An Analysis of Environmental Management and Sustainability in SMEs

SATYA SHAH[1], ELMIRA NAGHI GANJI[1], SYED HASAN[2]
[1]Faculty of Engineering and Science, University of Greenwich, UK
[2]Industrial and Manufacturing Engineering, NED University of Technology, PAKISTAN
S.Shah@gre.ac.uk, E.Naghiganji@gre.ac.uk

Abstract: Environmental sustainability in manufacturing sector has been allocated a major consideration in the international literature. Due to growing concerns over the high effect of SMEs on world manufacturing industries and their high contribution to pollution; this research attempts to focus on the key parameters that interact in the application of environmental management system, taking into account the main features of SMEs and the integral role of industrial entrepreneurs in inspiring their firms' approaches. The paper explores the potential opportunities that enable these enterprises to move towards organizations with high level of responsibility regarding environmental protection in order to provide a healthier life for future generations. Case investigation conducted on an adhesive manufacturing company, which covers a notable market share within the sector. The research identifies that the company requires developing both internal and external entities within an explicit plan to revolutionize the recruitment patterns. Given the lack of adequate studies in adhesive technology, more research is required in future to consider the sustainable innovations on a broader sample of adhesive manufacturing companies to perform the life-cycle analysis due to the harmful organic compounds and toxic vapours of the adhesive products.

Keywords: Environmental Management, Sustainability, Environmental Management Systems (EMS), Adhesive Manufacturing, SMEs.

1 Introduction

In the last two decades, the concept of sustainability and accountability has become an emerging characteristic of the enterprises worldwide. Improving significant aspects of a company success such as economic, social and environmental performance, sustainability defines a strategy to transform businesses towards long-term prosperity. The Brundtland Commission (WCED) defined sustainable development in 1987, as "seeking to meet the needs and aspirations of the present, without compromising the ability to meet those of the future" which became a classic and common definition [1]. Nowadays, widespread idea of the triple P of business (Profit, People and Planet) which delivered by [2], describes the term sustainability appropriately. Therefore, environmental sustainability would be a significant factor of every decision-making, from purchasing raw materials to products and services that firms provide. Going green is at the heart of the sustainability and involves some guiding principles to provide the deepest view of how the business can have impacts on our planet and build a better life for future generations [3]. The United Nations Environmental Programme (UNEP) expressed environmental management as the control of all human activities that potentially influences in the environment [4]. In other words, green strategies focus on propelling just one of the sustainability goals, which is environmental stewardship [5].

ISO is originally a Greek word meaning "Equal" and it was initially an organization for product development and safety standards, which altered its traditional way by evolving a series of quality management standards [6]. Implementation of the EMS and adopting a certification such as ISO 14001 or EMAS act as sustainable evaluation tools to provide visual assessment, monitor the production waste and environmental performance. A comprehensive definition for EMS given by ISO.org, as ''organizational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy". Thus, EMS would be the effective and positive bedrock for companies' continual improvements that also assist them on their path towards sustainability [7]. This research seeks to address the gaps in literature regarding the actual effectiveness of considering environmental sustainability practices with a particular attention to the traditional management methods, lack of

understanding of environmental risks and lack of proper information availability within SMEs, specifically in manufacturing sector. The author also tends to look at the recruitment practices in SMEs as a part of the research.

2 Literature Review

The review of literature seeks to outline the conceptual framework of the research by presenting a review of advantages, disadvantages, motivations, drivers and hurdles towards Environmental Management Systems (EMS) in order to prove the necessity of the environmental sustainability practices within the SMEs. In particular, adhesive technology characteristics considering major problems correlated with optimizing sustainability and its environmental impacts are been examined.

2.1 Importance of SME on Business Factors

Since the priority of any firm is its survivability and better performance, SMEs are not only an exception, but also have a significant impact in most of the market economies. Research studies indicated that SMEs make up about 90% of all global enterprises and many of them are suppliers over the supply chain [8]. Moreover, 0.4% of all the SMEs belong to the enterprises with more than 100 employees. SMEs share of global environmental pollution is 70%, with the majority of manufacturing sector [9]. Most of the SMEs pollutions are generated from the plastics and non-metallic minerals, chemicals and casting industries [10]. Climate change is looked upon as the greatest environmental challenge facing the world today and is considered as the key focus of international, European and UK policy. With climate change considered as an important factor within any environmental and governmental policies, the study aims towards focusing on t he importance of Environmental and Climate change aspects through sustainable development and Environmental Management systems within SMEs.

The existing literature on the business response to climate change seems to be largely normative rather than empirical in nature and tends to focus towards larger firms rather than small and medium enterprises (SMEs). Similarly, government policies on climate change often focus predominantly on larger firms, with less emphasis on the roles that SMEs can play. Yet, as SMEs constitute 99% of UK businesses, provide 43% of private-sector employment and account for 20% of total UK carbon emissions understanding their environmental impact and engagement, both generally and with respect to climate change, seems highly important [11].

Identifying a firm internal and external changes and profitability benefits through adoption of sustainable strategies are fundamental factors in healthy dynamic businesses. Hence, there is a growing concern to promote SMEs to make investments in sustainable business practices, particularly in developing countries as it has been noted that the industrial activities carried out within the SMEs contributes towards environmental pollution. This would be also because of poor financial resources, lack of regulations and inadequate expertise to deal with complex technologies. Utilising economical and simple solutions facilitate a foundation for developing countries to implement effective systems for environmental protection without the need to spend long times or having high scientific backgrounds, high costs and high-level technologies. Likewise, the countries worldwide pursue to develop innovative strategies to integrate their environmental assets into economic development schemes by supporting the pollution prevention projects, motivating businesses to enter the new rising green markets and improving the life quality through investments in environmental facilities [12].

