

# Framework for Implementing Sustainable Practices in SMEs in the United States

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**Abstract—** The past two decades have seen an increase in response to environmental factors as being part of a company's strategy. The move towards environmentally friendly operations has been due to various factors including legislation, community, management, social awareness, and non-governmental organizations. SMEs are often slow to adapt to the changes and are still moving towards better environmental practices. This paper reviews available literature on the problems and the corresponding strategies as regards to SMEs. An important observation made is that there is substantial literature on sustainable practices followed in Europe. The paper introduces a preliminary framework for implementing sustainable practices among SMEs in the United States.

**Index Terms—**SMEs, Sustainable Practices, Framework, United States and Europe

## I. INTRODUCTION

Small and Medium-sized Enterprises (SMEs) are categorized by the number of employees in the United States and in the European Union. SMEs are defined to employ fewer than 250 employees in Europe and fewer than 500 in the United States [1]. SMEs constitute 80% of all enterprises globally [2]. In the United States, the number is more than 85% [2] and more than 90% in the European Union [2], [3]. In the United Kingdom, the numbers are even higher, with 99% of the country's enterprises being SMEs [4], [5]. The sheer number of SMEs directly contributes to the increasing environmental impact caused by their activities.

In this light, it is important that sustainability strategies followed by SMEs are studied in detail. SMEs face problems including finance, technology, lack of knowledge, organizational culture, and internal motive in implementing sustainable practices [3], [6], [7].

This paper revises the literature dealing with sustainability in SMEs in the European Union and the United States. It then introduces a preliminary model and a methodology to help motivate sustainable practices among SMEs in the United States.

## II. LITERATURE REVIEW

### A. Sustainable practices in Europe

Palmer and van der Vorst [8] discussed green reporting strategies for SMEs. They identified the lack of a specific format and channel for environmental reporting in the UK. The main reasons for SMEs not reporting environmental activities were found to be lack of awareness of the protocols, not understanding the benefits of reporting, and the lack of resources. The paper discusses strategies for green reporting based on eight major elements: organization size, inputs, outputs, improvement targets, finance, stakeholder relations, the company's view on sustainability, and a system of evaluation.

The Growth and Environment Scheme is a scheme "sponsored by the European Commission and managed by the European Investment Fund," [9]. The main aim of the scheme is to support environmentally sustainable activities in SMEs in the European Union (EU). The scheme was a partnership between SMEs and bank intermediaries in order to ensure economically viable sustainable solutions for SMEs.

Shearlock et al. [4] discussed the importance of a business-support network in implementing sustainable practices in SMEs. Shearlock et al. [4] discussed the importance of a business-support network using the case of SMEs in the North West region in England. The network actors were the environmental agency of the North West, the environmental agency, the North West Business Leadership Team, the National Centre for Business and Ecology, Groundwork (a non-governmental organization, i.e., an NGO), representatives from the companies in the North West, Business Link of North West, and the North West training and enterprise council. The different actors were involved in the development of an Environmental Initiatives Database (ENID). The ENID and the different actors were responsible for the development of Green Edge of North West, an agency that was responsible for maintaining the environmentally competitive edge of the SMEs in the North West of England.

Medina-Munoz and Medina-Munoz [10] presented the case of SMEs in Canary Islands, Spain. They identified that 99.2% of all enterprises in the Canary Islands were SMEs and 49.1% of those firms were service-based industries. Moreover, most of these enterprises are micro-enterprises that employ fewer than 10 employees. The major service-based sectors were tourism, and trade and repair works. They suggested strategies for a sustainable economy, one that does not depend only on tourism—which consumes a lot of resources and produces the maximum waste. SMEs are proposed to make better contributions to the environment than larger organizations as the decisions are made locally

Manuscript received March 23, 2011. Parts of this work was presented at the American Society for Engineering Management (ASEM) National Conference in October 2010.

