this document. The process adopted was to scour the existing literature (for a list of journals visited, see Appendix 9) and filtering the results by using the various terms used in the barriers. The names of authors of books used in 2006 were trawled to see if further work or later editions were available. Finally the search became iterative as further relevant or interesting work came to light and their reference lists were investigated. This process has its limitations of 'only looking at what we know', but a keen eye and an alert brain were kept open to the possibility of new themes and topics coming to light. This was not the case, however, and although it cannot be proved comprehensively that no new themes have been developed over the intervening period, the author is confident that this is the case. Indeed work carried out by Revell *et al*., (2010) noted the following barriers to environmental reform: see Table 8, where they are compared to the barriers shown in the Conceptual Framework earlier in this Document.

Table 8 – Comparison of the Barriers to environmental Reform amongst SMEs

Barriers from Revell *et al*., (2010)	**Barriers shown in the Conceptual framework (Allen, 2012)**
Loss of competitiveness in the market	Costs of investment/training*
Increased costs	Costs of investment/training* or costs of achieving/maintaining ISO141001
Lack of staff time to introduce measures	Lack of resources
Very low impact of the business on the environment	Lack of/low awareness of Environment
Very low impact of the business on local community	Lack of/low awareness of Environment
Lack of relevance of environmental issues to the business	Lack of/low awareness of Environment or Lack of knowledge of the relevant legislation
Insufficient information on how to act	Do not seek advice or training
Poor infrastructure to support activity	Lack of resources

Similarly, Battisti and Perry (2011) also look at barriers and their work is shown in Table 9, where they are compared to the barriers shown in the Conceptual Framework earlier in this Document:

Table 9 – Comparison of the Barriers to environmental Reform amongst SMEs	
Barriers from Battisti and Perry (2011:173-174)	Barriers shown in the Conceptual framework (Allen, 2012)
Limited resources of owner-managers constrain their engagement in environmentally responsible business Practices	Lack of resources
Low levels of 'eco-literacy' and a lack of or inability to access information	Lack of/low awareness of Environment Lack of knowledge of the relevant legislation or Do not seek advice or training
Low environmental visibility and the perception that small firms individually have a small or almost negligible environmental impact	Lack of/low awareness of Environment
Difficulty establishing a business case for sustainability as the possibilities of enhancing relations with customers, regulators and other stakeholders are limited	Costs of investment/training* or Lack of resources or Do not seek advice or training
A tendency for environmental management tools and programmes to be designed for large firms rather than being customized to the issues facing SMEs	Do not seek advice or training

As can be seen, all of Revell *et al*., (2010) and Battisti and Perry's (2011) barriers were uncovered in the original Literature Review. Note that the 'Costs of investment/training' barrier in the Allen (2012) column is asterisked as it was identified as a major barrier in the original literature review, but in the Positivist phase of the DBA, it was dropped from the Conceptual Framework, as statistically it was not demonstrated to be a barrier. It is felt that this was due to a faulty research instrument, rather than the barrier not existing. This barrier *does* exist, as has been demonstrated by much research (e.g. Revell and Blackburn (2007); Elsayed and Paton, (2009); Battisti and Perry (2011); Williams and

Schaefer, 2013) and further work will be undertaken later in this document to establish this.

The rest of this chapter will now be taken up with discussing the literature review and will be structured to look at the overarching topics of global issues and Sustainability and their impact on business. It will then look at the more recent literature on the Barriers.

5.2 Global issues

There is no doubt that the Environment is a key topic and has been for 40 years since the first major global environmental conference: the UN Stockholm Conference on the Human Environment, held in June 1972 (O'Riordan, 2012). The global population is growing at unprecedented rates and Everard (2011:34) lists an extensive and depressing range of natural phenomena which are affecting the world:

> "collapsing fisheries, shrinking forests, eroding soils, deteriorating rangelands, expanding deserts, rising atmospheric carbon dioxide levels, falling water tables, rising global temperatures, more destructive storms, melting glaciers, rising sea levels, dying coral reef and disappearing species."

It is a topic that has its fair share of merchants of doom (*inter alia* Ayres, 2007; Seager, 2008; Rockström, 2009). A major piece of academic research – the Stern report (2006) – and a populist film (Al Gore's *An Inconvenient Truth* of the same year) kept the momentum of environmental discussion going for a few years and indeed moved the public consensus towards accepting the 'fact' of global warming (Morrison and Hatfield-Dodds, 2011), but now the Stern Report is rarely mentioned. In it, the economist Sir Nicholas Stern laid out the potentially calamitous economic and environmental consequences of the world maintaining its 'business as usual' attitude towards sustainability issues. However instead of condemning business as the inevitable destroyer of the planet, he offered it the opportunity to redeem itself by maintaining that "tackling climate change is the pro-growth [business] strategy for the longer term" (Stern, 2006:1). He concluded that global warming has the potential to shrink the global economy by 20% – thus harming the global economy in an unparalleled way, yet taking action now could result in only a 1% reduction in global GDP.

The environment is still a major concern for society (*inter alia* Kinver, 2011; BBC News, 2012b; Barnes, 2013; Duggan, 2013) and the added influence of the current economic situation means that there is continued pressure on organisational budgets and training (Brass, 2009; Groundwork, 2010; Learndirect, 2011). It is against this background of difficult economic times and continued concerns about the environment that the following discussions take place.

5.3 The concept of Sustainability

Sustainable Development became a 'hot topic' during the last years of the 20th Century and will continue to be one for the foreseeable future (Madsen and Ulhøi, 2003). However, it has no single and agreed definition (Uphadyay, 2012). Most commentators take the definition of the so-called Brundtland Report – the output of the World Commission on Environment and Development – which describes it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987:8). Although this definition of Sustainable Development is relatively simple, its implications are anything but simple and many observers, whilst applauding the sentiments behind Sustainable Development, are quick to point out the difficulties with it. For example, Sutton (1998) contends that for the concept of Sustainability to be meaningful, it must refer to maintaining, renewing or restoring something *specific*. Additionally there is no concept of *measurement*: this elusive notion of Sustainability cannot be quantified (Bartelmus, 2000). Buchholz (1998) notes that another issue is the long-term nature of the definition: today's consumers are being exhorted to be mindful of resources so that *future* consumers may benefit and this goes counter to many consumers' and producers' viewpoints (Dyllick and Hockerts, 2002). Within two years of the 1987 Brundtland definition of Sustainability, over 140 alternative definitions had been coined and by 2007 this had risen to over 300. There is therefore a risk that Sustainability and its sister-concept Sustainable Development are fairly arbitrary abstract concepts (Everard, 2011). There have been some attempts to redefine it from a business perspective: such as Dyllick and Hockerts' (2002:131)

> "corporate sustainability can accordingly be defined as 'meeting the needs of a firm's direct and indirect stakeholders (such as shareholders, employees, clients, pressure groups, communities etc.), without compromising its ability to meet the needs of future stakeholders as well'"

Such definitions hardly move the debate on however, just redefine it for a narrower context. Another, later, definition claims to define Sustainability, but releases business from any responsibility of futurity

> "In our context, sustainability refers to how an organization behaves relative to how its decisions could affect society and the environment as a whole. In essence, how an organization conducts its business while being sensitive to those affected by its decisions, both positive and negative" (Anon, 2011a:13).

Although there are clearly some issues regarding the definition of Sustainable Development the Brundtland Report (WCED, 1987:8) definition will be used as it is the most widely used (*inter alia* Peattie, 1999; Hillary, 2000; Wilkinson *et al*, 2001; Young, 2006; Uphadyay, 2012).

The Brundtland Report had a notion of integrating environmental thinking into the three major strands of political, economic and social activity and Elkington (1994:90) put forward the idea that by implementing environmental policies firms could develop "'win-win-win' strategies…to simultaneously benefit the company, its customers and the environment". Porter and van der Linde (1995) also took a positive view, challenging the entrenched view that the extra costs of 'going green' and the associated costs of meeting regulations would harm profit. They put forward the notion that a combination of market-forces and regulation would be a major factor in environmental improvements and that companies could develop a 'win-win' scenario where their environmental impacts diminished, but their business and profit increase. This concept of 'win-win' later became embedded in the literature as a 'holy grail' to be attained (Hahn *et al*., 2010). For business, it was appealing as the 'win-win' solution allowed them to generate more output with less input – so-called 'eco-efficiency' (Young and Tilley, 2006). However this eco-efficiency was a flawed concept as it encouraged firms to make their destructive, polluting processes to become merely less destructive and polluting – leading to a slower death for the planet – rather than looking at re-engineering processes to eliminate the destructive practices. Moving beyond that concept was 'eco-effectiveness' which took the view that 'waste equals food' and introduced a closed-loop system rather than the linear approach of the eco-efficiency model. This was a much more radical idea as "eco-effectiveness ultimately requires industry to reinvent itself so that the new ways of doing business result in regenerative, not depletive, practices" (McDonough and Braungart, 1998:404).

In a similar way, Young and Tilley (2006) argued that the social element of a firm's responsibilities could be split between 'socio-efficiency' and 'socio-effectiveness'. The former is not enough in that although firms may practice it through its CSR policies, society in the wider sense may be harmed (Michael, 2003), whereas firms which embrace 'socio-effectiveness' are ones which have a social mission and put maintaining a strong positive impact on society as a major outcome of their activities. Finally Young and Tilley (2006) distinguished between sufficiency and ecological equity whereby closed loop processes are developed and products are designed so that their waste becomes the inputs for new production processes. By way of example, Braungart *et al*., (2007) give the somewhat prosaic example of an ice lolly wrapper that contains seeds and which liquefies at room temperature; taken to its logical end this would encourage people to litter, but at least the litter is bio-degradable and the seeds would bring forth new life! In summary Young and Tilley (2006:402) noted that developments in Sustainable Development were leading to

> "integrated models of corporate sustainability that link together the six criteria that a sustainable business will need to satisfy, namely eco-efficiency, socio-efficiency, eco-effectiveness, socio-effectiveness, sufficiency and ecological equity"

to develop sustainable entrepreneurs.

Moving on it is clear that Sustainability is maturing and changing. It has moved from being a short-term issue such as recycling or pollution control to a long-term strategic issue. Increasingly managers find themselves responsible for environmental issues and have targets to measure their performance. As a result firms are having to include more and more sustainability training into their TMD programmes (Coleman, 2013) and there is a move to incorporate business strategy, governance and financial performance into the social, environmental and economic context within which a firm operates (Welford, 2012).

5.4 SMEs

It is worth emphasising the difference between larger and smaller firms as it is a key concept with the SME literature. Bos-Brouwers (2010) notes the main difference between large and small firms and this is shown in Table 10 below.

These traits are worth bearing in mind as they recur during the following discussion, particularly the dominant role of the OM, the lack of resources and the low degree of formalisation

Table 10 – Differences between SMEs and larger firms

SME	Larger Firm
Dominant role of the OM	Delegated management control between board of directors and shareholders
Resource poverty (capital, time, knowledge and skilled personnel)	Economy of scale, resource abundance
Flexible organisation capacities	Bureaucratic rigidity
Focus on short term	Focus on mid to long term
Strong local/regional focus and customer needs orientation	Strong (inter)national focus and looser ties with customers
Low degree of formalisation	High degree of formalisation

Source: Bos-Brouwers (2010)

It is also important to emphasise that the literature notes frequently that SMEs are far from homogenous (*inter alia* Rodgers, 2010; Ciemleja and Lace, 2011; Wilson *et al*., 2012b). Battisti and Perry (2011) segment them into four distinct groups in the environmental context:

- 'cost burden': this group sees environmental sustainability as an opportunity cost for the business to the extent that any "expenditure on environmental improvement would outweigh the savings to the business" (Battisti and Perry, 2011:176). These SME OMs are both environmentally *un*aware and believe they have a negligible environmental impact;
- 'business opportunity': this group sees *environmental* sustainability as an opportunity to reduce their costs *and* to increase profits by achieving a competitive advantage. They are not interested in the environment unless and until it brings higher profits.
- 'business bottom line': this group sees environmental sustainability as the bottom line of doing business, giving the environment priority over financial considerations. The OMs operate their firm for broader aims than just pure profit; and
- 'responsible': this group sees environmental Sustainability as having a wider responsibility "toward their employees, their customers and suppliers, their local community, as well as their natural environment" (Battisti and Perry, 2011:177). They have a very holistic view of business, wanting to be profitable, to maintain good relationships with all stakeholders, to provide a quality product or service and to contribute to local, national and global welfare. Their *Weltanschauung* is that even if their impact is small, *everybody* has a responsibility.

5.5 Sustainability and the SME context

After discussing how Sustainability and Sustainable Development thinking has changed over the years, how they have impacted on business – particularly at the SME level – will be looked at. After an initial overview, the topic will be looked at in terms of the barriers.

There is consensus that SMEs have a significant role to play in sustainability because of their numbers and impact (*Inter alia* Kerr, 2006; Howarth and Fredericks, 2012). There is evidence of increased levels of environmental engagement: Tilley (2000:38) claimed that "the typical small firm has yet to become fully engaged in the environmental debate" but Revell *et al.,* (2010) note that this may be changing. Encouragingly, others such as Battisti and Perry (2011), Cassells and Lewis (2011) and Brammer *et al*., (2012) all note that most small businesses are engaged in some form of environmental initiatives – usually limited to activities that would increase profitability (energy reduction, recycling, waste management etc.). Cassells and Lewis (2011) observe that SME involvement in sustainable business practices has been underestimated. However the latest NetRegs (2009) survey still makes depressing reading for those hoping for a major improvement in engagement. The NetRegs (2009) survey of 7000 SMEs indicate that SMEs are not developing their environmental knowledge, nor their sustainability practices, at anything

approaching a suitable speed – these findings are discussed under the separate headings below. It is worth noting that the survey takes place on a regular basis (2002, 2003, 2005, 2007, 2009), but there is no consistency over the 5 surveys, so trends cannot be seen. Additionally data are usually disaggregated into sectors, company size or region within the UK, with no total UK figures, thus making comparisons across the years hard. As a result, it represents a 'snapshot' not a moving canvas.

5.6 The Attitude of the SME OM

There is still a strong body of evidence to confirm the importance of the SME OM to their firm (*inter alia,* Nielsen and Thomsen, 2009; Revell *et al*., 2010) and the attitude of the OM to sustainability and the environment clearly has the largest impact of any factor in the firm. Williams and Schaefer (2013:173) conducted a major survey of SMEs in the east of England and concluded that:

> "While economic arguments and external pressure played a role in their pro-environmental engagement, perhaps the most notable motivation for managers in this study to engage with environmental and climate change issues was personal values and beliefs"

Kerr (2006) maintains that in order to embed a strong sustainability operation within an SME there has to be leadership 'by example'. Writers such as Roberts *et al.,* (2006), Gadenne *et al.,* (2009), Revell *et al*., (2010) and Brammer *et al*., (2012) all note the willingness of SME OMs to participate in activities that will lead to making a difference to their environmental performance: indeed the SME industry body (The Federation of Small Businesses) claims that SMEs "are keen to go green but are not getting the help or incentives they need to do so" (FSB, 2011c:np). There is still a view that a gap exists between the claims of SME owner-managers to perceive the environment as an important issue and their actual commitment as revealed through participation in sustainable business practices (Tilley, 2000; Revell *et al*., 2010; Cassells and Lewis, 2011). Roxas and Coetzer (2012) acknowledge the importance of the OM in setting the firm's 'Sustainability agenda' and Netregs (2009) showed that SME OMs were becoming increasingly aware of the type of business activities that impact upon the environment and noted that the bigger the firm, the bigger the awareness. The most common environmental activities were recycling, generating less waste and designing energy efficiency programmes and SME OMs saw the benefits of environmental performance improvements as being reduced operating costs and a more motivated workforce (Netreg, 2009).

5.7 Lack of resources

SMEs view environmental improvements as expensive to undertake (Revell and Blackburn, 2007) and the balance between environmental performance and payback is a key one. Revell and Blackburn's (2007) view of the 'win-win' paradigm is that it is flawed on the basis that SME OMs do not behave rationally. There is still evidence that SMEs lack the skills and capacity to embrace the new technologies that environmental improvements might need (Pinkse, and Dommisse, 2009) and they are more probable to give thought to making incremental, short-term changes rather than making disruptive, radical changes to their processes (Smith and Crotty, 2008).

For those that are interested and committed enough to want to invest in them, Masurel (2007:199) notes "SME's motivation to invest in environmental issues may not be to improve the environment as such". It is usually to provide better working conditions for the employees and obeying the law. Masurel (2007:199) concludes: "However, in an indirect way SMEs do also appear to be concerned about the actual environment". Blazy and Weil (2013), though, point out that there are major problems in SMEs getting loans from banks to finance investment. In addition to financing difficulties, SMEs are being hit disproportionately hard in the recession – liquidation/bankruptcy of customers, the slowdown in manufacturing, less investment by customers and – crucially – late payment of debts (Price, *et al.*, 2013).

In terms of investment in training, SMEs are known for their informality: formal HR policies are usually more expensive to implement in SMEs than larger firms (Barrett *et al*., 2007) this leads to an *ad hoc* attitude rather than a strategic one (Ates, 2011). SME OMs rely upon on-the-job training as they are reluctant to pay for external consultants or experts and reluctant also to release staff for time needed (Stokes and Wilson, 2010).

5.8 Not accepting/distrusting advice

SME OMs are still very wary about accepting outside advice. The 'regular' public sector support services such as Business Link will only be accessed if the SME OM views that the services have been developed with SMEs in mind. SME OMs would rather see current initiatives followed through and agencies act in a 'joined up way: there is no interest in '*another* new initiative' (Roberts *et al*., 2006). There is still the notion that SMEs are the recipient of large company solutions which do not necessarily lead to successful outcomes within an SME environment (Bos-Brouwers, 2010; Battisti and Perry, 2011). The main private sector sources are consultants, accountants and banks and the most common information/assistance requests are for compliance and/or tax issues (BIS, 2011). Worryingly for this research, the East Midlands SMEs had the lowest uptake of advice with

36% seeking advice: whatever the reason for the low uptake, it is concerning that the SME OMs are not taking advantage of the knowledge sources that are available

5.9 Lack of knowledge of legislation

There is more and more European legislation aimed at larger firms and a necessity for them to 'green the Supply Chain' (Smith and Crotty, 2008). For example the *End of Vehicles' Life Directive* forces firms to implement 'clean design' into their manufacturing processes and even to consider the eventual disassembly of the cars. It would be thought that SME suppliers need to be able to fit in with these design needs and be aware of the legislation, but Smith and Crotty (2008) found only very limited evidence to suggest that this was so. Only 23% of firms could name, unprompted, a piece of environmental legislation that was relevant to them (62% prompted) (Netreg, 2009) and recent research (Wilson *et al*., 2012a) confirms that the compliance by SMEs with the 'spirit of the Law', let alone the 'letter of the law', are both generally low. SME OMs consider legislation unnecessarily complicated, they do not understand it and this leads to low levels of compliance. Finally, the SME view that there is very little enforcement activity by the Authorities (e.g. the Environment Agency) means that they are prepared to risk not complying. In a positive twist though, Wilson *et al*. (2012a) found that although the SME OMs felt compliance would impose a resource burden on their firm, there was no evidence of having to carry out major alterations to how they worked for those that did comply.

5.10 Costs of achieving ISO14001

The ISO group of sustainability standards has now grown to include ISO26000 (social responsibility) ISO31000 (risk management) and ISO50001 (energy management) with ISO14001 (environmental management) as the foundation. Worldwide uptake of ISO14001 has increased by 6% from 2011 to 2012 (ISO, 2012). ISO14001 certainly has its supporters and it has caused many larger firms to reassess their environmental performance. However there are critics of the standard (Curkovic and Sroufe, 2011). Darnell *et al.* (2008) maintain that larger firms do not use it to challenge their supply networks to become more environmentally sustainable, rather they use it to improve areas of operation within the firm's current ambit rather than being extended throughout the supply chain; and that firms with an EMS have little reason to 'green' their supply chains, since they can effectively market themselves as being environmentally proactive by virtue of having the standard. They do note however that that firms that adopt EMSs are more frequently likely to implement Green Supply Chain Management practices. Boiral and Gendron (2011:333) claim that:

> "ISO audits are not focused on performance improvement but on organizational conformity with a management system supposed to improve quality or environmental performance."

Their research concludes that whilst there may not have been any major structural ISO14001 audit failures, the accreditation has three main errors:

- ISO certification is a more of a *commercial* requirement than a tool to strengthen accountability. It is used by adopters as a Marketing tool to develop their image and reputation on a superficial level;
- secondly it is superficial in itself – and usually document-based – since they comprise relatively short audits. The process for accreditation is far less detailed than, say, the financial accounts; and
- thirdly the auditor is rarely independent as they are directly employed and paid for by the firm they are auditing. Clearly there is an actual conflict of interest.

Curkovic and Sroufe (2011) take a more practical critical approach. They maintain that the benefits of implementation and maintenance may be offset by the costs of the same; there is barely any evidence to show the positive relationship between improved environmental performance and the strong corporate performance that is 'promised'; and once gained, complying with the standard and duplication of record-keeping is bureaucratic and costly.

ISO14001 is still seen as developed for larger firms, not smaller ones, as are other environmental frameworks and policies. Battisti and Perry, (2011) found that benchmarks and assessments of SMEs should be developed for, tailored to, and targeted at SMEs, not just be 'cut down' from the MNE originals. Ciemleja and Lace (2011) go further and say that it is impossible to apply the standardised, identical indicators of an EMS to all SMEs as they are all so different. This confirms Netregs (2009) which found that few respondents (only 4%) had an Environmental Management System; the reason given was that they were too expensive.

5.11 Lack of awareness or low awareness of the environment

Netregs (2009) found that 93% of SME OMs claim that they have no negative environmental impact, but this went down to 54% after the prompting of some of their likely impacts. The improvement is impressive, but for over half of SME OMs still to consider that they have no negative environmental impact shows a lack of awareness of their processes' effects and the legislation that covers them. Conversely they have little awareness of the benefits that might arise from cost reductions from their environmental-friendly practices (Gadenne *et al*., 2009) – the so-called 'win-win' opportunity. However in 2003 Netregs found that the figure was similar (94% of SMEs thought that they did not

contribute to the overall effects of pollution). In the intervening six years, it appears that the SME's awareness of its impact on the environment has not grown at all. A stark difference can be seen with the larger firms: the environment *has to* feature highly on a PLC board's agenda (Welford *et* al., 2008) and many large firms 'institutionalise' sustainability by rewarding CEOs with pay rises and bonuses based on their sustainability performance (Berrone and Gomez-Mejia, 2009).

5.12 SMES and training

As noted in Table 10, SMEs exhibit a low degree of formalisation (Bos-Brouwers, 2010) and this extends to TMD (Barrett *et al*., 2007). SME OMs are traditionally averse to training as they see it as 'formalised learning' akin to school learning (Stokes and Wilson, 2010); their tendency towards short-termism means SME OMs do not appreciate the longer term benefits of training (Ates, 2011); they think that well-trained employees will defect to – or be poached by – the competition (Devins *et al*., 2004); linking back to the resources issue, they see formal training as involving loss of employee time (Admiraali and Lockhurst 2009): informal training is more appreciated (Johnston, 2003). This leads to employees of SMEs being considered a "'disadvantaged group' in terms of training" (Devins *et al*., 2004 441) as 70 percent of SME employees have a positive attitude to training, yet little access to it.

The benefits of training are not in doubt: there is a positive correlation between training and firm productivity (Admiraali and Lockhurst, 2009), a well-trained workforce is seen as a source of competitive advantage for SMEs – even the smallest companies (Lorenzet *et al*., 2006) and it develops a sense of trust and belonging (Lewis and Koetzer, 2009). Lyons and Mattare (2011) maintain that TRD matters to SMEs; there are increases in employee and firm performance when it takes place, but, more crucially, they maintain performance suffers if it does *not* take place.

