

Environmental Sustainability Issues in Malaysian Metal and Fabrication SMEs: Comparative Analysis from a Case Study Perspectives

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Abstract

Environmental issues are now becoming a constant if not a dominant issues in society and government agenda. There is an expectation that all institutions especially industries take proactive steps towards improving their environmental performance. Malaysia recognises this shift and has move towards a more positive approach in promoting environmentally sound and sustainable development practices for industries and businesses including SMEs. Yet there are many aspects of the SMEs sector are still isolated and need to be investigated. This case study is the first part of the investigation and perceived as an opportunity to explore and understand the weakness of the current system in Malaysia. A series of interviews were carried out with senior management of metal and fabrication SMEs in United Kingdom and Malaysia to understand the attitude towards environmental sustainability, current environmental and operation performances, and other key improvement areas. This paper presented the findings of the case study and the comparative analysis helps identify key areas for continuous improvement, in order to better promote environmental sustainability to Malaysian SMEs especially in the metal and fabrication sector.

Keywords

Environmental sustainability, small medium sized enterprises, cleaner production

1. Introduction

For many industries especially SMEs, the environmental improvement dilemma is getting started, particularly if economic survival is the most pressing requirement. In a developing country like Malaysia, environmental sustainability in SMEs is still at the early stage (SMI/SME Business Directory Malaysia, 2012 ; Rao, 2004 and Wang, 2004) although the government has taken a positive approach in promoting environmentally sound and sustainable development practices for the industries and businesses. The establishment of Ministry of Energy, Green Technology and Water (KeTTHA) in 2009 together with the existing Department of Environment, Ministry of Natural Resources and Environment further shows the Malaysian government's commitment for environmental sustainability whilst developing the country's economy. Nonetheless, there are still many aspects of the SME sector as well as its implementation that need to be investigated

This paper present the results of eleven case studies carried out as part of a research project to develop a framework for aiding and implementing environmental sustainability in Malaysia metal and fabrication SMEs. The presentation of this paper primarily covers the comparison of three main elements shown in Figure 1. The first element was intended to gather information with regard to company characteristics that linked to its environmental performance. The aim of the second element was to determine the level of awareness and attitude in respect to environmental and quality improvement. It will also explore the factors that promote and hinder the adoption of environmental initiatives in the organization. The third element involved identifying the internal and external support and resources that SMEs received or would like to receive in order to implement environmental practices in their operation.

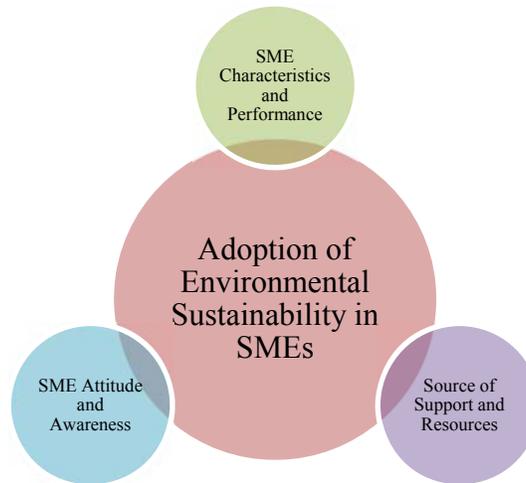


Figure 1: Key elements in the adoption of environmental sustainability in SMEs.

2. SME and Environment

Small and medium sized enterprises (SMEs) play a pivotal and important role in the economic development and growth of a country. Table 1 shows the different definition and categories of SMEs according to United Kingdom and Malaysia. Even though, there is a differences in the definition of SME, they without a doubt formed a fundamental part of the country's economy comprising over 90 percent of total business establishment and contributing a highly significant number of the employment opportunities as well as gross domestic product.

