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Abstract Title: Process Embedded Design of Integrated Management Systems

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# **PROCESS EMBEDDED DESIGN OF INTEGRATED MANAGEMENT SYSTEMS**

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## **ABSTRACT**

Integration of quality, environmental and occupational health and safety management systems is a viable organisational approach to cost reduction, efficient utilization of resources, greater motivation of employees and a means to sustainable development. But difficulties, and even failures, have been faced in the implementation of integrated management system (IMS). This is, partially, due to lack of any formalized standard for IMS. An elaborative strategy for integration of individual management systems is thus an appropriate and timely topic of research. This paper describes the impediments faced in implementation of IMS and the strategies employed commonly to achieve integration. Historically, approaches described for IMS implementation have ignored the process-based design of an IMS. Building over “core-activities based IMS design”, this paper proposes a “process embedded design of an IMS (PEDIMS)”- an approach that gives rise to IMS that is operations oriented, convenient for key users and readily internalisable. PEDIMS implementation is composed of three interconnected elements: 1) a context based design, 2) IMS implementation and 3) internalisation of newly developed system. Finally it addresses the problem of IMS internalisation in the organisations’ core processes and culture. The PEDIMS approach for IMS implementation can further be advanced for total quality management or other business excellence models.

## **KEYWORDS**

Integrated management systems, quality management system, environmental management system, occupational health and safety management system, strategy of integration, total quality management and business excellence models

## **1. INTRODUCTION**

Integration is the complete harmony and alignment of policy and purpose of an organization. It means that different departments and levels speak the same language and are tuned to the same wavelength (Garvin, 1991). In the literature, integration of management systems has been discussed as the merger of the quality management system (QMS), environmental management system (EMS) and health & safety management system (OH&SMS) (Fresner & Engelhardt, 2004; Karapetrovic, 2002; Labodova, 2004). Indeed, to survive and thrive in a period of global competition, organisations need to look at every aspect of their processes, including the well-being of their employees, the working environment and the impact that organisational operations have on their neighbors and on the local community. Moreover companies must address these issues while continuing to provide quality products and services. The concept of integrated management systems (IMS) has arisen from this need.

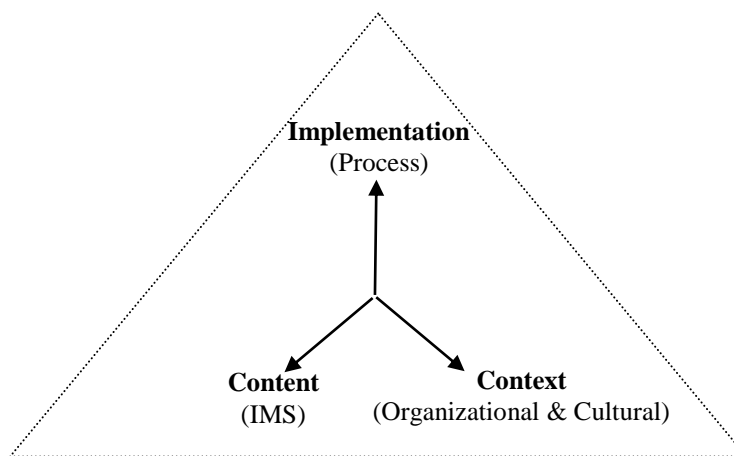
However difficulties are also faced in the integration of management system standards (MSS) having diverse scope and compositions. The guidelines for the implementation of individual management systems, such as QMS, EMS and OHSAS do exist but there is no formalized standard for IMS. Similarly guidelines/models for business excellence, such as EFQM and MBNQA also exist. So an elaborated strategy for IMS implementation would be helpful. With that in mind, the purpose of this paper is to develop a strategy to design and implement an IMS. To achieve this purpose, this paper starts with a survey of literature to highlight the commonly accepted meaning of IMS in literature and in practice. This is followed by a discussion on what difficulties are faced in the integration of MSS and their implementation and what strategies are commonly employed to achieve integration. This provides the basis for the development of a “Process Embedded Design of Integrated Management Systems” (PEDIMS) which forms the next section. In the final section, the conclusion and discussion is presented.