Scrutinizing SMEs characteristics to face green or environmental management issues and sustainability criteria, helps researchers recommend applicable mechanisms for such. On the other side, SMEs may confront many pressures on their management strategies to the way of being environmentally friendly. Inadequate financial resources, lack of technical expertise, low level of research and development, management weaknesses and their visions that SMEs have little environmental impact are the major barriers for SMEs social responsibility and competitive advantage [13]. Therefore, the strategic choices of entrepreneurs and managers play a vital role in organizational growth and sustainable development of the firm in the long-term perspective.

2.2 EMS Objectives for SMEs Performance

Numerous benefits of adopting EMS by SMEs are been categorized into two main groups [9], Internal Benefits and External Benefits. Internal benefits include many organizational improvements, financial savings and payback periods of

investments within the company. Moreover, EMS implementation provides new interactions between personnel and management and results in intangible advantages such as employee morale and social responsibility (MSR) enhancement, communication and skills improvements, increasing knowledge and altering staff's attitude, which are very important for SMEs performance. In terms of External benefits, companies find more competitive and business rewards. Therefore, they attract new business partners and increase satisfaction of customer requirements. In addition to the commercial benefits, companies find positive outcomes such as environmental achievements, assured legal compliance, energy consumption minimization and waste reduction. As a result, relationships with stakeholders, company image and reputation are to be further improved.

Research have defined the main objectives of EMS that allows companies towards systematic approach development [7]. Applying the concept of EMS not only assists SMEs to reduce energy consumption, pollution and hazardous wastes in the chemical industry; but also lead them into conservation of resources, increasing productivity and reducing costs. It develops awareness of environmental issues and responsibilities among entrepreneurs. Furthermore, SMEs will be encouraged to apply an environmental management system in their production processes. Research studies introduced EIS that help SMEs to review comprehensive environmental information relevant to the company operations and facilities. An effective tool such as EIS as an effective tool to measure, benchmark and monitor the environmental performance in a time sequence analysis. The environmental indicators enable company managers to detect the market prospect, cost reduction potentials, compare their firm with industrial standards and importantly, to better decision-making [7]. The studies pointed out that eco-mapping is a visual assessment tool particularly designed for SMEs to reduce their environmental documentation quantities. Using this tool includes maps for various entities of the company, such as water map, energy map, and material and resource flow map [7]. Furthermore, flowcharts such as process maps provide a general and instant overview of company operations, starting with material inputs ending up with waste disposal and distribution [14]. Both these evaluation tools assist and prepare SMEs on their journey to environmental management system and sustainability.

Quantitative evaluation of environmental management system is required to help us determine the effectiveness and value of such a system. Assisting particular sector if SMEs, helps to focus on hom ogenous tools and approaches without necessity of high cost modification or application. Moreover, using visual assessment and evaluation tools already exist and necessitate the contribution and commitment of all personnel that is a key success towards EMS implementation. These tools help manufacturing sector appropriately but they still remain heterogeneous and needs integrated. In general, three main factors answer the "Why" it is necessary to adopt EMS by SMEs. Firstly, implementing EMS brings high efficiency and cost savings. Moreover, many bank insurance companies give predominance to organizations with low environmental risk. Secondly, market demand for products and services with better environmental preferences such as "green consumerism" would be another driver. Thirdly, effective EMS brings firms fewer risks of breaking the laws and fewer environmental incidents [7].

2.3 SMEs Motivations towards Environmental Approaches

Different scenarios exist for SMEs to optimize sustainability and create competitive advantages discussed through research studies [8]. These motivations enable SMEs to develop into valuable sustainable investment target points for larger firms; therefore, they become sustainable suppliers in both global and local supply chain. If SMEs work collaboratively and create networked entities in sustainable marketplace, which nowadays facilitated by globalization of communication technology, it can offer them the opportunities for better economic performance where the MNEs (Multinational Enterprises) are less successful.

Considering SMEs from an upstream view as buyers from suppliers, more pressures should be exerted by them in order to take into account the three dimensions of sustainability in order to provide a sustainable supply chain [15]. Furthermore, other research studies also claim that motivations inspiring the sustainability concept for the SMEs are in a wide range, including internal organization improvements, legal requirements, competitive advantage, reputation concerns and increasing profitability [16]. Three fundamental phases and motivations

been identified for corporate sustainability by [17]. In this regard, sanitizing as compliance driven health or safety efforts, controlling as eco-efficiency driven environmental management and integration of all the components of the company into business decisions as a value creator have been mentioned.

Exploring the strong drivers such as customers, legislation and social responsibility of SMEs environmental processes like disposal, recycling and EMS, it is necessary to address their impact on company performance. Achieving this goal, a sample of 500 Turkish SMEs was investigated by [18] using a cross- sectional design. T hey considered regulation as a low-level motivator towards environmental pollution in Turkish SMEs. The research points out that government can also act with other beneficial techniques such as building waste treatment facilities in industrial areas and encourage the SMEs to develop their environmental projects. The important point is that besides environmental issues, government policy should also result in SMEs growth. Moreover, OEM as an element in supply chain could offer some help to their suppliers in order to provide green design, processes or certifications. In the factor analysis, the researchers have eliminated some of the drivers triggering environmental processes due to the poor loadings on their intended factor. Removing short-term profits allows long-term benefits are to be more investigated along with market share, firm image and competitive advantage [18]. One significant problem that's requires solving is that of SMEs in an ambiguous situation and that the confusion among different entities controlling the environmental programs always exists, and some SMEs operate without accurate inspection. Moreover, a huge investment is required to implement recycling processes or EMS.

