ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PLANNING IN MANUFACTURING: FACILITIES MANAGEMENT PROSPECTS

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ABSTRACT

The increasing consciousness of sustainable development and reconciling production with ecosystem conservation have fostered the adoption and implementation of Environmental Management System (EMS). This study investigates the process and factors that affect in EMS planning. Previous research mainly focuses on environmental management practices and its performance towards different sectors. It was identified that minimum attention is given to planning of EMS at corporate level. Thus, this study explored the corporate EMS planning process in Sri Lankan manufacturing industry. This is an area where facilities managers can contribute in manufacturing facilities. This paper reports on case studies of three private sector manufacturing industries, which were using up to date environmental management practices. Data was collected by interviewing three participants from each of selected manufacturing firms. Based on the case study findings, a framework was developed for EMS planning. This includes six stages starting from strategy formulation to system implementation and evaluation. The developed framework will lead to an effective EMS planning practice that could be used in Sri Lankan manufacturing industry.

Keywords: *Corporate Environmental Management; Environmental Management System; EMS Planning; Manufacturing Industry; Sri Lanka.*

1. INTRODUCTION

The extension of economic growth in business through globalisation has often been associated to issues that are threatening to the environment. As such, many corporations have realised their social responsibility and voluntarily succumbed themselves to international standards pertaining to environmental management (Watson, 2000). Hence, environmental considerations in organisations are likely to form an integral part of commercial normality and indeed competitiveness in the future (Pun and Hui, 2001). A competitive advantage can be achieved not merely by keeping abreast of environmental developments, but also by initiating change with an organisation and responding with new environmental friendly products and production process. Indeed, growing consumer awareness and environmental pressure groups are likely to ensure that firms which do not take action on the environmental front will lose market share (Montabon *et al.*, 2000). Thus, manufacturers that can simultaneously provide quality and environmental friendly products tend to have a general potential of capturing larger market shares and returns.

Facilities managers today similar to other managers are expected to become more environmentally responsible (Montabon *et al.*, 2000). Pitt and Trucker (2008) defines FM as the integration and alignment of the non-core services including those relating to premises, required to operate and maintain a business to fully support the core objectives of the organisation. Nowadays, dedication of FM organisations to new developments seems to be the way to stay in business, constantly exceeding customers' expectations and adding value to the core business of the client organisation (Mudrak, 2004). In that, facilities managers should work in par with the top management to practice environment management within facilities. This

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paper looks into environmental management and its planning process in manufacturing organisations in Sri Lanka.

2. LITERATURE SYNTHESIS

An Environmental Management System (EMS) is a structured approach to address the environmental bottom line. It is defined by the British Standards Institute (1994, p.6) as; "the organisational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy." With reference to the International Organisation for Standardisation (ISO, 2010), an EMS is a systematic approach to dealing with the environmental aspects of an organisation. It is a 'tool' that enables an organisation of any size or type to control the impact of its activities, products or services on the natural environment.

An EMS, therefore, generally follows the adoption of an environmental policy. According to Maier and Vanstone (2005), the environmental policy formally outlines a company's commitments to environmental management and commonly includes commitments to reduce waste, pollution, energy and resource use, sets objectives and targets and reviews the company's environmental performance. This policy starts with EMS planning phase.

EMS planning is the process of identifying a portfolio of environmental strategy and business process and determining a better alignment of both (Pun *et al.,* 2002). The planning can assist an organisation in executing its business plans and monitoring its environmental performance and goals. The outcomes are greater understanding of the EMS opportunities and a shared view of the EMS benefits and constraints across the organisation. Nevertheless, the EMS planning is a complex and continuous process which consists with four major actions, namely, 1). Identify aspects and impacts from facility activities, products, and services; 2). Review legal requirements; 3). Set objectives and targets; and 4). Establish formal EMS program (Washington, 2007). It is influenced by a host of socio-technical parameters whose behaviour and interactions are not well understood. According to Pun's *et al* (1998) view the effectiveness and efficiency of the process also rely largely on stable environment and quality planning resources. Previous studies have found that different planning methodologies may lead to various planning results and decisions. Many attempts at EMS adoption do not necessarily lead to align EMS planning with the corporate objectives, and identify critical processes and procedures according to the pressures bearing on their unique core business (Maxwell *et al.,* 1997). Besides, there are number of common organisational factors that are affecting to the environmental management system planning as presented in Table 1.