As far as the methods of delivery of TRD go, SME OMs desire TRD that is low cost, bespoke, on-site, flexible and involves both the OM and the employees. It should be engaging, motivating and involving and most importantly it should be experiential and hands-on and usable across several skills needs (Lyons and Mattare, 2011). Given this set of requirements, it is hardly surprising that SME OMs deem the TRD that they have received unsatisfactory. Lyons and Mattare (2011) note that between 1990 and 2002, all forms of training within SMEs except e:learning, declined, with the most common forms of training being on-site contractor-led training, experiential, 'on-the-job' training. Training was usually used on the skills for the role *currently* undertaken (no developmental work involved). However the growth of e-learning as an option for SPs can be misleading as

Admiraali and Lockhurst (2009) found that SME OMs generally did not show positive attitudes towards learning and training in their companies through technology.

Having said that HRM in SMEs is typified by informality, there is no reason to suppose that it is any less effective or that it means any lack of focus within the SME. It may well be that the perceived lower incidence of formal training in SMEs may be due to ways of defining, measuring and recording it (Lewis and Koetzer, 2009).

5.13 Next steps

Having brought the literature on SMEs, TRD, Sustainability and their impact on each other up to date, the DBA will now look at the research element of this Document.

6 – Research Strategy

6.1 Research Philosophy

Throughout the study of the DBA and the subsequent reading around the philosophy of research, the importance of 'defining one's research position' has been emphasised (*inter alia* Miles and Hubermann, 1994; Blaxter *et al,* 2006; Bryman and Bell, 2011). As Easterby-Smith *et al*. (2012:19) put it: "failure to think through philosophical issues…, while not necessarily fatal, can seriously affect the quality of management research". The philosophical poles of Interpretivism and Positivism were discussed at length in Document 3 (Allen, 2009) and there is no need to repeat that here except for a brief resumé of the author's understanding of the terms.

6.2 Positivism vs. Interpretivism

Positivism takes the attitude that a concept or theory cannot be proven true, unless empirically researched and then tested (Bryman and Bell, 2011). Founded in scientific research and discovery, it attempts to uncover governing 'laws' that explain the 'how?', 'why?' and 'what?' of events in order to establish a cause and effect. It assumes the existence of a reality 'out there' that can be tested, measured, observed and quantified. The researcher is a non-participative observer who does not influence the research. It is highly structured, can be replicated and deals with large numbers which lends itself to statistical analysis.

In contrast, Interpretivism comes from the social sciences and takes the position that people and phenomena are different and that "the subject matter of the social sciences – people and their institutions – is fundamentally different from that of the natural sciences" (Bryman and Bell, 2011:16). Investigation of the 'human' world and the interactions between individuals and their groupings needs a different method of analysis and interpretation from the natural world – one that reflects the distinctiveness of humans when compared to the natural order. The researcher is a participant who may well influence the research.

The main 'clash' is that of the way in which Positivism emphasises the *description* of human behaviour, whereas Interpretivism emphasises the *explanation* of human behaviour. Interpretivism seeks to understand the human condition rather than to describe the forces that act upon it. A key debate between Positivists and Interpretivists is 'Can the social world be viewed in the same way as the scientific world?' Can the thoughts, feelings, management structures or strategies of a socially constructed business environment be reduced to numbers, frequencies and equations that can be objectively measured to give

immutable laws that can be used to predict behaviour? Or are these same thoughts, feelings, management structures, strategies only constructions of the mind with ever-shifting meanings and interpretations, thus rendering definitions and measurement meaningless once lifted out of their context? Words can either be fixed in their meaning (Positivist) or be fluid and unfixed (Interpretivist).

6.3 Positivism and Interpretivism…and Realism

It is becoming more apparent from the research literature that pure 'Positivism' and pure 'Interpretivism' have a lessening divide between them (Walliman, 2011; Flick, 2011): it is more of a continuum where philosophical positions may be plotted on a line. Hesse-Biber and Leavy (2011:7) call the two philosophical positions "different but complementary." It should be noted however, that this view comes from the Social Sciences camp and from Interpretivists; Positivists are slow to accept any watering down of their scientific *Weltanschauung*.

Between these two poles lies another major position: Realism. Realist social science has various guises (i.e. pragmatic realism, scientific realism, critical realism, subtle realism and transcendental realism (Robson, 2002)) and has become a serious 'third way' between Positivism and Interpretivism (Thomas, 2006). Johnson and Duberly (2000) say that many authors view Positivism and Realism as the same, but maintain that they should be treated as separate approaches. Realists maintain that the hypotheses that they use in their research do not, as Positivists say, test fixed, scientific laws, but offer possible, tentative explanations of the 'hard data' (Fisher, 2007). The author has identified himself as a Pragmatic Realist (PR).

> "[Pragmatic Realists] believe that social phenomena exist, not only in the mind, but also in the world – and that some reasonable stable relationships can be found in the inherent idiosyncratic messiness of life. There are regularities and sequences that link together phenomena. From these patterns we can derive the constructs that underlie individual and social life. The fact most of these constructs are invisible to the naked eye does not make them invalid. After all, we all are surrounded by lawful physical mechanisms of which we're, at most, remotely aware" (Miles *et al*, 2004:7).

For Realists, there are two levels of 'reality': an external objective reality that exists and within which humans operate (as Positivists suggest), but there is also a second internal subjective reality that this world cannot be experienced or 'known' directly but only through the medium of human interpretation, following the Interpretivist view (Marschan-Piekkari and Welch, 2004). These levels are linked together by regular and stable patterns – some of which can be predicted – and from these we can develop constructs that underpin the life of individuals and society (Miles *et al*, 2014). Individuals exist within various 'frameworks' or 'contexts' such as the family, the workplace or a social setting and

their actions, attitudes and views will differ dependent upon the context that they find themselves in. For an SME OM, this may raise tensions as the work and family contexts may overlap if the OM employs family members in the organisation: the morning's doting husband and loving father may turn into a bullying tyrant come lunchtime! The contexts that exist may not be visible, but they are, nevertheless, real and exist both subjectively and objectively.

Explanation is possible in the social world, but not in the strict view of the Positivists. Social phenomena are phenomena rich in complex meanings rather than 'objects' or 'things' and so need to be studied using means appropriate to them (Flick, 2011). For instance the behaviour of these 'objects' or 'things' can be influenced by impersonal forces whereas the behaviour of people can be influenced by their own goals, feelings and motivations as well as 'objects' or 'things'. In order to understand and predict human behaviour the researcher has to understand the 'world' through the eyes of the researched person and to recognise the meanings that they apply to their actions and interactions within the physical world. In order to do this the Positivist's tools of "isolation, observation and experimentation" (Thomas, 2006:37) are not appropriate and such tools as "communication, interaction and participation" (Thomas, 2006:37) ought to be used. A Pragmatic Realist believes in the middle ground that words are not fixed in any absolute sense, but neither are they totally fluid, but are fixed "for the time being" (Thomas, 2006:17). This allows for varying interpretation of such terms as 'training', 'environment' or 'management.'

This Research will use the Positivist tools of Survey and statistical analysis, but will view it through the 'distorted mirror' of the social constructs that exist. More of this will be discussed in the next section. Using the debates identified above, it is fair to say that the Author's awareness of his philosophical position has developed over the period of the DBA course. How this has happened is reflected upon in Document 6.

6.4 The Research Position

In order to appreciate the research fully a review of the author's philosophical position is necessary. Based upon Bryman and Bell, (2011) and Coghlan and Brannick's (2008) and Saunders *et al.*'s, (2012) philosophical foundations, the researcher has plotted his own philosophical position comparing them to the poles of Positivism and Interpretivism (Table 11 and discussion thereafter).

Ontology — the Researcher believes that certain physical 'objects' or 'things' have an existence independent of the human mind and are fixed according to their properties and indisputable laws of physics: these tend to be concrete concepts such as a building.

However there are also non–physical 'objects' or 'things' which can only exist thanks to the intervention of the human mind: these tend to be representational or abstract concepts such as what the building represents (a 'workplace'? or a 'prison?'). A PR believes that there are always two steps to interpreting a phenomenon: people experience 'sensations' and then process what those sensations mean through their everyday experiences (Saunders *et al*., 2012).

Table 11 – Research Paradigms

Philosophical Foundations	Positivism	Interpretivism	The Author
Ontology (the nature of reality)	External to the research	Socially constructed by the participants	Pragmatic Realist
	Objective	Subjective	Subjective
Epistemology (the grounds for knowledge)	Knowledge is gained through observable phenomena	Knowledge is based on subjective meanings	Subjectivist
	Law-like generalisations exist	Specific instances apply	Law-like generalisations exist, but do not always apply
Axiology (the role of values in research)	Researcher's values are not valid	Researcher's values are important	Value laden
Reflexivity (the relationship between the researcher and the object of research)	Methodological	Hyper-reflexive	Epistemic
Role of Researcher	Distanced from data – researcher is 'outside looking in'	Immersed in data – researcher is participative	Close to data

(Based on Coghlan and Brannick, (2008); Bryman and Bell, (2011); Saunders *et al*. (2012), Miles *et al*. (2012))

Epistemology — the Researcher takes the view that knowledge comes from how we interpret phenomena according to our own social constructions; again there is the two-stage process of recognising what we observe and then making sense of it through our prior experiences and knowledge. However given the nature of knowledge and reality, it is possible for a PR to accept into their theorising terms and concepts that cannot be directly measured and use them for generalisations (Bryman and Bell, 2011).

Axiology — the Author's work is value-laden. He is keen to help SMEs to develop better ways of working that generates both profit and environmental benefits. This can be contextual too. The subject of sustainability features heavily in the values of a father with three young children; if the topic were research on the design of cross-selling promotions to influence repeat purchase (Liu-Thompkins, 2013) the author's values would feature less heavily.

Reflexivity — the Researcher is seeking out new modes of engagement with the research participants and his own practice through participatory and co-operative approaches (Bryman and Bell, 2011). Coghlan and Brannick (2008) note that this epistemic approach is guided by a commitment to change and improvement.

Role of Researcher — for the Author the data are important and rich. The close involvement with the data was formed by the literature reviews and the interviews. It has been enhanced by the surveys. Although the nature of the relationship is not as immersive as it would be for an Interpretivist, there is a strong close relationship. As Bryman and Bell (2011) say it is perfectly acceptable for a PR to employ any of the Positivist and Interpretivist tools to arrive at their version of reality and truth.

Having noted all the above, it must be said that a strong thread of pragmatism runs through the DBA: "Pragmatism asserts that concepts are only relevant where they support action" (Saunders *et al*., 2012:130). The most important influence is not the epistemology or ontology, but the research question and its relevance to the DBA! A PR takes the somewhat–teleological view that it is entirely appropriate to use different philosophical positions to achieve appropriate results.

6.5 Research Strategy

Bryman and Bell (2007) make a simple distinction on research strategy: broadly Quantitative (uses measurement) and Qualitative (does not). A Quantitative research strategy entails a deductive approach where the emphasis is on testing theories, incorporating the norms of Positivism and seeing social reality as an externally constructed, objective reality. A Qualitative research strategy emphasises words and their meaning rather than quantification and entails an inductive approach where the emphasis is on generating theories, incorporating the norms of Interpretivism and seeing social reality as an internally constructed and constantly shifting reality. However a PR can straddle the divide and use a mixed methodology strategy and employ 'triangulation' (Saunders *et al*., 2012). Indeed the DBA course encourages a mixed methodology with its requirement for both Positivist and Interpretivist research.

6.6 Research ethics

The position of ethics in research is more than ever a topical point: witness the fact that Bryman and Bell (2002, 2007) moved their chapter on the subject from twenty fifth to fifth position in the later edition of their book on Research. Miles *et al.,* (2014) note that it is important to consider ethical issues in advance of undertaking research. There are several areas where the researcher needs to be aware of ethical issues. For example, the researcher is in the position to be able select 'pliable' respondents that will offer certain views that the researcher may want to hear. The Interpretivist researcher is in a stronger position than the positivist counterpart to bias results, falsify evidence and manipulate data to his own ends as the researcher may well be the only one with access to the original participant, the recording and the transcript (Walliman, 2011).

All the sources read on research have at least a chapter on ethics and all warn of the dangers of unethical behaviour. A key issue is the power given to a Researcher: the researcher has the power to manipulate the research process and thus endanger the integrity of the Research. O'Leary (2004) contends that all Researchers have this power, but that not all Researchers realise this and as a result are unable to manage it. The issues usually revolve around the issues of "harm, consent, privacy and the confidentiality of data" (Berg, 2004:43). These four will now be assessed in the light of this research.

Physical or Mental Harm

There is no real scope for physical harm in the research: it is doubtful that the researcher and respondent will come to physical blows over the content of the research instrument and the statements made; and whilst it is a possibility that this could include the internal distress caused by the respondent realising that they are helping to destroy the planet, it must be remembered that the respondents are down-to-earth business people and the possibility will be remote. There is also an ethical onus on the researcher to 'do good' (Miles and Huberman, 1994; Flick, 2006) and hopefully the dissemination of this research to both service providers and in academic journals will satisfy this.

Active informed Consent

Consent will be considered 'given' by virtue of the survey being completed (Fisher, 2007). This will ensure that it is 'active' rather than 'passive' consent, that the respondent knowingly takes part in the research and is doing so of their own choice (Berg, 2004).

In terms of gaining consent Walliman (2005) provides a list of issues that may be involved and this will be used by the researcher as a checklist to establish if ethical issues exist (Table 12).

Table 12 – A list of ethical Issues and the Author's Response	
Issues	Measures taken to ensure ethical compliance
The relationship to respondents	Independent of, and not known to, the respondents
How respondents are chosen	By invitation through a third party
How respondents are informed and what that information consists of	By information on the survey collection website
Guarantee of confidentiality and anonymity	No personal details are asked for, unless the respondents wish to divulge them
Impartiality of data collection	The data are gathered by the survey website, with no intervention from the researcher
Impartiality of data analysis	Researcher awareness of potential bias
Management of sensitive information	No sensitive information is foreseen
Freedom from deception and covert methods	A true description of the research will be given in the Information Sheet. No covert methods will be used
Adequate training of assistants	No assistants used
Careful management of data and eventual disposal	All confidential material will be stored on a password-protected computer and disposed of in line with NTU guidelines.
Feedback to respondents	A copy of the transcript will be sent to the respondents and a summary of the research if requested
Forms of dissemination that ensure no harm is done	Academic output: DBA dissertation, academic articles. Practitioner output: presentation and reports to service providers – anonymity preserved
Responsibilities to funders	Primary funder is the University. Responsibilities are to behave in a responsible and ethical manner and to develop academic articles. Secondary funder is *emda*. Responsibilities are to present and report on findings to help them to achieve their outputs on Sustainability
Adapted from Walliman (2005:362)	

Privacy

Privacy is both a practical and ethical consideration. Many authors (e.g. Fisher, 2007) maintain that seeking a quiet area – preferably away from such distractions as telephones and computer screens – is a necessity in order to establish conditions where the researcher and participant can talk freely without interruption. Privacy may well be an ethical issue if the participant wishes to disclose something that he may not want others to hear, so an open-plan office will not be an ideal location. Having said that, the researcher visited OMs of SMEs and a private office was never experienced.

Confidentiality and Anonymity

Berg (2004:65) defines confidentiality as "an active attempt to remove from the research records any elements that might indicate the subjects' identity"; however this is more a definition of 'anonymity'. To Fisher (2007) these are two different concepts and will be treated as such now.

The definition of confidentiality to be followed is material "not to be divulged" (Chambers, 1999). This is clearly a difficult area as the Author *does* intend to use information that the participant will divulge (how else can the research be presented?), however he does intend to protect the participant's anonymity. The participant will also be made aware that the information given may well be used in other research. These will be confirmed to the respondents via the Consent Form and the Information Sheet.

The anonymity of the respondents was protected by assigning a generic name to them at the transcription stage. A list of respondents was generated showing just their basic details. For example: 'participant A, Male, OM, engineering company' (See appendix 2). However if the Author considers that this information may be enough to identify the participant, then a more bland descriptor may be used. There will be one 'master list' of the descriptors allocated to each participant and this will be kept in a password-protected file, known only to the author. The original recording of the interviews will be saved digitally until after the final Exam Board and transcripts saved for five years after the research in line with University policy.

Information Misrepresentation

Miles *et al.* (2014) add to Berg's (2004) list by warning against misrepresenting the data. This can be a dichotomy as the task of the researcher is to reduce the mass of transcribed data to manageable proportions at the analysis stage and this can be done by being selective about what is reported in order for the researcher to 'prove' a point. Although the researcher may not *deliberately* falsify information (Miles *et al*., 2014), the deliberate (or even subconscious) exclusion of information can be seen as an unethical act. This can

be overcome by returning a copy of the transcript to the participant for them to check it (*inter alia* Flick, 2006; Fisher, 2007), thus ensuring that the transcript is accurate, but not whether it is interpreted appropriately at a later stage.

Ethics of collection

As Maylor and Blackmon (2005:280) note: "a minimum ethical standard [of research] is to do no harm. A higher goal is to find a way that your research project can benefit the organisation and individuals involved." Certainly the researcher is well aware of the potential opportunities to cause harm and distress to respondents, but considering the sampling frame and the research instrument there should be negligible harm caused. The aim of the DBA research is to give funded providers more knowledge to be able to access SMEs and this would be the higher goal. However the researcher is also under an obligation to act ethically in his research activities, including recording, interpreting and reporting the data faithfully (Fisher, 2007). The respondents will be aware of the intentions of the research, be advised that they are under no obligation to complete the questionnaire, will be offered the opportunity to receive copies of the research when completed, will be offered no inducements to participate and their anonymity and confidentiality will be respected. Completing the online instrument will constitute 'informed consent' (Maylor and Blackmon, 2005).

Plagiarism

A final and perhaps obvious ethical issue is to avoid plagiarism and to ensure that all citations of others' work are fully and correctly attributed. As an academic, the researcher is fully aware of the potential for this to occur and of the penalties.

6.7 Chosen data collection method and rationale

This Document will analyse data gathered for Document 4. Whilst this thesis featured data collected and analysed using a Positivist lens, the Author feels that there is no dichotomy in using it within a PR philosophy. As noted above, there is an increasingly blurred distinction between Positivism and Interpretivism and hence the tools they use (Walliman, 2011). Tashakkori and Teddlie (2009) advocate researchers using a mixed method paradigm to achieve 'balanced' research; this is especially appropriate if the researcher is interested in both numeric *and* narrative data and their analyses. The very nature of the DBA as a whole encourages a mixed methods approach, even though individual documents will use only one approach. This particular DBA project uses "mixed methods and multi strand designs" employing a "sequential mixed design" (Tashakkori and Teddlie, 2009:145). The 'mixing' takes place across different stages of the study "questions or procedures of one strand emerge from or depend on the previous strand and

research questions are related to one another and may involve as the study unfolds" (Tashakkori and Teddlie, 2009:151) – see Figure 1 on page 1.

Although Bryman and Bell (2011) note that *broadly* Positivists use quantitative methods and Interpretivists use qualitative methods, they also note that it is how the data are used and the findings interpreted that are important. As PR sits between Positivism and Interpretivism, there is no trouble with using the tools of either position– in this case a survey – as a means of gathering data. The key will be in the interpretation.

Justifications for using the Document 4 data are that the data still have currency, having been gathered last year and the author's increased skills and proficiency in using SPSS mean that the rich data obtained can be mined more extensively. More practical justifications are the resource constraints on the researcher (to be discussed in more detail in Document 6) and the difficulties in contacting SMEs (Feltham *et al.,* 2005; Ekanem, 2007). Although there has been – and continues to be – a strong growth in research on SMEs (Blackburn and Smallbone, 2008), there still continues to be considerable difficulties in engaging with them.

Factor Analysis (FA) was used earlier as it has the ability to reduce large amounts of data into fewer variables (Salkind, 2011). Document 4 saw how the 28 components were reduced to 6 variables. It is often used to see if the data contain any 'latent variables' (Field, 2013). These are variables that are not immediately obvious or cannot be measured directly. For example it is hard to measure the concept of 'Sustainability' directly: asking 'do you practice a sustainable lifestyle?' may be hard for a respondent to answer, but if this is broken down into questions which test actions, then this may well be more practical. Such questions might revolve around if the respondent recycles, drives or walks, uses a garden hose or whether or not they leave electrical goods on 'standby'. In Document 4, the factor analysis was *confirmatory* – used to check hypotheses (Salkind, 2011).

The process of how the data were collected is described in 6.8 below. The same raw data will be used for this Document, but analysed in a new way. The data will be subjected to regression analysis to establish the impact of certain message elements on the SME OM's propensity to accept free environmental advice and training. Regression Analysis allows an outcome to be "predicted by a linear combination of two or more predictor variables" (Field, 2013:880) and uses as its basis correlations between the variables and predicts the value of one variable dependent on the others. "It is a very powerful tool for social and behavioural science researchers" (Salkind, 2011:245). Simple regression analysis is often adequate for simple analysis but in this case there are multiple factors which need to be taken into account. Regression analysis attempts to take all the measurements from the

data set and develop a 'line of best fit' that can predict the effect upon a Dependent Variable based upon the observations and interactions of Independent Variables (Field, 2013). The dependant variable is component 6 from the research instrument – "I am happy to accept free outside help for my company". The Independent Variables are seen as negative variables or barriers to this dependant variable being *positive.* The list of Independent Variables as derived from the factor analysis carried out in Document 4 and the mean score of the variable (showing its importance as a barrier) are shown in Table 13. Using this Dependent Variable and regression analysis will allow the researcher to predict the impact of the various Independent Variables upon the SME OM. This information will allow messages to be constructed by SPs that will have greater resonance with the SME OM and elicit the appropriate positive response of accepting free environmental advice.

Table 13 – Names and labels given to the Independent Variables.

SPSS factor derived from factor analysis	Mean score of Factor	InDependent Variable name for regression analysis	Short name used for SPSS
Lack of resources	3.79	Lack of resources is a key barrier to accepting free environmental advice	IV 1 - Lack of Resources
Not accepting any advice is a key barrier	3.54	Not accepting any advice is a key barrier to accepting free environmental advice	IV 2 - Not accepting any advice
The attitude of the OM is a key barrier	3.36	The attitude of the OM is a key barrier to accepting free environmental advice	IV 3 - OM Attitude
Lack of knowledge of the relevant legislation	3.34	Lack of knowledge of the relevant legislation is a key barrier to accepting free environmental advice	IV 4 - Lack of legislation knowledge
The costs of achieving ISO14001	3.34	The costs of achieving ISO14001 is a key barrier to accepting free environmental advice	IV 5 - Costs of ISO14001
Lack of/low awareness of Environment	3.09	Lack of/low awareness of Environment is a key barrier to accepting free environmental advice	IV 6 - Lack of environmental awareness

6.8 Nature of the data

The data were collected via an online questionnaire. The survey was promoted via an East Midlands-based SP to 4,125 SMEs which had not received any environmental training. A

total of 206 usable responses were received. The requirements of good quantitative research – reliability, replicability and validity (Bryman and Bell, 2011) – were all satisfied. *Reliability* was measured by using Cronbach's Alpha test and had a value of 0.868 (1 being the maximum value and greater than 0.5 being acceptable). The *Replicability* of the research instrument was considered sound as it existed as an entity on a website and therefore – provided that the research is repeated within a reasonable amount of time – should yield the same results. *Measurement Validity* could have been an issue as it is never definitively certain that the concepts used in a question will be interpreted the same way by the respondents. However, it was felt that piloting the research instrument and using more than one question to test each measure minimised the opportunity for poor measurement validity. *Internal Validity* refers to "the extent to which findings can be attributed to interventions rather than any flaws in the research design" (Saunders et al., 2012:593). As the research instrument was based upon an extensive literature review and improved through the piloting process, it was thus considered to have internal validity. *External Validity* is an indication of how generalisable the findings of the research are (Bryman and Bell, 2011) and needs a sample that is representative of the population. As was noted in 4.2 the sample was representative of the population on an *industry sector* basis and so the external validity was satisfactory.

6.9 Research question and hypotheses

The previous research has looked at the Drivers and Barriers to SMEs undertaking free environmental advice. This research validated the original list of Drivers and Barriers and was able to rank them in order of importance. The sole research question for this thesis is:

> Can any of the theorised barriers predict the negative uptake of free environmental training better than others?

The intention behind this question is to see if all factors (barriers) have the same weighting in influencing the SME OM. Document 4 showed a ranking of the barriers in terms of their 'scores' (Table 6) but by using regression analysis it will be possible to evaluate if any of the barriers are 'more important' than others and thus need to be emphasised by the SP to combat them. Using the six factors identified in the factor analysis as 'Independent Variables' ('*Predictors*') the intention is to see their impact upon the 'Dependent Variable' which is '*I am happy to accept outside free help for my company*'.