Assessing the motivation of five German SMEs to implement and certify EMS was part of another research studies [19]. Among the small and medium-sized energy and gas companies in Germany, organizing companies to deal with environmental regulations and domestic competition, finding cost cutting opportunities and increasing efficiency for competitiveness enhancement frequently mentioned as strong motivators to adopt EMS. These companies reported air and waste emissions reductions, energy and water conservation, safety and incidence reduction as positive consequences of ISO 14001. Obtaining formal EMS certification is an effective foundation towards sustainability management in a company, taking into account the three pillars; social, economic and environmental issues. If ISO 14001 achieved positively and implemented slowly, it can be an effective foundation to managing sustainability aspects in a firm and leads to greater advantages. However, it is essential to perform more researches to e xplore whether the benefits and positive impacts of certifying environmental management system can accomplish the strong motivations of doing so. Furthermore, among all the benefits of SMEs, cost savings documentation, increased competitive advantages and operational improvements are more difficult to bring into focus.

2.4 Environmental and Sustainability Practices and Strategies

Key parameters and strategies that interact with implementation of environmental management tools been described and analysed by taking into account the specific characteristics of the SMEs [13]. According to Figure1, in the First stage of the strategy it is noted that environmental tools adoption does not require extra financial support or access to capital [9] [13]; as SMEs may have higher risks, information limitations and higher costs for implementing EMS. Since the small firms usually consist of an operative unit that's run by a single individual owner-manager having the absolute authority, the Second stage is to identify that the mind-set of the manager in risking, embracing change, innovation, growth and social responsibility exert a high influence on the development of firms and choice of strategies and policies. The Third stage indicates the necessity of internal expertise, higher qualifications of managers, attracting high skill labour and increasing awareness on waste minimization in SMEs. Moreover, SMEs organizational structure need to be revised as a small team who is generally responsible for all the important aspects of the business including key decision makings, dealing with regulations and identifying markets. In doing so, SMEs have to shift responsibilities to qualified workers in order to facilitate collaboration and a democratic workplace which relies on high knowledge and expertise. The fourth stage highlights the using the external expertise. Eventually on the Fifth stage, the need for technological development and a culture of innovation is illustrated.

In general, in the case of packaging they mentioned that legislation, producer responsibility obligation and increasing pressure on companies related to environmental issues would result in attracting more expertise and advice in order to implement environmental management tools with the new regulations.

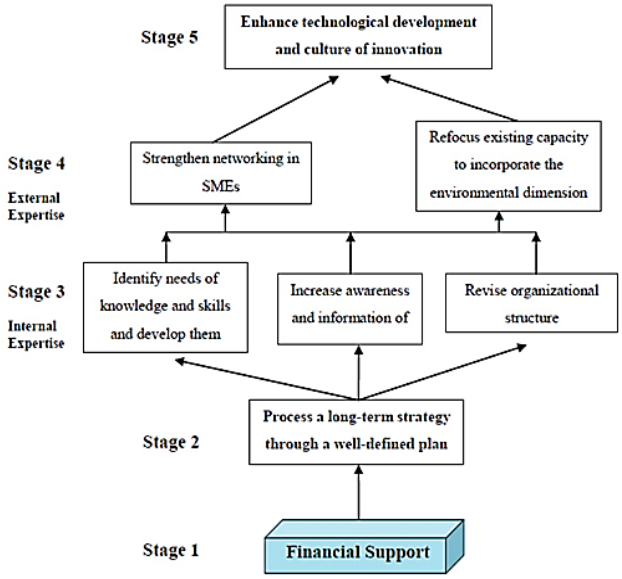

Figure 1. Proposed Strategy for Environmental Activities in SMEs [13].

Strategy elements that address several important issues for adopting environmental management tools need more research, since they might develop or become invalid in the future. In SMEs, the transit packaging used to supply materials and finished products that is the treat for the packaging waste. This information could also be utilised for developing an export system. Research investigated development practice and innovation theory within the SMEs that will lead sustainable innovations into practice. In the research, it shows that sustainable innovations mostly rely on technological processes improvements and reduction in production costs [20]. The case of PRIMA project (rubber and plastics industry) selected, in order to interview with their 26 c ompanies and gather the appropriate data to study the triple P in business through them. In the specified case, the dominant role of the managers considered as one of the SMEs behavioural advantages to undertake the sustainable innovation activities. Moreover, flexibility o f the organization is another benefit for SMEs especially the smaller companies, as a little bureaucracy and personnel motivation will result in more efficiency in innovation projects.

In contrast, managers could have disadvantages regarding to their short-term focus and weaknesses in managerial skills such as decision-making. Plenty of sustainable innovation activities indicate that attaining a determined concept for sustainable innovation seems not to be easy in the short-term. Therefore, further research is required towards comparing the influence of internal and external factors in SMEs to the way of their sustainability corporations. Furthermore, better understanding of the sustainable innovation techniques, companies' stakeholders and staffs could perform tasks more effective to make developments in company performance.

Research shows an idealized enterprise leadership model used for enterprises sustainability [21]. This model is very comprehensive and requires the full contribution of all elements of the company from human resources, marketing, information, R&D, finance and environmental policies. Hence, SMEs may face some barriers on their way to become sustainable, as they have difficulties in the ir resource capability and sustainability awareness. A case report investigated the SMEs that are engaged in some types of the QMS such as ISO 9001, but not operate with EMS. Most of the larger enterprises that utilize both of these systems believed that they would be appropriate incentives to move SMEs as suppliers towards forming environmental sustainability practices and become sustainable developing enterprises in the supply chain. The study shows that QMS provides customer satisfaction and resource conservation and has the potential to eliminate or decrease the environmental impacts adopting green management and process innovation [21]. In this regard, implementing and certifying the formal EMS help companies to integrate environmental, health and safety systems and quality management systems [19].

