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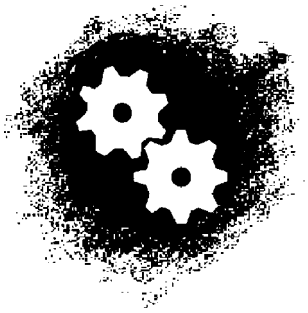
EMS MODELS FOR BUSINESS STRATEGY DEVELOPMENT



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This research investigation identifies the organizational barriers that can occur within large organizations to impede the introduction and development of environmental management systems (EMSs). The findings from the six case study investigations into multinational electronic and telecommunications organizations enabled the construction of four categorical models: devoid, isolated, devolved and integrated. They provide a profile of the way organizations use their EMSs and detail the types of organizational barrier that are likely to occur in each case.

The models are designed to offer insight into the profile of the organization, the type of EMS being used and the operational advantages and disadvantages of using each model. They offer managers additional decision-making tools with which to assess the EMS profile of their own organization and those of competitor organizations and to assess the effectiveness of an organization's EMS in weak and strong economic conditions.

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BACKGROUND

Current literature would tend to suggest that progress is being made in understanding the need for the further development of environmental management systems (EMSs). There is, however, little evidence of understanding of the interactions of the many organizational factors and the impact they may have on EMSs. Figure 1 serves to demonstrate the three main areas of this research investigation. It represents the process of the development of EMSs within organizations and the continual battle against organizational barriers that may occur to impede organizational acceptance.

By dissecting Figure 1 into its key parts the various characteristics of each element can be explored. The organizational barriers presented in Figure 1 have been taken from the current literature. The following descriptions of the barriers serve two functions: first to support their inclusion as a potential barrier and

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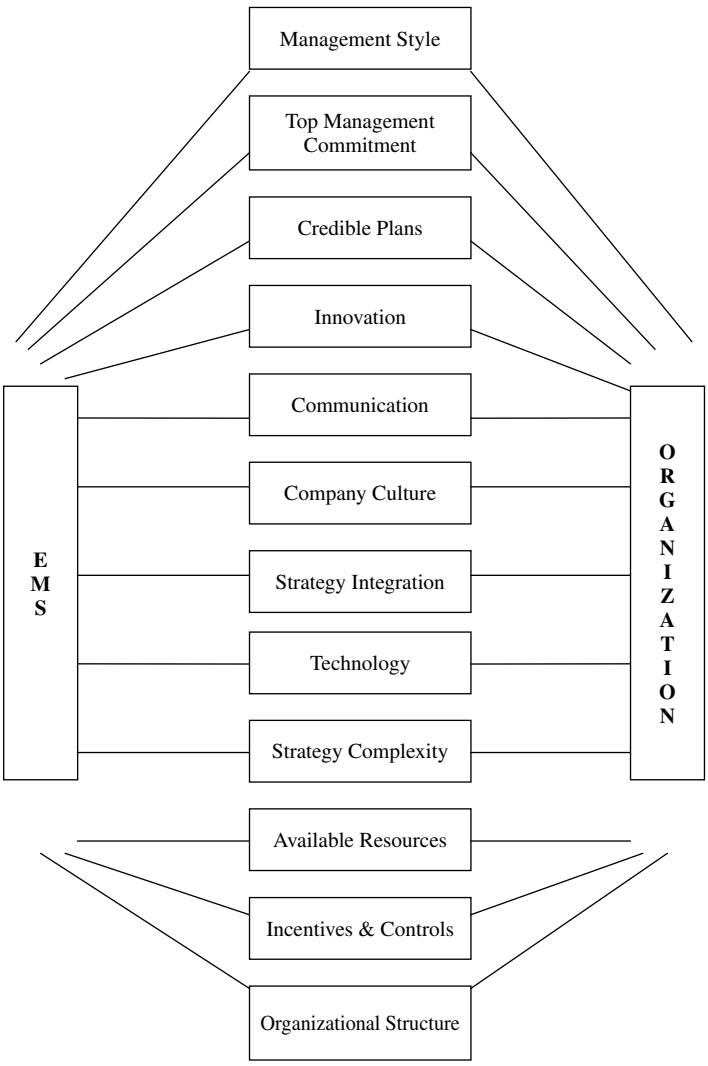

Figure 1. Organizational barriers

second to identify a number of characteristics of each barrier that generate clearer definitions, which will define each construct and differentiate it from the other (Eisenhardt, 1989).