Table 1: Categories of SMEs according to European Commission of Enterprise and Industry (2011) and Small and Medium Enterprise Corporation Malaysia (2013)

Country	United Kingdom			Malaysia (manufacturing)* (*The new definition of SMEs for Malaysia will be effective on 1 st January 2014)		
	Medium	Small	Micro	Medium	Small	Micro
Number of Employees	<250	<50	<10	75 to 200	5 to <75	<5
Annual Turnover or	≤ €50million	≤ €10million	≤ €2million	RM15million to ≤RM 50 million	RM300,000 to <RM15million	<RM300,000
Annual Balance Sheet	≤ €43million	≤ €10million	≤ €2million	-	-	-

The effect of SMEs on the environment is still unclear and it is doubtful that it will be accurately measured. But because of their huge numbers, it can be assumed that as a collective group their environmental impact on the ecosystem would be substantial (Hillary, 2004; Simpson et.al, 2004; Pimenova and VanDerVorst, 2004). NetRegs (2011,2010) reported that the impact of UK and EU SMEs on the overall pollution is estimated to be more than 50 percent. It is therefore important that the focus now is turned to SMEs with regard to industrial environmental improvement. There is no data currently available on Malaysia SMEs' impact on the environment, but the effect can be assumed to be as significant as their counterpart.

Environmental sustainability involves the management of operation and resources in the organisation in order to reduce, conserve and prevent negative impact towards the environment. However, focusing on environment alone is not adequate; SMEs have to make profit in order to survive. Being environmental sustainable has been proved throughout the literature not only an added value to the environment and community, but also benefited the businesses as well (DOE, 2012; NetRegs, 2011). Successful implementation of environmental sustainability in companies will result in a collective outcome of quality environment, economic success and social benefits to SMEs.

3. Research Methodology

A qualitative method was undertaken at the initial stage of the research where the author benefited from unrestricted views of the participants. In identifying the problems and reasons that motivate and hinder the application of environmental practices in SMEs, this method proved to be most beneficial. The semi-structured interview is also recognised as a means of extracting a deeper and richer understanding of the issues that are being explored. The interview questions were guided by the key elements which form the basis of the interview, facilitating the exploration and investigation of the sub-topics shown in Table 1. These elements are based on the literature review which incorporated Environmental Management System (EMS) (McKeiver, 2005), Pollution Prevention (US Environmental Protection Agency (US EPA) Guidelines, 2013; Shen, 1999;) and previous publications on the element of environmental sustainability and SMEs such as Chavan (2005) and Hillary (2004)

Table 1: Interview topic questions

No.	Key Elements	Interview sub-topics	Explanation of Question Context
1.	Characteristics of SME and Performance	a) Introduction to the company and its top management b) Introduction to key products, services and processes c) Exploration of its business attributes d) Investigate quality and environmental management programme in the company e) Potential quality or environmental improvement practices used or viewed to be beneficial in performance improvement activity	<ul style="list-style-type: none"> Understand and relate the effect of company-unique features to the level of environmental performance in the organisation Identifying the type of tool and practices that SMEs are likely to use to improve their environmental and sustainability performance
2.	Management Attitude	a) Exploration of motivation/perception for positive change towards environmental sustainability in the organisation	<ul style="list-style-type: none"> Investigating the factors that promote or constrain the adoption of environmental initiatives in the organisation
3.	Support and Resources	a) Exploration of internal and external support and resources for environmental and sustainability performance (if any) that affects the adaptation of environmental sustainability practices in the organisation.	<ul style="list-style-type: none"> Identifying the type of support and resources that SMEs receive or would like to receive in order to implement environmental sustainability practices in their operation

The case study in this research featured SMEs manufacturing companies in the metal and fabrication-related industrial sector (Table 3) both in Malaysia and United Kingdom. The list of companies was obtained through the government agencies directory and some were recommended by the agency itself. In this study, a total of 50 invitations were sent, however only 11 companies positively responded to participate in the research. Interviews were conducted with the top management of the respective companies.

The study aimed at identifying and highlighting issues, perceptions, changes and challenges that might not appear in the published literature.