2.5 Environmental Impacts of Adhesive Industry

Studies had sought to find out the concept of environmental sustainability within the adhesive industry. Adhesives are mostly consisting of polymers and derived from petroleum feedstock, which is non-renewable resources [22]. Moreover, in their manufacturing process, a large-scale energy with pollutions including greenhouse gases used as input and emissions of organic pollutants generated in output. In terms of resources, studies also declare that adhesives

produced from renewable vegetable and animal resources used for a long time. In addition, the pressures towards sustainable practices caused investigations to develop new polymers from renewable biomass, using fermentation techniques or controlled pyrolysis [22]. Adhesive products are a main source of volatile organic compounds that are harmful to the atmosphere as they cause photochemical smog and lung diseases such as asthma. Furthermore, organic vapours have the same influence as greenhouse gases due to absorption of infrared radiation [22].

However, several adhesives such as rubber to metal bonding, which produced as organic solvents, based on aqueous emulsions at present. Residues of some of the compounds used in additives and adhesives are released into the environment and reported for disruption of endocrine system as well. According to European Union "REACH", regulations (Registration, Evaluation, Authorization and Restriction of Chemical) apply more obligations to the industries to substitute safer materials by endocrine disruptors [22]. Taking into account the two important factors including raw material inputs and discharging wastes outputs from and back to the ecosystem, the laws of the Thermodynamics considered [22]. In accord with the second law of Thermodynamics, in this case, system begins with highly ordered raw materials with low entropy and moves towards increasing entropy and finally ends up with disordered wastes with maximum entropy, referred as *the state of "Thermodynamic Equilibrium"*. Therefore, the petroleum with low entropy burnt to produce carbon dioxide with high entropy. On the other hand, constant rate of growth (size of the economy or resource) relies on the growth rate in mathematical terms. Therefore, it is clear that as long as the economic system pursues endless growth, sustainability is not achieved by adhesive technology and this fact is well ensured by Thermodynamics laws.

The case of Omyang company, a Korean speaker supplier was investigated in order to make a qualitative analysis of the process of environmental management adoption [23]. One of the company's green challenges was the cone paper manufacturing process, which generated huge amount of wastewater and required significant amount of glue that is an environmentally hazardous material due to the toxic vapours emitted when it dries and it is an origin of solid waste as well. Applying the green management approaches, company reformed the cone paper production process with installation of a wastewater treatment tank. Moreover, the company invented soluble glue from toluene, which was substituted, by rubber glue in spite of its higher cost. As a result, company productivity increased along with reduction of chemical use and wastewater emissions. Redesigning the organizational structure, company decided to put the research and development units, quality assurance and production directly under the control of managing director. In addition, a TFT mainly from the quality management team organized in order to submit ideas regarding green management. In this place, the management team plays an important role in supporting personnel and brings them strong motivation for green management. After the TFT organization and decision to obtain ISO 14001, the management team realized employees reluctant and a negative organizational climate, therefore presented an education and training program to change personnel's attitude to participate in green activities positively.

However, many researchers have tried to find a solution for environmental impact of particular adhesive products; still it is necessary to consider the total environmental aspects of the engineering framework in which the adhesive technology is developed. Improving the engineering efficiency towards products sustainability and reducing the environmental impacts of adhesive industry, a complete "life-cycle analysis" would be found.

2.6 EMS Disadvantages for SMEs

The disadvantages of EMS have been grouped [9] into three categories. Some studies indicate that cost of certification/validation, cost and quality of advising consultant resulted in SMEs dissatisfaction with implementing the EMS. In this regard, lack of rewards, restriction of linking the EMS to quality systems and complexity of this approach are other factors that need to account. According to the research, legislation and regulators are more significant for environmental improvements in SMEs than customers are and this fact shows the key role of regulations in SMEs environmental strategies [9]. Investigating the adoption of formal EMSs across the European Union, studies identified regarding EMAS and ISO 14001. According to reliable commercial sources, comparing ISO 14001 standard popularity to EMAS, it can be estimated

that the percentage of SMEs registered to international guideline ISO 14001 would be higher than for European EMAS. This is also widely reported in the analysed studies. Due to the variety of enterprises in the SME sector, it is not evaluated as a homogenous group of companies.

Therefore, SMEs have a diverse and heterogeneous nature and the studies that probe this sector are too general. The research conducted also identified the limitation recommends that further research, specific sub-groups of SMEs in terms of size and sector diversity are be considered [9]. In summary, the literature demonstrates that environmental management system and sustainability strategies employed mainly within developed nations such as the European markets. Implementing EMS in SMEs, different techniques and strategies are studied in order to gain a perception about the criteria of the environmental sustainable practices. However, there is lack of literature regarding adhesive technology environmental impacts. In the next chapter, a detailed description of all features of the design and research settings presents through main principles for the research approach.

3 Research Methodology

This research is based upon on both qu alitative and quantitative data that facilitates through detailed company survey using site visits, themed interviews and questionnaire administration. Furthermore, reviewing the history and background of the company, all the publicity available materials such as company website and brochures used within the research. The proposed research seeks to describe the characteristics of a sustainable manufacturing business by pursuing environmental management strategies based on the collected data from document research, industry association data from the interviews and also any government environmental regulations, therefore it would be a descriptive research.

The population of the study is the personnel of Company X consisting of the shareholders, senior managers, engineers and high-level personnel due to their primary knowledge; current, accurate and factual data they can present for the research purpose. As a result, the researcher will be able to draw assumptions, derive findings based on the existing information, and perform the analysis in the higher steps. In Company X, five main parties were involved in meetings and helped the author to write up the observations and findings of the production line and surroundings during two days of company visit comprising HSE department (Health and Safety protection experts), quality control management, planning management, foreign purchasing management, and technical management. Moreover, the five owners (shareholders) and the board of director of the company offered an opportunity to ask some key questions and take their feedback regarding the most significant challenges they face in the company.

4 Results and Data Analysis

The main research findings were organized and presented through relevant qualitative and quantitative data. Company X reports regarding environmental aspects from energy and water consumption to noise pollution and management strategies for staff recruitment practices were analysed. Furthermore, the designed survey questionnaire administrated to 29 members of the organization and the further analysis resulted in some integrated findings regarding case investigations.