## 2. LITERATURE SURVEY

IMS has been discussed extensively in the literature. Due to growing number of management systems, their integration is the popular topic of research. Indeed implementation is a process of change from one state to another and so the IMS implementation process could be viewed from the perspective of “three essential dimensions of change” as described by Pettigrew & Whipp (1991) and shown in figure 1. These three dimensions are content, context and process. In IMS perspective, these three dimensions could be described as:

1. The content of IMS (What)
2. The context of IMS: The internal & external environment (Where)
3. The process of IMS implementation (How)

Following section describes a survey of IMS related literature in the perspective of these three essential dimensions of change.



**Figure 1: Three dimensions of IMS implementation (Based on Pettigrew & Whipp, 1991)**

*Content:* There is no specific mention of what constitutes an IMS or what should be the components of IMS. An IMS is conceptualized as a single set of interconnected processes that share a unique pool of human, information, material, infrastructure and financial resources in order to achieve a composite set of goals related to the satisfaction of stakeholders (Karapetrovic, 2003). Although some authors have suggested the integration of other management elements into an IMS (see, for example,

Matias and Coelho, 2002 and Raouf, 2004), most of the published work concentrates on integration of quality, environment, and health and safety management systems (Karapetrovic, 2002). These management systems constitute the three pillars of an organization's management structure. Inability to address any of these constituent systems may result in regulatory, social, operational or corporate nonconformance. New standards will continue to emerge and existing standards will undergo periodic updates; the choice of which management system to implement always depends on the unique circumstances faced by the organization, an IMS is required to ensure that each of them is integrated into the mainstream business infrastructure (Rocha, Searcy, & Karapetrovic, 2007). In order to achieve full realization of the potential benefits of individual management systems it is imperative to integrate them into one system (Zutshi & Sohal, 2005).

*Context:* The "context" dimension of IMS implementation process could be viewed in terms of "internal" or "external" context. The internal context includes an organisation's resources, capabilities, culture and politics whereas external context includes economic/business factors, external politics and social factors (Pettigrew & Whipp, 1991). The consideration of context dimension is crucial since it plays important role in the management's decision making of integrating MSS and the course of implementation process. This is because IMS implementation is dependent upon the availability of resources and expertise (Zeng, Shi, & Lou, 2007; Zutshi & Sohal, 2005) and organisational culture (Jorgensen, Remmen, & Mellado, 2005; McDonald, Mors, & Phillips, 2003; Rahimi, 1995) in addition to other factors described in later sections. The role of resources and expertise has been discussed in more detail in the section "difficulties in integration". However due to its vital role in IMS implementation, a brief mention of the culture is imperative.

The role of culture in the context dimension is critical. Culture is usually viewed as internal (organisational / corporate culture) or external (national culture). There is an intimate relationship

between national culture and organisational culture since companies cannot develop an organisational culture that differs substantially from the prevailing cultural factors of the country in which it operates (Lagrosen, 2003). This problem is notably poignant for multinational firms. As they conduct their operations in many different countries with varying cultures (Lagrosen, 2003). The importance of addressing the culture in IMS implementation was highlighted by the Wilkinson and Dale (1999) who noted that organisational culture is the key issue in integrating management systems. Similarly, Sigler & Pearson (2000) noted that culture is occasionally considered as one of the reasons behind the success (or failure) of an implementation. The reason why cultural transformation is so important could be understood by considering the core values of IMS. Essentially at its core, IMS consists of certain values such as customer satisfaction, leadership commitment, full participation of employees, education and training, facts based decision making, continuous improvement, employees health and safety and realisation of social responsibilities as describes in the individual management systems. Successful implementation requires that these values be aligned with the values of organisation. However it is not easy as the values are grounded in the organizational culture. The IMS implementation thus requires the cultural transformation.

*Process:* The third dimension in the change process of Pettigrew & Whipp (1991) is the process by which an implementation takes place. In contrast to “what” (contents) and “where” (context), the process represents the “how” part of implementation. The IMS implementation process could be seen as a flow of activities and in essence achieving an objective. Before moving to the “implementation process”, a review of “difficulties encountered in implementation process” and “currently employed strategies of integration” is imperative to better understand the nature of problem. The following section, thus, presents a description of the difficulties faced in integration and the strategies that have been employed to implement IMS.