Table 1: Divers and Barriers for EMS

Drivers	Industrial Barriers	Organisational Barriers
Organisations: The drivers within organisations include management, staff, parent company, and shareholders.	Capital costs: This mainly comprises with funds for major and minor environmental improvements and the expected internal rate of return on all capital projects.	Attitudes of personnel: Personal attitudes like disengaged, parochial interests, effect more critically since those attitudes directly cause the organisational line of business.
Market: Most consumers now demand environmental loyalty before they purchase products. Industries, therefore, are prompted by the market to adopt new strategies towards the environment.	Community concern: In an emergency situation, community must concern on the perception of risks associated with the business.	Quality of communication: "Distance" between top management's espoused commitment and action throughout the organisation.
Social forces/Community: A community can demand the existence of good EMS in an organisation that they feel is a threat to the environment and their existence. In particular, the activities of environmental non-governmental organisations are	Regulatory constraints: Since EMS planning works with regulations, standards, operating permits, there's a barrier to make required	Administrative heritage: Improper establishments of Standard operating procedures and assumptions about running the business also can be a prioritised

Drivers	Industrial Barriers	Organisational Barriers
becoming very vocal and serve as a key driver of EMS.	changers without legal consent.	factor in organisational EMS planning.
Financial: Financial institutions and insurance companies these days demand the existence of an effective management system like EMS in order to acquire and get insurance.	Information: Difficulty of collecting appropriate data and inadequate measurement tools.	
Regulatory Institutions: Porter (1990) argued that government regulations may serve in practice as a stimulus to both economic growth and cleaner production.	Technical knowledge: Physical, chemical, and biological uncertainty, inability to eliminate some risks or effects.	
Source: Zutshi and Sohal (2004)	Source: Post and Altman (1994)	

While above mentioned drivers and barriers influence an EMS planning process, it is seen increasing recognised in the manufacturing industry. For example, Stipanuk (1996) found in their study that almost all manufacturing firms have planned their in-house EMS or used efforts on protecting the environment in manufacturing firms with varying degrees of intensity in the past few decades. Hence, there is a necessity for facilities managers who engage in manufacturing sector to be knowledgeable about EMS planning process and take a lead role in implementing this together with the company top management. With this, this research study aimed to identify good practices of Environmental Management System (EMS) planning processes in Sri Lankan manufacturing organisations together with its drivers and barriers in order to suggest an effective procedure for EMS planning in manufacturing sector.

3. RESEARCH METHOD

This study has adopted qualitative research approach, the essence of which, according to Wigren (2007), consists of focusing on understanding the naturalistic setting, or everyday life, of a certain phenomenon by the investigator. Qualitative methods are essentially descriptive and inferential in character and focus primarily on the kind of evidence that will enable to understand the meaning of what is going on. Accordingly, among various approaches available in the qualitative approach, case study (Yin, 2003) has been selected.

The case study research method provides an in-depth investigation by studying ‘cases’ in an uncontrollable environment. According to Yin (2003), case studies are the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events and when the focus is on contemporary phenomenon within real-life context. Considering these points, the case study method was seen as suitable for this study.

In this study, cases were selected from manufacturing industries which were adapting EMS Planning. Accordingly, three manufacturing firms which engage in EMS planning were selected. From each case three semi structured interviews were conducted with three representatives from top management, middle management and employees. Altogether, 9 interviews were conducted and each normally lasted for 30 minutes to 45 minutes. Table 2 provides the case studies and interviewees’ details.