4.1 Company Interviews and Reports Analysis

The interviews conducted with the specific content and the reports provided by the request of the researchers.

4.1.1 HSE methods and resource consumption

Company X currently using the professional health and risk assessment services from an external engineering corporation approved by ministry of health and medical education and provides the HSE examinations for different organizations and industrial companies. The mentioned company helps firms to measure and assess the risks, eliminate and control all the issues that leads towards an unhealthy and unsafe environment for the workers, either in terms of mental or physical health. Their services include the identification of both physical and chemical hazard factors in the work environment. The pollutant measurement report for the late 2013 provided some data regarding noise and air pollutions in different production and packaging sites of the factory. Energy consumption of the company monitored within one-year period and water sources of the company investigated further within these research studies.

4.1.2 Environmental purchasing and green Products

In terms of green products, establish a new production line for producing an eco-friendly insecticide. The product presented under the marketing name of *"The safer alternative"* and provides safety for all the humans, plants and domestic animals. Its unique formulation caused it to be a product that is biodegradable and environmentally friendly, which is based on 99.75% water. Therefore, it is non-flammable, odourless, does not result in skin or eye irritation, and needs no protection before application. It has the minimum possible toxicity and can be applied even in the children's rooms and near the food or pets. For its packaging, a linear polymer called HDPE used due to its distinct features such as lightweight, low moisture absorption, high density and its high temperature resistance. Comparing the new insecticide with the former chemical insecticide, which is being producing for 20 years in the factory, the new one is economical and absolutely greener.

4.1.3 QMS methods

As mentioned in the literature [5] [19], there is an integration between QMS and EMS as some QMS techniques can be expanded to evaluate potential environmental risks of processes, products or activities. The company's HSE department has made some arrangements to implement 5S and also FMEA methods in some of the production sites in order to move along the continuous improvement of quality management system (ISO 9001:2000) and ISO 10668:2010 Brand valuation that they have already available. According to the HSE manager of the company, the 5S pillars consisting of sort, set, shine, standardize and sustain, can help them to eliminate overproduction or defective production wastes, in-process inventories, unnecessary transportations, motions and many other factors.
As a result, self-discipline will improve morale and pride in the workplace and it guarantees the continuity of daily routines without reminding of the managers. Moreover, these new approaches would be beneficial steps. However, lack of employees' culture and their resistance in using individual safety devices be mentioned as some barriers in these practices.

4.1.4 Staff recruitment practices

The authors intended to look at personnel recruitment aspects in order to develop an overall understanding of the values of owners who also define the recruitment criteria, in terms of staff employment, which can have a huge effect on the key decisions within the company, in particular environmental practices.

According to the report analysis, the granted positions to senior managers based on family relations (80%), length of the employment in company (10%), expertise, friendship and loyalty to the company only 10%. It was found that the criteria of employing the senior managers is not only based on their level of education and professional qualifications, but also is based on acquaintance and follows the traditional model of selecting the staff from the family members or through connections regardless of their capabilities and their point of awareness of the latest management techniques. It also indicates that company is being running within a small team of owner-managers who are responsible for every aspect of their business. These statistics seem to be surprising as they show a high hesitation of the company's owners to hand over the responsibilities to a new generation of people who might be the fresh graduates of universities, or their second generation of owners. "Cronyism" is a phenomenon that defines the case appropriately [24].

4.2 Questionnaire Analysis

Different levels of managers and personnel were engaged in completing the survey questionnaires. The respondent to the survey questionnaire consisted of owners (17.5%), board of directors (3.5%), top managers (24%), engineers (27.5%) and other high-level personnel (27.5%). In total 29 responds were received for the Question 1, 2, and 3 for the further analysis. Question 4 only related to the company owners, since it only relates to their job responsibilities. The key questions identified within the research study are as shown below:

1. In which department do you work? What is your task within that department?
2. How important are these stakeholders' pressures listed below in influencing your company attitudes towards environmental performance and are known as main drivers for adoption of formal EMS?
3. How important are the factors listed below in motivating your facility to seek for ISO 14001 and sustainability practices?
4. From your perspective, what are the top five challenges your firm faces generally?

4.2.1 Influence of stakeholder's pressures to adopt EMS

In accordance with the second question, all the 29 respondents were replied to all parts of the questions, and the respondents indicated that a variety of stakeholders exert strong influences on their environmental performance improvement.

As it is evident from figure 2, the three stakeholders commonly mentioned as applying pressure to undertake EMS were competitors, government regulations and shareholders with 31%, 30% and 27% respectively. The power of inspiration and significant role of these three entities in changing the whole SME approaches towards thinking about environmental concerns and working in a sustainable organization is realised from the following chart.

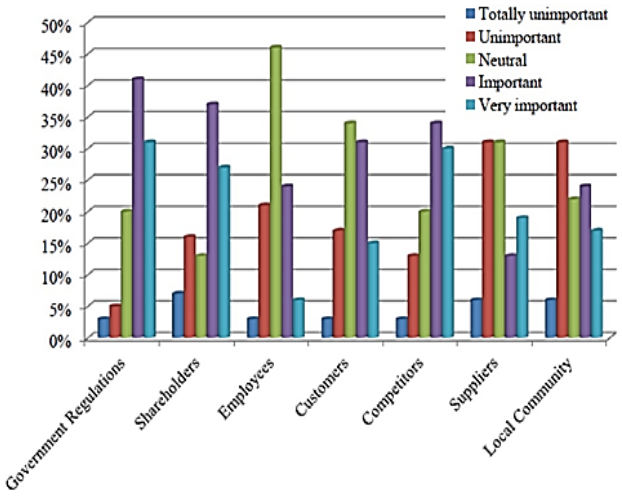

Figure 2. Influence of Stakeholders pressures towards adopting EMS [25].