As there are six factors there will be six hypotheses:

H_1 – the lack of resources (e.g. time and money) is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

H_2 – the unwillingness of the SME OM to take external advice is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

H_3 – the attitude of the SME OM is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

H_4 – the lack of knowledge of the relevant environmental legislation is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

H_5 – the costs of achieving ISO14001 is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

H_6 – the low or lack of awareness of environmental issues is a predictor on the SME OM's intention to accept free environmental training and help for his firm.

The null hypothesis for all of these will be (for example for H_1):

H_0 – the lack of the resources (e.g. time and money) is not a predictor on the SME OM's intention to accept free environmental training and help for his firm.

If the intention of this DBA is to provide SPs with a 'toolkit' to overcome the barriers, then the output of the regression analysis may be able to be used to predict the SME OM's response to a given message through specific 'coding' of a message to resonate with the SME OM and thus achieve greater impact and response.

6.10 Data manipulation procedure

There are two important guidelines to bear in mind when running multiple regression analysis. The first is that when selecting a Dependent Variable to predict an outcome, the *Independent Variable*s should share something in common with the *Dependent Variable* (Salkind, 2011). The literature review (chapters 2 and 5) put forward various barriers to accepting free environmental advice by SME OMs and these were refined through factor analysis into six factors. Therefore it is accepted that the six Independent Variables (which are based on the factors) *are* related to the Dependent Variable. The second guideline is that when selecting more than one Independent Variable, as in this case, they should be independent or uncorrelated with one another but both related to the Dependent Variable (Salkind, 2011). Appendix 8 shows that five components (out of 28) loaded onto more than one factor during factor analysis, thus showing some degree of correlation between

the two resultant factors – 'some degree' is acceptable (Field, 2013), but perfect collinearity is not. Perfect collinearity means that if two or more Independent Variables are perfectly correlated it is impossible to obtain unique estimates of the regression coefficients: SPSS provides a diagnostic which measures this effect.

When the factor analysis was run for the data in Document 4 SPSS was able to save the six resultant factors. According to Field (2013) consideration should be given to the selection of the Independent Variables for regression analysis as the variables included and the way in which they are entered have a great impact. He suggests few Independent Variables – otherwise the output will be very confusing – and the Independent Variables should be "based on a sound theoretical rationale or well-conducted past research that has demonstrated [their] importance" (Field, 2013:321). This research satisfies both criteria: only six Independent Variables have been chosen and they are based on the sound theoretical basis of the previous research. The order in which they will be entered should be the order of their (estimated) importance of impact on the Dependent Variable. This importance has been based upon the scores shown in Table 6 on page 24. For the purposes of the regression analysis these Independent Variables were renamed (Table 13) and given a short name in order to improve the clarity of the output. IV 1 to IV 6 were entered in that order, reflecting their relative importance.

The intention of the regression analysis is to develop prediction of the behaviour of the SME OM through an equation:

$$Y_i = (b_0 + b_1X_{1i} + b_2X_{2i}...b_nX_{ni}) + \dot{\varepsilon}_1$$

where Y_i is the dependant variable – in this case the propensity of the SME OM to accept free environmental advice;

b_0 is the 'constant' showing where the line of best fit intersects with the vertical axis of the regression graph;

b_1X_{1i} is the magnitude of the impact (b_1) that the Independent Variable (X_{2i}) has on the Dependent Variable;

$\dot{\varepsilon}_1$ is the error factor that attempts to explain any exogeneity of the model.

Y_i in this case is the willingness of an SME OM to accept free environmental advice; b_0 is a constant that is always 'present' and contributes to the SME OM's willingness. For the purposes of this explanation b_1 is the name of the largest Independent Variable that contributes to the equation (for example IV 3 - OM Attitude) and X_{1i} is the amount which the Independent Variable contributes to the change in the Dependent Variable – this can be positive or negative.

A regression analysis at the 'meta'-level of all cases will be carried out (R_0) this will ascertain the correlation coefficients of the six Independent Variables and their relative importance. Given the nature of the overall DBA Project which is to give SPs an insight into the barriers to SME OMs accepting free environmental advice, it is felt that 6 variables for them to manipulate will be too many and so based on the regression analysis and the statistical significance of the results, this may be lessened to three or four variables. The discarded variables will no doubt have some influence on the Dependent Variable, any influence lost will be added to the error amount.

If the 'meta-level' analysis proves robust, significant and illuminating, then some 'lower level' analyses will be undertaken looking at the size of company, industry sector and geographic location. Some of these units of analysis have very low numbers (eg there were three respondents in the '50-99' size group, three respondents in the 'Education' sector and eight from Rutland). Field (2013) suggests that it is the number of Independent Variables that is important: if the Independent Variables are hypothesised to have a medium effect on the outcome variable and – as in this case – there are six of them, Field (2013) suggest a minimum total sample size of at least 96: this study has 206. Care needs to be taken that the regression analyses using the smaller sample sizes are tested for their statistical significance before any claims are made. The sample sizes for the analyses of the smaller samples are shown below in Table 14, together with the SPSS shortnames allocated to them. Consideration was given to running some other regression analyses at an even lower level using mixtures of the company size, industry sector and county, (eg, 0-9, services, Derbyshire) but it was decided against as the sample size may be too small to be of statistical use, too complex (and misleading) to interpret and too precise to be of practical use to an SP.

Table 14 – Breakdown of cases by size, industry sector and geography for regression analysis

	Category	Number of cases in category	Regression Analysis Code	SPSS shortcodes
All cases	Total	206	RA_0	All
Industry Sector	Manufacturing	53	RA_1	AFF, MAN, CON
	Services	146	RA_2	TRADE, TRANS, ACCFOOD, IT, FININS, ESTATE, CONSULT, ADMSUPP, EDU, HSW, ARTSENT, OTHER.
Company size	1-9	126	RA_3	MICRO

6.11 Regression analysis in SPSS

Most statistical textbooks discuss regression analysis in great detail (eg Salkind, 2011, Argyrous 2011, or Field 2013) and it is not the intention to replicate their work, nor discuss the theoretical basis of regression analysis. The following, though, describes the way in which SPSS uses statistical theory to analyse and present a regression analysis, which may be of use.

SPSS was used to compute various statistics as below:

Regression Coefficients – these are the parameters B_1 and B_0. These refer to the slope (or gradient) of the line of best fit and the point at which the line crosses the vertical axis (known as the intercept of the line). The intention of the regression analysis will be to develop an "equation" which can predict the effect on the SME OM's attitude to accepting free environmental advice by manipulating one or more of the six Independent Variables

Residuals – these are the differences (or 'errors') between what the model predicts and the observed data. These are extremely important as, amongst other things, they are used to estimate the error in a regression model. The residuals are squared then added together to form the sum of squared residuals SS_R which is an indication of how well the regression line fits the data. If SS_R is large, the line is not representative of the data; if SS_R is small, then it is.

Goodness of Fit – just because the line fits the data, it may well be just the 'best' one available and actually be a poor fit. To test for this, the model sum of the squares is used SS_M. This uses a combination of SS_R and the total sum of squares (SS_T) leading to a measure of improvement of the model. If SS_M is large, then this means that the regression model is very different to the method of using SS_R to predict the variable outcome, implying that the regression model has made a big difference to how the outcome variable can be predicted. This improvement can be quantified by dividing SS_M by SS_R to give quantity called R^2. This is then multiplied by 100 to give the amount of variance in the outcome explained by using the regression model. R^2 can further be used to test the null hypothesis that R^2 is zero (meaning there is no improvement in the sum of squared error due to fitting the model) by developing the F-test.

Outliers – 'outliers' can cause problems with the regression coefficients. An outlier is a "case that differs substantially from the main trend of the data" (Field, 2013:304) and can lead to bias within the regression line by influencing it unduly. SPSS checks for outliers by converting them to standard deviation units. By doing this, it is possible to estimate their deviance from the norm. As it is known that 99.9% of all cases should lie between -2.58 and +2.58 standard deviations, SPSS can be told to highlight any cases to the

researcher. According to Field (2013), if more than 5% of cases have standardised residuals with an absolute value of greater than 1.96 then there is evidence that the model is a poor representation of the actual data.

As well as testing for outliers it is also possible to look at whether certain cases exert undue influence over the model. This can be measured by 'Cook's distance' which is a measure of the overall influence of a case on the model and it is suggested that a value greater than 1 may be a cause for concern. Again SPSS provides a test for this. A final test for the undue influence of a case is provided by the 'covariance ratio' which is a measure of whether case influences the variance of the regression parameters.

Generalising the model – when a regression analysis is completed an equation can be produced that is correct for the sample of the observed values. However it is usual to want to generalise findings outside the sample. This can be tested by cross validating the model. SPSS does this by computing an adjusted R^2. As noted earlier R^2 shows how much of the variance in Y is accounted for by the regression model from our sample. The adjusted R^2 shows how much of the variance in Y is accounted for by the regression model from the population from which the sample was taken.

A final point to note is that although the total number of responses to the survey was 206, Table 15 and Table 16 show $n=99$. This is because many of the questionnaires were not fully completed leaving 'missing values'. Whilst no statistical package has a fool-proof way of dealing with them, SPSS has three: the first is to deal with them 'listwise': this means that *all* the data from any respondent that failed to answer one or more questions is removed. The second method is to exclude data on a 'pairwise' basis, which means that for any respondent that failed to answer one or more questions the data *from that question only* are removed. The final method is to replace the missing value with the mean of their scores. The last method allows for a larger sample to be used within the analyses, but it does "lower the standard deviation of variables and so can lead to significant results that would otherwise be insignificant" (Field, 2013:691). For this research missing data were treated as 'listwise'. This reduced n to 99, but means that the results would be more meaningful than the other two methods. It does mean though that extra needs to be taken to ensure that any results are statistically significant and a limit of $p < 0.005$ (there is a 0.5% probability that the outcome has been achieved by chance) has been set.

Using the above data and statistical theory the regression analysis was run and the following chapter discusses interpretation of the results.

7 – Data Analysis

7.1 Introduction

The previous chapter detailed the rationale for the research strategy for this thesis and laid out the various regression analyses. This chapter will analyse the data following the regression analysis using SPSS. Field (2013:321) has some very salutary words regarding SPSS however:

> "It is important to remember that SPSS may appear to be very clever, but it is not. SPSS will happily generate output based on any old garbage you decide to feed into it, it will not judge you or give you any indication of whether the model is valid or generalizable. SPSS will provide the information necessary to assess these things, but we need to rely on our brains to evaluate the model."

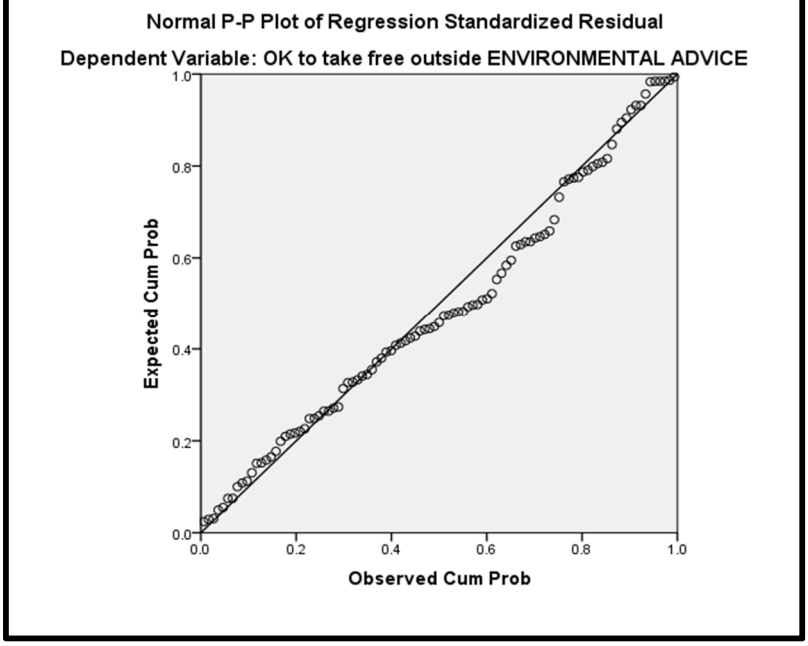
So, it is important to analyse not only the data but also what SPSS shows. A complete set of the SPSS output is provided in Appendix 10 and may be referred to throughout this chapter. Some individual elements of the analysis are repeated in this chapter for clarity. Each of the regression analyses will be dealt with in order and at the risk of tedium, but with the aim of consistency and ease of comparison, all will follow the same format, however some of the explanatory information regarding the analysis will not be repeated.

7.2 RA_0 – all organisations in the sample – descriptive statistics

Visual test for normal distribution

SPSS produces various visual representations of the data to allow comparison of the observed data versus predicted data. The P-P plot (Figure 3) shows that the observed cumulative frequencies' distribution shows little overall deviation from what was predicted.

Figure 3 – P-P Plot showing Cumulative frequencies (Total Sample)



Correlations – initial analysis

The first tables to look at are the Table 15 and Table 16. The former shows the Pearson's Correlation value *r* and the latter shows the one-tailed significance of *r*. Looking at Table 15, there are several interesting items of note.

Firstly, there are no intra-Independent Variable correlations: other than the first column and the first row all correlations are zero. (It is to be expected that all the figures in the diagonal are 1 as these values represent the correlation of each variable with itself so the resulting values are 1). The significance of zero in all the other cells shows that the assumption that the predictors interact with each other – as indicated by the initial factor analysis and discussed in 4.6 – is unproven.

Secondly, the fact that all the coefficients are negative bears out the assumption that the IVs are all *negative* and have a negative effect on the Dependent Variable.

Thirdly, low *r* value for *IV 1 - Lack of resources*. The theoretical ranking of the Independent Variables suggested IV 1 would have the most influence. However not only does it have a low *r* of -.120, but a very high significance of $p = .119$ and so should be discounted.

Fourthly, *IV 2 - Not accepting advice* has the largest influence: there is a significant negative correlation with the Dependent Variable ($r = -.763$, $p < .001$, $n = 99$). This indicates that this IV is the best predictor of SME OM behaviour.

In general, the other Independent Variable *IV 3 - the SME OM attitude* has a moderate effect ($r = .396$, $p < .001$, $n = 99$) and is worth including. The next two Independent Variables *IV 6 - Lack of environmental awareness* and *IV 5 - Costs of ISO14001* all have fairly small values of *r* and are only significant at the $p < .05$ level and so should be treated with caution. *IV 4 - the lack of legislation knowledge* has a very small correlation and very high *p* ($p = .435$) so can be judged as not having any significant impact upon the Dependent Variable.

In order to confirm this, the regression analysis was run again using 'stepwise' method. Although Field (2013) notes that the 'Enter' method should be used as a starting point, this forces the researcher to 'guesstimate' the order of importance of each Independent Variable and input the Independent Variable accordingly. This may not always be *statistically* the most sound method and so using the 'stepwise' the researcher allows SPSS to decide the most influential Independent Variables.

Correlations – second analysis

Rerunning the regression analysis using stepwise does not alter the Pearson's *r* nor the one-tailed significance, but does represent the data in order of influence (Tables 17 and 18).

Table 15 – Correlations: Pearson's *r*: all companies – original 'entry' method

n=99		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	-.120	-.763	-.396	-.017	-.176	-.170
	IV 1 - Lack of resources	-.120	1.000	.000	.000	.000	.000	.000
	IV 2 - Not accepting advice	-.763	.000	1.000	.000	.000	.000	.000
	IV 3 - OM Attitude	-.396	.000	.000	1.000	.000	.000	.000
	IV 4 - Lack of legislation knowledge	-.017	.000	.000	.000	1.000	.000	.000
	IV 5 - Costs of ISO14001	-.176	.000	.000	.000	.000	1.000	.000
	IV 6 - Lack of environmental awareness	-.170	.000	.000	.000	.000	.000	1.000

Table 16 – Correlations: 1-tailed Significance Test: all companies – original 'entry' method

n=99		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK to take free outside environmental advice	.	.119	.000	.000	.047	.041	.435
	IV 1 - Lack of resources	.119	.	.500	.500	.500	.500	.500
	IV 2 - Not accepting advice	.000	.500	.	.500	.500	.500	.500
	IV 3 - OM Attitude	.000	.500	.500	.	.500	.500	.500
	IV 4 - Lack of legislation knowledge	.047	.500	.500	.500	.	.500	.500
	IV 5 - Costs of ISO14001	.041	.500	.500	.500	.500	.	.500
	IV 6 - Lack of environmental awareness	.435	.500	.500	.500	.500	.500	.

Table 17 – Correlations: Pearson's *r*: all companies – 'stepwise' method

n = 99		OK to take free outside environmental advice	IV 1 - Lack of resources	IV 2 - Not accepting advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	-.120	-.763	-.396	-.017	-.176	-.170
	IV 1 - Lack of resources	-.120	1.000	.000	.000	.000	.000	.000
	IV 2 - Not accepting advice	-.763	.000	1.000	.000	.000	.000	.000
	IV 3 - OM Attitude	-.396	.000	.000	1.000	.000	.000	.000
	IV 4 - Lack of legislation knowledge	-.017	.000	.000	.000	1.000	.000	.000
	IV 5 - Costs of ISO14001	-.176	.000	.000	.000	.000	1.000	.000
	IV 6 - Lack of environmental awareness	-.170	.000	.000	.000	.000	.000	1.000

Table 18 – Correlations: 1-tailed Significance Test: all companies – 'stepwise' method

n=99		OK to take free outside environmental advice	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 1 - Lack of Resources	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK to take free outside environmental advice	.	.000	.000	.047	.119	.041	.435
	IV 1 - Lack of resources	.000	.	.500	.500	.500	.500	.500
	IV 2 - Not accepting advice	.000	.500	.	.500	.500	.500	.500
	IV 3 - OM Attitude	.047	.500	.500	.	.500	.500	.500
	IV 4 - Lack of legislation knowledge	.119	.500	.500	.500	.	.500	.500
	IV 5 - Costs of ISO14001	.041	.500	.500	.500	.500	.	.500
	IV 6 - Lack of environmental awareness	.435	.500	.500	.500	.500	.500	.

Model summaries

This is an important analytical tool as it shows whether the model put into SPSS is successful in predicting the SME OM behaviour. The model summary shows the effect of each Independent Variable on a cumulative basis. The Model Summary in Table 19 uses the 'step-wise' version as it presents the hierarchy of Independent Variables and discards IV 6 - Lack of environmental awareness. It demonstrates that 90% of the variation can be explained by the 5 Independent Variables chosen.

Model 2 shows that IV 3 - OM Attitude contributes 15.6% of the variation (adjusted R^2 = .773). Between them these two Independent Variables account for 73.8% of the variability in the Dependent Variable. The other three predictors added in to Models 3, 4 and 5 contribute very little. IV 5 - Costs of ISO14001 (3.1%), *IV 4 - Lack of legislation knowledge* (2.9%) and *IV 1 - Lack of Resources* (1.4%) could be considered for exclusion, particularly the last one as its *p* value is so high. This will be discussed later.

The *adjusted* R^2 column indicates how well the model generalises and this number should be ideally very close to the R^2 figure (Field, 2013). In all five models the difference is never more than .010, indicating that if the model were derived from the SME population rather than the research sample then it would account for 1% less variance in the outcome. This is an almost insignificant figure and so the adjusted R^2 figure indicates that the findings of the regression analysis can be generalised to the SME population. It is worth noting that in model 5 the *adjusted* R^2 - R^2 figure is ten times the level of any other model. Again, this give a reason for excluding this Independent Variable as including it may jeopardise its generalisabilty.

The next statistic identifies the change in F (the *F*-ratio) which is

> "a measure of how much the model has improved the prediction of the outcome compared to the level of inaccuracy of the model… A good model should have a large *F*-ratio" (Field, 2013:302-3).

For models 1 and 2 the F change figure is very large and significant.

For model 1 the *F*-ratio = 134.821, $p < .005$.

For model 2 the *F*-ratio = 57.549, $p < .005$.

For models 3 and 4 the F change figure is modest and significant.

For model 3 the *F*-ratio = 12.726, $p < .005$.

For model 4 the *F*-ratio = 13.402, $p < .005$.

For model 5 the F change figure is small and significant

For model 5 the *F*-ratio = 7.098, $p < .01$.

Table 19 - Model Summary: all companies – 'stepwise entry' method

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
1	-.763[a]	.582	.577	.918	.582	134.821	1	97	.000	
2	-.859[b]	.738	.733	.730	.157	57.549	1	96	.000	
3	-.877[c]	.769	.762	.689	.031	12.726	1	95	.001	
4	-.893[d]	.798	.789	.648	.029	13.402	1	94	.000	
5	-.901[e]	.812	.802	.628	.014	7.098	1	93	.009	2.075

a. Predictors: (Constant), IV 2 - Not accepting any advice

b. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude

c. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude, IV 6 - Lack of environmental awareness

d. Predictors: (Constant), IV 2 - Not accepting any advice, T IV 3 - OM Attitude, IV 6 - Lack of environmental awareness, IV 5 - Costs of ISO14001,

e. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude, IV 6 - Lack of environmental awareness IV 5 - Costs of ISO14001, IV 6 - Lack of environmental awareness, IV 1 - Lack of Resources

f. Dependent Variable: Willingness to take free outside environmental advice

Given such large *F*-ratio figures it is clear that using models 1 and 2 has delivered a large improvement to the accuracy of the model and by using models 3 and delivers an improvement, but far more modest.

The final column of the model summary shows the Durbin-Watson statistic which confirms whether the assumption that the 'residuals' have no correlation to each other is supportable. Field (2013) notes that the residuals should be independent and that the Durbin-Watson test checks for correlations between errors. The test value can vary between 0 and 4 with a value of 2 suggesting that the residuals are uncorrelated. The Durbin-Watson score for this regression analysis = 2.075 indicating a very low level of correlation and thus supports the assumption of independent residuals.

Using the model summary it can be claimed that particularly IV 2 – not accepting advice and IV 3 - OM Attitude are both very good predictors for the outcome variable and adding in variables IV 5 - Costs of ISO14001 and IV 4 - Lack of legislation knowledge increases the predictive ability but at the risk of complexity and confusion. Adding in IV 1 - Lack of Resources has a negligible effect: considering that this was the most important factor from the Factor Analysis, this is an interesting result and will be discussed more in the next chapter.

ANOVA test

The ANOVA (Table 20) tests whether or not the regression model is significantly better at predicting the Dependent Variable than would have been the case had only the means SS_M been used as a 'best guess'. This is found by using the F ratio which represents the ratio of the improvement in prediction that results from fitting the model, *relative to the inaccuracy that still exists* (Argyris, 2011 – author's emphasis). If the improvement due to fitting the regression model is much greater than the inaccuracy within the model, then the value of *F* will be greater than 1. For all models there is a large *F* number and $p < .001$.

Thus it can be claimed that the five models significantly improved the ability to predict the outcome variable compared to just using means.

Addressing endogeneity

Endogeneity occurs when an unknown, or missing, IV affects the Dependent Variable. For example even though the literature review has attempted to assess all the possible factors that can affect the Dependent Variable of whether or not an SME OM is willing to take up the offer of free environmental advice there is always the potential that a factor has not been taken into account. There is surprisingly little in the research literature regarding how to test for endogeneity: neither Argyrous (2011), Salkind (2011) nor Field (2013) address the issue, except to say that endogeneity is represented by the error factor ($\dot{\varepsilon}_1$)

in the regression analysis equation, so it appears to be more of a *theoretical* issue. The researcher is happy that the literature reviews of 2006 and 2013 have theoretically addressed all the factors that can affect the Dependent Variable and the regression analysis has delivered a fairly low statistical value for it. This issue is discussed further in 6.10.