4. Results

4.1 SME Characteristics and Environmental Performance

Based on the case study findings, the following link between SMEs attributes and the level of adoption of environmental sustainability in the organisation was observed (Figure 2). The number of employees was observed to play a significant role on the level of environmental implementation within both companies. The SMEs with more than 45 employees were more involved into quality improvement programmes. SMEs are often characterised by the limitation of people resources and therefore have different needs, goals and challenges compared to larger organisations. An environmental sustainability programme requires dedicated staff to champion and oversee its process and is not seen as a core concern of the organisation. The study found that for small and micro sized SME, additional tasks not directly related to the company's core business were difficult to administer.

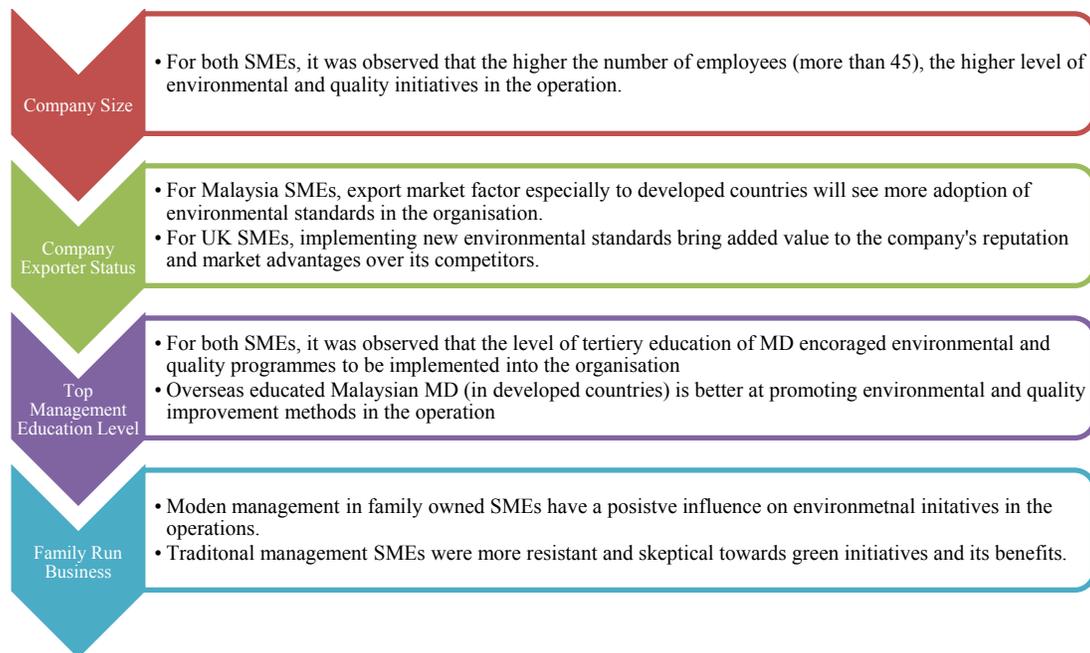


Figure 2: The link between SME characteristics and level of environmental adoption

The study revealed that only two of the UK SMEs exported their product outside UK and EU market. In contrast majority of the Malaysian SMEs exported their product and services outside the home country. For these exporter SMEs, they faced to meet the standard and legislation requirements especially involving quality, safety and environmental criterion. As a result, most opted to implement these initiatives as part of the market requirement. Only one UK company stated that by adhering to environmental legislation and implementing improvement practises in the organisation, it gives the company a competitive advantage over its local and overseas competitors.

In terms of tertiary education, the case study showed that only 40 percent of the UK top management has at least a university degree whilst interestingly more than 80 percent of Malaysia top management has a degree. Researcher established there is a cultural distinction between the two countries whereby UK regards highly people with working experiences and Malaysia prefer paper qualifications over the latter. The study ascertained that the exposure to tertiary education especially among Malaysia's new management is reflected by the company's business strategy that emphasises environmental and corporate sustainability. These participants admitted that they are more opened and convinced with the benefits of implementing environmental sustainability into their process.