Table 2: Case Study Description

Organisation	Organisation A	Organisation B	Organisation C
Type of Business	Tobacco Manufacturer	Biscuits Manufacturer	Dairy Food Manufacturer
Interviewees	▪ EHS Manager ▪ Shift Manager ▪ Quality Executive	▪ QA Manager ▪ System Manager ▪ Assistant System Manager	▪ EHS Manager ▪ Assistant QA Manager ▪ QA Executive

Key themes (codes) emerging from the findings were identified within each case and replication of findings were tested using 'cross-case analysis.' The research results are presented and discussed next.

4. RESEARCH FINDINGS

Research findings from the case studies are presented here in two sections: Environmental Management practices in Sri Lankan manufacturing firms; and, Drivers and barriers of EMS planning.

4.1. ENVIRONMENTAL MANAGEMENT PRACTICES IN MANUFACTURING

The empirical study revealed that Environmental Management (EM) of an organisation provides a framework for managing environmental responsibilities efficiently integrating the company's production cycle and the overall operation. Considering the environmental management practices in manufacturing industry, it can be identified that it is a crucial factor which affects each and every step of the production cycle. Starting from the raw material reception, all the raw materials must be fitted to the pertaining parameters or standards of the organisation which emphasis the aptness of them to the environment. For example, EHS Manager of Organisation A emphasised that, "*since this company provides a consuming product to the end user, we are highly concerned about the environmental management in our production cycle. We mainly consider about the energy, electrical, fuel, vehicle emission, transportation, logistics, water and waste*." Generally, manufacturing firms are operating their regular tasks with the machinery works where emission, effluent, waste and odour are the major discharging entries that arise as consequences of electricity, water, fuel and other raw material usages. According to QA Manager of Organisation B, "*first, we conduct an aspect evaluation and prepare process maps and flow charts. Then check each and every process steps and prepare environmental aspects and relevant impacts. It called as the aspect register. There we identify each and every aspect of the organisation with their impacts*." As per EHS Manager of Organisation C, *"in the area of packaging, an active and fruitful environmental friendly mechanism is needed and it results to the whole environmental improvement."* These quotes show how each organisation aligns EM with their production cycles.

The responsibilities of the all management levels include identifying ways for the organisation to improve its environmental performance; setting objectives and targets; and monitoring and evaluating implementation. The organisation should explore its in-house expertise in forming the task group, with the participation of top management, middle management and the employees. Case studies revealed duties and responsibilities of these three levels as depicted in Figure 1.