Table 20 – ANOVA: all companies

Model		Sum of Squares SS_M	df	Mean Square	F	Sig.
1	Regression	113.648	1	113.648	134.821	.000[b]
	Residual SS_R	81.766	97	.843		
	Total	195.414	98			
2	Regression	144.293	2	72.147	135.484	.000[c]
	Residual SS_R	51.121	96	.533		
	Total	195.414	98			
3	Regression	150.332	3	50.111	105.597	.000[d]
	Residual SS_R	45.082	95	.475		
	Total	195.414	98			
4	Regression	155.957	4	38.989	92.887	.000[e]
	Residual SS_R	39.457	94	.420		
	Total	195.414	98			
5	Regression	158.755	5	31.751	80.549	.000[f]
	Residual SS_R	36.659	93	.394		
	Total	195.414	98			

Bias: casewise diagnostics

The final stage in the analysis procedure is to check for the residuals for evidence of bias. Residuals are differences between the values that the model predicts and the values that are observed in the data: basically it is an error (Field 2013). As residuals manifest themselves often as 'outliers', it is important to find out if the results have been unduly biased by them. When setting the criteria for running the regression analysis in SPSS it was decided to show any 'cases' (i.e. respondents to the questionnaire) which had a

standardised residual outside +/- 2 standard deviations. It is reasonable to expect about 5% of cases to have standardised residuals outside this parameter. Looking at Table 21, there are only six cases whose standard residuals lie outside +/-2 standard deviations: this equates to 3% of cases and so is well within expectations. Additionally only 1% of cases should fall outside +/-2.5 standard deviations and as only one case meet this criterion it is within expectations. Therefore there is no evidence of bias in the results due to 'outliers'.

Table 21 – Casewise Diagnostics

Case Number	Std. Residual	OK to take free outside environmental advice	Predicted Value	Residual
27	2.474	5	3.44	1.560
70	2.566	4	2.38	1.618
128	-2.275	2	3.43	-1.435
166	2.422	4	2.47	1.528
176	2.395	5	3.49	1.511
204	2.121	5	3.66	1.338

Summary of the diagnostic tests

The evidence thus far has established whether or not the model has improved our ability to use the Independent Variables to predict the outcome variable. It has been seen that all five IVs correlate to the Dependent Variable and there is no multicollinearity. One of the IVs has a very low *r* and is not significant and is excluded.

The model summary show that Models 2 and 3 account for 73.8% of the variability of the model. The other three contribute 7.5% in total

A high *adjusted* R^2 score means that the findings are generalisable outside the sample and can be applied to the general population.

The very large and significant *F-ratio* for Models 1 and 2 indicates that the model has improved the prediction of the outcome compared to the level of inaccuracy of the Model and ANOVA has improved the prediction of the outcome compared to using means to calculate it.

Finally six outliers were identified and assessed as having no undue influence on the model.

It appears then that the regression analysis is statistically sound and can be used for the next, more interpretive stages of the analysis.

For the purposes of this Project, a decision has to be made regarding the number of IVs to explore. From the initial six, the regression analysis indicates that *IV 6 - Lack of legislation knowledge* may be discarded as it has both a low *r* value and is not significant (r = .017, p = .435, n = 99). A second exclusion on the basis of the model summary is *IV 1 - Lack of Resources* as its addition to R^2 in Model 5 is minimal compared to the other, higher ranked Models. The decision has to be made whether or not to keep the two 'middle ranking' IVs*: IV 5 - Costs of ISO14001* and *IV 6 - Lack of environmental awareness.* Whilst retaining them improves the R^2 by 7.4%, this may at the cost of complexity when discussing the practical consequences of using four IVs. For the meantime all four IVs will be retained.

Model Parameters

As noted in 6.10, the aim of regression analysis is to provide an 'equation' that predicts in a linear way a Dependent Variable based on changes in its IVs in the form of:

$$Y_i = (b_0 + b_1X_{1i} + b_2X_{2i}...b_nX_{ni}) + \acute{\varepsilon}_i.$$

This can be derived from the Coefficients table on SPSS. Within the equation and for the purposes of this Project, *n* relates to the number of IVs and based on the above, can be rewritten as below. $\acute{\varepsilon}_1$ is the error value and is calculated by taking the *adjusted R^2 value* for the relevant model and subtracting it from 1.

Taking free outside environmental advice =

(b_0) [a constant]

+ (b_1. IV 2 - Not accepting any advice)

+ (b_2. IV 3 - OM Attitude)

+ (b_3. IV 5 - Costs of ISO14001)

+ (b_4. IV 6 - Lack of environmental awareness)

+ $\acute{\varepsilon}_1$

Where values of *b* are derived from SPSS. If a *b* value is positive then a positive relationship between the IV and the Dependent Variable exists, if it is negative the reverse is true. The premise for the equation is that there is a certain level of *Willingness to accept free environmental advice*: this is the constant b_0 and this level is dragged down by the four IVs (all of which are negative). The task is to estimate which IVs have the largest

influence. It also allows one to predict what effect each IV has on the Dependent Variable if all the other IVs remain constant (Field, 2013). The *b* value in Table 22 show this value. $\dot{\varepsilon}_1$ can be estimated as 1-.802 = .198. Field (2013) suggests that any value lower than .200 is acceptable, and so not only does this value satisfy – just – that criterion, but it also attempts to show that there is little endogeneity in the model. Using them in the equation the following equation is generated:

Willingness to accept free environmental advice =

3.616

- (1.077 x IV 2 - Not accepting any advice)

- (0.559 x IV 3 - OM Attitude)

- (0.348 x IV 5 - Costs of ISO14001)

- (0.340 x IV 4 - Lack of environmental awareness)

+ .198

Thus for every unit – effectively a one point score on the scale used on the Research Instrument – that an SME OM gives below the mean score of 3, the overall score of 3.616 declines by 1.077 (provided that the SME OM rates all the other IV at a mean score). Thus if the SME OM gives a score of 2 to each of the Research Instrument items consistently, then the overall score drops from the mean score of 3.616 to 1.492 (3.616-0.559-0.348-0.340). The converse is true: if the SME OM gives a score of 4 to each of the research Instrument Statements consistently, then the overall score increases from the mean score of 3.616 to 4.663 (3.616+0.559+0.348+0.340).

Each of the *beta* values has an associated standard error, which a *t-test* analyses – in Model 4 all the *t* values are significant at the 0.005 level. The smaller the *sig* value and the larger the *t* value, the greater the contribution of the IV. By looking at Model 4 it can be seen that the direction of the magnitude of *t* is as expected and the values of IV2 and 3 are greater than IVs 5 and 4.

Another test of the model is the confidence intervals. The boundaries of the *B* are estimated in such a way that in 95% of samples, these boundaries contain the population value of *b* (Field, 2013). It is important that all the boundaries share the same sign and "do not cross zero" (Field, 2013:341). All the IVs have a spread of 0.25 – a small number, indicating that the estimates of the current model are likely to be representative of the true population values and none crosses 0.

Multicollinearity

The coefficients table (Table 22) also shows a measure of multicollinearity. The *Variable Inflation Factor* (VIF in the table). Field suggests that if the VIF exceeds 10, then there may well be some collinearity amongst the IVs. All the measures are 1.000 and so there is no problem with collinearity within the models.

Table 22 – Coefficients: all companies

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.616	.092		39.189	.000	3.433	3.799		
	IV 2 - Not accepting any advice	-1.077	.093	-.763	11.611	.000	-.893	-1.261	1.000	1.000
2	(Constant)	3.616	.073		49.306	.000	3.471	3.762		
	IV 2 - Not accepting any advice	-1.077	.093	-.763	11.611	.000	-.893	-1.261	1.000	1.000
	IV 3 - OM Attitude	-.559	.074	-.396	7.586	.000	-.706	-.413	1.000	1.000
3	(Constant)	3.616	.069		52.231	.000	3.479	3.754		
	IV 2 - Not accepting any advice	-1.077	.093	-.763	11.611	.000	-.893	-1.261	1.000	1.000
	IV 3 - OM Attitude	-.559	.070	-.396	8.036	.000	-.697	-.421	1.000	1.000
	IV 5 - Costs of ISO14001	-.348	.070	-.176	3.567	.001	-.110	-.386	1.000	1.000
4	(Constant)	3.616	.065		55.535	.000	3.487	3.745		
	IV 2 - Not accepting any advice	-1.077	.093	-.763	11.611	.000	-.893	-1.261	1.000	1.000
	IV 3 - OM Attitude	-.559	.065	-.396	8.544	.000	-.689	-.429	1.000	1.000
	IV 5 - Costs of ISO14001	-.248	.070	-.176	3.567	.001	-.110	-.386	1.000	1.000
	IV 4 - Lack of environmental awareness	-.340	.065	-.170	3.661	.000	-.370	-.110	1.000	1.000

7.3 Further Regression Analyses

As noted earlier, it would be of interest to look at further analyses of the data at a lower level (see Table 14). The following section looks at these. The level of detail for each is not as extensive as for R_0: the key elements and any impacts upon the Project will be discussed.

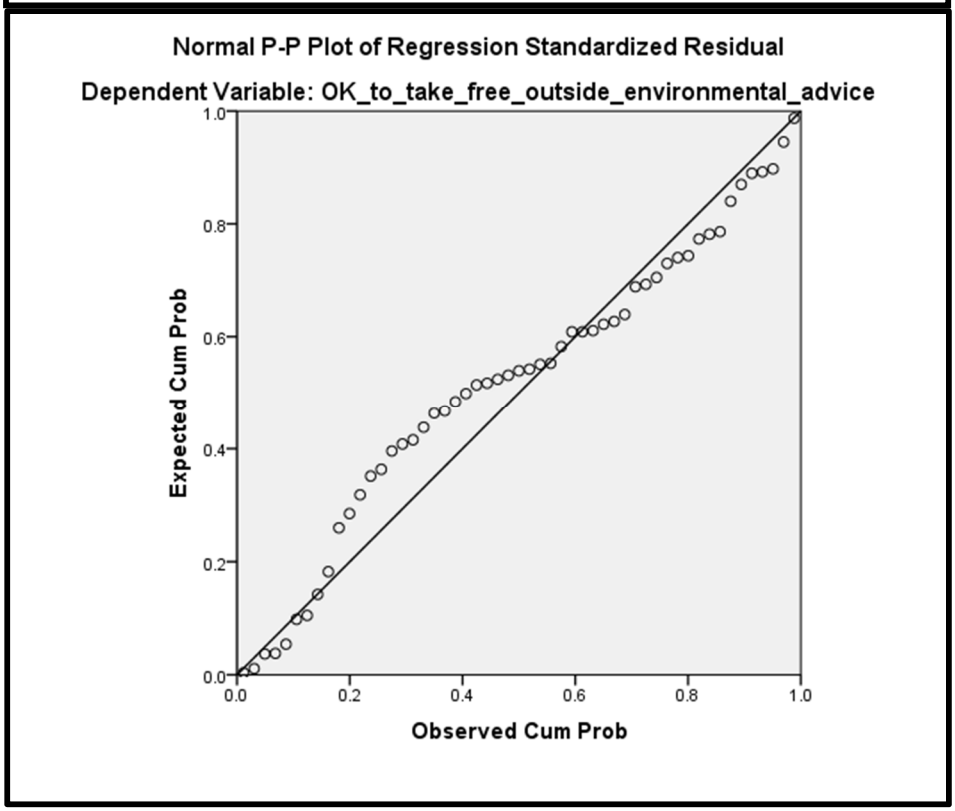
R_1 Regression Analysis on Manufacturing Organisations

The first regression analysis will look at the split between manufacturing companies and service companies. The results of the regression analysis are shown below.

Visual test for normal distribution

The first analysis to be viewed is the P-P plot which compares the observed data versus predicted data (Figure **4**). This shows a similar result to the P-P plot of the total sample but with slightly more deviation towards the lower end. This is indicative of a positive skew to the data and this will be tested statistically later.

Figure 4 – P-P Plot showing Cumulative frequencies (manufacturing organisations)



Correlations – R_1 - manufacturing companies

The first thing to note in Table 23 is that n = 42. There are 53 companies in the sample that identify themselves as manufacturing. Due to the way in which the non-responses

have been handled this reduces the effective sample sized 42. It could be considered that this is too low a sample size to be of use and so close scrutiny of the one-tailed significance (Table 24) is needed: *p* had originally been set at the .001 level however for the purposes of this analysis it may well have to be lifted to .005 or .010.

Looking at the correlation table the highest correlations are *IV 6 - Lack of environmental awareness* and *IV 2 - Not accepting advice*. Their values are *IV 6 - not accepting advice* (r = -.449, p < .001, n = 42) and *IV 2 - Not accepting advice* (r = -.216, p < .01, n = 42). The next thing to notice is that there is much more intra-Independent Variable correlations – this is likely to be a function of the small sample size. Fourteen of the relevant cells (i.e. those which are neither in the first row/column nor on the diagonal) greater than p = .01. Therefore there is a possibility that there can be some intra-dependence between the IVs. As such, there should be a high degree of scepticism about these correlations.

As noted, IV 2 and IV 6 have the highest r value. The next two are *IV 4 - Lack of legislation knowledge* and *IV 1 - Lack of resources*. Their values are (r = .176, p > .1, n = 42) and (r = -.107, p > .1, n = 42), so their influence is not statistically significant.

The final two IVs are *IV 5 - Costs of ISO14001* (r = -.088, p > .1, n = 42) and *IV 3 - OM Attitude* (r = .176, p > .1, n = 42). Due to the small correlation coefficient and the very high one-tailed significance value neither of these is considered appropriate to include in the analysis

Therefore IV 2 and IV 6 will be the two main IVs to focus on.

Model summaries

The results of the model summary are very disappointing (Table 25). Even if the non-significant IVs are included, the sum of all five IVs show an R^2 of only .300. Thus leaving 70% of the variation unaccounted for: clearly this is not a useful position to be in. Interestingly the *adjusted* R^2 shows little deviation away from R^2 (*adjusted* R^2-R^2 < -.121 for all models) so there is potential to allow these results to be generalised away from the sample to the total population, if some meaningful conclusions can be drawn. A final problem with the model summary is that the *F-change ratio* is far too small. The largest number is 5.832 which is far too small to allow the claim that this model has improved the predictability of the Dependent Variable compared to the level of inaccuracy in the model. It could be said even that using the SS_M would have been just as accurate.

Given the above statistics – particularly the disappointing R^2 value – there seems little point in pursuing analysis of the model generated by this regression analysis.

Table 23 – Correlations: Pearson's *r*: manufacturing companies

n=42		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	.107	-.216	.067	.176	-.088	-.332
	IV 1 - Lack of resources	.107	1.000	-.133	-.168	.091	.196	-.088
	IV 2 - Not accepting advice	-.216	-.133	1.000	.024	-.076	.046	.004
	IV 3 - OM Attitude	.067	-.168	.024	1.000	-.024	-.396	-.119
	IV 4 - Lack of legislation knowledge	.176	.091	-.076	-.024	1.000	-.107	-.107
	IV 5 - Costs of ISO14001	-.088	.196	.046	-.396	-.107	1.000	.067
	IV 6 - Lack of environmental awareness	-.332	-.088	.004	-.119	-.107	.067	1.000

Table 24 – Correlations: 1-tailed Significance Test: manufacturing companies

n=42		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK to take free outside environmental advice	.	.222	.006	.316	.104	.266	.000
	IV 1 - Lack of Resources	.222	.	.171	.114	.259	.080	.266
	IV 2 - Not accepting any advice	.006	.171	.	.432	.294	.373	.487
	IV 3 - OM Attitude	.316	.114	.432	.	.432	.002	.198
	IV 4 - Lack of legislation knowledge	.104	.259	.294	.432	.	.224	.223
	IV 5 - Costs of ISO14001	.266	.080	.373	.002	.224	.	.318
	IV 6 - Lack of environmental awareness	.000	.266	.487	.198	.223	.318	.

Table 25 – Model Summary: manufacturing companies

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
1	.332[a]	.110	.088	1.305	.110	4.949	1	40	.032	
2	.367[b]	.135	.090	1.303	.025	1.108	1	39	.299	
3	.500[c]	.250	.191	1.229	.115	5.832	1	38	.021	
4	.519[d]	.270	.191	1.229	.020	1.001	1	37	.324	
5	.528[e]	.279	.179	1.238	.010	.476	1	36	.495	
6	.547[f]	.300	.179	1.238	.020	1.021	1	35	.319	1.843

a. Predictors: (Constant), IV 6 – lack of environmental awareness

b. Predictors: (Constant), IV 6 – lack of environmental awareness IV 2 - Not accepting advice

c. Predictors: (Constant), IV 6 – lack of environmental awareness IV 2 - Not accepting advice, IV 1 – lack of resources

d Predictors: (Constant), IV 6 – Lack of environmental awareness IV 2 - Not accepting advice, IV 1 – lack of resources, IV 4 - Lack of legislation knowledge

e. Predictors: (Constant), IV 6 – Lack of environmental awareness IV 2 - Not accepting advice, IV 1 – lack of resources, IV 4 - Lack of legislation knowledge, IV 5 - Costs of ISO14001

f. Predictors: (Constant), IV 6 – Lack of environmental awareness IV 2 - Not accepting advice, IV 1 – lack of resources IV, IV 4 - Lack of legislation knowledge, IV 5 - Costs of ISO14001, IV 3 - OM attitude

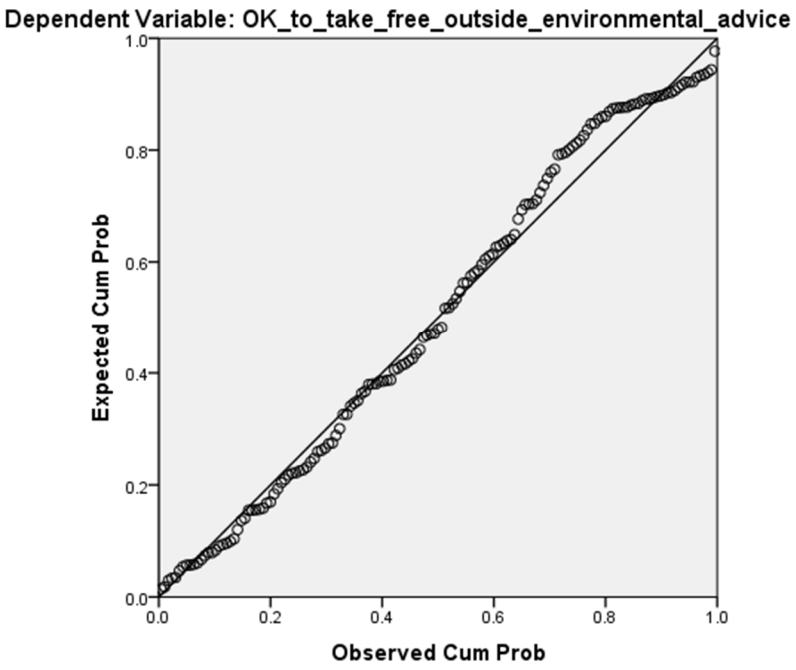
R_2 Regression Analysis on Services Companies

The second regression analysis will look at the split between manufacturing companies and service companies. It is a truism to claim that the former think that they have little or no environmental impact (Revell *et al.,* 2010), so it is theorised that if there is a difference between the two, there will be more of an emphasis towards IV 6 - Lack of environmental awareness as three of the four elements of the research instrument (statements 25-27) relate directly to this IV (see appendix 5).

Visual test for normal distribution

The first analysis to be viewed is the P-P plot which compares the observed data versus predicted data (Figure 5). This shows a similar result to the P-P plot of the total sample R_0 and R_1 but with slightly more deviation towards the higher end. This is indicative of a negative skew to the data and this will be tested statistically later.

Figure 5 – P-P Plot showing Cumulative frequencies (Service companies)



Correlations – service companies

The first thing to note in Table 26 is that *n* = 134. There were 146 companies who identify themselves as service companies in the sample but due to missing data this is reduced to 134. It is hoped that this larger sample size may lead to more statistically significant results, especially since service companies make up a much larger proportion of the SME population (see appendix 6). Even though their environmental impact per organisation

may not be as large as a manufacturing company, cumulatively they will have a large impact.

Looking at the correlation table the highest correlations are IV 2 - Not accepting *advice* and *IV 6 - Lack of environmental awareness*. This is a similar result to the manufacturing companies even though their order is reversed. Their values are *IV 2 - Not accepting advice* (r = -.674, p < .005, n = 134) and *IV 6 - not accepting advice* (r = -.264, p < .001, n = 134). The next thing to notice is that there is much more intra-Independent Variable correlations – this is likely to be a function of the small sample size: thirteen of the relevant cells are greater than p = .010. Therefore there is a possibility that there could be some intra-dependence between the IVs. As such, there should be a high degree of scepticism about these correlations.

As noted, IV 6 and IV 2 have the highest r value. The next nearest is *IV 4 - Lack of legislation knowledge* (r = .100, p > .1, n = 134) – not a significant result even considering its r value.

Finally three IVs have very similar values: *IV 1 - Lack of resources* (r = -.020, p > .1, n = 134), *IV 3 - OM Attitude* (r = .009, p > .1, n = 134) and *IV 5 - Costs of ISO14001* (r = -.021, p > .1, n = 134). Due to the small correlation coefficient and the very high one-tailed significance value none of these is considered appropriate to include in the analysis

Therefore IV 6 and IV 2 will be the two main IVs to focus on.

Model summaries

The results of this model are at first glance more encouraging than for those of the manufacturing companies. If the non-significant IVs are included, all six models show an R^2 of .542 and the *adjusted* R^2 shows little deviation away from R^2 (*adjusted* R^2-R^2 < .021 for all models) so there is potential to allow these results to be generalised away from the sample to the total population, if some meaningful conclusions can be drawn

However close analysis reveals some difficulties: the R^2 of .542 still leaves 55.5% of the variation unaccounted for; additionally four of the IVs have suspect significance. A final problem with the model summary is that the *F-ratio* is far too small. Even though the largest number (for Model 1) is 109.784, the next largest number is 13.156 which is far too small to allow the claim that this model has improved the predictability of the Dependent Variable compared to the level of inaccuracy in the model.

Given the above statistics there seems little point in pursuing analysis of the model generated by this regression analysis.

Table 26 – Correlations: Pearson's *r*: service companies

n = 134		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	-.020	-.674	.009	-.100	-.021	-.264
	IV 1 - Lack of resources	-.020	1.000	.049	.099	-.034	-.108	.031
	IV 2 - Not accepting advice	-.674	.049	1.000	.012	.029	-.021	.008
	IV 3 - OM Attitude	.009	.099	.012	1.000	.024	.206	.028
	IV 4 - Lack of legislation knowledge	-.100	-.034	.029	.024	1.000	.043	.049
	IV 5 - Costs of ISO14001	-.021	-.108	-.021	.206	.043	1.000	-.007
	IV 6 - Lack of environmental awareness	-.264	.031	.008	.028	.049	-.007	1.000

Table 27 – Correlations: 1-tailed Significance Test: service companies

n = 134		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK to take free outside environmental advice	.	.407	.004	.456	.114	.399	.001
	IV 1 - Lack of resources	.407	.	.278	.118	.341	.097	.353
	IV 2 - Not accepting advice	.004	.278	.	.445	.364	.401	.460
	IV 3 - OM Attitude	.456	.118	.445	.	.388	.004	.370
	IV 4 - Lack of legislation knowledge	.114	.341	.364	.388	.	.301	.278
	IV 5 - Costs of ISO14001	.399	.097	.401	.004	.301	.	.467
	IV 6 - Lack of environmental awareness	.001	.353	.460	.370	.278	.467	.