MANAGEMENT STYLE

Management style can act as a barrier to EMSs, particularly if used as a convenient mechanism for those corporate executives seeking a quiet life (Wheeler, 1993). Put into more simplistic terms, some managers believe that if a problem is ignored long enough it will resolve itself (Kirkland and Thompson, 1999).

A more complex view is held by Taylor (1992), who finds that the traditional management concept of viewing the organization as a collection of entities, or strategic business units (SBUs), competes with the growing impression that environmental management requires a holistic view of an organization (Taylor, 1992). Studies by Miller and Freisen (1980), Argyris (1993) and Pfeffer (1996) suggest that

managers do not follow rational environmental practice because it falls out with their 'focus of attention'. Managers in industries more exposed to environmental legislation and policies must first translate these legislative and policy requirements into achievable objectives before implementing cost-effective operational strategies (Currie, 1993).

TOP MANAGEMENT COMMITMENT

Earlier EMSs were generally isolated from the main function of the organization (Shelton, 1994). This was in part due to the failing of top management expecting environmental management to adapt to the prevailing business culture, and in part to environmental managers who expected to be accepted into the organization (Hunt and Auster, 1990; Buzzelli, 1991). Cohen and Levinthal (1990) referred to this phenomenon as an organization's 'absorptive capacity'.

They observed that this absorptive capacity is a function of an organization's prior related knowledge, that is an organization's capacity for assimilating and applying external information for commercial benefit. In the case of environmental management, the absorptive capacity theory would imply that prior knowledge would be limited and therefore the introduction of EMSs would be difficult due to the lack of top management commitment (Kirkland and Thompson, 1999).

CREDIBLE PLANS

Inappropriate or 'quick fix' plans to introduce an EMS into an organization is a risky strategy (Kirkland and Thompson, 1999). Kirkland and Thompson (1999) found that the use of credible plans benefit the organization in two main areas. First they suggest that the plans created must match the complexity of the problem as environmental issues can pose complex problems for organizations, and second they point to the loss of credibility through management mistakes, which can quickly lead to disenchantment within the organization and eventual resistance to the introduction of the EMS.

INNOVATION

Innovation has been identified, generally, as causing delays, obstruction, misunderstandings and disagreements on newly installed organizational systems (Irwin *et al.*, 1994; Roome, 1994; Porter and van der Linde, 1995). Innovation, or the lack of it, is also an issue in the implementation of EMSs. The study by Porter and van der Linde (1995) suggests that too many companies spend too many environmental pounds on fighting regulation and stalling legislation, rather than in finding real environmental solutions to environmental issues.

COMMUNICATIONS

James (1993) and Azzone and Bertele (1994) suggest that lack of education, communication and technology can act as barriers, particularly if not diffused successfully throughout the organization. While a number of organizations are attempting to introduce EMSs (Kirkland and Thompson, 1999), often those managers tasked with the responsibility of introducing EMSs lack the necessary training and education. Those managers who have the required levels of education and training know the importance of raising levels of environmental knowledge amongst other employees.

COMPANY CULTURE

Corporate culture can be defined by the prevailing values and attitudes within an organization that rely on previously adopted problem solving methods when confronted with environmental management issues (Welford and Gouldson, 1993). Due to the speed, range and

complexity of environmental issues, organizations need to internalize and operationalize policies and programmes to be consistent with long-term goals (Corbett and Wassenhove, 1993). Shimell (1991) argues that culture change produced long-term business benefits to the likes of 3M, Dow Chemical and AEG. Previous, cosmetic, PR (public relations) responses to environmental issues have proved to be ineffective and have at times back-fired on organizations (Peattie, 1990).