There are many definitions of 'family business' in the literature, but for the purpose of this study it will be based simply on the degree of ownership, control and management by the family members. Upon assessment in Table 3, it was found that only one of five UK SMEs was of family run business whereas more than 50 percent of participating Malaysia SMEs were family owned. The study found that although majority of UK SMEs was not family owned, employees' loyalty to the company is very high, with most having long experience rising up through the positions in the company.

The study discovered two scenarios relating to the family owned SMEs, modern and traditional management. The first scenarios revealed there is a strong relationship between the company's family ownership and its positive environmental performance. The scenario revealed that the new generation of family run SMEs were well educated, more modern and open to improvement programmes. In addition, by having common values and understanding between the employees (family members) make it easier to manage the business operation and for new agenda to be implemented. The second scenario related to a more traditional approach in the organisation. SME EE and SME2F were founded by the first generation of UK Indian and Malaysian Chinese immigrants. The traditional type family run SMEs was observed to have relatively conventional management methods and opted to lower level technology in their operation and market largely for domestic market. Although the companies are now run by the third generation of managers, intervention by the previous owner still occurs. They often resist major changes to their

operation and harder to convince of the benefits in environmental and quality improvement initiatives. The old ways were still valued above all others and changes to the management style have been minimal.

4.2 SME Attitude

- **Influential Factors**

The participating SMEs were asked to identify factors that influence and discourage the company’s decision to adopt environmental sustainability practices into the operation. The results are shown in Figure 3 and 4 below. In the UK case study, the legislation factors only influenced 43 percent of the SMEs, where other driving factors such as customer requirement, business opportunities and company responsibility have more than 10 percent positive influence towards adoption of environmental sustainability in the organisation. On the other hand, legislation played a significant role in influencing Malaysian SMEs to adopt the initiatives in their companies. Although majority agreed that legislation is a key factor, only SME 2B, SME 2D and SME 2E were able to identify (when prompted) quality and environmental legislations related to the industry. Other factors such as customer requirement came second with 16 percent and business opportunity is only perceived to be a minor influence to the SMEs. One factor which was indicated in the UK case study but was not cited by any of the participating Malaysia SMEs is the company own responsibility and commitment to improve its environmental performance.

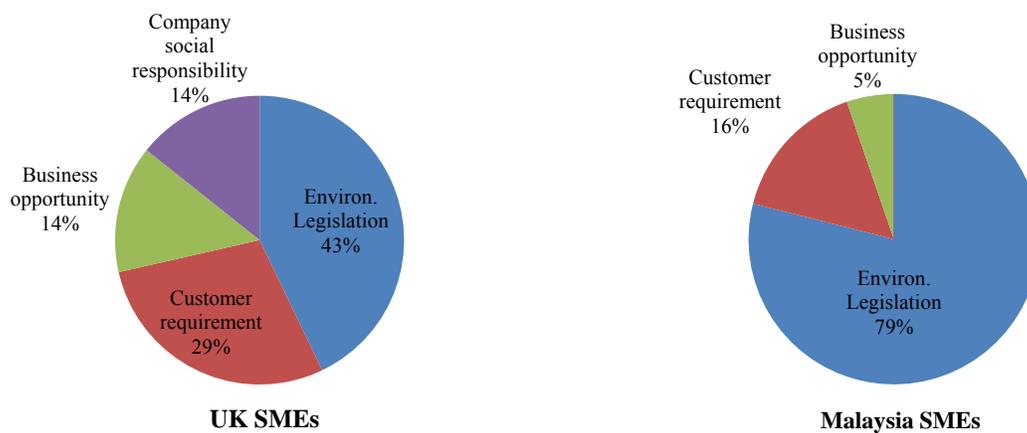


Figure 3: The persuasive factors affecting environmental sustainability practices in SMEs