Table 28 - Model Summary: service companies

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
1	-.674[a]	.454	.450	1.044	.454	109.784	1	132	.000	
2	-.676[b]	.457	.448	1.045	.003	.620	1	131	.432	
3	-.712[c]	.507	.495	1.000	.050	13.156	1	130	.000	
4	-.730[d]	.532	.518	.977	.026	7.091	1	129	.009	
5	-.734[e]	.538	.520	.975	.006	1.724	1	128	.191	
6	-.736[f]	.542	.521	.974	.004	1.045	1	127	.308	2.198

a. Predictors: (Constant), IV 2 - Not accepting any advice

b. Predictors: (Constant), IV 2 - Not accepting any advice, IV 6 – Lack of environmental awareness

c. Predictors: (Constant), IV 2 - Not accepting any advice, IV 6 – Lack of environmental awareness, IV 3 - OM Attitude

d. Predictors: (Constant), IV 2 - Not accepting any advice, IV 6 – Lack of environmental awareness, IV 3 - OM Attitude, IV 4 - Lack of legislation knowledge

e. Predictors: (Constant), IV 2 - Not accepting any advice, IV 6 – Lack of environmental awareness, IV 3 - OM Attitude, IV 4 - Lack of legislation knowledge, IV 1 - Lack of Resources

f. Predictors: (Constant), IV 2 - Not accepting any advice, IV 6 – Lack of environmental awareness , IV 3 - OM Attitude, IV 4 - Lack of legislation knowledge, IV 1 - Lack of Resources, IV 5- costs of ISO14001

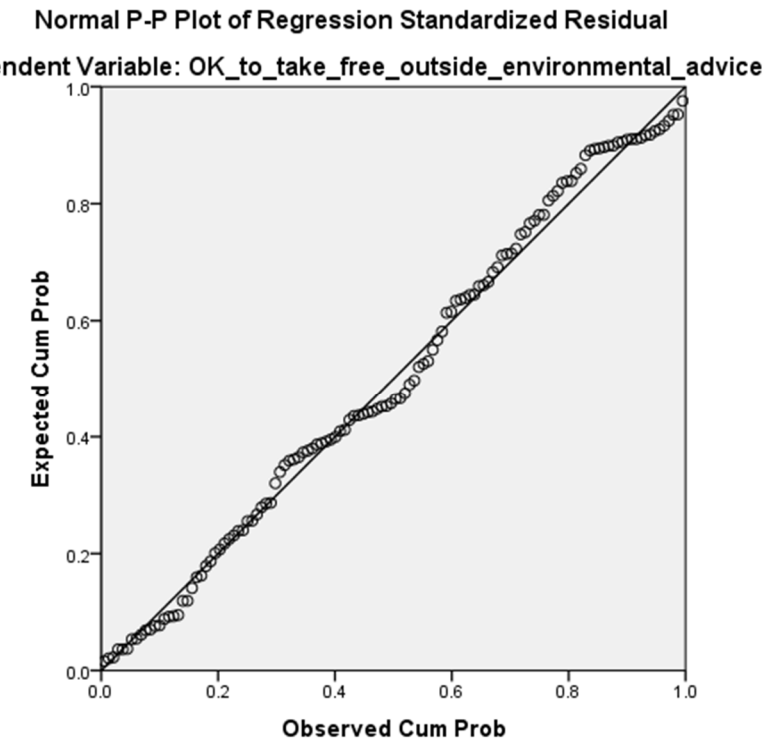
R_3 Regression Analysis on Micro Organisations (0-9 employees)

The first thing to note in Table 29 is that *n* = 103. There were 126 companies who identified themselves as 'Micro' companies employing less than 10 people in the sample but due to missing data this is reduced to 103. It is hoped that this sample size may lead to more statistically significant results, especially since Micro companies make up (99.9% of all employment in the UK. Even though their environmental impact per organisation is not anywhere near as large as larger companies, cumulatively they will have a large impact (Howarth and Fredericks, 2012).

Visual test for normal distribution

The first analysis to be viewed is the P-P plot which compares the observed data versus predicted data (Figure 6). This shows a similar result to the P-P plot of the total sample R_0 and visually shows very little difference.

Figure 6 – P-P Plot showing Cumulative frequencies (Micro companies)



Correlations – Micro companies

Looking at the correlation table the highest correlations are IV 2 - Not accepting *advice* and *IV 6 - Lack of environmental awareness*. This is the same result as the service companies, however although *r* is similar, the *p* value is higher. Their values are *IV 2 -*

Not accepting advice (r = -.653, p < .005, n = 103) and *IV 6 - not accepting advice* (r = -.251, p < .005, n = 103). The next thing to notice is that there is much more intra-Independent Variable correlations – this is likely to be a function of the small sample size: thirteen of the relevant cells are greater than p = .010. Therefore there is a possibility that there could be some intra-dependence between the IVs. As such, there should be a high degree of scepticism about these correlations.

As noted, IV 2 and IV 6 have the highest r value. The next nearest is *IV 4 - Lack of legislation knowledge* (r = -.090, p > .1, n = 103) – neither significant nor highly correlating. Finally three IVs have very similar values: *IV 5 - Costs of ISO14001* (r = -.024, p > .1, n = 103), *IV 1 - Lack of resources* (r = -.042, p > .1, n = 103) and *IV 3 - OM Attitude* (r = -.034, p > .1, n = 103). Due to the small correlation coefficient and the very high one-tailed significance value none of these is considered appropriate to include in the analysis

Therefore IV 6 and IV 2 will be the two main IVs to focus on.

Model summaries

Once again, the results of this model are at first glance more encouraging than for those of the manufacturing companies. If the non-significant IVs are included, all six models show an R^2 of .494 and the *adjusted* R^2 shows little deviation away from R^2 (*adjusted* R^2-R^2 < .026 for all models) so there is potential to allow these results to be generalised away from the sample to the total population, if some meaningful conclusions can be drawn

However close analysis reveals some difficulties: the R^2 of .494 still leaves over 50% of the variation unaccounted for; additionally four of the IVs have suspect significance. A final problem with the model summary is that the *F-ratio* is far too small. Even though the largest number (for model 1) is 7.989, the next largest number is 8.045 which is far too small to allow the claim that this model has improved the predictability of the Dependent Variable compared to the level of inaccuracy in the model.

Given the above statistics there seems little point in pursuing analysis of the model generated by this regression analysis.

Table 29 – Correlations: Pearson's *r*: micro companies

n=103		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	-.042	-.653	-.034	-.090	-.024	-.251
	IV 1 - Lack of resources	-.042	1.000	.073	.030	-.084	.110	.038
	IV 2 - Not accepting advice	-.653	.073	1.000	.009	.004	-.030	.038
	IV 3 - OM Attitude	-.034	.030	.009	1.000	-.004	-.130	.069
	IV 4 - Lack of legislation knowledge	-.090	-.084	.004	-.004	1.000	.224	.100
	IV 5 - Costs of ISO14001	-.024	.110	-.030	-.130	.224	1.000	-.107
	IV 6 - Lack of environmental awareness	-.251	.038	.038	.069	.100	-.107	1.000

Table 30 – Correlations: 1-tailed Significance Test: micro companies

n=103		OK to take free outside ENVIRONMENTAL ADVICE	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK_to_take_free_outside_environmental_advice	.	.319	.004	.351	.159	.393	.002
	IV 1 - Lack of Resources	.319	.	.209	.369	.175	.110	.336
	IV 2 - Not accepting any advice	.004	.209	.	.462	.480	.371	.338
	IV 3 - OM Attitude	.351	.369	.462	.	.480	.074	.221
	IV 4 - Lack of legislation knowledge	.159	.175	.480	.480	.	.006	.134
	IV 5 - Costs of ISO14001	.393	.110	.371	.074	.006	.	.117
	IV 6 - Lack of environmental awareness	.002	.336	.338	.221	.134	.117	.

Table 31 - Model Summary: micro companies

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
1	.653[a]	.426	.420	1.085	.426	74.989	1	101	.000	
2	.658[b]	.433	.421	1.084	.006	1.143	1	100	.288	
3	.689[c]	.475	.459	1.048	.043	8.045	1	99	.006	
4	.702[d]	.493	.472	1.035	.018	3.445	1	98	.066	
5	.703[e]	.494	.468	1.040	.001	.204	1	97	.653	2.236

a. Predictors: (Constant), IV 2 - Not accepting advice

b. Predictors: (Constant), IV 2 - Not accepting advice, IV 6 – lack of environmental awareness

c. Predictors: (Constant), IV 2 - Not accepting advice, IV 6 – lack of environmental awareness, IV 3 - OM Attitude

d. Predictors: (Constant), IV 2 - Not accepting advice, IV 6 – lack of environmental awareness, IV 3 - OM Attitude, IV 4 - Lack of legislation knowledge

e. Predictors: (Constant), IV 2 - Not accepting advice, IV 6 – lack of environmental awareness, IV 3 - OM Attitude, IV 5 - Costs of ISO14001, lack of resources

f. Dependent Variable: Willingness to take free outside environmental advice

7.4 Discussion of the data analysis

The analyses in 7.2 and 7.3 have indicated that the regression analysis of the data at the meta-level (R_0) has been properly conducted and its results are statistically sound. The results are all within the expected parameters and so it is considered legitimate to base predictions upon the data. It is extremely disappointing that running regression analyses on smaller sample sizes did not yield as meaningful data.

However it is interesting to note that there are some similarities between all 4 analyses. This is shown in Table 32. With the exception of the first analysis they all show the same most important IVs. Therefore there seems to be some commonality between these three analyses and their resultant models which can be discussed further in the next chapter.

Table 32 – Comparison of the Regression Analyses

Regression Analysis	Variable with highest *r*		Variable with next highest *r*	
	Description	Statistic	Description	Statistic
R_0 – all companies	*IV 2 - Not accepting advice*	r = .763, p < .001, n = 99	*IV 3 - the SME OM attitude*	(r = .396, p < .001, n = 99
R_1 – Manufacturing Companies	*IV 6 - Lack of environmental awareness*	r = -.449, p < .001, n = 42	*IV 2 - Not accepting advice*	r = -.216, p < .01, n = 42
R_2 – Service Companies	IV 2 - Not accepting *advice*	r = -.674, p < .005, n = 134	*IV 6 - Lack of environmental awareness*	r = -.264, p < .001, n = 134
R_3 – Micro companies	IV 2 - Not accepting *advice*	r = -.653, p < .005, n = 103	*IV 6 - Lack of environmental awareness*	r = -.251, p < .005, n = 103

In order to assess the findings of this research it is necessary to return to the research question and the hypotheses as initially discussed in 6.9. All of the findings and their implications will be discussed in the next chapter.

Research Question: can any of the theorised barriers predict the uptake of free environmental training better than others? The results are based on the 4 Regression Analyses undertaken and are shown in Table 33 below:

Table 33 – the Research Hypotheses

Hypothesis	Results – R_0	Results – R_1	Results – R_2	Results – R_3
H_1 – the lack of resources (e.g. time and money) is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = -.120, *n* = *99*, *p* > .100, ns. **Null hypothesis not rejected**	*r* = .107, *n* = 42, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.020, *n* =134, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.042, *n* = 103, *p* > .100, ns. **Null hypothesis not rejected**
H_2 – the unwillingness of the SME OM to take external advice is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = -.763, *n* = 99, *p* < 0.005, sig. Null hypothesis rejected	*r* = -.216, *n* = 42, *p* < 0.010, sig. Null hypothesis rejected	*r* = -.674, *n* = 134, *p* < 0.005, sig. Null hypothesis rejected	*r* = -.653, *n* =103, *p* < 0.005, sig. Null hypothesis rejected
H_3 – the attitude of the SME OM is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = -.396, *n* = 99, *p* < 0.005, sig. Null hypothesis rejected	*r* = .067, *n* = 42, *p* > .100, ns. **Null hypothesis not rejected**	*r* = .009, *n* = *134*, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.034, *n* =103, *p* > .100, ns. **Null hypothesis not rejected**
H_4 – the lack of knowledge of the relevant environmental legislation is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = -.170, *n* = 99, *p* < .050, sig. Null hypothesis rejected	*r* = .176, *n* = 42, *p* > .100, ns. **Null hypothesis not rejected**	*r* = .100, *n* = 134, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.090, *n* =103, *p* > .100, ns. **Null hypothesis not rejected**
H_5 – the costs of achieving ISO14001 is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = -.176, *n* = 99, *p* < .050, sig. Null hypothesis rejected	*r* = -.088, *n* = 42, *p* < .050, ns. Null hypothesis rejected	*r* = -.264, *n* =134, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.024, *n* =103, *p* < .005, ns. Null hypothesis rejected
H_6 – the low or lack of awareness of environmental issues is a predictor on the SME OM's intention to accept free environmental training and help for his firm	*r* = .017, *n* = 99, *p* > .100, ns. **Null hypothesis not rejected**	*r* = -.332, *n* = 42, *p* < .001, sig. Null hypothesis rejected	*r* = -.264, *n* =*134*, *p* < .001, sig. Null hypothesis rejected	*r* = -.251, *n* =103, *p* < .005, sig. Null hypothesis rejected

Although it is appreciated that hypotheses are not accepted or rejected on the basis of a democratic vote – in other words with three or four regression analyses agreeing – it is clear from the above that a pattern is emerging. The constant throughout the analyses is that *IV 2 - Not accepting advice* is consistent, being both a strong correlation and significant. Similarly *IV 1 - Lack of resources* is constant in having both weak correlation and not being significant. As noted before this is interesting since this IV was considered the most important factor during factor analysis. *IV 6 - Lack of environmental awareness* is also consistent in being rated highly by all three of the smaller sample groups and *IV 5 - Costs of ISO14001* also features in three analyses as being significant however it is a different three. In almost marked reflection of this, *IV 3 - OM Attitude* and *IV 4 - Lack of legislation knowledge* have very high one tailed significance scores in all three of the smaller regression analyses.

In conclusion, the earlier factor analysis showed that although the SME OM considered *the lack of resources* as the major barrier to undertaking free environmental training, the best predictor of his behaviour is the barrier of *not accepting advice*. The implication of this is that the more that the SME OM will not accept advice generally, the more the SME OM is unlikely to undertake free environmental training. This may seem like a truism but due to the nature of the factors that underlie this predictor there is more to it than meets the eye. This will be discussed further in Chapter 8.

Having analysed the data, the discussion turns to the interpretation.

8 – Data Interpretation and Findings

8.1 Introduction

Having presented the data in chapter 7, there will be a discussion of the relevance and the importance of the findings, not only of the most recent statistical analysis, but also putting it in the context of previous documents. It is important to bear in mind Field's (2013) comments at the beginning of chapter 7 regarding interpreting the output of SPSS. Another view to take into account is from Muijs (2011:171) – emphasis has been added:

> "Regression [analysis] is basically a correlational method and… correlation does not mean *causation.* When we do regression analyses, we are easily tempted to think in causal terms, but the method does not determine that; it only looks at mathematical relationships. Any *causal* inference must come from our own theorising."

Muijs is thus warning the researcher against assuming that correlation equals causality. As far as this research is concerned, it would be wrong to assume that changing the attitude of the OM will *cause* them to take free environmental advice: all that can be claimed is that there is a *correlational* link. With the caution of both of these statisticians in mind, the thesis turns to look at the interpretation of the DBA project to see if any sense-making can take place. The discussion will focus on how the factor analysis and the regression analysis can help to frame a message from the SP.

Whilst the intention of a regression analysis is to develop an equation to predict the Dependent Variable (in this case the SME OM's willingness to undertake free environmental advice) and allow the researcher knowledge of which IV to concentrate on to have the maximum effect on the Dependent Variable (see 6.10), it is important to note that this is *directional* as much as absolute (Argyris, 2011). Given the equation derived from the first regression analysis of:

Willingness to accept free environmental advice =

3.616 - (1.077 x IV 2 - Not accepting advice)

- (0.559 x IV 3 - OM Attitude)

- (0.248 x IV 5 - Costs of ISO14001)

- (0.240 x IV 4 - Lack of environmental awareness),

the researcher can surmise that decreasing any of these four IVs can lead to a positive change in the SME OM's willingness to accept free environmental advice. It is disappointing that other three regression analyses had so many insignificant results. This means that developing a coefficient matrix and thus an equation for each of the regression analyses is problematic. At the best it could be misleading and at the worst wildly inaccurate. However given the strength of the evidence regarding the similarities between

the four regression analyses, the interpretation will focus on two IVs which feature strongly in all four regression analyses: *IV 2 - Not accepting advice* and *IV 6 - Lack of environmental awareness.*

8.2 Selection of the predictors

Section 6.10 demonstrated that the predictors must not correlate with each other and so will not influence each other. This is a valuable finding as it means that each predictor can be considered in isolation: no one predictor interferes with another and so manipulation or use of one will not lead to a confusing change in another. Using the model summary (Table 19) it can be claimed that *IV 2 - Not accepting advice* is a very good predictor for the outcome variable and although adding in *IV 6 - Lack of environmental awareness* increases the predictive ability, it is at the risk of increased complexity and confusion. However it is considered that this complexity may well contribute to a lessening of the barriers and so it is included in further discussion.

A point must be made here regarding the IV that scored second highest in the R_0 analysis: IV 3 - *the attitude of the SME OM.* It is considered that this is too diffuse and pervasive an influence to be useful. The literature concurs about the importance of the SME OM (*inter alia* Nielsen and Thompson, 2009; Roxas and Coetzer, 2012) and the Interpretivist research in Document 3 (Allen, 2009) bears this out, so there is no doubt about its importance, but to use a message based upon the importance and attitude of the SME OM may well be counterproductive. Instead, it would be more beneficial to SPs to concentrate on the two IVs that they may well be able to have an influence over: persuading SME OMs to consider taking advice from outside providers and to reassess their knowledge of the environment and their impact on it.

8.3 Use of the predictors

The strongest predictor is *IV 2 - Not accepting advice*. Three of the four regression analyses show a strong and significant negative correlation between the SME OM's attitude to accepting advice and their willingness to accept free environmental training: the *r* value ranged from -.653 to -.763 and the fourth regression analysis showed it at a weaker value of -.216. The premise is that if the SME OM's negative attitude to accepting advice decreases there should be an increase in the uptake of free environmental training. The coefficient table for R_0 shows this as -1.077 (Table 22). In other words, if an SME OM can be persuaded to *decrease* their willingness to accept outside advice by one 'unit', then their willingness to accept free environmental advice *increases* by 1.077 'units' (all other factors being constant). For the purposes of this Project, a 'unit' is considered to be theoretically the way in which the SME OM completes the research instrument. If the SME OM records a '3' in answer to the statement "I am happy to accept outside free help for

my company" and is persuaded by whatever means to record a '4', then overall his willingness to accept free environmental advice will increase by 1.077.

When this factor was constructed originally from the literature it was made up from various components (see Appendix 1 for a full breakdown). There were internal factors such as the SME OM not being able to identify training needs (Marlow, 1998) or the fear that staff will defect to the opposition after training (Hill, 2004). There were concerns over the advice itself: that it was intended for 'big companies' (Netregs, 2003) and neither available (Netregs, 2002) nor consistent (edie.net, 2005a). Finally there was concern over the advisors themselves: they were not trusted (Bennett and Robson, 1999) and not SME-friendly (Starkey, 2000) which brings the issues full circle as that relates to the advice being only for 'big companies'. Balanced against this was the fact that training often has many benefits: such as a higher staff retention rate (Devins and Johnson, 2003), increased competitiveness through having better trained staff (Wilson and Homan, 2004) and increased customer satisfaction through having these better trained staff who feel appreciated and who will try harder to please the customer (Barrow and Brown, 1997).

The more recent literature shows that there is still great concern over the nature of the advice: SMEs perceive that they are the recipient of large company solutions which do not necessarily lead to successful outcomes within an SME environment. There is cynicism over the SPs taking Government money to develop interventions for SMEs, but really only providing the same advice and support as they would for a larger company (Bos-Brouwers, 2010; Battisti and Perry, 2011). Kalafatis *et al*., (2012:394) note the importance of the *source credibility*: "all the communicator's positive characteristics that affect the receiver's acceptance of a message", so SPs have an opportunity to improve their acceptability to the SME market by improving their image.

The other predictor is *IV 6 – lack of environmental awareness*. Again, three of the four regression analyses show a strong and significant negative correlation between the SME OM's attitude to accepting advice and their willingness to accept free environmental training: the *r* value ranged from -.251 to -.449: not as large as IV 2, but consistent nevertheless. The premise is that if the SME OM's negative attitude to (or low awareness of) their impact on the environment decreases there should be an increase in the uptake of free environmental training. The coefficient table for R_0 shows this as 0.340 (Table 22). In other words, if an SME OM can be persuaded to *decrease* their lack of awareness of the environment by one 'unit', then their willingness to accept free environmental advice *increases* by 0.340 'units' (all other factors being constant). If the SME OM records a '3' in answer to the statement "My company has no impact on the environment" or "The environment is a high business priority for the company" or "Only big companies have any impact on the environment" (statements 25 to 27 on the research instrument) and is

persuaded by whatever means to record a '4', then overall his willingness to accept free environmental advice will increase by 0.340. This may not seem to be a very large increase given the amount of input but if the other change in attitude regarding the SME OM's willingness to accept advice is factored in then the effect is cumulative and a one unit decrease in their negative attitude will lead to a 1.417 increase in their willingness to accept free environmental advice

When this factor was constructed originally from the literature it was made up from various components (see Appendix 1 for a full breakdown). It was found that SME OMs not only had a very low awareness of what could be termed 'the Environment', many were actually oblivious to what this term represented (Tilley, 1999). Those that did have an idea of what the environment meant had a very low perception of the impact of SMEs in general and their own company in particular (Gerstenfeld and Roberts, 2000). For many of them they considered that they were either too small to count (Clement and Hansen, 2003) or that what they called 'green issues' had a very low priority within their organisation (O'Laoire and Welford, 1996).

The more recent literature shows that there is still a perception amongst SMEs that they have no negative impact on the environment. A Netregs survey (2009) found that 93% of SME OMs claim that they have no negative environmental impact, but this went down to 54% after prompting of some of their likely impacts. This still means that over half of SME OMs consider that they have no negative environmental impact, which shows a woeful lack of awareness of the effect of their company's processes and the legislation that covers them. Conversely they have little awareness of the benefits that might arise from cost reductions from their environmental-friendly practices (Gadenne *et al*., 2009) – the so-called 'win-win' opportunity. A stark difference can be seen with the larger firms: the environment *has to* feature highly on a PLC board's agenda (Welford *et* al., 2008) and many large firms 'institutionalise' sustainability by rewarding CEOs with pay rises and bonuses based on their sustainability performance (Berrone and Gomez-Mejia, 2009). This opportunity though is not afforded to SMEs: it is very unlikely that an SME OM would be able to award pay rises based on environmental performance let alone consider it.

8.4 Influence of the key barriers

As was noted earlier in this chapter, factor analysis found that the SME OM considered the *lack of resources* to be the most significant barrier to undertaking free environmental advice. The research in Document 4 (Allen, 2012) concluded that as the training was free, the real barrier was time: SMEs are very resource-poor – particularly time-poor (Stokes and Wilson, 2010) – and view 'on-the-job training' as the most efficient method of training (Lyons and Mattare, 2011). SPs use the 'cost-benefit' argument to try and overcome this,

but SME OMs consider that they do not have the resources to invest in the first place and are unconvinced by this argument (Gadenne *et al*., 2009). However, it is the most important barrier, so it cannot be obviated. We therefore have a dichotomy: on the one hand there is an analysis that shows that *lack of resources* as a major barrier to accepting free environmental advice, on the other hand there are some analyses that show it as being only a minor barrier. In order to understand this dichotomy it is important to understand what these two analyses attempt to do. As noted earlier factor analysis attempts to take a large quantity of 'components' and reduce them to a more manageable number of factors. It does this by looking for correlations between the components and assessing their similarities: therefore it is an analysis that looks at what has happened and attempts to group similar past events together (Field 2013). Regression analysis, on the other hand, looks at the correlations between Independent Variables and their relationship to a Dependent Variable and establishes a 'line of best fit' using a linear analysis to predict what effect a change in any single Independent Variable has on a Dependent Variable (Field, 2013). As such, factor analysis deliberately attempts to match data together, regression analysis attempts to keep the Independent Variables independent. There is therefore no theoretical dichotomy between both analyses sharing the same base data but providing two different outcomes based on two different analyses.

8.5 Conceptual Framework development

It was noted in 4.3 that the Conceptual Framework could be revised following factor analysis (see Table 7). Following the regression analysis it is legitimate to update this Conceptual Framework again. The most recent version showed quite clearly that 'Lack of awareness of Environment/Environment a low priority' was the lowest ranking of all the barriers, having a mean of 3.09 following factor analysis (Table 6). Using the regression analysis and noting that *IV 6 - Lack of environmental awareness* featured so strongly and significantly in three of the four regression analyses it could be considered to have a more elevated position in the Conceptual Framework (see Table 34). Similarly given the higher rating accorded *IV 2 - Not accepting advice*, which featured strongly and significantly in all four of the regression analyses, it could legitimately be considered the most important of the barriers for *future* consideration (see previous section for more discussion on the difference between factor analysis and regression analysis).