SYSTEM INTEGRATION

The literature suggests that it is the system itself, its complexity (Rothenberg *et al*., 1992; Roome, 1992; Avila and Whitehead, 1993), its level of integration (Welford, 1996; Pujari and Wright, 1994; Shelton, 1994) and its 'fit' with the existing organizational structure (Prothero and McDonagh, 1992) and culture (Shrivastava and Hart, 1994; Beaumont, 1992; Peattie, 1990; Corbett and Wassenhove, 1993) that determines a successful EMS.

TECHNOLOGY

The organizational decision making process for the acceptance of promising environmental innovation can also be biased (Cramer and Zegveld, 1991). Exploring the use of technology in environmental management, Cramer and Zegveld (1991) found that the innovations that were eventually selected appeared to be the most successful, or advantageous, in a competitive, as opposed to an environmental development sense.

STRATEGY COMPLEXITY

The more complex the EMS, the more organizational forces will act against implementation (Rothenberg *et al*., 1992). The study by Rothenberg *et al*. (1992) found that effective environmental strategies were integrated with existing corporate strategies that were consistent with organizational characteristics and operating context and aided the acceptance of new environmental strategies. The purpose of an EMS is to make complex environmental issues manageable (Kirkland and Thompson, 1999). Unfortunately, managers and other stakeholders are prone to see EMSs as adding to the existing organizational complexity they have to deal with.

AVAILABLE RESOURCES

The introduction of an EMS may be hampered by the shortage of adequate resources or by the lack of recognition or provision of necessary resources (Greeno and Robinson, 1992). The lack of available budgets, human resources and corporate incentives (Tapon and Sarabura, 1995; Gallarotti, 1995) are identified as potential barriers. A lack of available resources or the mis-allocation of resources may result from other existing barriers such as a lack of commitment or lack of communication (Kirkland and Thompson, 1999). A study by Tinsley and Melton (1997) highlighted the problem of low prioritization of resources for addressing environmental issues when faced with daily operational requirements.

INCENTIVES AND CONTROLS

Environmental systems and programmes cannot be introduced into organizations through senior management directives; incentives and controls must be in place to ensure employee support (Tapon and Sarabura, 1995). Tapon and Sarabura (1995) suggest that full employee involvement through group learning situations is more beneficial to an organization than relying on solutions from experts. Dow Chemical's 'Waste reduction always pays' (WRAP) programme is one example of an incentive scheme that rewards employees with generous financial incentives for environmental improvement.

ORGANIZATIONAL STRUCTURE

The cross-disciplinary, cross-functional nature of environmental issues leads Roome (1994) to suggest that organizations need to reform their structure. The development of an environmentally successful company requires problems of environmental inertia to be addressed, which are familiar in organizations striving to move from one set of structures, systems and values to new frameworks (Mintzberg, 1987).

The importance of this point is underlined in the study by Pujari and Wright (1994), which finds that there cannot be an effective EMS without a change of structure or organization. A change in an organization's structure or strategy usually takes the form of planners presenting plans to top management for acceptance and resourcing (Piercy, 1989). Piercy (1989) suggests that barriers are created when the plans for change are accepted and attention is then turned to the issue of implementation. He states that at this juncture top management considerably underestimates the costs and problems of getting the new plans accepted.

ENVIRONMENTAL MANAGEMENT SYSTEMS

Figure 2 demonstrates the main EMSs currently used by UK based organizations (British Standards Institute, 1992, 1994).

The EMSs ISO 14001 and BS7750 are certificated environmental standards whereas the EMAS is a regulation (Welford, 1996). While these are prevalent in large organizations some organizations operate their own EMSs (Tinsley, unpublished). These systems may have existed as quality or health and safety systems and have had the environmental issues incorporated into them. The in-house systems are environmentally non-certified but are built on certified standards such as ISO 14001, which are represented in Figure 2 by EHS (Environmental Health and Safety) systems.

ORGANIZATIONS

Environmental issues, particularly environmental legislation, affect all sizes of companies (see Figure 3). The literature suggests that some companies are more active than others in addressing environmental issues (Hunt and Auster, 1990). What is clear from the literature is that larger companies are more likely to have EMSs than small and medium sized enterprises (SMEs) due mainly to the availability of additional resources (Welford, 1997). They are also more likely to have formalized structures and a dedicated environmental management team to operate their EMS (Tinsley and Melton, 1997). As a consequence of this, the number of organizational barriers that can act against an EMS within a large organization are likely to be high and their interaction more complex.