On the contrary, the local community and suppliers mainly mentioned as unimportant components with no pressure and little influence on firm environmental attitude by 31% of each. With respect to the employees, the respondents recorded 46% neutral answers, which are to interpret that the environmental approach and awareness of the employees is not sufficient and they seem to have no orientation about these issues. This can be as a result of cultural and existing gaps in a developing country, meaning that it is not a long time that the public society got familiar with environmental importance of today's world.

4.2.2 Motivations towards EMS adoption

Based on the literature, a conceptual framework has defined the most important drivers for adopting EMS practices [26]. The study classifies these motivations to four main groups including relational, innovation, operational and business competitiveness. Each factor influences by related variables that leads to the adoption of different EMS practices.

The authors agreed to expand the mentioned elements in the literature to develop new motivation factors for the content of third question. Figure 3, illustrates the significant business elements and their level of encouragement for the owners, top managers and the rest of the staff of company, which can revolutionize their way of thinking about the wide range of environmental program advantages, build a foundation for them to uptake a sustainable agenda, and achieve its great results. Competitive advantage as most frequently rated as a very important motivator, by 31% of the respondents and only 10% of them judged it as unimportant. Results also showed that 24% noted highly motivated by p rofitability and cost savings.

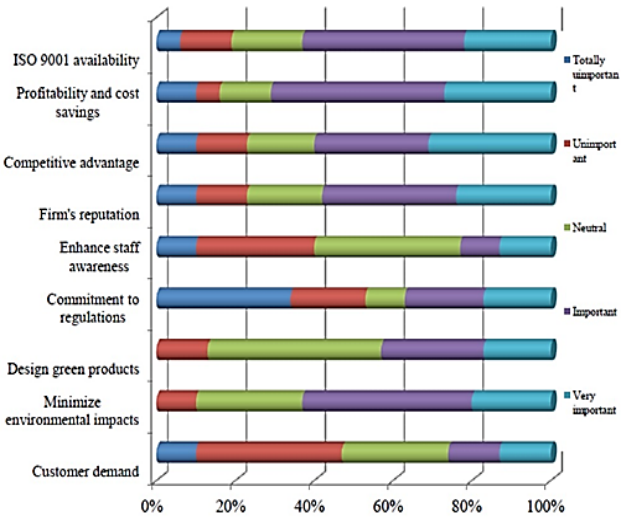

Figure 3. Motivation Factors towards adoption of EMS [25].

By contrast, commitment to the government regulations judged as very unimportant by a massive 34% of the respondents. Considering the respond to customer demand, a large percentage of 37% mentioned it as an as an unimportant factor which is a surprising statistic showing that the house customers or even industrial customers

do not consider the negative impacts on the environment or the green certificates the company might have. The planning manager of the Company X also mentions this during site visits.

4.2.3 Business owners challenges

With regard to the fourth question, the total number of five participants including owners (shareholders) of the Company X participated to the questionnaire. The question sought to discover the top five most challenging aspects that they currently have to tackle in their business.

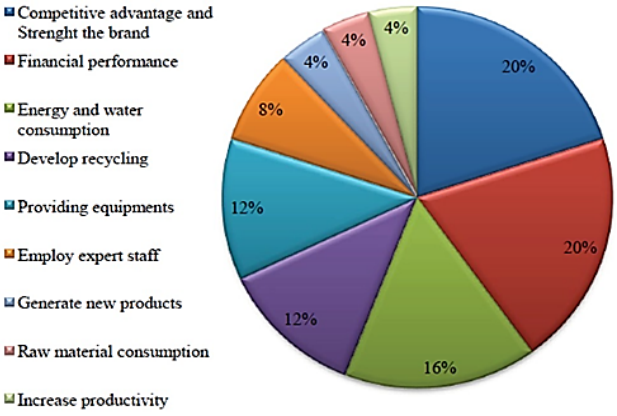

Figure 4. Business Owners Challenges within their Environment [25].

Figure 4 indicates that the top five challenges the managers encounter were strengthen the "RAZI" brand (20%), increasing financial performance (20%), energy and water consumption (16%), providing equipment's (12%) and recycling development (12%). 8% of the respondents were also largely regarded to be so important by 24%. Hence, it is evident that employing expert s taff, generating new products, increasing productivity and reducing raw material consumption have a minor priority and currently their key focus is towards competing with the growing market of SMEs to save their costs. This is achieved by consultations with professional advisors and employing high-skilled staff instead of those who are old and have old-fashioned insights into environmental sustainability issues.

4.3 SWOT Analysis

In order to have a final evaluation of Company X environmental performance, a S WOT analysis conducted as an effective technique. This would help the authors to identify the strengths and opportunities of the business and exploit them, and shift the paradigm on the weaknesses and environmental threats.

Table 1. SWOT Matrix [25].

Factors	*Evaluation*	
	Positive	***Negative***
Internal	**Strengths** ▪ Well-known brand ▪ Competitive advantage ▪ Desirable prices and variety of products ▪ ISO 9001 availability ▪ 5S and FMEA methods ▪ Private well ▪ Controlling noise and air pollution ▪ Owners' values for energy and water conservation and recycling development ▪ Producing green products	**Weaknesses** ▪ Owners' practices for staff recruitment ▪ Lack of technical expertise ▪ Lack of environmental culture ▪ Lack of environmental department ▪ Neutrality of employees towards sustainable practices
External	**Opportunities** ▪ Competitors' vulnerabilities ▪ Green products development ▪ Employ expert staff ▪ Setting environmental department ▪ Green suppliers ▪ Export new products to the present customers in middle east and north Africa	**Threats** ▪ Bureaucracy in ministry of oil ▪ Neutrality of customers for demanding green products ▪ Rising costs of fuel and energy ▪ Few key suppliers ▪ Recent sanctions against the country and obstacles for equipment imports ▪ Lack of environmental platforms in the country

In other words, this analysis helps to maximize the company strengths and opportunities as well as minimizing the effect of weaknesses and threats in terms of environmental issues.