## 2.1 Difficulties in Integration

Integration depends upon a number of factors in addition to cost, expertise, and availability of resources. These factors include complexity of the company (single/multiple sites; national/multinational, small/large), whether management is looking for alignment of few standards or full integration of all management systems, and the nature of operations of the organisation. The difficulties in the integration and implementation of IMS, frequently reported in the literature, are noted in Table 1.

| Difficulties in integration                              | Supporting literature   |
|--|---|
| <b>Diversity of constituent MSS</b>                      |   |
| Different scope of individual systems                    | (Wilkinson & Dale, 2001; Zeng et al., 2007)                         |
| Different structure of individual systems                | (Karapetrovic, 2002; Seghezzi, 2000)                                |
| Inadequate audit methodologies                           | (Karapetrovic, 2002)  |
| Unavailability of formal IMS                             | (Labodova, 2004)  |
| Unavailability of common denominator                     | (Karapetrovic, 2002)  |
| Misunderstanding of integration concepts                 | (Wilkinson & Dale, 2001)  |
| <b>Employees Resistance</b>                              |   |
| Employees rejection of new system                        | (Matias & Coelho, 2002; Zutshi & Sohal, 2005)                       |
| Employees resistance due to loss of individual functions | (Karapetrovic, 2002)  |
| <b>Lack of resources</b>                                 |   |
| Insufficient expertise                                   | (Zeng et al., 2007; Zutshi & Sohal, 2005)                           |
| Insufficient resources                                   | (Zutshi & Sohal, 2005)  |
| <b>Post implementation difficulties</b>                  |   |
| Reduced flexibility after integration                    | (Crowe, 1992)   |
| Increase in bureaucracy due to intertwining              | (Matias & Coelho, 2002)   |
| <b>Cultural aspects</b>                                  |   |
| Requires cultural transformation                         | (Jorgensen et al., 2005; Wilkinson & Dale, 1999; Zeng et al., 2007) |

**Table 1: Difficulties in integration of individual management systems**

These difficulties could broadly be categorized as difficulties due to:

1. *Different nature of individual systems:* The individual management systems in the IMS have their own foci. QMS is the oldest available management system meant for achievement of customer satisfaction, EMS is geared towards environmental protection and pollution prevention, OHSAS 18001 is aimed at the proactive control of risk and hazards to improve the health and safety of employees.

Since individual management systems are meant for different purposes and thus vary in their composition and their scope, difficulties are faced in their integration into one management system. ISO (International Organisation for Standardization) approved standards exist for QMS and EMS but no ISO approved standard exists for occupational health and safety. ISO has voted twice about whether to develop an ISO standard in this field and both times, the proposals have been turned down, and therefore, ISO currently, has no plans to develop such a standard. (Jorgensen, Remmen, & Mellado, 2005). So different scopes and structures of individual management systems pose a difficulty in their integration into one IMS.

2. *Employees' Resistance*: Employee resistance to change is a well documented phenomenon of organisational psychology (Dent, 1999; Kotter, 1979, 1995, 1996; O'Toole, 1995) that affects implementation of a new system. Due to this resistance to change, it is difficult for people to communicate and explain their system requirements to others and explain how their systems may be best integrated with other system(s). However this problem may be addressed, at least in part, by training and education (Holdsworth, 2003). Resistance is also faced from the people who fear to lose their workplace ownership in the course of integration.

3. *Lack of resources*: Lack of financial and knowledge resources is an important impediment in the integration of individual management systems and their implementation. Indeed, the integration of individual management systems is an approach that does not come easily; it requires dedicated efforts on behalf of management and employees as well as the allocation of human and financial resources. Further costs are incurred in obtaining certification by a third party. Many small & medium enterprises (SMEs) have insufficient resources to implement an IMS (Zutshi & Sohal, 2005). Moreover, when an external source of help is solicited for the IMS, it can only facilitate the implementation process but its internalization and maintenance is the function of key users, who in the case of SMEs may not have the required level of expertise.

4. *Lack of strategy for integration:* The individual management systems do exist for QMS, EMS and for OH&SMS but no standard exists for implementation of IMS. Furthermore, empirical research in many countries such as China (Zeng et al., 2007) and Australia (Zutshi & Sohal, 2005) has shown that the problem of insufficient expertise is also faced in the IMS implementation. In such circumstances operational managers are left with no option except to integrate the individual MSS based on their perceptions and experiences. The need for an elaborated strategy of IMS implementation has been envisaged.