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by owners or a small group of people, and local owners took interest in the local environment. The major barrier that prevented implementing sustainable efforts was the lack of financial resources. In spite of this barrier, it was found that SMEs contribute more to sustainability in Canary Islands than do the large companies.

Biondi et al. [6] have identified the barriers, the motivators, and possible solutions to achieving sustainability in SMEs through innovation. Their suggestions were based on research projects and studies performed with SMEs for the European Union. The major solutions suggested by Biondi et al. [6] lies in being part of a network and leveraging the networks advantages in order to drive down costs and improve environmental innovation.

A study by Pimenova and van der Vorst [3] supports the findings of the study by Biondi et al. [6]. A survey of 250 SMEs in the London area revealed that some of the highly rated constraints to environmental improvements were time, finances, technology, and lack of knowledge. The drivers or motivators were also similar between the studies. Some of the high motivators for environmental practices were social responsibility, compliance with legislation, and growing public awareness. Cost savings as a motivator was rated with a medium importance. The major premise of the work was to measure the effectiveness of support programs in helping SMEs achieve sustainability. The paper identified sixteen support programs on the local, regional, national, and EU level that help SMEs in achieving environmental sustainability. Of the sixteen programs, eight participated in the survey. Most SMEs expected information and some expected financial support from the support programs. The different support programs were evaluated based on how well they perform in providing information, advice, financial support, and constant feedback. A good support program affected and improved the environmental performance of SMEs.

Trade associations in the UK have been identified as a good channel for developing sustainable practices in SMEs [11]. The research concentrated on SMEs in the tourism industry in the UK and how trade associations can help in implementing sustainable strategies. Clarke [11] identified that trade associations are under-utilized entities in the UK in moving towards sustainable practices in SMEs. Clarke [11] also identified that there are three types of behaviors that SMEs exhibit when it comes to the environment. The three possible approaches are positive attitude, compliance only attitude, and a negative attitude. The most desirable behavior would be the positive behavior where SMEs take the initiative and understand the benefits of implementing sustainable practices. The results of surveying seventeen trade associations in the UK representing 12,646 members were used to analyze the importance and the role of trade associations in altering and affecting SMEs' environmental behavior. The results showed that not every trade association that replied had it compulsory for members to abide by some environmental policies. Some trade associations supported and encouraged positive behavior by collaborating with the member SMEs, but on the whole the role played by trade associations needed improvement. Clarke [11] suggested improvement measures need to be brought in by trade associations who have the advantage of networks. Trade associations are a great channel for promoting sustainable practices owing to their strong network and partnerships at a national level.

Hitchens et al. [12] studied the relation between firm competitiveness and willingness to take up environmental performance among SMEs. The research also took into account the management environment and culture as a factor affecting environmental performance. The study surveyed companies through face-to-face interviews, postal responses, interviews with advise providers, and a culture questionnaire to managers of firms participating in the face-to-face interviews. A total of 320 responses, from different industry sectors, were obtained from four different countries: UK/ Republic of Ireland (100), Germany (112), and Italy (108). Similar to Clarke's [11] classification of SMEs, Hitchens et al. [12] classified SMEs as Compliance, Compliance plus, and Excellence firms, based on the level of proactive and positive attitude towards environmental performance. One of the major findings of the research proved wrong a commonly held belief that economic performance affects environmental performance. The study showed that there was no significant proof that SMEs with better economic performance were able to perform better environmentally. The results were the same across all the four countries compared. Another important result of the study was that there was no relationship between the size of the company and the type of constraints faced. Capital and technological skills were the most common constraints across all the industries considered irrespective of the size of the company.