In addressing the hindering factors that discouraged UK SMEs from implementing green improvement program, only 33 percent of the SMEs stressed financial constraints to be the main factor and 29 percent cited time constraint. Other minor factors with less than 13 percent influence were cited to be lack of skills and technical know how to conduct the program, the SMEs believed that their operation is at lower environmental risk and 12 percent were sceptical on the green benefits hype. The case study result shown that majority of Malaysian SMEs stressed that financial limitations is the main hindering factor preventing SMEs from applying environmental practices. Often, these SMEs perceived green improvement programs and certification to be expensive and forfeit the company’s revenue. The study also revealed that unlike their UK counterparts, majority of the Malaysian SMEs complained that they have a limited access to full financial assistances from the government to introduce environmental best practices in the company. Although in the recent years, Malaysia has taken positive steps in providing partial grants in supporting SMEs undertaking local and international quality and international standards into their operation (Malaysian Productivity Corporation, 2012). Other minor factors with less than 3 percent influence were similar to UK SMEs’ with addition lack of support by the government and not a major requirement from present customer.

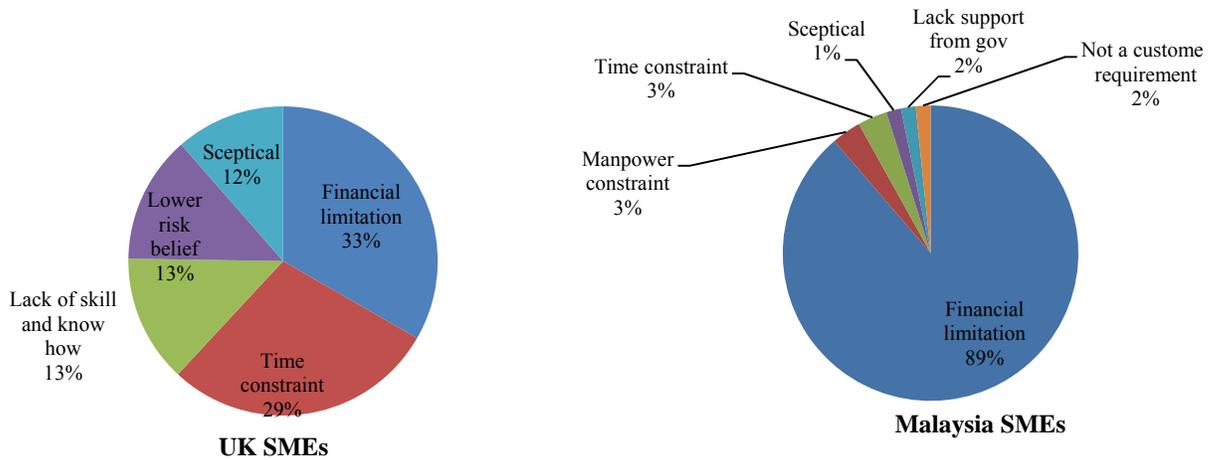
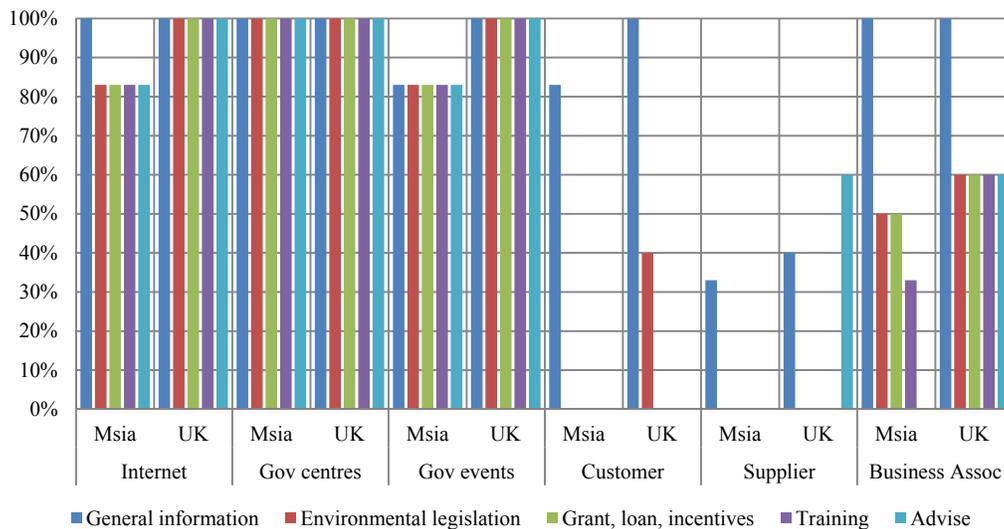