This is clearly an arguable and debatable point and it is suggested that this forms the basis of some future research and will be highlighted in 11.3 – Further Research.

Table 34 – revised Conceptual Framework: Forcefield showing driving and resisting Forces to implementing Sustainable Development Training following Positivist Research

Driving Forces →	The Small Firm	← Resistant Forces
OM attitude Competitive advantage Increased financial performance Benefits of training Legislation Stakeholder pressure ISO14001		Do not seek advice on training Lack of awareness of Environment/Environment a low priority OM attitude ISO14001 Lack of resources Legislation

9 – Findings of the Research

The major findings of this Project are two-fold:

- firstly establishing the ongoing development of a forcefield Conceptual Framework to highlight the drivers and barriers regarding the uptake of free environmental advice by an SME OM;
- secondly the identification of the major barriers to an SME OM accepting free environmental advice as being the SME OM's unwillingness to accept any sort of external advice coupled with their awareness of the Environment and their place in it.

The following two sections discusses these two findings and in particular section 9.2 relates these findings back to the literature.

9.1 Conceptual Framework

The Conceptual Framework has gone through four iterations. The first one (see Table 3) was developed following an in-depth and structured literature review. It was noted at the time that the barriers and drivers were not ranked in any way at all, but the author had found there was a simple symmetry to the analysis. There were 'pairs' of factors which were both drivers and barriers depending on how they were viewed by the SME OM. This was then refined following Interpretivist research into the drivers for SME OMs accepting the offer of free environmental training (Table 4). This allowed the Author to take a more nuanced approach to the barriers and the drivers at the expense of the symmetry of the model. After the factor analysis had analysed the research instruments completed by SME OMs the barriers were reordered (Table 7) and finally following the regression analyses undertaken recently a further iteration of the Conceptual Framework can take place (see Table 34).

The key finding is not that the Conceptual Framework has been developed, it is that the Conceptual Framework is not a finished piece of work: it will continue to grow and develop as further research continues to refine it. However it is felt that the bases of the framework are sound and that it provides a useful springboard for adaptation in the future. This adaptation can be for SMEs in general or according to their industry and size.

9.2 The major barriers

The literature comments many times and consistently regarding the independence of the SME OM (Dalley and Hamilton, 2000; Lewis and Koetzer, 2009; Bos-Brouwers, 2010), so it is not surprising that they are reticent to accept advice. Very often they have set their own business up and want to guard it jealously (Haugh and McKee, 2004), so it is not surprising that they often think that 'they know best' and do not want to receive any

advice. They may well believe that the advice is 'official' and useful to them (Beaver and Hutchings, 2004), but they still mistrust it (Freel, 2000) or the provider (Spence, 2004). To some SME OMs, accepting advice can be seen as a sign of weakness (Hill, 2004) whilst others can see it as a positive benefit their company (Roberts *et al*., 2006). A key finding of this project is that an SP has to find the right way in which to approach and SME OM in order to gain their trust and formulate a message in a way that will engage and allow the SME OM to respond without them feeling that they are jeopardising either their company or their reputation by accepting it.

The other major barrier that has been identified through this research is the fact that an SME OM often has no or little awareness of the impact of their organisation on the environment. In spite of an ever increasing environmental legislative burden upon small businesses, many managers are ignorant of their responsibilities – in fact it is not surprising that they fail to keep up with the latest laws and regulations (Smith and Crotty, 2008). It is also true to say that most SME OMs are quite happy to conform to the spirit of the law rather than to the letter of the law (Wilson *et al*., 2012a): there has always been and always will be a view amongst SMEs that they are too small to attract the attention of the regulatory bodies (Sheridan, 2001). Again this is the opportunity for an SP to exploit. If they can phrase their message in such a way that can exploit the perceived lack of awareness of the environment for an SME OMs without in any way belittling them then there is a good chance that they can persuade the manager to become more environmentally aware, undertake some environmental training for themselves or their staff and thereby benefit from the training itself.

10 – Recommendations

10.1 Considerations

The DBA project has shown the complexity of communicating a 'free service' to such a varied and diffuse sector of business. SMEs are by their very nature an heterogeneous group, covering every industry sector in the UK and ranging in size from sole traders to 250 employees. It is quite likely therefore that some of the issues encountered in the regression analyses on small groups of data may have stemmed from the heterogeneity of the SME population and the sample derived from it. Given this heterogeneity, trying to communicate an offering that is basically conceptual – "Sustainability" – is not easy, but the recommendations below may help SPs.

10.2 The target market

SPs must know their target market and communicate appropriately. This has to go below the level of 'SMEs' and consider subgroups. Because SMEs are so heterogeneous, this cannot be on a geographical basis, which is often used for the convenience of the SP (Curkovic and Sroufe, 2011) or the demands of the funder of the SP. It is recommended that this is done on the basis of industry. The rationale is that a group of SMEs in – say – the construction industry will have more in common with each other than a geographically-defined group containing a multiplicity of industries – retail, engineering, transportation etc. It will also allow the SP to promote a further benefit to offset the 'time out of the office' barrier: the benefits to be gained from networking. This will involve the SP in investment in market research and an up-to-date database. Unfortunately the sample of SMEs in the construction sector in this project was only eight: a much larger sample for a positivist approach or a more in-depth Interpretivist approach must be undertaken to understand this sector – or any sector – better.

10.3 Reflect reality

After interacting with some SME OMs for Document 3 (Allen, 2006), the Author noted how 'pragmatic' and 'cynical' they were. It is clear that they do not trust a 'free lunch' (BIS, 2011) and know the cost and value of their time. It is recommended that the SP, whilst focusing on the benefits of free training, does not oversell this. It would be better to be honest about the commitment and emphasise the low impact of the activity – free but time-costly (Revell and Blackburn, 2007).

11 – Contributions, Limitations and further Research

11.1 Contributions

This thesis has attempted to contribute to academia, business and society.

To the former, there has been comprehensive and deep research into the ways of SMEs and into their OMs in order to understand how they react and function. A substantial literature review was carried out in 2006 and reviewed and revisited in 2013. This review consolidated and brought up to date many of the themes facing in the fields of SMEs, training and sustainability. It particularly put forward a Conceptual Framework for barriers to SME OMs accepting free environmental advice which was then tested through empirical research. This research identified, conceptualised and confirmed the barriers to the SME OMs accepting free environmental advice and developed various Conceptual Frameworks that refined the situation based upon empirical evidence. Then – in this document – the research identified through regression analysis the major Independent Variables that need to be manipulated by SPs in order to access this large and disparate sector of the economy.

A contribution to the academic world is confirmation of how difficult it is to access SMEs – their 'churn rate' makes it very difficult to keep track of them and keep databases up-to-date. Another contribution would be the development of the Conceptual Framework to demonstrate the force field analysis of both drivers and barriers to SME OMs accepting free environmental advice. A final contribution – albeit now somewhat tardy, is the fact that at two points in time a comprehensive and up-to-date literature review was prepared.

There is the opportunity for this research to be reconfigured as a journal article either for presentation or publication and so to disseminate the findings of the research to a wider audience.

As far as business is concerned, the work has looked at how SPs can communicate better with SME OMs in order to provide them with their services – to the benefit of both parties. SPs can use the results of the empirical research to structure their message and their content in their communications to SME OMs. Knowing that the single most important barrier to an SME OM taking advantage of free environmental advice is the fact that the SME OM is not willing to accept any advice at all allows the SP to mount an attack against this barrier, perhaps by impressing upon the recipient importance of training overall, the trustworthiness of the provider and the benefit to the company and its employees of the training. The SME OM's lack of awareness of their company's impact on the environment can also be used by the SP. If the company is unaware of their impact, it is more than likely that they are aware of the benefits available to them – both financially and processually – by accepting free environmental advice which can both reduce their costs (e.g. through lower landfill charges, lower material costs brackets and increase their

competitiveness (e.g. through being more appealing to larger organisations wishing to 'green their supply chain').

It is hoped that society can benefit too as encouraging SMEs to undertake environmental training and become more sustainable can only be of benefit to people and society. Although each SME on its own will contribute very little in the way of environmental impact – particularly if it is a service industry – when the size of the SME sector is calculated it has a huge impact on the environment. In an era when climate change is a controversial and high profile topic any steps that can be taken by society to lessen the future environmental impact of current activities will be to the benefit of society. Finally, SPs who provide free environmental advice are usually funded by the government and the funding for this activity generally comes from the public purse and the taxes paid by society. If the government, through the SPs, can provide better 'value for money' then again society stands to gain from this.

11.2 Limitations

There are inevitably limitations to any piece of research. There were limitations in the research approach. Although the SME population is huge in the East Midlands, managing to access it was always an issue. During the Interpretivist phase of research for this project the researcher was surprised how difficult it was to interact with SME OMs who had already received environmental training in order to assess their views on accessing it. For the positivist phase of the research the researcher was challenged with trying to access SME OMs who had not received environmental training and who therefore did not appear on any register or database detailing them as such. Even with the help of an SP to organise a communication to SME OMs in the East Midlands to promote the research only just over 200 usable responses were received and many of those were incomplete which limited the scope of the research.

The reliability of the data always has to be considered a limitation. There is no guarantee that the respondents have told truth regarding their responses. It is likely, perhaps, that SME OMs do not want to be seen to be failing to undertake training or what others may consider to be their environmental obligations and so may well respond in a way that they feel the researcher would like them to respond. There is also the potential for a respondent to complete the online questionnaire randomly although one would hope that as they had taken the trouble to access the questionnaire that they would have at least gone to the trouble of completing it truthfully. It must also be said that the inability of the Project to come up with any statistically meaningful regression analyses for R_1 to R_3 is a limitation. Whether this was due to inadequacies in the sample size, the process or the data is not known.

For this thesis there is the issue of generalisability. Even though the statistics demonstrate that the East Midlands sample of 206 SMEs is generalisable to the general population, there are caveats to that as the SME population is so fast-changing and so heterogeneous, that caution is urged. It must be noted that the Model summary for R_0 (Table 19) indicated an *adjusted* R^2 figure very close to the R^2 figure, which indicates the generalisability of that particular model was good.

One of the issues regarding the project has been its longevity. The initial scoping document was prepared in 2005, the literature review in 2006 and two pieces of research have been carried out since. There is always the chance that 'events have moved on' over the intervening nine years and that the original assumptions made in the literature review have now been made redundant by circumstances. A good example of this would be the 2008/2009 economic recession which was not even considered at the time that the literature review was done and was only just being felt when the Interpretivist research was carried out. Another issue regarding the longevity would be the fact that it could have been easy to miss new developments, concepts and ideas in the literature.

The structure of the DBA itself could be considered a limitation with the enforcement of both Interpretivist and positivist research paradigms. It is very unusual that a 'novice' researcher is skilled in both of these areas, and so inevitably some issues may arise from having to work in different paradigms when one may be well outside the comfort zone of the researcher.

Inevitably one of the major constraint has been that of time. The researcher has been undertaking the project on a part-time basis whilst occupying and developing a very important and time-consuming role at work. There have been times when the DBA has had to be put on a 'back burner'– often for months at a time whilst other more pressing (not quite so important) issues have been resolved. Apart from the work commitments there have obviously been social and family commitments as well, all of which have to be fitted around the DBA project.

Finally, the Researcher's inexperience must also be considered a limitation. This has been the largest and most complex piece of work undertaken and a lot of the skills have been acquired and practiced along the way 'on the job' which may not have been the most appropriate method of acquiring them.

If the opportunity arose to complete a similar sort of project again the research would definitely consider the access to the population to ensure that it was feasible on a large scale; prepare the methodological basis of research in a much better way; and ensure that the project was completed within a more manageable timescale that ensured that the findings were related to more recent literature.

11.3 Further Research

The topic that this DBA project has looked at is one that attracts infrequent attention in academe. Ithas attempted to add to the interest in what the researcher considers to be an important area. This project may have finished but the work goes on. The project was able to gain some meaningful data at the overall level of SMEs, but it is considered that the sample sizes at smaller levels were too small to be statistically significant and were only of limited use. It is suggested that further work with larger samples should be done by smaller groupings such as type of industry – and not just services/manufacturing companies but perhaps looking at more defined groupings such as retailing/wholesaling, food preparation and handling or transport. There is also the opportunity to analyse the market by size of company. This was an intention of this work, but the size of the groups (the largest industry sector was only 34) prevented that. Research could be done to establish the similarities within and across industries to establish the views of SME OMs vis-à-vis Sustainability and environmental training.

The second area of further research is to investigate the solidity and significance of the Conceptual Framework. As noted earlier this has been through three iterations since its original manifestation and it is hoped that it is an organic framework which is only right at a single point in time and can be added to, manipulated and tested for its ongoing significance and validity over time. This is because although many of the concepts within it are perennial (e.g. the attitude of the SME OM, the lack of resources available to an SME or issues of training and personal development within small organisations) the importance to an organisation may vary over time, vary according to the size of the company and vary according to the industry it is in.

A further opportunity for research would be to use some of the more behavioural segmentation found in the literature rather than very rigid geodemographic segmentation. For example Battisti and Perry (2011) segment the SME sector into four distinct groups in the environmental context: ‘cost burden’, ‘business opportunity’, ‘business bottom line’ and ‘responsible’. This segmentation divides the market into the way in which the company/SME OM views their environmental position. For further details see page 35.

There have been several government initiatives to survey the environmental attitudes and practices in the SME sector (e.g. NetRegs and EcoTec), but funding for both of these bodies has been withdrawn. Both of these bodies undertook large-scale national surveys and these may be beyond the scope of any one single university department to replicate. There may well be the opportunity however for a group of universities to undertake such surveys. In particular the NetRegs surveys were of a longitudinal basis running from 2002 to 2009. They were useful in charting the development of sustainability and environmental issues within SMEs and it is considered that there must be a need for this work to continue.

12 – A Moment of Reflection

12.1 Reflection…

This is easily the largest piece of work undertaken by the researcher – and the most drawn out, spanning, now, 10 years. A full reflective appraisal is available in Document 6. In spite of the length of time to complete earlier documents (particularly Documents 3 and 4), this one has been engaging and absorbing. I am pleased that my passion for Sustainability has not been diminished by 'having to study' it, in the way that the brilliance of Joseph Conrad was irredeemably lost to me by having to dissect it at A-level. I still want to 'make a difference' and am actively pursuing the opportunity to use my research findings to help SPs to deliver environmental training. I have learnt especially how hard it is to access SMEs – now I know how the SPs must feel.

The research has informed me as an individual, changed me in my attitude towards the topic and its actors and allowed me to develop my lectures and teaching in Sustainability and Green Marketing.

12.2 …and Thanks…

I know that I have mentioned some individuals in the acknowledgements, but I cannot finish and fail to mention again my wife and family who have had to put up with me scaling my DBA mountain for nine long eventful years.

12.3 …and the End?

There is a strange euphoria creeping over me that says, when I read this thesis in its entirety in about 20 minutes, I am about 10 words away from completion and getting my life back.

Reference List

Admiraali, W. and Lockhurst, D. 2009; *E-Learning in Small and Medium-sized Enterprises across Europe*, **International Small Business Journal**, volume 27, issue 6, pages 743-767.

Allen, A.S., 2005; **Barriers to imparting Sustainable Development Education to SMEs: an East Midlands' Perspective**, Document One, submitted as part fulfilment of a DBA, Nottingham Trent University, February, 2005.

Allen, A.S., 2006; **Barriers to imparting Sustainable Development Education to SMEs: an East Midlands' Perspective**, Document Two, submitted as part fulfilment of a DBA, Nottingham Trent University, April, 2006.

Allen, A.S., 2009; **Barriers to imparting Sustainable Development Education to SMEs: an East Midlands' Perspective**, Document Three, submitted as part fulfilment of a DBA, Nottingham Trent University, October, 2009.

Allen, A.S., 2012; **Barriers to imparting Sustainable Development Education to SMEs: an East Midlands' Perspective**, Document Four, submitted as part fulfilment of a DBA, Nottingham Trent University, February, 2012.

Ammenberg, J. and Hjelm, O., 2003; *Tracing Business and environmental Management Systems – A study of Networking small and medium sized Enterprises using a Joint Management System*, **Business Strategy and the Environment**, volume 12, number 3, pages 163–174.

Anderson, V. and Boocock, G., 2002; *Small Firms and Internationalisation: learning to Manage and managing to Learn*, **Human Resource Management Journal**, volume 12, issue 3, pages 5-24.

Anon, 2011; *Sustainability by the Numbers*, **Business & the Environment**, volume 22, issue 7, pages 13-14.

Ates, A., 2011; *Change Process: a key Enabler for building resilient SMEs*, **International Journal of Production Research**, volume 49, issue 18, pages 5601-5618.

Ayres, R., 2007; *On the practical Limits to Substitution*, **Ecological Economics**, volume 61, issue I, pages 115-128.

Barber, J., Metcalfe, J.S. and Porteous M., 1989; *Barriers to Growth: the ACARD Study*, in Barber, J., Metcalfe, J.S. and Porteous, M., 1989; **Barriers to Growth in Small Firms**, Routledge, London.

Barnes, H., 2013; *How many climate Migrants will there be?* **BBC News Magazine**, [online] available at http://www.bbc.co.uk/news/magazine-23899195, [accessed 05/09/13]

Barrett, R., Neeson, R. and Billington,L., 2007; *Finding the "right Staff" in small Firms*, **Education + Training**, volume 49, Issue 8/9, pages 686 – 697.

Barrow, C., 1998; **The Essence of Small Business**, Prentice Hall, Harlow.

Bartelmus, P., 2000; *Sustainable Development: Paradigm or Paranoia?* **International Journal of Technology Management & Sustainable Development**, volume 3, number 4, pages 358-369.

Battisti, M. and Perry, M., 2011; *Walking the Talk? Environmental Responsibility from the Perspective of Small-business Owners*, ***Corporate Social Responsibility & Environmental Management***, volume 18, issue 3, pages 172-185.

Bayliss, R., Connell, L. and Flynn, A., 1998; *Sector Variation and Ecological Modernisation: Towards an Analysis at the Level of the Firm*, **Business Strategy and the Environment,** Volume 7, pp150-161.

BBC News, 2012a, *John Swinney in call for action on Bank Lending,* [online], available at http://bbc.co.uk/news/uk-scotland-scotland-business-1718444, [accessed 24/02/12].

BBC News, 2012b, *Drought conditions in England 'set to widen'*, [online], available at http://www.bbc.co.uk/news/uk-17151399, [accessed 24/02/12].

Beaver G. and Hutchings K., 2004; *the big Business of Strategic Human Resource Management in small Business*, in Stewart J. and Beaver G. (2004) (eds.), **HRD in Small Organisations–Research and Practice**, Routledge, London.

Beaver, G, 2002; **Small Business, Entrepreneurship and Enterprise Development**, Prentice Hall, Harlow.

Belch, G.E. and Belch, M.A, 2012; **Advertising and Promotion: an integrated Marketing Communications Perspective**, 9th edition, McGraw-Hill Irwin, New York.

Bennett, R.J. and Robson, P.J.A., 1999; *The Use of external Business Services by SMEs in Britain*, **Entrepreneurship & Regional development**, [online] April-June, volume 11, issue 2, pages 155-180, available via EBSCOHost [accessed 18/11/2005].

Berrone, P., and Gomez-Mejia, L., 2009; *Environmental Performance and Executive Compensation: an Integrated Agency-Institutional Perspective*, **Academy of Management Journal**, volume 52, issue 1, pages 103-126.

Bevis, K., 2011; *The Challenges for sustainable Skills Development in the UK Automotive Supply Sector: Policy and Implementation*, **Management Research Review**, Volume 34 Issue 1, pages133-147.

BIS, 2011; **Research to understand the Barriers to take up and Use of Business Support**, Department of Business, Innovation and Skills [online], available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32250/11-1288-research-barriers-to-use-of-business-support.pdf [accessed 13/09/13]

Blackburn, R.A. and Smallbone, D., *Researching Small Firms and Entrepreneurship in the U.K.: Developments and Distinctiveness*, **Entrepreneurship Theory and Practice**, volume 32, issue 2, pages 267–288.

Blaxter, L., Hughes, C. and Tight, M., 2006; **How to research**, 3rd edition, Open University Press, Milton Keynes.

Blazy, R., and Weil, L., 2013; *Why do Banks ask for Collateral in SME Lending?* **Applied Financial Economics**, volume 23, issue 13, pages 1109-1122.

Blythe, J., 2013; **Essentials of Marketing**, 5th ed., Pearson, Harlow.

Boiral, O., and Gendron, Y., 2011; *Sustainable Development and Certification Practices: Lessons Learned and Prospects*, **Business Strategy and the Environment**, volume 20, issue 5, pages 331-347.

Bos-Brouwers, H., 2010, *Corporate Sustainability and Innovation in SMEs: Evidence of Themes and Activities in Practice*, **Business Strategy and the Environment**, volume 19, issue 7, pages 417-435.

Brammer, S., Hoejmose, S. and Marchant, K., 2012; *Environmental Management in SMEs in the UK: Practices, Pressures and Perceived Benefits*, **Business Strategy and the Environment**, volume 21, issue 7, pages 423-434.

Brass, K., 2009; *Recession hits SME green business practice*, **Greenwise Weekly** [online], available at http://www.greenwisebusiness.co.uk/news/recession-hits-sme-green-business-practice-692.aspx [accessed 12/12/11].

Braungart, M., McDonough, W. and Bollinger, A., 2007, *Cradle-to-cradle Design: creating healthy Emissions – a Strategy for eco-effective Product and System Design*, **Journal of Cleaner Production**, volume 15, issue 13–14, pages 1337–1348.

Bryman, B. 2012; **Social Research Methods**, 4th edition, Oxford University Press, Oxford.

Bryman, B. and Bell A. 2002; **Business Research Methods**, 1st edition, Oxford University Press, Oxford.

Bryman, B. and Bell A. 2007; **Business Research Methods**, 2nd edition, Oxford University Press, Oxford.

Bryman, B. and Bell A. 2011; **Business Research Methods**, 3rd edition, Oxford University Press, Oxford.

Buchholz, R. 1998; *the Ethics of Consumption Activities: a future Paradigm?* **Journal of Business Ethics,** volume 17, issue 8, pages 871-882.

Cassells, S. and Lewis, K., 2011; *SMEs and Environmental Responsibility: do Actions reflect Attitudes?* **Corporate Social Responsibility and Environmental Management**, volume 18, issue 3, pages 186-199.

Chandler, D., 2013; **The Transmission Model of Communication**, [online] available at http://www.aber.ac.uk/media/Documents/short/trans.html#Top [accessed 20/08/13].

Chaston, I. and Baker, S., 1998; *Relationship Influencers: Determination of Affect in the Provision of advisory Services to SME sector firms*, **Journal of European Industrial Training**, [online], volume 22, issue 6, pages 249–256, available via Business Source Premier [accessed 04/08/2005].

Ciemleja, G. and Lace, N., 2011; *The Model of Sustainable Performance of Small and Medium-sized Enterprise*, **Engineering Economics**, volume 22, issue 5, pages 501-509.

Ciliberti, F., Pontrandolfo, P and Scozzi, B., 2008; *Investigating Corporate Social Responsibility in Supply Chains: an SME Perspective*, **Journal of Cleaner Production**, Volume 16, Issue 15, pages 1579–1588.

Clarke, J., 2004, *Trade Associations: an appropriate Channel for developing sustainable practice in SMEs?*, **Journal of Sustainable Tourism**, volume 12, number 3, pages 194-208.

Clement, K. and Hansen, M., 2003; *Financial Incentives to improve environmental Performance: A review of Nordic Public Sector Support for SMEs*, **European Environment**, volume 13, number 1, Jan-Feb, pages 34-47.

Coghlan and Brannick, 2010, **Doing Action Research in your own Organization**, 3rd edition, SAGE Publications, London.

Coleman, G., 2013; *Sustainability as a learning Challenge*, **Journal of Management Development**, volume 32, issue 3, pages 258-267.

Culkin, N. and Smith, D, 2000; *An emotional Business: a Guide to understanding the Motivations of small Business Decision Takers*, **Qualitative Market Research: An international Journal**, [online], volume 3, number 3, pages 145-157, available via Emerald [accessed 08/10/2005].

Curkovic, S., and Sroufe, R., 2011; *Using ISO 14001 to promote a sustainable Supply Chain Strategy*, **Business Strategy and the Environment**, volume 20, issue 2, pages 71-93.