De Eyto et al. [13] and Lukman et al. [14] have discussed the role of universities, students, and SME professionals in developing strategies that foster sustainable practices in the UK and Slovenia, respectively. The research by de Eyto et al. [13] discusses how sustainable literacy can be a potential addition to the skill set of an undergraduate. They suggested educational models and network collaboration based on studies conducted with Irish undergraduate students from the Institute of Technology, Carlow, and the University of Limerick. The students and the universities collaborated with SMEs in offering services wherein the students started at the conception stage and worked up to the final deliverables. As a precursor to this live project experience, students were involved in multidisciplinary learning in order to foster the environmental thinking and mindset. The authors observed that the sustainability literacy and the experience gained from the live projects helped the students, from a follow up study, become initiators of sustainable practices elsewhere. The study by Lukman et al. [14] establishes the position of the University of Maribor, Slovenia, in improving collaboration among various entities in order to improve sustainability initiatives at a regional level. They suggested that, "academic research has an important role to play but only if interdisciplinary and multidisciplinary thinking and learning are brought into effect..." [14]. According to them, an open systems model where there is participation from universities, local community, local governments, NGOs, and other stakeholders is the ideal setup for better implementation of sustainable practices in SMEs. Collaborative learning was suggested as a major tool in bringing about the change, based on the case of local SMEs in Maribor. The results showed collaboration among the University of Maribor, Municipality of Maribor, NGOs, and other local agencies. However, the authors identified insufficient linkage among the agencies and suggested a

better collaborative learning framework in order to promote local and regional sustainability measures.

Walker and Preuss [5], in a study on UK-based SMEs, discussed the public sector perspectives in implementing sustainable practices. They reviewed how considering SMEs as suppliers in the public sector supports and helps them to initiate sustainability measures. The methodology involved interviewing purchasing managers from the public sector on the importance given to sustainability in sourcing from SMEs as suppliers. SMEs were identified to use their network collaborations in order to gain information and technical expertise to foster sustainability measures when it was required by public sector buyers. It was observed that public sector purchasing promoted sustainable practices among the SMEs and in turn helped the local and regional economy. Since public sector industries have the financial power and also improve the bottom line of the sourcing SMEs, sustainable development was seen as feasible and economically viable.

### *B. Sustainable Practices in the United States*

Babakri et al. [15] measured the recycling performance of firms before and after implementing the ISO 14001 – an international standard in the ISO 14000 series that explains the audit and certification process for environmental management. The study took a sample of 584 manufacturing companies in the United States, out of which 177 replied to the survey questionnaire. The results showed that the smaller the size of the organization, the better was the recycling performance after an ISO 14001 implementation.

Manring and Moore [16] provided a conceptual framework for how to create and manage a virtual inter-organizational learning network for greener production. The virtual learning network development was based on a systems thinking perspective. The development process involved building a shared vision, becoming aware of one's capabilities, testing mental models, and team learning. The process follows the model of learning organizations as explained by Senge [17]. The case study explained in the paper was the problem of North Carolina's aquatic toxicity. The major problem was with increasing regulations on the toxicity of waste water discharged into the rivers of North Carolina by textile industries in the state. The inter-organizational network (ION) structure used in the case study involved federal and state regulatory agencies USEPA and NCDWQ, local authority Publicly Owned Treatment Works (POTW), the textile industries, engineers, NGOs, and the community. The ION approach yielded better results in the case of the textile industries, enabling them to follow better sustainable practices. The networking and collaborative learning helped the state's textile industries in overcoming the barriers to implementing sustainable practices and move towards a more positive systems thinking approach.

Hussey and Eagan [1] used Structural Equation Modeling (SEM) in order to model and test the environmental performance of SMEs. SEM involves the use of a series of statistical methods to analyze data. Some of the tools used are "path analysis, confirmatory factor analysis, structural regression models, and latent change

models" [1]. The steps in SEM are developing a theoretical model, constructing a path diagram, converting the path diagram into structural models, and choosing the input matrix type to estimate the proposed model. The sample for the research contained a survey, based on the criteria used for Baldrige Performance Excellence, of 458 small manufacturers in the United States. The research found that SEM could be a useful tool in modeling factors, both internal and external, that affect the environmental performance of SMEs. In addition the evaluation process helps in identifying key problem areas such that resources can be focused in order to improve the environmental performance.