ENVIRONMENTAL MODELS

The theory of EMSs would tend to suggest that there are specific EMSs for those organizations concerned with environmental management. In reality each EMS, to be effective, must adapt to the business environment (Greeno and Robinson, 1992). There is good evidence to suggest that there are a number of typologies

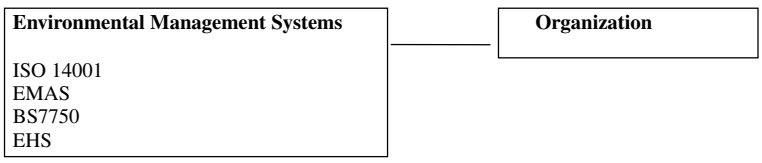

Figure 2. Environmental management systems

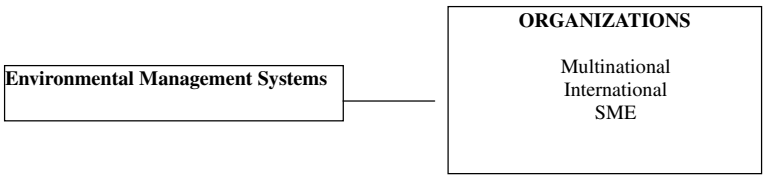

Figure 3. Organizations

1.	Strategic options model (Roome, 1992)
2.	Organizational posture model (Steger, 1993)
3.	ROAST scale (Dodge and Welford, 1995)
4.	Greening model (Gladwin, 1993)
5.	Environmental contexts (Azzone and Bertele, 1994)
6.	Five stages model (Hunt and Auster, 1990)

Figure 4. Typologies of organizational environmental development

of organizational environmental development, and these are detailed in Figure 4.

These models offer some evidence to suggest that as an organization moves through each phase of environmental development barriers may be created or avoided depending on the stage of development. These stages are dynamic and may be hindered or stopped by a variety of barriers (Kirkland and Thompson, 1999).

The models identified in Figure 4 have been constructed to predict patterns of organizational environmental development and to provide a framework for organizations to identify where they are in their environmental management development, and how to move to the next stage. They are designed to offer an organization insight into where it is on the environmental development continuum, i.e. a 'beginner' or 'proactivist' (Hunt and Auster, 1990), or identify its attitude to environmental risk and opportunity, i.e. 'non-compliance' or 'leading edge' (Roome, 1992). The models assume that an organization begins at the 'beginner' stage and develops the EMS until it becomes 'proactive' in how it deals with environmental issues.

It can be argued that the models in Figure 4 take a narrow focused approach as to how an organization develops environmental policy, audit processes and training and awareness needs. The wider issues of environmental management such as the effect of organizational barriers, operational advantages and its interrelationship with the organization's existing business strategy are largely ignored. Little evidence is provided as to the effect of the staged environmental development on an organization during economic decline or uncertainty.

Hunt and Auster (1990) point to organizations EMS's 'hitting the green wall' and then stalling. The four EMS models constructed from the case study findings offer more information for managers to make informed decisions about the type of EMS profile that is in operation and be better placed to identify the organizational barriers that may impede the development of an EMS.

METHODOLOGY

The case studies used were selected to try and determine models of operational patterns that may exist to determine what barriers could arise to impede EMSs. The six case studies were selected with this purpose in mind (Eisenhardt, 1989). The two case studies of CB5 and CB6 have been taken from a previous study (Tinsley, unpublished) and have been reused here to provide a contrast to the other four. The two case study interviews from Tinsley (unpublished) were conducted during a favourable economic climate for

the electronics industry. The other four case study interviews were conducted when large-scale redundancies were being forecast for the sector.

This research investigation began by looking to test further, with follow up interviews, the findings from the two case study investigations by Tinsley (unpublished). Four similar organizations were selected with a view to identifying some consistencies or patterns within the organizations that would allow some generalizations to be made as to how EMSs were used within an organization and whether the barriers that arose were consistent between organizations.