Dalley, J. and Hamilton, B., 2000; *Knowledge, Context and Learning in the Small Business*, **International Small Business Journal**, [online], volume 18, number 3, issue 71, pages 51-59, available via European ASAP [accessed 17/09/2005].

Darnall, N., Jolley, G.J. and Handfield, R., 2008; *Environmental management systems and green supply chain management: complements for sustainability?* **Business Strategy and the Environment**, volume 17, issue 1, pages 30-45.

Deakins, D., Logan, D., Morrison, A., and Steele, L., 2000; *Financial Management in the Small Firm*, paper presented at the 23rd ISBA National Small Firms Policy and Research Conference, *Small Firms: Adding the Spark*, The Robert Gordon University, Aberdeen, 15-17 November 2000 in Ekanem, I., 2007; *"Insider Accounts": a qualitative Research Method for small Firms*, **Journal of Small Business and Enterprise Development**, volume 14, issue 1, pages 105-117.

Department for Business Innovation and Skills, 2011; **Small and Medium-sized Enterprise Statistics for the UK and Regions** [online], available at http://webarchive.nationalarchives.gov.uk/20110920151722/http://stats.bis.gov.uk/ed/sme/index.htm [accessed 15/12/11].

Devins, D. and Johnson, S., 2003; *Training and Development Activities in SMEs: some Findings from an Evaluation of the ESD Objective 4 Programme in Britain*, **International Small Business Journal**, [online], volume 21, number 2, May, pages 213-228, available via European ASAP [accessed 17/09/2005].

Devins, D., Johnson, S. and Sutherland, J., 2004; *Employer characteristics and employee training outcomes in UK SMEs: a multivariate analysis*, ***Journal of Small Business and Enterprise Development***, volume 11, issue 4, pages 440-457.

Devlin, H, 2011; *New Arctic Temperature records strengthen Climate-change Case*, **The Times**, 12th November 2011, page 24.

Duggan, J., 2013; *China's Choice*, **the Guardian**, [online], 7th June 2013, available at http://www.theguardian.com/environment/chinas-choice/2013/jun/07/chinas-environmental-problems-grim-ministry-report, [accessed 05/09/13]

Dyllick, T. and Hockerts, K., 2002; *Beyond the business Case for Corporate Sustainability*, March-April 2002, **Business Strategy and the Environment**, volume11, number 2, pages 130–141.

Easterby-Smith, M., Thorpe, R. and Jackson, P.R., 2012; **Management Research**, 4th edition, SAGE Publications, London.

EIB, 2005; *SMEs leave ISO14001 on the Shelf*, **Environmental Information Bulletin**, July 2005, issue 150, page 5, IRS, London.

Ekanem, I., 2007; *"Insider Accounts": a qualitative Research Method for small Firms*, **Journal of Small Business and Enterprise Development**, volume 14, issue 1, pages 105-117

Elkington, J., 1994, *Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development*, **California Management Review**, volume 36, issue 2, pages 90-100.

Elsayed, K., and Paton, D., 2009; *The Impact of financial Performance on environmental Policy: does Firm Life Cycle matter?* **Business Strategy and the Environment**, volume 18, issue 6, pages 397-413.

emda, 2005; **Manufacturing in the Regions: East Midlands**, East Midlands Development Agency brochure.

Everard, M., 2011, *The Earth's Natural* Systems, in Brady, J., Ebbage, A. and Lunn, R., eds., 2011; **Environmental Management in Organizations: the IEMA Handbook** [electronic resource], Earthscan, London.

Fay, C., 2000; *Foreword*, in Hillary, R., (ed.) 2000; **Small and Medium-Sized Enterprises and the Environment – Business Imperatives**, Greenleaf, Sheffield.

Feltham, T., Feltham, G. and Barnett, J.J., 2005; The Dependence of Family Businesses on a single Decision-maker, **Journal of Small Business Management**, volume 43, issue 1, pages 1-15.

Field, A, 2013; **Discovering Statistics using IBM SPSS Statistics and Sex and Drugs and Rock'n'Roll**, 4th edition, SAGE Publications, London.

Fill, C., 2009; **Marketing Communications: Engagement, Strategies and Practice**, 5th edition, FT Prentice Hall, Harlow.

Fill, C., 2013; **Marketing Communications: Engagement, Strategies and Practice**, 6th edition, FT Prentice Hall, Harlow.

Fisher, C., 2007; **Researching and writing a Dissertation: a Guidebook for Business Students**, 2nd edition, Pearson, Harlow.

Flick, U., 2006; **An Introduction to Qualitative Research,** 3rd edition, SAGE Publications, London.

Freel, M.S., 2000; *Barriers to Product Innovation in Small Manufacturing Firms*, **International Small Business Journal**, [online], volume 18, number 2, issue 70, pages 60-80, available via European ASAP [accessed 17/09/2005].

Friedman, A.L. and Miles, S., 2002; *SMEs and the Environment: evaluating dissemination Routes and handholding Levels*, **Business Strategy and the Environment**, volume 11, number 5, pages 324-340.

FSB, 2011a; *Small business confidence slumps as rising costs pile on the pressure*, **Federation of Small Businesses**, [online] available at http://www.fsb.org.uk/News.aspx?loc=pressroom&rec=7347,[accessed 17/09/2012].

FSB, 2011b; *Micro firms still hit by a raft of EU regulations as moratorium on regulation begins*, **Federation of Small Businesses**, [online] available at http://www.fsb.org.uk/News.aspx?loc=pressroom&rec=7052,[accessed 17/09/2012].

FSB, 2011c; *Keen to go green*, Federation of Small Businesses, [online] available at http://www.fsb.org.uk/environment, acessed 17/09/2012].

Gadenne, D., 1998; *Critical Success Factors for Small Business: an Inter-industry comparison*, **International Small Business Journal**, [online], volume 17, number 1 issue 65, pages 36–56, available via European ASAP [accessed 17/09/2005].

Gadenne, D., Kennedy, J. and McKeiver, C., 2009; *An Empirical Study of Environmental Awareness and Practices in SMEs*, **Journal of Business Ethics**, volume 84, issues 1, pages 45-63.

Gelber, M., 2001; *Bite-sized Chunks of EMS for smaller Firms*, in Hilary, R, (ed.) 2001; **The CBI Environmental Management Handbook: Challenges for Business**, Earthscan Publications, London.

Gill, J. and Johnson, P., 2005; **Research Methods for Managers**, 3rd edition, Sage, London.

Groundwork, 2010; *Memorandum submitted by Groundwork UK*, **Adapting to Climate Change - Environmental Audit Committee** [online], available at: http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/113/113we04.htm [accessed 23/12/11].

Gummeson, E., 2000; **Qualitative Methods in Management Research**, Sage, London, in Bryman, A. and Bell, E., 2007; **Business Research Methods**, 2nd edition, Oxford University Press, Oxford.

Hahn, T., Figge, F., Pinkse, J. and Preuss, L., 2010. *Trade-offs in corporate sustainability: you can't have your cake and eat it*, **Business Strategy and the Environment** , volume 19, issue 4, pages 217-229.

Halila, F., 2007; *Networks as a Means of supporting the Adoption of organizational Innovations in SMEs: the case of Environmental Management Systems (EMS) based on ISO 14001*, **Corporate Social Responsibility and Environmental Management**, volume 14, issue 3, pages 167–181.

Hall, G, 1989; *Lack of Finance as a Constraint on the Expansion of Innovatory Small Firms*, in Barber, J., Metcalfe, J.S. and Porteous, M., 1989; **Barriers to Growth in Small Firms**, Routledge, London.

Haugh, H. and McKee, L., 2004; *The cultural Paradigm of the small Firm,* **Journal of Small Business Management**, volume 42, issue 4, pages 377-394.

Hesse-Biber, S. N. and Leavy, P, 2006; **The Practice of Qualitative Research**, Sage, Thousand Oaks.

Hill, J., 2001a; *A multidimensional Study of the key Determinants of effective SME Marketing Activity: Part 1*, **International Journal of Entrepreneurial Behaviour and Research**, [online], volume 7, number 5, pages 171-204, via Emerald [accessed 04/08/2005].

Hill, J., 2001b; *A multidimensional Study of the key Determinants of effective SME Marketing Activity: Part 2*, **International Journal of Entrepreneurial Behaviour and Research**, [online], volume 7, number 6, pages 211-235, via Emerald [accessed 04/08/2005].

Hill, R, 2004; *Why HRD in Small Organisations may have become a neglected field of Study*, in Stewart J. and Beaver G. (2004) (eds.), **HRD in Small Organisations – Research and Practice**, Routledge, London.

Hillary, R., (ed.) 2000; **Small and Medium-Sized Enterprises and the Environment – Business Imperatives**, Greenleaf, Sheffield.

Hogarth-Scott, S. and Jones, M.A., 1993; *Advice and Training Support for the small Firms sector in West Yorkshire*, **Journal of European Industrial Training**, [online], volume 17, number 1, pages 18-22, available via Business Source Premier [accessed 04/08/2005].

Howarth, R. and Fredericks, J., 2012; *Sustainable SME Practice: a Reflection on Supply-Chain Environmental Management Intervention*, **Management of Environmental Quality: An International Journal**, volume 23, issue 6, pages 673-685.

Howarth, R. and Melton, K. 2001; *Environmental Business Support to SMEs: the Marketing Factor*, **Eco-Management and Audit Conference**, Nijmegen, ERP Environment.

ISO, 2012; **The ISO Survey of Management System Standard Certifications 2011**, [online] available at http://www.iso.org/iso/news.htm?refid=Ref1686, accessed [30/08/13].

James, P., Ghobadian, A. Viney, H. and Liu, J. 1999; *Addressing the Divergence between Environmental Strategy Formulation and Implementation*, **Management Decision**, Volume 37, Issue 4, pages 338 - 347.

Jobber, D. and Ellis-Chadwick, F., 2013; **Principles and Practice of Marketing**, 7th ed., McGraw-Hill Maidenhead.

Johnson, P. and Duberley, J., 2000; **Understanding Management Research: an introduction to epistemology [electronic resource]**, SAGE Publications, London

Johnston, K., and Loader, K., 2003; *Encouraging SME Participation in Training: identifying practical Approaches,* **Journal of European Industrial Training**, [online] volume 27, issue 6, pages 273-280, [accessed 30/08/13].

Jones, J.E and Pfeiffer, J.W., 1973; *Lewin, K. (1946). Force field analysis*. **The 1973 Annual Handbook for Group Facilitators**, np.

Kerr, I.R., 2006; *Leadership Strategies for sustainable SME Operation*, **Business Strategy and the Environment**, volume 15, issue 1, pages 30-39.

Kinver, M., 2011; *UN report: Cities ignore climate change at their peril*, **BBC News**, [online], available at http://www.bbc.co.uk/news/science-environment-12881779, [accessed 28/03/11].

Learndirect, 2011; *Firms slash training Budgets during the Recession*, [online], available at http://www.learndirect.co.uk/businessinfo/newsupdates/news/all/2009/september/19350938/ [accessed 12/12/11].

Leiss, W., 1994; *Risk Communication and public Knowledge*, in Crowley, D. and Mitchell, D, 1994; **Communication Theory Today**, Stanford University Press, Stanford.

Lewis K. and Koetzer, L., 2009; *Human Resource Management in Small Firms* in Fink, M. and Kraus, S., eds., 2009; **The Management of Small and Medium Enterprises**, [electronic resource] Routledge, New York.

Liu-Thompkins, Y., 2013; *not all repeat Customers are the same: designing effective cross-selling Promotion on the Basis of attitudinal Loyalty and Habit*, **Journal of Marketing**, volume 77, issue five, pages 21 to 36.

Lorenzet, S.J., Cook, R.G. and Ozeki, C., 2006; *Improving Performance in very small Firms through effective Assessment and Feedback*, **Education + Training**, volume 48, issue 8/9, pages 568-583.

Lyons, P. and Mattare, M., 2011; *How can very small SMEs make the Time for Training and Development: Skill Charting as an Example of taking a scenistic Approach*, **Development and Learning in Organizations**, volume 25, issue 4, pages 15-19.

Madsen, H. and Ulhøi, J.P., 2003; *Have Trends in Corporate Environmental Management Influenced Companies' Competitiveness?* **Greener Management International**, [online], Winter 2003 Issue 44, p75 - 88, available via Business Source Premier [accessed 12/11/2005].

Marschan-Piekkari, R. and Welch, C., 2004; **Handbook for Qualitative Methods for international Business**, Edward Elgar Publishing Ltd, Cheltenham.

Masurel, E., 2007; *Why SMEs invest in environmental Measures: Sustainability Evidence from small and medium-sized Printing Firms,* **Business Strategy and the Environment**, volume 16, issue 3, pages 190-201.

Matlay, H., 2004; *Contemporary Training Initiatives in Britain: a small Business Perspective*, **Journal of Small Business and Enterprise Development**, volume 11, issue 4, pages 504–513.

McDonough W, Braungart M., 1998; *The next Industrial Revolution*, **The Atlantic Monthly**, October, www.theatlantic.com/issues/98oct/industry.htm in Young W. and Peattie, K., 1999; *Trappings versus Substance in the Greening of Marketing Planning*, **Journal of Strategic Marketing**, Volume 7, pages 131-148.

Michael, B., 2003; *Corporate Social Responsibility in international Development: an Overview and Critique*, **Corporate Social Responsibility and Environmental Management**, volume 10, issue, 3, pages 115–128, in Young W. and Tilley, F., 2006; *Can Businesses Move beyond Efficiency? The Shift toward Effectiveness and Equity in the Corporate Sustainability Debate?,* **Business Strategy and the Environment**, volume 15, issue 6, pages 402-415.

Miles M.B. and Huberman A.M., 1994; **Qualitative Data Analysis**, 2nd edition, Sage, Thousand Oaks.

Miles M.B., Huberman A.M. and Saldaña, 2014; **Qualitative Data Analysis**, 3rd edition, Sage, Thousand Oaks.

Morrison, M. and Hatfield-Dodds, S., 2011; *The Success and Failure of An Inconvenient Truth and the Stern Report in Influencing Australian Public Support for Greenhouse Policy*, **the Economic Record**, volume 87, issue 277, pages 269–281.

Muijs, D., 2011; **Doing Quantitative Research in education with SPSS**, SAGE Publications, London.

NetRegs, 2002; **2002 Netregs Benchmarking Survey: How green are small Businesses?**, [online], available at http://www.netregs.org.uk/pdf/netregs_benchmarking_survey_2002.pdf, [accessed 13/08/13].

NetRegs, 2003; **SME-nvironment 2003: a Survey to assess environmental Behaviours amongst SMEs**, [online], available at http://www.netregs.org.uk/pdf/sme_2003_uk_1409449.pdf, [accessed 13/08/13].

Netregs, 2009; **SME-nvironment Survey 2009: UK** [online], available at http://www.netregs.gov.uk/static/documents/NetRegs/NetRegs_SME_Environment_2009_UK_summary.pdf [accessed 13/06/11].

Nielsen, A.E and Thomsen, C., 2009; *Investigating CSR Communication in SMEs: a Case Study among Danish Middle Managers*, **Business Ethics: A European Review**, volume 18, issue 1, pages 83-93.

O'Laiore, D and Welford, R., 1996; *The EMS in SME*, in Welford, R, (ed) 1998; **Corporate Environmental Management 1: Systems and Strategies**, 2nd edition, Earthscan, London.

O'Leary, Z., 2004; **The essential Guide to doing Research**, Sage, London.

O'Riordan, T., 2012; *The Limits to Growth revisited*, in Guedes Vaz, S., ed., 2012, **Why read the Classics?** [electronic resource], Greenleaf Publications, Sheffield.

Peattie, K., 1999; *Trappings versus Substance in the Greening of Marketing Planning*, **Journal of Strategic Marketing**, Volume 7, pages 131-148.

Petts, J., Herd, A., Gerrard, S. and Horne, C., 1998; *The Climate and Culture of environmental Compliance within SMEs*, **Business Strategy and the Environment**, volume 8, number 1, January-February 1999, pages 14–30.

Pickton, D. and Broderick, A., 2005; **Integrated Marketing Communications**, 2nd edition, Pearson Educational, Harlow.

Pinkse, J., and Dommisse, M., 2009; *Overcoming Barriers to Sustainability: an Explanation of residential Builders' Reluctance to adopt clean Technologies*, **Business Strategy and the Environment**, volume 18, issue 8, pages 515-527.

Porter, M. and van der Linde, C., 1995; *Green and Competitive – ending the Stalemate*, **Harvard Business Review**, September–October, pages 120–134.

Preuss, L., 2005; *Rhetoric and Reality of corporate Greening: a View from the Supply Chain Management Function*, **Business Strategy and the Environment**, volume 14, number 2, pages 123–139.

Price, L., Rae, D. and Cini, V., 2013; *SME Perceptions of and Responses to the Recession*, **Journal of Small Business and Enterprise Development**, volume 20, issue 3, pages 484-502.

Quinn, J.J., 1997; *Personal Ethics and Business Ethics: the ethical Attitudes of Owner Managers of small Businesses*, **Journal of Business Ethics**, volume 16, issue 2, pages 119-127.

Revell, A. and Rutherfoord, R., 2003; *UK environmental Policy and the small Firm: broadening the Focus*, **Business Strategy and the Environment**, volume 12, number 1, pages 26–35.

Revell, A., and Blackburn, R., 2007; *The Business Case for Sustainability? An Examination of small Firms in the UK's Construction and Restaurant Sectors*, **Business Strategy and the Environment**, volume 16, issue 6, pages 404-420.

Revell, A., Stokes, D. and Chen, H., 2010; *Small Businesses and the Environment: turning over a new Leaf?* **Business Strategy and the Environment**, volume 19, issue 5, pages 273-288

Ritson, M. and Elliot, R., 1999; *the social Uses of Advertising: an ethnographic Study of adolescent advertising Audiences*, **Journal of Consumer Research**, volume 26, issue 2, pages 260-277.

Roberts, S., Lawson, R. and Nicholls, J., 2006; *Generating regional-scale Improvements in SME Corporate Responsibility Performance: Lessons from Responsibility Northwest*, **Journal of Business Ethics**, volume 67, issue 3, pages 275-286.

Robson, C., 2002; **Real World Research: A Resource for Social Scientists and Practionner-Researchers**, Blackwell, Oxford.

Rockström, J., 2009; *Planetary Boundaries: exploring the safe operating Space for Humanity'*, **Ecology and Society**, volume 14, issue 2 page 3.

Rodgers, C., 2010; *Sustainable Entrepreneurship in SMEs: a Case Study Analysis*, ***Corporate Social Responsibility and Environmental Management,*** volume 17, issue 3, pages 125-132.

Roxas, B., and Coetzer, A., 2012; *Institutional Environment, Managerial Attitudes and Environmental Sustainability Orientation of Small Firms*, **Journal of Business Ethics**, volume 111, issue 4, pages 461-476.

Salkind N., 2011; **Statistics for People who (think they) hate Statistics,** 4th edition, SAGE, London.

Saunders, M., Lewis, P. and Thornhill, A., 2012; **Research Methods for business Students**, 6th edition, [electronic version], Pearson Educational, Harlow.

Seager, T.P., 2008; *The Sustainability Spectrum and the Sciences of Sustainability*, **Business Strategy and the Environment**, volume 17, issue7, pages 444-445.

Simpson, M., Taylor, N. and Barker K., 2004; *Environmental Responsibility in SMEs: does it deliver Competitive Advantage?*, **Business Strategy and the Environment**, volume 13, number 3, pages 156–171.

Smith, M., and Crotty, J., 2008; *Environmental Regulation and Innovation driving ecological Design in the UK Automotive Industry,* **Business Strategy and the Environment**, volume 17, issue 6, pages 341-349

Spence, L.J., 20041999; *Does Size Matter? The State of the Art in Small business Ethics*, **Business Ethics: European Review**, volume 13, number 1, pages 163-174

Stanwick P.A. and Stanwick, S.D., 2005; *Sustainability, Violations and Financial Performance*, in Starik, M. *et al* (2005); **New Horizons in Research on Sustainable Organisations**, Greenleaf, Sheffield.

Starkey, R., 2000; *Environmental Management Tools: some Options for small and medium-sized Enterprises*, in Hillary, R., (ed.) 2000; **Small and Medium-Sized Enterprises and the Environment – Business Imperatives**, Greenleaf, Sheffield.

Stern N. 2006; *Publication of the Stern Review on the Economics of Climate Change*, **the Stern Report**. [online] available at http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm [accessed 29/08/13].

Stewart J., and Beaver G., (eds.), 2004; **HRD in Small Organisations – Research and Practice**, Routledge, London.

Stokes, D. and Wilson, N., 2010; **Small Business Management and Entrepreneurship**, Cengage Learning Andover

Sutton, P., 1998; *The Sustainability-promoting Firm*, **Greener Management International**, [online] volume 23, Autumn issue 23, pages 127-152, available via EBSCO [accessed 04/08/2005].

Sweeney, L., 2007; *Corporate social responsibility in Ireland: barriers and opportunities experienced by SMEs when undertaking CSR*, **Corporate Governance**, volume 7, issue 4, pages 516-523.

Tashakkori, A and Teddlie, C, 2009; **Foundations of Mixed Methods research: integrating qualitative and quantitative Approaches in the social and behavioural Sciences**, Sage, London

Thomas, A.B., 2006; **Research Concepts for Management Studies**, Routledge, Abingdon.

Tilley, F., 1999; *The Gap between the environmental Attitudes and environmental Behaviour of small Firms*, **Business Strategy & the Environment**, volume 8, issue 4, July-August, pages 238-248.

Tilley, F., 2000; *Small Firms' environmental Ethics: how deep do they go?*, in Hillary, R., (ed.) 2000; **Small and Medium-Sized Enterprises and the Environment – Business Imperatives**, Greenleaf, Sheffield.

Toms, J.S., 2000; **Environmental Management, Environmental Accounting and Financial Performance**, Chartered Institute of Management Accountants, London.

Uphadyay, A, 2012; *Editorial: Sustainability: Overview and Concepts,* **International Journal of Innovations in Business**, volume 1, issue 4, pages 268-273.

Walliman, N., 2011; **Your Research Project**, 3rd edition, SAGE Publications, London.

WCED, 1987; **Our Common Future**, UN World Commission for Environment and Development, Oxford University Press, Oxford.

Welford, R., 2012; *Integrated Reporting – Time for a Reality Check?* **Keeping Good Companies**, volume 64, issue 3, pages 151-154.

Westhead, P. and Storey, D., 1996; *Management Training and small Firm Performance: why is the link so weak?*, **International Small Business Journal**, [online], volume 14, number 4, July–September, pages 13–24, available via European ASAP [accessed 17/09/2005].

Wilkinson, A., Hill, M. and Gollan, P., 2001; *the Sustainability Debate*, **International Journal of Operations & Production Management,** volume 21 number 12, pages 1492-1502.

Williams, S., and Schaefer, A., 2013; *Small and Medium-Sized Enterprises and Sustainability: Managers' Values and Engagement with Environmental and Climate Change Issues*, **Business Strategy and the Environment**, volume 22, issue 3, pages 173-186.

Wilson A. and Homan G, 2004; *The Management Development needs of Owner-Managers in manufacturing SMEs – Mapping the Skills and Techniques*, in (eds.), **HRD in Small Organisations – Research and Practice**, Routledge, London

Wilson, C.D.H., Williams, I.D. and Kemp, S., 2012a; *Compliance with Producer responsibility Legislation: Experiences from UK Small and Medium-Sized Enterprises*, **Business Strategy and the Environment**, volume 20, issue 5, pages 310-330.

Wilson, C.D.H., Williams, I.D. and Kemp, S., 2012b; *An Evaluation of the Impact and Effectiveness of Environmental Legislation in Small and Medium-Sized Enterprises: Experiences from the UK*, **Business Strategy and the Environment**, volume 21, issue 3, pages 141-156.

Woods, D.D. and Hollnagel, E., 2005; Joint Cognitive Systems: Foundations of Cognitive Systems Engineering, Taylor & Francis, Boca Raton.

Young W. and Tilley, F., 2006; Can Businesses Move beyond Efficiency? The Shift toward Effectiveness and Equity in the Corporate Sustainability Debate? **Business Strategy and the Environment**, volume 15, issue 6, pages 402-415.