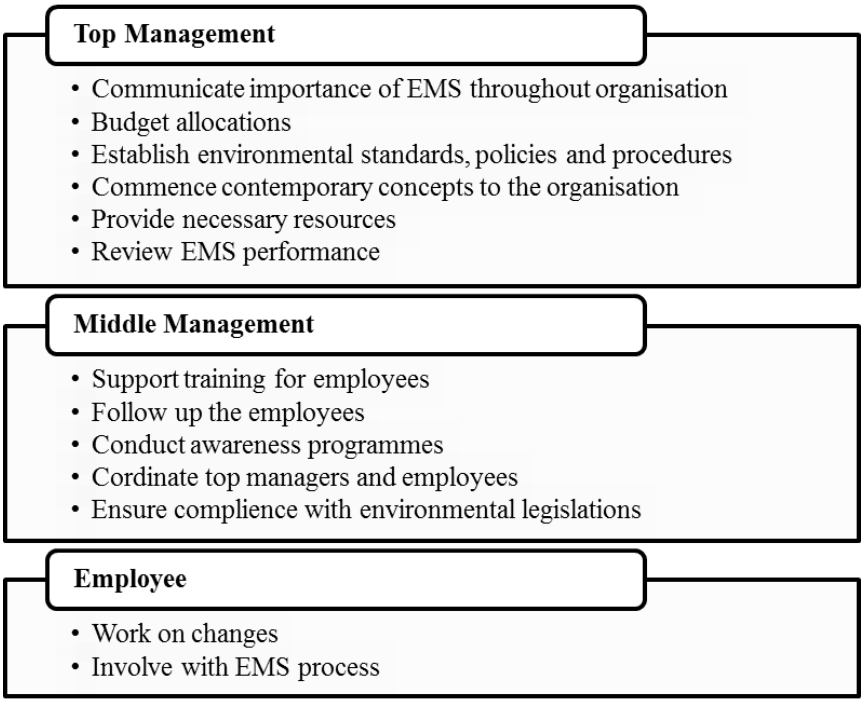

Figure 1: Corporate Responsibilities of EM Practice

Key difficulties faced by management during and after the implementation of EMS include issues with human resource management, changing attitudes and inadequate training in terms of employees. Another significant difficulty as per the QA Manager of Organisation B was paying attention to legal and regulatory factors that are pertaining to the manufacturing industry.

To introduce EMS within the organisations, each organisation practice different strategies. These could be group into three areas and listed as given in Figure 2. Factory-based EM strategies comprised with the standard measurements of ISO 14000 under the criteria of air emission, soil protection, waste management, effluent and eco efficiency. Strategies which aligned with personnel and resource consumption of the organisation were identified as community-based EM and Resource-based EM respectively.

Factory based Environmental Management

- *Environmental management based on the ISO 14000 standards*
  - ✓ *Air emission control*
  - ✓ *Maintain water and discharge of waste water*
  - ✓ *Protect soil and ground water level*
  - ✓ *Eco – efficiency*
  - ✓ *Waste management*

Community based Environmental Management

- *An approach to environmental protection that starts with a local environmental problem and involves all the needed persons and organisations*
- *Jointly manages the resource through partnerships of governments, businesses, non-government organszations and citizens.*
  - ✓ *Conduct periodical training programmes*
  - ✓ *Invite guest lecturers to training programmes*
  - ✓ *Conduct posters, painting and art programmes to aware our stakeholders*

Resource based Environmental Management

- *Environmental management strategies which align with the resource consumption of the organization*

Figure 2: EMS Strategies

Through the study it was apparent that these EM Strategies tend manufacturing industries to provide an overall framework and direction for environmental management.

4.2. DRIVERS AND BARRIERS FOR EMS PLANNING

Case studies identified internal environment and external environment factors. Internal environment factors were mainly based on organisation resources, technological capacity, organisational culture, management systems and employee morale. In terms of external environmental factors, interviewees agreed on market, financial and social related drivers but were unable to provide specific examples. In terms of regulatory drivers, they mentioned about Environmental Protection License. This aims to prevent or minimise the release of discharges and emissions into the environment from prescribed activities in compliance with national discharge and emission standards and develop an approach to pollution control that considers discharges from prescribed processes to all media (air, water, land) in the context of the effect on the environment.

Interviewees discussed on industries barriers starting with capital costs. Management commitment and analysis was seen as a must, before allocating capital for EMS planning. Therefore, in the planning stage of an EMS the organisation must highly concern on the capital cost that need to be allocated in environmental management projects. This enables the firm to determine funding sources and feasibility of those projects. Although, the relevant laws and regulations act as a driver in EMS planning in manufacturing organisations, they become barriers due to constraint in obtaining certificates and license. Similarly, community requirements could both act as a driver or a barrier as per the interviewees.

Further barriers were identified through case studies. One significant barrier was inadequacy of relevant information and resources which agitates the process of how to plan EMS and how to integrate with the organisational internal and external forces. The Shift Manager of Organisation A confirmed that "*overall, we have an inadequacy of information on relevant activities regarding the EMS planning and there are no ideal solutions for certain problems*." Further, technical knowledge was seen as a significant in the process of planning an EMS. Even in the stage of planning an environment management system, organisation have

to have an outstanding technical knowledge for the purpose of providing a better procedure of environmental management. The Shift Manager of Organisation A stated, "*to update all levels of employee's knowledge frequently we need a high quality communication throughout all the personnel levels*." Thus, in the planning stage of environmental management system, all levels of organisation must have a communication system which captures the whole management levels and the employee levels.