In Tinsley (unpublished) a semi-structured questionnaire was used in a face-to-face interview situation within the offices of each organization. The case study format for conducting the four further interviews remained unchanged from that used in Tinsley (unpublished), although the time lapse between the two studies was six months.

The economic climate for organizations in the electronics and telecommunications industry in Scotland had changed and the economic situations during the time of the two studies were different. During the first two interviews the industry was buoyant. Within a period of six months, many large electronic and telecommunication organizations within the 'central belt' (Edinburgh to Glasgow) of Scotland were announcing that thousands of employees were to be made redundant (*Business A. M.*, 2001).

The four organizations selected for this study – CB1, CB2, CB3 and CB4–were affected in different ways, and each were in the process of taking corrective actions in response to the declining economic conditions. The change in the economic conditions between the two studies offered an opportunity to observe the dynamics within the EMSs and the organization and identify whether the same, or additional, barriers, emerged as a consequence of the down-sizing of the organizations.

In both this study and that by Tinsley (unpublished) the findings of the case studies were considered to be consistent, and this enabled the construction of the four models. Some assumptions have been made, however, on the flexibility of the models during periods of strong economic and weak economic situations. Of the six case studies, two, CB6 and CB5, were subject to interviews in strong and weak economic situations. The remaining four case studies were undertaken during weak economic situations only. Despite this, opportunity was taken during these four interviews to ask the participants to reflect on how the EMS and their organization had changed before and during the weak economic situation. From these findings, assumptions were formed as to how each model would react in different economic situations.

EMS ORGANIZATIONAL MODELS

From the case studies used, evidence emerged to suggest that the organizational barriers that arose were dependent on the degree of integration of the EMS within the organization. From this evidence four categorical models were constructed to demonstrate the typical profile of organizations that were either 'devoid', of an EMS or had one that was 'isolated', 'devolved' or 'integrated' within the organization (see Table 1).

With the creation of these models it was possible to position the six case studies and to identify the type of organizational barrier that would be key and the associated operational advantages and disadvantages of each model.

Table 1. EMS organizational models

Case study	Organization	EMS organizational model
1	CB1	Integrated
2	CB2	Isolated
3	CB3	Devolved
4	CB4	Devolved
5	CB5	Integrated
6	CB6	Devoid

For each type of model four key characteristics were identified: organizational profile, operational advantages, operational disadvantages and organizational barriers. The organizational profile describes how the EMS 'fits' with the organization. The operational advantages detail the advantages offered to the organization with the type of EMS used. Similarly the operational disadvantages state the converse. The organizational barrier characteristic details those key barriers that are most likely to occur to impede the EMS currently in operation.

DEVOID EMS MODEL

The devoid EMS model shown in Table 2 represents characteristics of those organizations that have no accredited EMS. Included in this model are those organizations that are currently in the process of implementing an accredited EMS. Although those organizations in the process of implementation will have a lower level of environmental risk and reduced operational disadvantages, consideration is given to Shelton's (1994) study, which identifies the risk of failed, or stalled, EMSs within organizations that have been in the process of implementing EMSs.

Some managers may consider that an operational benefit can accrue by redirecting scarce resources to operational, as opposed to non-operational, activities. Due to the number of pieces of environmental legislation and regulation currently in force (Ball and Bell, 1997) and the lack of operational efficiency resulting from not having an accredited EMS, it is considered that there are no operational advantages to be gained from using this model.

Organizations can operate waste monitoring and energy efficiency schemes without requiring an accredited EMS, thereby accruing some benefits. However, the numbers of operational disadvantages that result as a consequence of not having an accredited EMS add up to a high-risk strategy. Many of those organizational barriers identified in the literature (see Table 1) are likely to occur in an organization devoid of an EMS.

An organization with a devoid EMS model is found to delay or abandon the pursuit of an EMS during an economic downturn. Scarce resources are redirected to operational activities and the implementation of an accredited EMS is left until economic conditions improve. This model has a high risk of an environmental incident occurring.