Young, R, 2006, *Sustainability: from Rhetoric to Reality through Markets*, **Journal of Cleaner Production**, volume 14, Issue 15/16, pages 1443-1447

Appendices

Appendix 1 – Extended Conceptual Framework – amplifying the Forces and showing the Literature sources for them.

Extended Conceptual Framework – amplifying the Forces and showing the Literature sources for them	
OM attitude Altruist (Quinn, 1997) Recognition of organisation's environmental impact (Patton *et al.*, 2000)	OM attitude Independent – unwilling to accept help (Goffee and Scase, 1995) Does not believe in training (Simpson *et al*, 2004)
Legislation Desire to comply (Meritt, 1998) Lower risk of prosecution (Palmer, 2000) Fewer violations (Stanwick and Stanwick, 2005)	Legislation Lack of awareness (Netregs, 2002) Cost of compliance (Revell and Rutherfoord, 2003) Fines are lower than cost of compliance (Sheridan 2001)
ISO 14001 Sign of Quality (Fassoula and Rogerson, 2003) An aid to compliance (EIB, 2005a) Instils a systems approach (O'Laoire and Welford, 1996)	ISO 14001 No knowledge/awareness (Fassoula and Rogerson, 2003) Inertia (Gelber, 2001) Too costly to achieve (Gelber, 2001) No resources to administer (O'Laoire and Welford, 1996) Too formal a system (Chittenden *et al.*, 1998) Too costly for accreditation (O'Laoire and Welford, 1996) Too much paperwork (O'Laoire and Welford, 1996) Developed for big companies (Tilley, 1999a)

Extended Conceptual Framework – amplifying the Forces and showing the Literature sources for them (continued)	
Increased financial performance Waste and cost reduction opportunities (Gibson, 2001) Increasing waste disposal costs (Porter and van der Linde, 1995) Better energy usage or reduction (Haq *et al*., 2001) Lower financing costs (Toms, 2000) Future scarcity of raw materials (Angell, 2000)	Costs of investment No benefits (Bayliss *et al*., 1998b) Cannot pass costs on (Simpson *et al*., 2004) Higher operating costs (Wubben, 1999) Decreased asset utilisation (Toms, 2000) Increased investment (Walley and Whitehead, 1994) Investment is risky (Hill, 2001a) Slow payback on investment (Christmann, 2000) Importance of economic interests over environmental (Revell and Rutherfoord, 2003) No more 'easy wins' (Salman Hussain, 1999)
Benefits of Training Staff retention (Devins and Johnson, 2003) Increased competitiveness (Wilson and Homan, 2004) Increased customer satisfaction (Barrow and Brown, 1997)	Do not seek advice or training Cannot identify needs (Marlow, 1998) 'Big Company' advice (Netregs, 2003) Staff defection (Hill, 2004) Regulators (Friedman and Miles, 2002) Advisors not trusted (Bennett and Robson, 1999) Advisors not SME friendly (Starkey, 2000) Advice not joined up (ECOTEC, 1998) Advice not consistent (edie.net, 2005a) Advice not available (Netregs, 2002)
Competitive advantage Competitors will do something (O'Laoire and Welford, 1996) Supply Chain pressures (Revell and Rutherfoord, 2003) More business (Clement and Hansen, 2003) Better customer relationships (Netregs, 2003)	Lack of resources Time (Gelber, 2001) Skills (Dewhurst and Burns, 1993) Money (Wilson and Homan, 2004) Knowledge (Clement and Hansen, 2003; Wilson and Homan, 2004)

Extended Conceptual Framework – amplifying the Forces and showing the Literature sources for them (Continued)	
Stakeholder pressure Local organisations (Hillary, 1999) Employees (Bansal and Roth, 2000) Green Lobbies (Dyllick and Hockerts, 2002) Customers (Welford and Jones, 1998) Investment groups (Toms, 2000)	Lack of/low awareness of Environment (Tilley, 1999) Low perception of SME impact (Gerstenfeld and Roberts, 2000) Legislation (ECOTEC, 1998) Too small to count (Clement and Hansen, 2003) Environment a low priority (O'Laoire and Welford, 1996)

Appendix 2 – Breakdown of Participants in Qualitative Research.

The participants represented a range of size (from four employees to over 100) and the sample had representatives of both service and manufacturing industry. All participants were the OM of the SME except for one (Ben) who was the OM's son and another (Greg) who was the Operations Director. For each of the eleven firms it was possible to interview the owner or a current director who had the ability to comment on the organisation's training needs and activities. All participants were asked to describe their business and that description is used in the 'industry' column. There are seven manufacturing companies and four service companies. The interviews took place against the background of troubled financial times. Each of the participants was given an Identifier name to protect their anonymity. The breakdown of the participants was as follows:

Organisation	Contact Identifier	Gender	Industry	Number of employees
A	Adam	Male	Printing	25
B	Ben	Male	Engineering	110
C	Christine	Female	Manufacturing	12
D	Dave	Male	Electrical Wholesalers	45
E	Ed	Male	Manufacturing	22
F	Fay	Female	Sandwich bar and outsourced caterer	6
G	Greg	Male	Manufacturing	53
H	Harry	Male	Food Processor and Manufacturer	47
I	Ian	Male	Joinery	4
J	Jill	Female	Distribution	8
K	Karl	Male	Security Services	39

Appendix 3 – Interview Schedule

Interview Number			
Participant Name		Date	
Participant Company		Location	
Participant Code Number			

Interview schedule

Good morning/afternoon. Thanks very much for seeing me and giving me your time Can I just start by confirming how long we have for our discussions? {answer} Can you please let me have your signed Consent Form? {answer} And can you confirm that you are OK with me recording our conversation? {answer} Can you please give me some details about your company? [Probe for: size of company, service/manufacturing, industry, length established] Would you say that it is a very competitive industry? {answer} I want to understand a bit about training and staff development here. How important is training? {answer} Do you undertake training of employees using outside trainers? {answer} [if yes: how do you decide what training to undertake] [if no: why is that?] Thank you for that, I want to turn to the issue of sustainability. What do you understand by the phrase 'sustainability?' {answer} Would you say that the industry sector you are in is particularly concerned about Sustainability? {answer}	

Why do you say that? {answer} Do you have an employee who has specific responsibilities for sustainability, or for your environmental impact? {answer} We have contacted you because you received some free environmental advice from the Environmental Industries Forum recently. Can you tell us what the advice was about? {answer} Why did you take this advice? {answer} Did you find it necessary? [Probe dependent upon responses] [When flow starts to wane, or if the participant is struggling with reasons show card with Drivers on] I want to show you a list of reasons why other companies in your situation have taken advantage of environmental advice. Would you say that any of them were ones that actually *did* persuade you? {answer} [probe if necessary] If you were undertaking some environmental training tomorrow, would any of these persuade you to do it? Would you say that the advice that you received was useful? [if no:] Why do you say that? [if yes:] how did it impact on your business? {answer} How do you know? {answer} Thank you, that is all the questions that I have for you – is there anything else that you think would be interesting or relevant to my research? {answer} [respond as necessary] Thank you, you have been most helpful in my research – I appreciate your time. One further request though. In order to make sure that I have captured and understood your comments correctly, would it be OK for me to send you a transcript of the discussion for you to check it? Many thanks and goodbye.	

Appendix 4 – Hypotheses for the Positivist Research together with the Research Instrument Statements which contribute to testing them.

H_1 – Not undertaking training is a key barrier to accepting free environmental advice

1. I do not trust the advice I am given
2. Training staff is a waste of money – they always leave
3. Training courses are always designed with big companies in mind
4. I have no trouble identifying training needs for my staff

H_2 – The attitude of the OM is a key barrier to accepting free environmental advice

5. I am happy to pay for outside help for my company
6. I am happy to accept free outside help for my company
7. I am keen to limit our negative environmental impact
8. Training my staff has no real benefits for my company

H_3 – Lack of knowledge of the relevant legislation, or a lack of a willingness to comply with it, is a key barrier to accepting free environmental advice

9. It is important that the company complies with environmental legislation
10. I am confident that I am up-to-date with all relevant environmental legislation
11. The cost of compliance with legislation outweighs the benefits
12. I am not aware of any environmental legislation specific to this company

H_4 – A key barrier to accepting free environmental advice is the cost of achieving the environmental standard ISO14001

13. ISO14001 is developed for big companies and is not relevant to us
14. Once we have ISO14001 it will be too much hard work to keep it
15. Achieving ISO14001 would be a worthwhile investment for us
16. ISO14001 has too much paperwork for us to achieve

H_5 – The costs of investing in the recommendations of the environmental training is a key barrier to accepting free environmental advice

17. The company invests in other areas of the business before the environment
18. Implementing environmental advice will cut costs, energy usage and waste
19. The company will not be able to pass on the costs of environmental improvements to the customers
20. Investing in environmental improvements brings lower operating costs

H_6 – Lack of resources is a key barrier to accepting free environmental advice

21. The company cannot afford the money to undertake environmental training
22. No-one in the company has the skills to take action on our environmental impact
23. The company does not have the knowledge to take action on the company's environmental impact
24. No-one in the company has the time to undertake environmental training

H_7 – Lack of/low awareness of the Environment is a key barrier to accepting free environmental advice

25. My company has no impact on the environment
26. The environment is a high business priority for the company
27. Only big companies have any impact on the environment
28. The Environment and Climate Change are green issues that have had their day

Appendix 5 – Research Instrument

Note this is a paper version of the web version

Thank you very much for accessing this page and for agreeing to take part in my survey. I am a researcher at Nottingham Trent University, trying to find out why SME Managers tend not to accept free environmental advice or training and your answers to these questions will help me tremendously in understanding this issue.

Your answers will be treated confidentially and individual answers will not be revealed to anyone – only the survey results.

The survey should only take about 5-7 minutes to complete. You are free to leave the survey at any time and your results will not be recorded.

After questions regarding your attitude to various issues, there are some questions intended to classify your responses, so that we can do some further analysis.

Please read each of the statements below and click on the button that most accurately describes your views. Try not to think too long about the response!

First of all, I want to look at your attitude to training and asking for, or receiving, advice

1. I do not trust the advice I am given
2. Training staff is a waste of money – they always leave
3. Training courses are always designed with big companies in mind
4. I have no trouble identifying training needs for my staff

Moving on, I want to understand something of your attitude to environmental advice

5. I am happy to pay for outside help for my company
6. I am happy to accept outside free help for my company
7. I am keen to limit my negative environmental impact
8. Training my staff has no real benefits for my company

What is your attitude to environmental legislation?

9. It is important that the company complies with environmental legislation
10. I am confident that I am up-to-date with all relevant environmental legislation
11. The cost of compliance with legislation outweighs the benefits
12. I am not aware of any environmental legislation specific to this

Next I want to know something about your attitude to the environmental management standard ISO14001

13. ISO14001 is developed for big companies and is not relevant to us
14. Once we have ISO14001 it will be too much hard work to keep it
15. Achieving ISO14001 would be a worthwhile investment for us
16. ISO14001 has too much paperwork for us to achieve

Now a few questions about your attitude to investing in environmental improvements for your company

17. The company invests in other areas of the business before the environment
18. Implementing environmental advice will cut costs, energy usage and waste
19. The company will not be able to pass on the costs of environmental improvements to the customers
20. Investing in environmental improvements brings lower operating costs

SMEs always have limited resources, so now a few questions regarding your attitude to your organisation's resources.

21. The company cannot afford the money to undertake environmental training
22. No-one in the company has the skills to take action on our environmental impact
23. The company does not have the knowledge to take action on the company's environmental impact
24. No-one in the company has the time to undertake environmental training

Finally a few questions about your attitude to the Environment

25. My company has no impact on the environment
26. The environment is a high business priority for the company
27. Only big companies have any impact on the environment
28. The Environment and Climate Change are green issues that have had their day

In which county is your business located?	Derbyshire Leicestershire Lincolnshire Northamptonshire Nottinghamshire Rutland
Approximately how many people do you employ?	1-9 10-19 20-49 50-99 100-250 250+

Please use your own description of your business sector or industry	Agriculture, Forestry and Fishing Mining and Quarrying; Electricity, Gas, Steam and Air Conditioning Supply; Water Supply; Sewerage, Waste Manufacturing Construction Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles Transportation and Storage Accommodation and Food Service Activities Information and Communication Financial and Insurance Activities Real Estate Activities Professional, Scientific and Technical Activities Administrative and Support Service Activities Education Human Health and Social Work Activities Arts, Entertainment and Recreation Other Service Activities
If you would like to participate in further research of this issue, please leave your e:mail address here.*	
If you would like to receive a copy of the findings of this research, please leave your e:mail address here.*	
* your e:mail address will be stored separately from the answers above to preserve your anonymity and will not be passed on to anyone else.	
Thank you very much for completing this Research. Your help and time are greatly appreciated. If you wish to contact me further about this Research my contact details are: Alastair Allen, Nottingham Business School, Nottingham, NG1 4BU. Telephone: 0115 848 3832. Email address: alastair.allen@ntu.ac.uk	

Appendix 6 – Comparison of the sample to the population (by Organisation sector) and the paired samples test using a Pearson Correlation T-test

Industry Sector	SIC	Total population of East Midlands SMEs (2009 data*)	%	Sample number of SMEs	%
Agriculture, Forestry and Fishing	AFF	13,105	4%	10	5%
Mining and Quarrying; Electricity, Gas, Steam and Air Conditioning Supply; Water Supply; Sewerage, Waste	MQEGSAC	2,660	1%	0	0%
Manufacturing	MAN	21,060	7%	13	7%
Construction	CON	56,885	19%	30	15%
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	TRADE	42,875	14%	27	14%
Transportation and Storage	TRANS	17,705	6%	8	4%
Accommodation and Food Service Activities	ACCFOOD	10,140	3%	4	2%
Information and Communication	IT	10,755	4%	8	4%
Financial and Insurance Activities	FININS	4,580	1%	4	2%
Real Estate Activities	ESTATE	5,135	2%	4	2%
Professional, Scientific and Technical Activities	CONSULT	38,885	13%	34	18%
Administrative and Support Service Activities	ADMSUPP	22,220	7%	16	8%
Education	EDU	11,550	4%	3	2%
Human Health and Social Work Activities	HSW	19,935	7%	14	7%
Arts, Entertainment and Recreation	ARTSENT	9,090	3%	5	3%
Other Service Activities	OTHER	20,060	7%	14	7%
TOTAL		306,640		194	

(*Department for Business Innovation and Skills, 2011)

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 EM Population - Sample	-.00063	1.6198	.405	-.86375	.86250	-.002	15	.999

Note: the nearer the *Sig. (2-tailed)* coefficient is to 1, the higher the level of similarity (Salkind, 2011).

Appendix 7 – Component Matrix showing Factor Loading

Component (Bold numbers show the loadings on each factor)		Factor						
		1	2	3	4	5	6	7
1	Don't trust TRAINING advice	**0.755**		0.218	0.331	0.397		-0.174
2	TRAINING staff is a waste of money	**-0.794**	0.241	0.201	0.404	0.389		-0.148
3	TRAINING courses are for big companies	**-0.816**	0.235	0.103		-0.253	0.102	-0.120
4	No trouble identifying TRAINING courses	**0.857**	0.371	0.343	-0.519	0.134	-0.240	
5	OK to pay for outside ENVIRONMENTAL ADVICE	0.423	**0.357**	-0.114	0.164	0.170		
6	OK to take free outside ENVIRONMENTAL ADVICE	0.505	**0.584**	-0.339	0.196	0.137	0.107	
7	Keen to limit negative impact through ENVIRONMENTAL ADVICE	-0.335	**0.901**		0.258		0.213	-0.241
8	ENVIRONMENTAL ADVICE has no real benefit	-0.690	**0.888**	-0.234			0.163	
9	Important that we comply with ENVIRONMENTAL LEGISLATION	0.178		**0.807**	0.125		-0.158	0.338
10	Up to date with ENVIRONMENTAL LEGISLATION	-0.631		**0.811**		-0.112	-0.159	0.183
11	Cost of complying with ENVIRONMENTAL LEGISLATION is too much	-0.495		**0.767**			-0.301	
12	Not aware of any ENVIRONMENTAL LEGISLATION	0.744	-0.413	**0.911**	0.459		-0.440	0.219
13	ISO14001 is for big companies	0.199	0.133		**-0.780**		0.128	
14	ISO14001 is too hard to maintain	0.732		0.323	**0.929**		0.166	0.112
15	ISO14001 is worthwhile investment	0.707			**0.826**	-0.440	0.189	
16	ISO14001 is too much paperwork	-0.133	0.220	0.271	**0.552**	0.100		

Component (Bold numbers show the loadings on each factor)		Factor						
		1	2	3	4	5	6	7
17	INVESTMENT goes into other areas first	0.325		0.177	0.159	-0.155		
18	Environmental INVESTMENT will cut costs etc	-0.627	0.426		0.411	0.123		
19	Cannot pass on the INVESTMENT costs to customers	0.270		0.306		-0.102		
20	Environmental INVESTMENT will bring lower operating costs	-0.495	0.388	0.142	0.137			
21	Cannot afford the money RESOURCE	0.405	0.565	-0.316		-0.107	**-0.800**	
22	No skills RESOURCE to take environmental action	0.356	0.540	-0.433		-0.154	**-0.734**	
23	No knowledge RESOURCE to take environmental action	0.250	0.545	-0.435		-0.148	**0.912**	
24	No time RESOURCE to take environmental action	-0.251	0.487	-0.219	-0.203		**0.788**	-0.141
25	No impact on the ENVIRONMENT	0.313	-0.230	-0.550	0.542	0.114		0.243
26	ENVIRONMENT is a high priority	-0.142	0.105	0.224	0.605	-0.493		**-0.676**
27	Only big companies have an effect on the ENVIRONMENT	0.166		-0.149	-0.246		0.655	**0.764**
28	ENVIRONMENT and green issues have had their day	0.368	-0.203	-0.145			0.416	**-0.754**

Extraction Method: Principal Component Analysis.

a. 7 components extracted.

Components 17-20 and 25 do not loads onto any Factors

Appendix 8 – Correlated Components following Factor Analysis

Component		Factor				
		1 – Not accepting advice is a key barrier to accepting free environmental advice	3 – Lack of knowledge of the relevant legislation is a key barrier to accepting free environmental	4 – The costs of achieving ISO14001 is a key barrier to accepting free environmental advice	6 – Lack of resources is a key barrier to accepting free environmental advice	7 – Lack of/low awareness of Environment is a key barrier to accepting free environmental
12	Not aware of any ENVIRONMENTAL LEGISLATION	0.744	**0.911**			
14	ISO14001 is too hard to maintain	**0.732**		0.929		
15	ISO14001 is worthwhile investment	**0.707**		0.826		
26	ENVIRONMENT is a high priority			**0.605**		0.676
27	Only big companies have an effect on the ENVIRONMENT				**0.655**	0.764

The components above load onto two Factors. The bold scores show the second factor. Factors 2 and 5 have been omitted for clarity's sake: no components 'double-loaded' onto them.

Appendix 9 – List of journals or websites revisited for the 2013 Literature Search

Journal or website
Academy of Management Journal
Business & the Environment (*formerly* Business & the Environment with ISO14001 Updates
Business Ethics: European Review
Business Week
CBI (the Confederation of British Industry)
Corporate Communications Journal
Department for Business Innovation and Skills
Edie.net
Education + Training
Entrepreneurship & Regional Development
Environment Business
Environmental Information Bulletin
European Small Business Journal
Federation of Small Businesses
Greener Management International
Greenleaf
Harvard Business Review
Human Resource Management Journal
International Institute for Sustainable Development
International Journal of Advertising : quarterly Review
International Journal of Entrepreneurial Behaviour and Research
International Journal of Marketing Communications
International Journal of Operations & Production Management,
International Journal of Sustainable Development

International Journal of Technology Management & Sustainable Development
International Small Business Journal
Journal of Business Ethics
Journal of Cleaner Production
Journal of Communications
Journal of Communications Studies
Journal of Direct Marketing
Journal of European Industrial Training
Journal of Knowledge Management
Journal of Marketing Communications
Journal of Small Business And Enterprise Development
Journal of Small Business Management
Journal of Sustainable Development
Journal of Sustainable Tourism
MIT Sloan Management Review
Qualitative Market Research: An international Journal,
Small Business Economics
Sustainability
Sustainable Development
The CBI Environmental Management Handbook: Challenges for Business
The Ecologist Magazine
The journal of Entrepreneurial and Small Business Finance
TQM & Business Excellence

Appendix 10 – SPSS output for the regression analysis.

SPSS Log

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT EnvAdvFree
  /METHOD=ENTER Resources
  /METHOD=ENTER Training
  /METHOD=ENTER OMAtt EnvLeg ISO14001
  /METHOD=ENTER ENVISS
  /PARTIALPLOT ALL
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS DURBIN HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(2)
  /SAVE PRED ZPRED ADJPRED MAHAL COOK LEVER ZRESID DRESID SDRESID SDBETA
SDFIT COVRATIO.
```

Correlations: Pearson Correlation for the for the Linear Regression Analysis (six Independent Variables and the Dependent Variable)

n=99		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Pearson Correlation	OK to take free outside environmental advice	1.000	-.120	-.763	-.396	-.017	-.176	-.170
	IV 1 - Lack of resources	-.120	1.000	.000	.000	.000	.000	.000
	IV 2 - Not accepting advice	-.763	.000	1.000	.000	.000	.000	.000
	IV 3 - OM Attitude	-.396	.000	.000	1.000	.000	.000	.000
	IV 4 - Lack of legislation knowledge	-.017	.000	.000	.000	1.000	.000	.000
	IV 5 - Costs of ISO14001	-.176	.000	.000	.000	.000	1.000	.000
	IV 6 - Lack of environmental awareness	-.170	.000	.000	.000	.000	.000	1.000

Correlations: 1-tailed Significance Test for the Linear Regression Analysis (six Independent Variables and the Dependent Variable)

n=99		OK to take free outside environmental advice	IV 1 - Lack of Resources	IV 2 - Not accepting any advice	IV 3 - OM Attitude	IV 4 - Lack of legislation knowledge	IV 5 - Costs of ISO14001	IV 6 - Lack of environmental awareness
Sig. (1-tailed)	OK to take free outside environmental advice	.	.119	.000	.000	.047	.041	.435
	IV 1 - Lack of Resources	.119	.	.500	.500	.500	.500	.500
	IV 2 - Not accepting any advice	.000	.500	.	.500	.500	.500	.500
	IV 3 - OM Attitude	.000	.500	.500	.	.500	.500	.500
	IV 4 - Lack of legislation knowledge	.047	.500	.500	.500	.	.500	.500
	IV 5 - Costs of ISO14001	.041	.500	.500	.500	.500	.	.500
	IV 6 - Lack of environmental awareness	.435	.500	.500	.500	.500	.500	.

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.120[a]	.014	.004	1.409	.014	1.409	1	97	.238	
2	.772[b]	.596	.587	.907	.582	138.158	1	96	.000	
3	.901[c]	.812	.802	.628	.217	35.779	3	93	.000	
4	.901[d]	.813	.800	.631	.000	.134	1	92	.715	2.080

a. Predictors: (Constant), IV 2 - Not accepting any advice

b. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude

c. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude, IV 6 - Lack of environmental awareness

d. Predictors: (Constant), IV 2 - Not accepting any advice, T IV 3 - OM Attitude, IV 6 - Lack of environmental awareness, IV 5 - Costs of ISO14001,

e. Predictors: (Constant), IV 2 - Not accepting any advice, IV 3 - OM Attitude, IV 6 - Lack of environmental awareness IV 5 - Costs of ISO14001, IV 6 - Lack of environmental awareness, IV 1 - Lack of Resources

f. Dependent Variable: Willingness to take free outside environmental advice

Casewise Diagnostics[a]				
Case Number	Std. Residual	OK to take free outside environ-mental advice	Predicted Value	Residual
27	2.474	5	3.44	1.560
70	2.566	4	2.38	1.618
128	-2.275	2	3.43	-1.435
166	2.422	4	2.47	1.528
176	2.395	5	3.49	1.511
204	2.121	5	3.66	1.338

a. Dependent Variable: OK to take free outside environmental advice