5 Discussion

As it is evident from the reports and collected data of Company X, various aspects and operations undertaken by company including risk assessments of noise and air pollution, energy and water consumption, fire protection and process improvement methods evaluated. Although, no specific environmental management plan defined in company; but all of the mentioned modification procedures are in line with the requirements of EMS adoption and can create a suitable foundation for the company to be certified with ISO 14001 w ithin management social responsibility and identifying expert teams of personnel.

On the other side, there is a linkage between QMS (ISO 9001) already available in the company, and EMS. FMEA techniques as one of the powerful

tools of quality standard are newly being applied to identify the potential failure of production equipment and therefore; these expanded to evaluate potential environmental risks of processes, products or activities.

Considering the existing bureaucracy in the ministries of oil, health and medical education in the country, there are some barriers for the company towards replacing gasoline and bottled gas with natural gas and evaluation of noise pollution. Therefore, new strategies defined to overcome these limitations are evaluated further. The planning manager of company stated, *"The negative aspect of bureaucracy in ministry of health and medical education and ministry of oil caused some difficulties in the way of environmental assessments in the company."* Increasing energy efficiency and reducing the electricity costs of Company X can be the focus in terms of environmental sustainability. It necessitates an integrated energy management system within a long-term energy management plan; due to the global climate change and criticality of energy consumption in today's world, especially the country of case, which is ranked at the world's top 20 electricity consumers in the world. Plenty of energy conservation practices that allows companies to create energy plan, improve energy efficiency and control the costs. Due to the large infrastructure of the factory and its suitable geographic location; solar thermal collectors can be utilised in the company in order to gather the sun's heat and redistribute it to heating water stored in tanks, especially during hot months like August which sun's light is more and electricity consumption reaches the pick. Solar electric is also useful to convert the sun's energy directly to the electricity for the equipment power. Moreover, due to the geographic location of the factory, small wind turbines can be practical to generate electricity from wind.

In terms of water consumption in company, it seems that there is no important problem as they already have a private well, which provides cost-effective water consumption. This would be one of the positive aspects of their business and a strength, which leveraged as part of a sustainable program.

Regarding material purchasing, however company have not defined any specific policy for environmental purchasing but they seem to be in a good situation in terms of purchasing green raw materials. However, they require widening the range of material suppliers instead of relying on few key suppliers. As an evident, commercial deputy manager of the company pointed out; "the world manufacturing industries are moving towards saving the earth, minimizing the costs and complying international rules and this provides the opportunity for our company to purchase green raw materials from Chinese or European suppliers unconsciously."

In terms of staff recruitment practices, the existing cronyism eliminated by employing high-level graduates as young qualified managers who are well educated by the up-dated knowledge with the relevant fields of study. Moreover, collaboration with higher education institutions or research centres, hiring external advisors; low cost assistance from funded organizations and changing the recruitment patterns would help the company to make a beneficial organizational shift to environmental attitudes and also facilitate a collaborative, democratic and professional workplace.

5.1 Defined Plan Towards EMS Approach

Based on the discussions regarding reports, interviews and questionnaire, the authors constructed a well-defined plan towards EMS approach of the company. This plan is to develop current activities and operations within the company to cover the research purposes, determine how to take advantages of positive points of the business to create a platform for EMS approach in the case, become environmental responsible and increase their profitability. Company X as guidance before proceeding environmental operations can adopt the six prioritized elements. According to the figure, different aspects of company need to develop with the aid of both Internal and External entities.

Internal entities refer to the whole organization's personnel including owners, senior managers, engineers and operators; which require their persistent commitment, engagement and reflective ideas. Furthermore, employees have a crucial role in this approach, therefore their attitudes, self-discipline and awareness of environmental aspects of the workplace can create valuable motivations for company improvements. External entities refer to the low cost assistance and advisory from graduates of universities or research institutions. They can also help the company in the next stages with ISO 14001 certification procedures.

1. Establish responsibility for managers and owners
   - Environmental responsibility culture
   - Awareness of firm's environmental risks
   - Awareness of cost cutting opportunities

2. Association with stakeholders
   - Use stakeholders as drivers to improve sustainability
   - Come up with innovative solutions
   - To address their needs

3. Revise recruitment practices
   - Engage universities and research institutions in firm's decisions
   - Employ expert staff from fresh graduates
   - Establish environmental department, green teams or TFT

4. Prioritize SWOT and key issues
   - Strategic fit assessment
   - Maximise strengths and opportunities
   - Minimise weaknesses and threats

5. Communication with external consultancy
   - Educate the workforce for sustainable practices through workshops, courses or participation programs
   - Provide guidance for environmental issues

6. Enhance technical and technological aspects
   - Develop 5S, FMEA practices and green products
   - Make low-cost innovations such as product light-weighting
   - Set environmental indicators and life-cycle assessment

6 Conclusions

The research was set out to scrutinize the concept of environmental sustainability and has determined the practicality of EMS within an SME in a developing country; explored the incentives and supply chain impressions for the standard system adoption, and the role and impact of management strategies on an organization sustainability and environmental developments. The study also has sought to argue the success of sustainable practices in SMEs, which confront with internal and external hurdles of doing so. Main consideration given to shifting managers' long- established attitudes, tackling the employees' indifference to environmental issues and making coordination with the upstream and downstream stakeholders of supply chain. Surprisingly that the findings of the research proved the significant role of owner-managers of the SME as absolute authorities and decision makers who have the power to embrace changes and address environmental risks by developing EMS. Hence, they need to be aware that their company exists not only to generate profit, but also to create a positive revolution in the world by actions to deal with the global issue of sustainability. They need to perceive that a sustainable business is more efficient, more robust and has closer ties with the stakeholders. In essence, based on the findings of the research; it seems that implementing EMS within the investigated SME absolutely has too many advantages that outweigh the disadvantages; such as improving firm images, enhancing environmental responsibility, achieving cost savings, profitability in the long-term and business prosperity.