Table 2. Devoid EMS model

EMS model	Organizational profile	Operational advantages	Operational disadvantages	Organizational barriers
Devoid	No accredited EMS In the process of installing an accredited EMS	None	High risk of heavy fines Adverse publicity Lack of shareholder investment Loss of credibility High investment risk Loss of competitive advantage Loss of market share Not accepted on many major supply chains High risk of environmental incident	Management commitment Communication Available resources Management style Incentives and controls Credible plans Company culture

ISOLATED EMS MODEL

The characteristics of an organization with an isolated EMS model are shown in Table 3. An organization with an isolated EMS profile will have an accredited system but it may only apply to one part or the organization, e.g. manufacturing, or to the whole organization but a small team has been established in an isolated unit to deal with the environmental compliance issues.

Dealing with legislative requirements is a low cost option, and such an option can be considered by management as an operational advantage. The operational disadvantages can again outweigh the advantages. Operational activity is paramount and environmental issues are considered mostly from a legislative impact perspective. Environmental knowledge of products and processes is limited and as a consequence early indications of potential environmental incidents are missed, or not recognized, and fire fighting can be a final and costly outcome.

An isolated EMS, by its very nature, is separated from many of the daily operations of the organization. As a consequence there is a lack of communication between the environmental team trying to raise levels of awareness and having input into operational decisions with other managers. The limited resources used to establish the unit sends messages to employees and managers that there is a lack of commitment from senior managers and directors and that environmental issues have low priority against operational requirements.

DEVOLVED EMS MODEL

An organization operating with a devolved EMS has an accredited system that pervades the whole organization and is part of daily operational activities. It is likely that the manager responsible for environmental management will also be responsible for health and safety and possibly quality. The responsible manager will play a key administrative role by communicating progress to senior management by way of periodic reports and ensuring that training and awareness programmes are made available for employee use. Contractors responsible for specific tasks of waste recycling and energy efficiency monitoring will report to the organization's environmental manager.

The key operational advantage that a devolved system offers is one of flexibility. The use of contract staff can be increased and decreased as quickly as economic situations dictate. The high hourly rates of engagement are considered an acceptable price to pay for downsizing flexibility. While the administration of the system is handled

Table 3. Isolated EMS model

EMS model	Organizational profile	Operational advantages	Operational disadvantages	Organizational barriers
Isolated	The organization has an accredited EMS The EMS applies to only a part of the organization A small unit, or team has been established to deal with environmental compliance	Low cost option focused only on compliance	Low priority of environmental issues Loss of efficiency Fire-fighting environmental incidents	Communication Management commitment Available resources Incentives and controls Company culture Credible plans Management style Organizational structure

Table 4. Devolved EMS model

EMS model	Organizational profile	Operational advantages	Operational disadvantages	Organizational barriers
Devolved	The organization has an accredited EMS Key manager provides an admin. support function for contractor activities	Increased downsizing flexibility	High cost option Loss of environmental knowledge and expertise	Gaps in communication Management style

by the organization there is a danger with any downsizing operation that the contractors that leave will take with them environmental knowledge and experience of operational processes.

This style of management is seen as a key organizational barrier to the development of an EMS as the focus is on short-term costs and not on long-term environmental improvement. Communication is also considered a barrier as contractors constantly change; communications can be interrupted. A 'them' and 'us' attitude between organizational staff and contractors can lead to informal demarcation lines and 'grey' areas of responsibility.

INTEGRATED EMS MODEL

An organization with an integrated EMS operates with one system that incorporates their environmental, health and safety (H&S) and quality systems into one system. The single system, often renamed as an environmental health and safety (EHS) system, is designed to operate with the same documents and procedures and a team of 'cross-skilled' auditors to monitor the system.

The key operational benefit of an integrated EMS is that it becomes part of daily operational activities. It is a system that is part of the organization's goals and objectives and as such it has the commitment of all managers and directors. Monitoring daily operational activities gives management early warning of the development of potential environmental incidents. The development of an integrated EMS will give the organization an opportunity to develop a culture of continuous improvement.

An operational disadvantage that can occur is that the establishment of a corporate centralized auditing unit can result in the loss of intimate environmental knowledge of site-specific manufacturing processes. Additionally, an audit programme may structure the required audits to be undertaken every two or three months, some site-specific processes may require more regular audits and as such the early identification of potential environmental incidents may go undetected until they fully develop.