5. *Post IMS implementation difficulties:* Failure to effectively design and implement the IMS may precipitate the danger of reduced organisational flexibility. Crowe (1992) has noted that in manufacturing systems integration has reduced the flexibility. Systems that are expected to be flexible turn out to be even worse after integration. This is due to use of hard integrated systems where “information interfaces are tied together in a fixed and rigid manner”. Wilkinson and Dale (1999) have suggested that this happens when those responsible for a system lose sight of its objectives. True flexible integration must be planned, designed, and implemented by the firm for the firm. Matias & Coelho (2002) have explained that the problem of increases in bureaucracy may occur due to the complexity of intertwined systems. However, these problems arise primarily due to inability to effectively design and implement the IMS.

Keeping in view the above difficulties faced in the implementation of IMS, it becomes evident that IMS implementation must follow a planned approach. The decision to implement an IMS must be reflected in strategic planning so that appropriate resources are allocated. The goals, objectives, and milestones need be clearly established. Team members involved in IMS should be kept motivated for accomplishment of objectives within the predefined timeframe and allocated resources. The importance of strategic planning for successful IMS implementation, employee involvement, and the use of an incentive system has been supported by Holdsworth (2003) and Rahimi (1995).

## 2.2 Strategies of Integration

Various strategies of IMS implementation have been described in the literature; having different orientations and exhibiting varying degrees of emphasis between a generalized implementation approach and a link with clauses of individual MSS. Some strategies are based on integration of existing individual management systems through describing a sequence of integration; others are described in the form of various levels of integration. Still others are described in the light of clauses of standards for individual MSS. Table 2 presents a brief overview of the strategies of IMS design and implementation as described in the literature.

| <i>Strategies for IMS Design &amp; Implementation</i>                                   |   |   |
|---|---|---|
| <b>Strategy of Integration</b>  | <b>Broader category</b>                                   | <b>Explanation</b>  |
| <i>General strategies for unification of MSS</i>  |   |   |
| <b><i>Alignment</i></b><br>(Jorgensen et al., 2005;<br>Wilkinson & Dale, 1999)          | Parallelisation of the MSS<br>using their similarities.   | Strategy whereby only common parts of standards are adopted. The practical implication of aligned approach would be that separate procedures are built but placed in the same manual  |
| <b><i>Integration</i></b><br>(Jorgensen et al., 2005;<br>Wilkinson & Dale, 1999)        | Full integration  | Full integration of all relevant procedures and instructions.   |
| <i>Strategies based on sequence of Integration</i>                                      |   |   |
| <b><i>Integration of already implemented MSS</i></b><br>(Karapetrovic & Willborn, 1998) | Sequence of integration<br>of already implemented<br>MSS. | There could be three options for integration of MSS<br>1. QMS first and then adding EMS<br>2. Establishing EMS first and then adding QMS.<br>3. Introducing QMS and EMS concurrently using the “system of systems” concept.   |
| <b><i>Possible sequences of integration</i></b><br>(Labodova, 2004)                     | Sequence of integration                                   | Integration could be achieved one of two ways.<br>1. Introduction of individual systems followed by the integration of the originally separate systems<br>2. Development and implementation of an integrated management system, integrated from the very beginning. |
| <i>System approach to integration</i>   |   |   |
| <b><i>Integration through “A system of systems”</i></b>                                 | Integration through<br>systems approach                   | The integration of two systems means to link them in a way that results in a loss of independence of one or both.   |