The authors attempts to discover appropriate answers concerning initial questions of the study, which helps to delineate the scope of the research. The key question was to identify the factors, which can motivate SMEs to adopt EMS. Moreover, advantages and disadvantages of environmental practices were compared together in order to find out the highest possible benefits that company can achieve through this journey. However, in the developing countries due to the economic, finance and cultural gaps still there is a long journey to the adaptation with the green management and sustainability practices to the businesses. The barriers of sustainable practices adoption in a developing country explored within the research, considering the major challenges of business entrepreneurs and the vulnerability of SMEs.

References:

[1] Brundtland Commission, World Commission on Environment and Development (1987). Our Common Future. *Oxford: Oxford University Press*, 1987.

[2] J. Elkington. Cannibals with Forks: The triple bottom line. *Oxford Press Publishers: Capstone*, 1999.

[3] J. Kaplan, J. *Greening Your Small Business: How to Improve Your Bottom Line, Grow Your Brand, Satisfy Your Customers-and Save the Planet.* New York: Penguin Group, pp. 13. 2009.

[4] A. Kovac Kralj, J.-M. Hsiao, and D. Kralj. Energy-efficient production process trough "Green" Management. *WSEAS Transactions on E nvironment and Development,* Vol.9, No.2, 2013, pp. 68–77.

[5] F. Roettgers, *Going Green Together: How to Align Employees with Green Strategies.* Environmental

Pioneers, 2011.

[6] G. Woodside, P. Aurrichio, P, J. Yturri. *ISO 14001 Implementation Manua*l, McGraw-Hill, pp. 3. (1998)

[7] A. Zorpas. Environmental management systems as sustainable tools in the way of life for the SMEs and VSME, *Bioresource Technology,* 101(6), 2010, pp. 1544-1557.

[8] S.B. Moore, S.L. Manring. Strategy development in small and medium sized enterprises for sustainability and increased value creation. *Journal of Cleaner Production,* Vol.17, No.2, 2009, pp. 276-282.

[9] R. Hillary. Environmental management systems and the smaller enterprise. *Journal of cleaner production,* Vol.12, No.6, 2004, pp. 561-569.

[10] UNIDO. Strategy Document to Enhance the Contribution of an Efficient and Competitive Small and Medium-sized Enterprise Sector to Industrial and Economic Development in the Islamic Republic of Iran. Vienna: United Nations Industrial Development Organization, 2003.

[11] H. Williams, A. Schaefer, A. Small and Medium Sized Enterprises and Sustainability: Manager's Values and Engagement with Environmental and Climate Change Issues. *Business Strategy and the Environment*, Vol.22, 2013, pp 173-186.

[12] E.T. Quartey, P. Lešáková, and I. Obršálová. Measuring Environmental Performance of the Regions of Czech Republic by Sustainable Value Approach. *WSEAS Transactions on Environment and Development,* Vol.12, 2016, pp. 141-148.

[13] D. Perez-Sanchez, J.R. Barton, D. Bower. Implementing environmental management in SMEs. *Corporate Social Responsibility and E nvironmental Management*, Vol.10, No.2, 2003, pp. 67-77.

[14] US EPA. Integrated environmental management systems: implementation guide. Washington DC: U.S. Environmental Protection Agency, 2000.

[15] F. Ciliberti, P. Pontrandolfo, B. Scozzi. Investigating corporate social responsibility in supply chains: a SME perspective. *Journal of cleaner production,* Vol.16, No.15, 2008, pp. 1579-1588.

[16] D. Dunphy. *Organizational change for corporate sustainability*. pp. 695-698. London: Routledge, 2003.

[17] G. Keijzers. *Business, Government and Sustainable Development.* Oxford: Routledge, 2005.

[18] Y. Agan, M.F Acar, A. Borodin. Drivers of environmental processes and their impact on performance: a study of Turkish SMEs. *Journal of Cleaner Production,* 51, 2013, pp 23-33.

[19] D. Morrow, D. Rondinelli. Adopting Corporate Environmental Management Systems: Motivations and Results of ISO 14001 a nd EMAS Certification. *European Management Journal,* Vol.20, No.2, 2002, pp. 159-171.

[20] H.E.J. Bos-Brouwers. Corporate sustainability and innovation in SMEs: evidence of themes and activities in practice. *Business Strategy and t he Environment,* Vol.19, No.7, 2010, pp. 417-435.

[21] I. R. Kerr. Leadership strategies for sustainable SME operation. *Business Strategy and t he Environment,* Vol.15, No.1, 2006, pp. 30-39.

[22] D.E. Packham. Adhesive technology and sustainability. *International Journal of Adhesion and Adhesives*, Vol.29, No.3, 2009, pp. 248-252.

[23] K. Lee. Why and how to adopt green management into business organizations? The case study of Korean SMEs in manufacturing industry. *Management Decision*, Vol.47, No.7, 2009, pp. 1101-1121.

[24] J. Nadler, and M. Schulman. *Favoritism, Cronyism, and Nepotism, 2015*. [Online] Available from: http://scu.edu/ethics/practicing/focusareas/governmen t_ethics/introduction/cronyism.html [Accessed 10 Oct 2016].

[25] S. Shah, E. Ganji, S. Hasan. Environmental management systems and sustainability in SMEs, *CSCC,* Greece, 2016. MATEC Web of Conferences, *2016,* Vol.76, p. 02006. doi: 10.1051/matecconf/20167602006.

[26] N. Singh, S. Jain, P. Sharma. Motivations for implementing environmental management practices in Indian industries. *Ecological Economics*. Vol.109, 2015, pp.1–8.