There seem to be few key organizational barriers that can occur with an integrated EMS; however, communication is still important to maintain employee awareness and participation. Many environmental training and awareness programmes exist within the organization but difficulties can result with the lack of employee participation. The daily interaction of environmental issues with operational activities may render them uninteresting overtime. Communication is the key to keeping the environmental training and awareness programmes fresh in employees' minds. This may involve periodically changing the scope of the programmes or introducing competitions and offering cash prizes or holidays.

Although managers and directors all agree to support an EMS, there is an element of interpretation. There can be many management styles within an organization and these

Table 5. Integrated EMS model

EMS model	Organizational profile	Operational advantages	Operational disadvantages	Organizational barriers
Integrated	The organization has an accredited EMS EMS is customized to fit with H & S and quality systems to form one system (e.g. EHS)	Part of daily operational activities Early warning of potential incidents Culture of continuous improvement	Centralized auditing process can lead to loss of site process knowledge	Lack of employee participation Communication Management style

different styles may interpret environmental management in different ways. The outcome may be disagreement on the operational methods to be used to achieve the environmental objectives.

DISCUSSION

Each case study provides an insight into the organizational barriers that can occur as a result of the interactions between the elements of an organization and the way the EMS is incorporated within it. It is clear from all of the case studies that organizational barriers exist and impede EMSs, but the findings also suggest that different barriers arise depending on how the organization uses its EMS. From the six case studies used four EMS models emerged.

The development of the four models began with the identification of the way each organization used its EMS: whether it was more or less integrated within daily operational activities. The identification of the organizational barriers that occurred within each organization showed that there was some consistency of barrier occurrence within those organizations that used their EMSs in similar ways. It also became apparent that not only were the organizational barriers similar but that operational advantages and disadvantages were also similar. The naming of the four EMS models denotes the way in which each organization uses an EMS and suggests the associated organizational barriers, operational advantages and disadvantages so that management can be aware of their potential impact and quickly assess corrective actions.

Case study CB6, for example, profiled as having a 'devoid' EMS model, demonstrates that such an approach gives rise to many organizational barriers and as a consequence many operational disadvantages. Other studies by Hunt and Auster (1990) and Shelton (1994) support the findings made and allow assumptions to be made that those organizations adopting a similar EMS approach would experience similar organizational barriers and operational disadvantages.

The findings from the CB3 case study led to the assumptions for the building of the 'devolved' EMS model. Using, predominately, contractors to operate the EMS, CB3 management had a more of an administrative and less hands-on role in operating the system. The operation of a 'devolved' EMS offered CB3 greater flexibility when responding to varying economic conditions. The findings of the CB3 case study were also evident in the CB4 case study. They both demonstrate the existence of similar organizational barriers and operational advantages and disadvantages that are identified by the 'devolved' EMS model.

The 'integrated' EMS model was created from the findings of the CB1 and CB5 case studies. Both organizations adopted an integrated approach to their EMSs. The management of the environment was part of daily operational activity that was bound with health and safety and quality requirements. Ensuring

that the whole organization had an environmental focus was one of the key objectives for each organization. The key objectives of each organization were tied in with budget allocation and the senior management from each organization gave their full support for the achievement of all key objectives. As well as displaying the same application of the EMS, CB1 and CB5 also displayed the occurrence of similar organizational barriers and similar operational advantages and disadvantages, giving rise to assumptions for the creation of an 'integrated' EMS model.

The fourth model, the 'isolated' model, was identified from the CB2 case study. The study showed that CB2 operated their EMS as a management system separate from other management information systems. It was considered by CB2 management that the manufacturing of semiconductor wafers was closely monitored by the quality system and the quality process was complex enough. They considered that integrating an EMS into the quality process would add to the existing quality management complexity. To avoid this complexity, environmental issues are dealt with on a project-to-project basis. All environmental considerations are considered at the design stage of a new product or process and appropriate actions taken depending on the likely environmental impact assessment.