|   |  |   |
|---|--|---|
| (Karapetrovic & Willborn, 1998)   |  | An integration normally leads to a stronger and more comprehensive management system.   |
| <b>System approach to integration:</b>                                    |  |   |
| Jonker & Karapetrovic(2004) (Karapetrovic & Jonker, 2003)                 | A holistic approach to prevent sub optimization of one component in pursuit of another.                          | Business is viewed as a single system in which individual systems upon integration give rise to an amorphous system that changes its shape depending on prevalent stakeholders and objectives to be achieved.   |
| <b>Integration at various organisational levels</b>                       |  |   |
| <b>Four levels of integration:</b> Wilkinson and Dale's (1999)            | Different modes of integration.  | <ol style="list-style-type: none"> <li>1. Individual management systems integrated into every function, so that the quality related requirements are covered by the QMS, environment requirements are covered by the EMS and health &amp; safety requirements covered by the OH&amp;SMS.</li> <li>2. Integration of the identified links in the three standards, i.e. QMS (ISO 9001), EMS (ISO 14001), and OH&amp;SMS (OHSAS 18001).</li> <li>3. Integration of the three systems (QMS, EMS, OH&amp;SMS) with other certificated systems.</li> <li>4. Integration of all certificated and uncertificated systems</li> </ol>   |
| <b>Integration at various hierarchical levels</b> Jorgensen et al. (2005) | Three ambition levels of integration starting from increased compatibility of MSS to the embeddedness in culture | <ol style="list-style-type: none"> <li>1. <i>Correspondence:</i> Efforts made to increase compatibility of MSS mainly through cross referencing between documents which results in a decreased documentation burden, simple procedures and work instructions, and simpler audit.</li> <li>2. <i>Coordination &amp; coherence:</i> Integration at the level of management activities so there is a focus on interrelations, synergies and tradeoffs. Objectives and targets are set, coordinated and balanced and organisational responsibilities are defined in one place.</li> <li>3. <i>Strategic integration:</i> This includes change at cultural level that fosters teamwork and participation of all stakeholders.</li> </ol> |
| <b>Multi level synergy</b> (Zeng et al., 2007)                            | Integration requires synergy at three organisational levels  | <p>Integration needs to take place at 3 levels</p> <ol style="list-style-type: none"> <li>1. Strategic synergy</li> <li>2. Organizational structural-resource-cultural synergy</li> <li>3. Documentation synergy</li> </ol>   |
| <b>Other approaches to integration</b>                                    |  |   |

|  |   |   |
|--|---|---|
| <b><i>Two-pronged approach:</i></b><br>Karapetrovic (2002)   | Integration through generic MSS and auditing            | A two-pronged approach. The first prong involves the creation of a generic management system standard to support integration. The second prong relates to auditing. It would generate a generic audit system standard.  |
| <b><i>Integration through Total quality approach</i></b><br>Wilkinson and Dale (2001)              | Integration of all resources required to achieve an IMS | Use of integrated resources (people, finance, equipment, the tools and techniques used; information and documentation; and training) to achieve satisfaction of all stakeholders while operating in a context of a total quality culture  |
| <b><i>Integration through Ascension, Augmentation and Assimilation</i></b><br>(Rocha et al., 2007) | Strategies for enhancing the existing MSS               | Organisations could integrate the existing and future MS through<br><ol style="list-style-type: none"> <li>1. <i>Ascension.</i> For instance, when a company previously registered to ISO 9001 wants to go beyond to a Business Excellence Model.</li> <li>2. <i>Augmentation.</i> An organization may need to ‘augment’ an existing MS in order to develop a more in-depth understanding. For example, augmentation of ISO 14001 by the ISO 14031 performance guidelines.</li> <li>3. <i>Assimilation.</i> Organization may ‘assimilate’ its internal MSS so that they work as one IMS.</li> </ol> |

**Table 2: Strategies of IMS design & implementation**

These strategies of IMS design and implementation have resulted in a better understanding of IMS implementation in general and across diverse contexts. But the insatiety is still there and there is a need to establish a strategy of IMS implementation that starts from the very first step at the operational level and then moves upward to encompass the activities typically included in the managerial domain (for example, planning, controlling and coordinating). Indeed a critical analysis of integration strategies discussed in the literature reveals their inadequacy to provide a complete roadmap for the implementation process of IMS. As an illustration, for example, we note that although some approaches describe the sequence of integration of already implemented management systems (Karapetrovic & Willborn, 1998; Labodova, 2004), but they are inapplicable to the situations where no management system already exists and implementation is to be started from scratch. Similarly a simple description of

integration processes at various levels also seems insufficient since it does not tell where to start from, what to do and how to do. With all these constraints and limitations of extant literature in mind, this paper proposes a “Process based design of IMS”. This approach is discussed in more detail in the section that follows.