Figure 4: The hindering factors affecting environmental sustainability practices in SMEs

4.3 SME Source of Support and Resources

This case study also looked at the support and resources that SMEs used to aid them to adopt environmental and quality improvement practices. As well as the information channel that SMEs utilised to obtain information regarding environmental issues such as new legislation, best practices, grants and etc. Based on the result shown in Figure 5, in ranking order, UK SMEs rated the Internet as the first source of information, whereas in contrast, SMEs in Malaysia ranked government centres as the primary source of information with regards to environmental issues, and the Internet ranked second.



(Gov: Government; Business Assoc: Business Associate; Msia: Malaysia)

Figure 5: SMEs' sources of information

According to the case study responses, the majority of the UK SMEs cited WRAP (previously Envirowise), BusinessLink and the Environment Agency website as good sources of information with regards to good business practice as well as environmental and sustainability initiatives and current issues. Training, events and grant availability are easily accessible through these online resources. These agencies also provide interactive live forums for SMEs to communicate with experts about problems or issues in their organisation. EUROPA is also mentioned by some of the UK SMEs as a good source of information with regards to good practice and new legislation that might affect their organisation.

Malaysian SMEs also cited SME Corporation, Department of Environment, Malaysia Productivity Corporation as useful websites to go to for information regarding training and events. However, they commented that these websites are less interactive and the user has to contact the agency's headquarters for further detailed information. Government centres are found to be a good source of information for Malaysian SMEs; however, there have been complaints of poor customer services received at the government centre. The majority of Malaysian SMEs have also used government events to search for related information, especially about training and grant opportunities.

SME Corporation Malaysia was acknowledged by all the Malaysian SMEs under study to be the main source of information on grants and loans as well as training availability specifically for SMEs. However, the information is general to SMEs rather than environment and sustainability specific. For matters regarding to environmental issues such as legislation, waste management, etc., SMEs indicated that they refer to the Department of Environment state offices for information and advice. All the SMEs interviewed agreed that KeTTHA has little or no information to offer relating to the environment and SMEs. Some are still unaware of the new ministry role and responsibility especially for a sustainable environment and industry.

Figure 5 also showed that another good source of information is through business associations, especially about legislation, grants and training prospects. A minority of the companies obtains some environmental and quality information from their customers, and only a few indicated that they have obtained information through their suppliers.

The majority of companies interviewed believe that more action is needed to inform the industry with regards to sustainability and environmental issues. Media outlets such as the television and newspapers should be used extensively to promote and distribute information, both of which are currently lacking in the UK and Malaysia.

6. Conclusion

SMEs are often characterised to have resource constraints in term of money, time and manpower. And this is another setback to any environmental implementation and improvement to be made into their operations for all SMEs. This barrier however could be complemented by ease of grants and other initiatives by the government to promote environmental sustainability into the organisations.

Businesses culture also plays an important role in prompting SMEs to take steps towards sustainable practices. In both case studies, there is always those which resisted change and opted to not do anything unless absolutely necessary. Environmental sustainability is about finding the balance between the present and future. It is important to recognise that forcing SMEs to adopt environmental sustainability is usually the wrong approach; SMEs need to acknowledge and voluntarily opt to the practise that would benefit the environment, society and to the organisation as well. The challenge is then on how to promote these best practices to SMEs whilst aligning to the SMEs need to survive. These positive changes would require a change of attitude, responsible environmental management, cheap environmental solution and support from the government.