Resistance to change was another barrier revealed through the case studies. At their worst, these can prevent the introduction of best practice altogether. Thus, senior management should be flexible with dynamic situations of the organisational changes. Top managers' commitment should be very strong in the process of EMS planning as if it goes wrong, that may cause to the deficiency of the whole process. As per the view of Quality Executive of Organisation B, "*this is a family owned business that has 30-40 years' experience. So it is difficult to convince them about the modern theories.*" Hence, most of the organisations are congregated with the strong views and opinions of the administrative intensity. Planning an EMS must be liberated from the external environmental forces and internal environmental forces as well. Hence, to overcome these barriers, organisations adopt practices such as establish good communication flow among all the management levels; monitor objectives; conducting awareness programmes and develop a network of environmental co-ordinators in all departments of the organisation.

4.3. EMS PLANNING FRAMEWORK

Considering the current industrial practice of EMS planning, most of the organisations were undertaking processes unique to them starting with formulating environmental strategies to EMS impact evaluation. However, it was possible to identify a common framework by capturing good aspects of the studied organisations. Figure 3 offers the complete framework for EMS planning that could be followed by manufacturing organisations. It has six phases starting from formulation of relevant environmental strategies. Next step is to determine the EMS team and their responsibilities. The third step is to identify drivers and barriers for EMS and prepare action plans. In the fourth step, organisational infrastructure is set. The next step is implementations followed by the final step which is reviewing the EMP plan.

By having EMS planning in place, case studies revealed following organisational benefits such as Reduces operating costs through waste reduction; Energy conservation and other savings; Provides a structured framework for identifying and meeting regulatory requirements; and, Demonstrates competitiveness with other competitive manufacturers. A proper plan of EMS could help organisations to improve their operation performances, since EMS regulates and enhances companies' communication of goals, procedures, environmental impacts, and solutions process. Moreover, it can help managers in eliminating the instances of redundancy in day-to-day efforts. Also EMS improves its marketing with customers, investors, creditors, suppliers, employees and the public.

For end users, several benefits were noted. When there is an EMS planning process, organisations can reduce violations of employee-employer relationships and there can be a superior legal bond with the relevant legal bodies due to the environmental friendly production cycle. Thus, through a proper planning of environmental management system the customer who consumes the products also can obtain several advantages like ability to consume green products, get aware about the environmentalism while receiving environmentally protected and healthy product for the price they expend. The conclusions drawn from this study are prioritised next.

5. CONCLUSIONS

EMS planning in manufacturing industries is significant since, all the environmental impacts and aspects in manufacturing industries very much affect to their environmental performance. When it comes to the practical level in the industrial sector, organisations specially focus on the manufacturing or the production cycle which emits waste, gases, fumes, odour and effluent to the environment.

Considering the corporate level of EM, case study findings disclosed that main corporate responsibilities are centralised within the top management, middle management and employees with specific duties and functions in order to guide their subordinates towards the practice of EMS.