The case studies of those organizations with EMSs demonstrate differences in how these systems are used and the differing organizational barriers that can occur. For example, 'communication' as an organizational barrier exists in all models but the communication barrier differs from just raising employee awareness in the case of CB6 to keeping environmental training programmes fresh in employees' minds in the case of CB5.

The continual trade-off between an organization's economic and environmental requirements led to the identification of the 'isolated' and 'devolved' models. The 'isolated' model identified in CB2's case study can offer organizations a low-cost, or a minimum-disruption, option with which to monitor and comply with environmental legislation and regulation. The 'devolved' model identified in the CB3 and CB4 case studies can provide organizations operating in volatile industries the flexibility of increasing or decreasing operational activity by using contract staff.

A fully integrated system operated by CB5 and CB1 treats environmental management as part of daily operational activity. As the organization grows so the system grows. During economic downturns the environmental activities will decrease, but in line with a general reduction in available operational budgets. It is in effect part of the organizational culture. The devoid EMS model is not a model that organizations would normally aspire to, but it is valuable to assess the possible operational outcomes for an organization that do not consider environmental management to be relevant to their operation. It would also provide a useful benchmark from which an organization can assess what progress has been made when an EMS has eventually been implemented.

CONCLUSIONS

The four EMS models offer a method for management to assess how each model would suit the organization, its industry and the economic climate in which it operates. They offer management the opportunity to look at the goodness of fit between the EMS and the business strategy of the organization.

The findings of the case studies suggest that EMS organizational models can be created and used as a management tool with which to determine the barriers that can potentially occur within an organization that can act against an EMS. The models can offer management a tool with which to assess three main areas:

(i) the profile of their own organization and the way it uses its EMS,

(ii) how the organization will respond in weak and strong economic situations and the effect this will have on the EMS,
(iii) to use as a 'discriminator' when assessing competitor environmental performance.

Organizational EMS development

The case studies demonstrate that there is a consistency in the main organizational drivers that motivate organizations to pursue EMSs. The studies also demonstrate consistency in that all organizations base their EMSs on an independently certified environmental standard, ISO 14001. From this base of consistency the application of the models can provide management with insight into how their EMS 'fits' with the organization, the barriers that arise from each model and associated operational advantages and disadvantages.

To assist management to make informed decisions, it is not enough just to identify the organizational barriers that exist to impede the development of EMSs. The models show that the types of barrier and the way they manifest themselves varies between models. It is important for management to understand the cause of the barrier and the impact upon the system and the organization so that correct remedial action can be taken. For example, communication is a barrier that can be identified in all models and yet management actions to overcome the barrier will vary between models. The devoid model demonstrates that the simple communication of environmental information to employees is lacking, whereas the integrated model points to refreshing the existing communication system to maintain levels of awareness and participation.

ECONOMIC CHANGE

For those organizations that need to react quickly to economic change the four models can offer additional information to management to determine how the organization and the EMS will react in both a strong and weak economic climate. Those organizations that operate in a highly competitive market sector may consider that a devolved model offers greater flexibility when adjusting to frequently fluctuating market conditions. The high cost of operating with a devolved model may be justified in retaining operational flexibility. Managers currently suffering from an economic downturn may consider that the time is right to consider the EMS model that will fit with their new business strategy.

COMPETITOR DISCRIMINATOR

Those organizations that seek to be market leaders will view environmental management not as an environmental risk minimization exercise but more as a business growth and competitive advantage opportunity. To this end, an integrated model ensures that environmental issues are part of daily operational activity, and whether the organization grows or contracts the integrated system will still remain as part of daily business activity.

Identifying the types of model used by competitors or key suppliers will also provide management with a useful discriminator as to how organizations can gauge the level of competitive advantage. The competitive advantage gained from an effective EMS does not begin and end with the type of model an organization uses but can also extent to the types of model the organization's supply chain uses.

The four EMS models suggest that environmental management is an important and complex business issue that affects technological, system and structural changes as well as individual and organizational values. They attempt to provide a greater understanding of environmental management, pointing to the link between an organization's preferred EMS, its overall business strategy and the prevailing economic conditions, thereby making the context for the interpretation of an organizational

barrier more meaningful, which in turn will aid any necessary remedial action.

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