Acknowledgements

The authors would like to thank Loughborough University and International Islamic University Malaysia for funding this case study. We wish to acknowledge the support of SME Corporation Malaysia and Jabatan Alam Sekitar in the course of the study. The authors would also like to thank all government and industry officials for their assistance. The study also liaised with industries, UK and Malaysia government departments, we are grateful for their assistance. The research study would not have been possible without the willing help of the eleven UK and Malaysia SMEs which agreed to the interview and providing valuable information.

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Biography

Atiah Abdullah Sidek is a lecturer in the Department of Manufacturing and Materials Engineering, International Islamic University Malaysia. She currently is doing her post doctorate degree at Loughborough University under the supervision of Professor C.J. Backhouse. She earned her B.Eng (Hons) in Manufacturing Engineering from International Islamic University Malaysia and MSc in Manufacturing Systems Engineering from Warwick University, United Kingdom. Her research interests include environmental sustainability, operation management, and renewable energy.

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Table 3: List of United Kingdom and Malaysia's participating SMEs in the case study

UNITED KINGDOM								
Code	Ownership Type	State	Employees	Business Type	Market	Accreditation	Other Practices	Education Level (MD)
SME AA	Not family owned	Loughborough	20	Manufacture and fabricate structural steelwork, secondary steelwork, metalwork and architectural metalwork	UK	-	Continuous Quality Improvement (CQI)	-
SME BB	Not family owned	Sheffield	45	Manufacture a range of custom-built products and fabricate special metals	UK, EU and Middle East countries	ISO9001 International standard BS4870, BS4787, BSEN288-3, ASME V111	BS standard for product and customer quality	Degree (UK)
SME CC	Not family owned	Sheffield	95	Manufacture an extensive range of solid bars, special steel sections and shapes. Exporter of hollow-drilled steel for use in the mining industry	UK, EU, US and Asia	ISO9001 and ISO14000		Degree (UK)
SME DD	Not family owned	Leicester	23	Manufacture and design metal fabrication products and other metalworking services	UK and EU	-	PDCA	-
SME EE	Family owned	Leicester	20	Product/Services: Manufacture metal pressings	UK	-	-	-
MALAYSIA								
Code	Ownership Type	State	Employees	Business Type	Market	Accreditation	Other Practices	Education Level (MD)
SME 2A	Family owned	Perak	147	Manufacture welded products and welding machinery	Malaysia, Asia, Middle East, Australia, UK and US	ISO9001 ISO14001	JIT	Degree (UK) MBA (UK)
SME 2B	Family owned	Kuala Lumpur	60	Manufacture wire and wire products and also act as an exporter and trader of electrical & gas appliances and machinery	Malaysia and South East Asia	SIRIM Product Certification	-	Degree (Malaysia)
SME 2C	Not family owned	Selangor	78	Manufacture and trading of metal products	Malaysia, China, Japan, South America, USA, Australia and other South East Asian markets	ISO9001 SIRIM Quality Certification		Degree (Malaysia)
SME 2D	Not family owned	Selangor	132	Manufacture and sale of steel-related products, mainly black welded steel and galvanized industrial pipes	Malaysia, West Africa, USA Taiwan and Japan	ISO 9001 SIRIM Product Certification International standards BS, JIS and ASTM.	Kanban, 5S	Degree (Japan)
SME 2E	Family owned	Selangor	148	Manufacture of carbon steel butt-welded fittings	Malaysia, USA, Canada, South America, Europe and ASEAN	ISO 9001 International standards ASTM and ASME ISO 14001 (in progress)	Lean Manufacturing	Degree (US)
SME 2F	Family owned	Kuala Lumpur	24	Manufacture and sale of metal products	Malaysia	SIRIM Product Certification	-	-