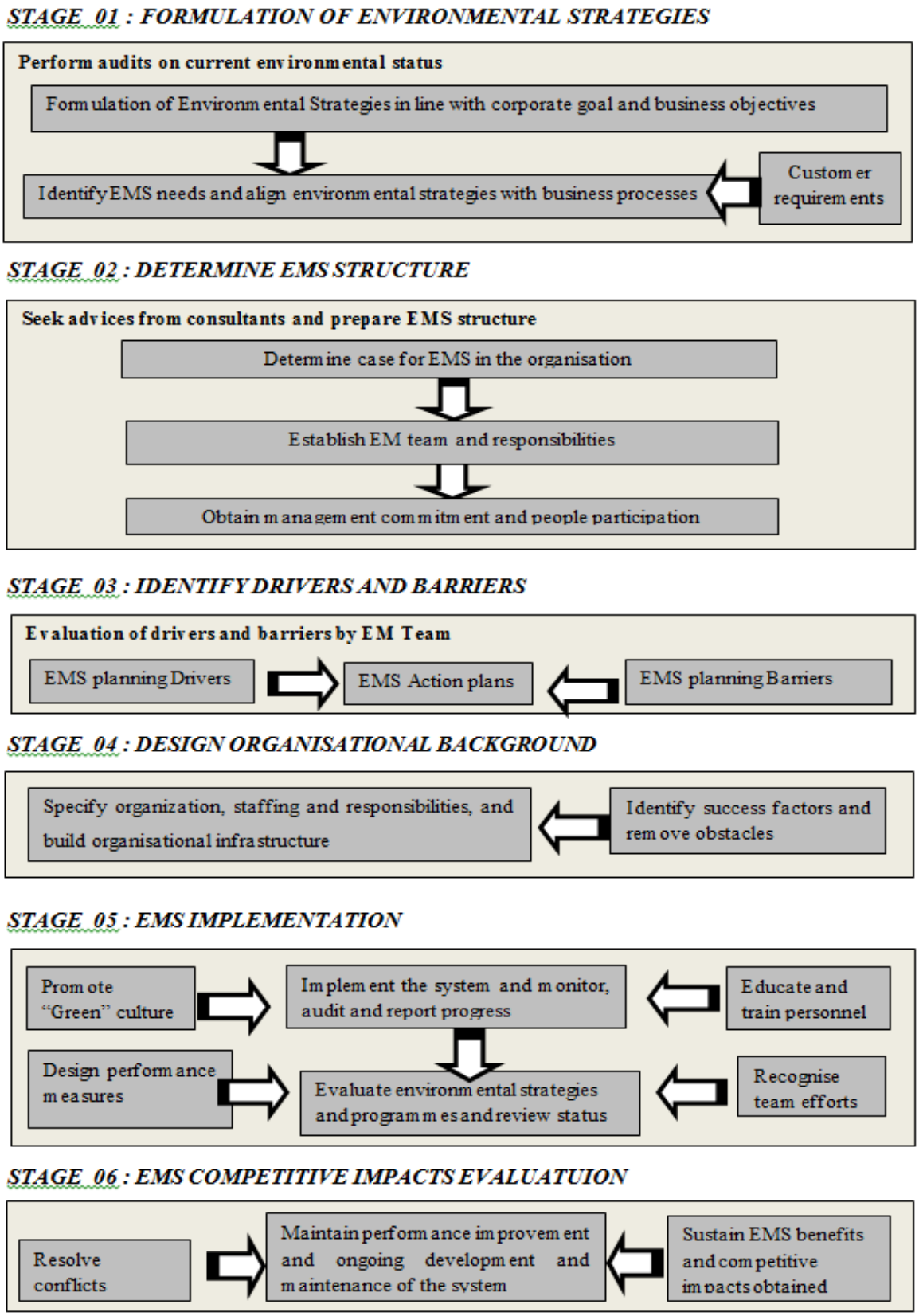

Figure 3: EMS Planning Framework

Three major EM strategies that are pertaining to the manufacturing industry were identified as factory-based EM, community-based EM and resource-based EM. Even though, the literature reviewed that Plan-Do-Check-Act are the four main steps in the process of EMS, the industrial practice comprised with three main steps call planning, implementing and monitoring. Pertaining to this whole EM process, EMS

planning was identified as the key step which directs the whole EM process towards the organisational ultimate goal of best practice.

The study offered a framework for EMS planning capturing the common processes followed by the case studies organisations. This framework can offer a better alignment of EMS planning process with business objectives and strategies. Overall, it is believed that the framework offers EMS planning implementations a reference point. Through following these steps in EMS planning the organisations can achieve competitive advantage and improve the company image with improved customer relationships.

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