Moore and Manring [2] explained some advantages that SMEs have over Multinational Enterprises (MNEs), and the advantages of networking for SMEs. The two major advantages that SMEs have over MNEs in terms of implementing sustainable practices are organizational culture, and exposure to competitive forces. MNEs have enough financial capabilities to form well-defined organizational processes. With the firms maturing, these processes become refined and help form the organizational culture. Changing the organizational culture and changing processes in order to implement sustainable practices is therefore difficult. On the other hand, SMEs do not have very well-defined processes and can leverage their processes to accommodate change because they are more agile. Larger organizations are better at developing and adopting technology than SMEs and also gain protection from competitive forces in the long run. On the contrary, SMEs work in an environment that is constantly changing and are more prone to competitive forces. Therefore, SMEs have to address the issue through constant innovation, which can make them better equipped to tackle environmental issues than MNEs. The authors also observed that the growth of better communication technologies have enabled SMEs to form better networks. "Networked SMEs can behave, in the marketplace, as a single larger firm" [2]. The importance of networks among SMEs in leveraging resources has been well explained.

### *C. Comparison between Europe and the United States*

The literature shows that more research involving SMEs are conducted in Europe. More importantly, the literature discussed in this paper dates back to 1997 in the case of Europe as compared to 2004 in the case of the United States. This shows that the effects of SMEs on the environment have been given attention in Europe earlier than the United States. The early detection has helped further research and the level of research that has progressed from there on. The literature here shows that Europe is at more advanced level than the United States in the amount of sustainable practices and the type of practices. The research in Europe has evolved from being conceptual to more application oriented, as evident from the case studies found in literature. On the other hand, the research in the United States pertaining to SMEs is still in the rudimentary stages. Most of the literature discussed here are conceptual frameworks or model formulation exercises. There are very few case studies which is an indicator of the lack of actual application in the field of these strategies.

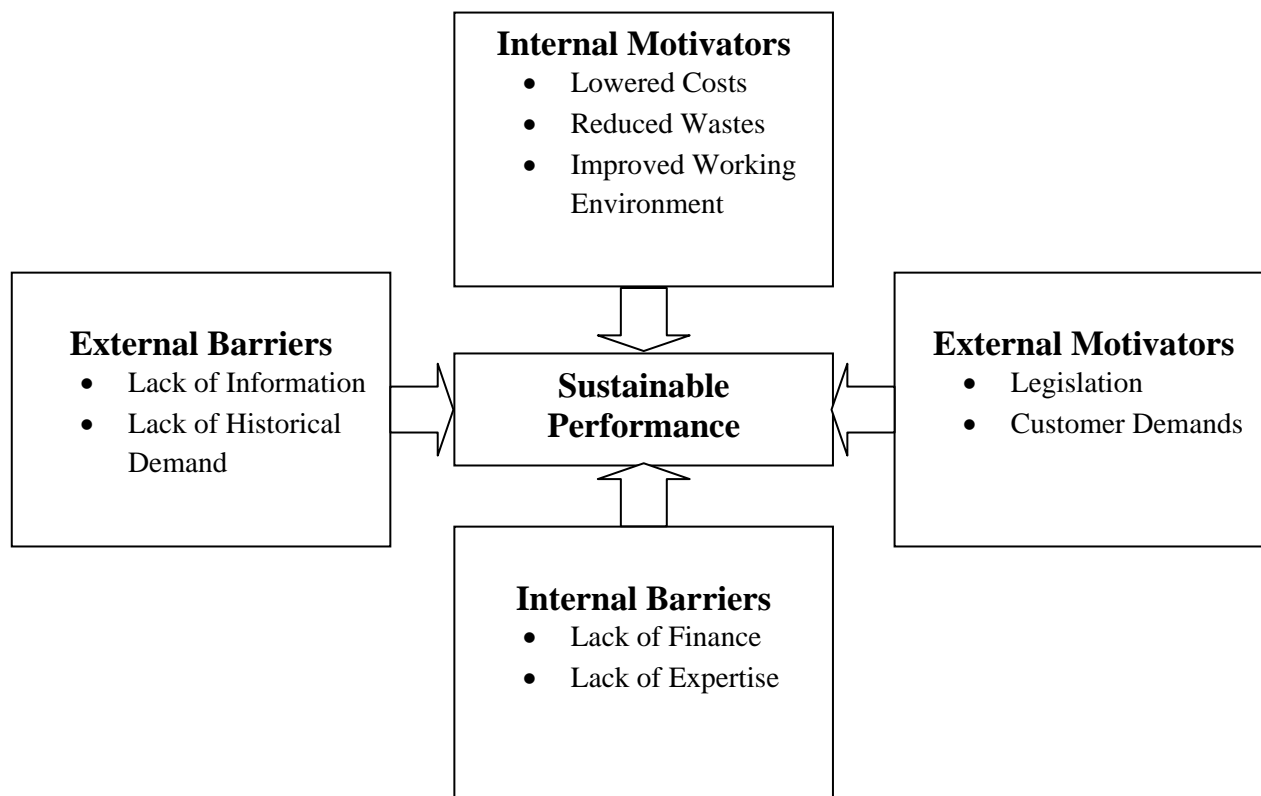


Fig 1. Sustainable Performance Four Force Model

### III. MODEL DEVELOPMENT

The literature reviewed in this paper lists some of the major factors that affect SMEs in implementing sustainable practices. The major factors are financial strength, technological expertise, availability of information, legislation, consumer pressures, and organizational culture. Based on the barriers and motivators of sustainable practices a model was proposed on how sustainable performance is a balance of motivators and barriers. The motivators and barriers can be both internal and external.

The model shown in Fig. 1 shows a four force model of how motivators and barriers affect sustainable performance. In the United States, the barriers are more pronounced than the motivators. Motivators, like legislation and customer demands, are very low. The motivation for SMEs to follow sustainable practices is low. Therefore, concentration is given at the current time to the barriers that affect sustainable performance.

In order to verify the validity of this model, a survey will be developed. The survey will check constructs related to the barriers and validate the presence and extent of the barriers. Once the barriers are validated, measures can be taken to remove the barriers and introduce motivating factors to owners and management of SMEs. With reduction in the barriers, the sustainable performance of SMEs will improve.

As a first step, the survey will be distributed to SMEs in the region served by the Lubbock Small Business Development Center (SBDC). Based on the results of the survey programs that will provide information and training on sustainable practices will be provided to the SMEs. The SBDC will be helpful in forming networks and establishing cross-SME contact. Networking is one of the key solutions to the barriers and Lubbock SBDC can play an important

role in implementing sustainable practices in the west Texas area.

### IV. CONCLUSION

This paper has compared the literature available regarding barriers and motivators affecting sustainable practices in Europe and the United States. It is clear that research of and application of sustainable practices in the United States is lagging behind Europe.

A preliminary four force model of sustainable performance has been developed. Using the model, a survey will be developed to assess and evaluate SME sustainability practices in the West Texas region of the United States.

In future work, the training and informational programs will be evaluated. Successful programs will serve as motivators to similar programs in other areas of the United States and encourage SMEs in the United States to practice sustainable practices. With a major percentage of the industries in the country being SMEs, being proactive will help in the long run. Legislations may get stringent, and customer demands for sustainable products may increase in the future, but having the capability put in now will help the SMEs to improve their social, economical, and environmental bottom lines.

### ACKNOWLEDGMENT

The authors would like to acknowledge the financial assistance provided by the Bryan Pearce Bagley Regents Chair endowment at Texas Tech University to support this work.

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