### **3. PROCESS BASED DESIGN OF IMS**

The need for a process based design of IMS lies in the very basic fact that there is no “one size fits all” IMS; organizations need to design the IMS system that is tailored to the specific challenges and opportunities of their own context and this process must start from the core processes of the organization. The need for a tailor made IMS has been mentioned by Fresner & Engelhardt (2004), Holdsworth (2003), Karapetrovic & Jonker (2003), Matias & Coelho (2002), and McDonald, Mors, & Phillips (2003). But there is a need of a strategy of IMS design and implementation that is based on this fundamental principle. With that in mind, the following section introduces the notion of a “Process Embedded Design of IMS” (PEDIMS) approach. To help facilitate the implementation of an IMS, a discussion of the enablers of PEDIMS approach is also presented.

### 3.1 Process Embedded Design of IMS (PEDIMS)

PEDIMS is explicitly designed to embed an IMS in the operational activities of an organization, with the added capability of helping other functions to better understand and implement an IMS.



**Figure 2 - Process Embedded Design of IMS (PEDIMS)**

Figure 2 illustrates that PEDIMS derives directly from the core processes. These operational activities are represented by the customer supplier chain (-C-S-C-S-) in which each individual is the customer of the preceding one and the supplier of the next in the operational chain. The PEDIMS at this very first stage requires that each activity be designed from the perspective of quality management, environmental management and health and safety aspects essentially but also other systems, management wants to implement. This is then followed by the second stage which is operational excellence or process performance excellence. The process performance excellence can be defined as “managing the process effectively and efficiently with a result that maximises the integrated stakeholder value in the long perspective while maintaining a balance between the interests of all stakeholders” (Garvare & Isaksson, 2001). The operational excellence could be achieved, partially, using quality tools and techniques such as Pareto analysis, cause and effect diagram and advanced quality techniques such as quality function deployment, six sigma, lean operations and lean sigma. Although these tools and techniques are mutually inclusive in terms of their application; Basu (2004) has noted that in modern times six sigma

and lean sigma are increasingly being used as the most viable tool to achieve operational excellence. The conventional and advanced quality tools and techniques lead to operational excellence through better product and process design, reduction in wastages, better compliance to specifications and customer requirements and thus enhanced customer satisfaction.

The first two stages of PEDIMS development are crucial since they address the IMS design process at the level of operational activities and thus must be supplemented by the identification of individual processes and the development of flowcharts which sequentially describe all processes, their interfaces and responsible personnel. Input and feedback of key users is critical for a successful design of PEDIMS. The PEDIMS implementation up to this stage would result in the processes that comply with all the requirements of quality, environment and health and safety and are free from every type of waste (such as over production, waiting, unnecessary transportation, inappropriate processes, unnecessary inventory, excess motion, defects, underutilisation of employees) and have high output to input ratio. Later are typical characteristics of processes that have undergone operational excellence.

The third step in PEDIMS approach is the “Integration in strategy and operation”. Essentially this stage involves incorporating the “improved processes (through preceding two stages)” into the “mainstream of MSS (such as QMS, EMS, OH&SMS and others)” using the guidelines of individual MSS. Integration at this stage ensures that requirements of all stakeholders (regarding customer satisfaction, environmental protection, employee’s health and safety and social responsibilities) described in individual MSS, have been addressed at the strategic level, translated in management processes and then integrated with operational activities. Through being addressed in the management processes, sustenance is also provided to the preceding stages. The integration in strategy and operations could also be achieved through certification of individual management systems since the certification process ensures that the requirements of all constituent management systems are effectively fulfilled. However certification is neither a pre requisite nor a guarantee of effective integration of MSS. The PEDIMS

approach up to this stage results in a system that has certain objectives (design and implementation of IMS), which are translated in the management processes (to facilitate IMS implementation) and then integrated with the core processes (that have been designed and improved to meet requirements of quality, health and safety, environment and operational excellence).

For an example of how PEDIMS works, let us consider the examples of (1) manual dispensing (or weighing) of certain chemical or pharmaceutical compounds/raw materials and (2) welding. With the weighing process, there are concerns about the quality of the chemical compound. This is checked through the physical and chemical properties of the compound and other factors such as temperature, humidity, light, calibration of balance, etc. At the same time, it is imperative to consider environmental and health and safety concerns associated with the handling of that particular compound. Three different procedures, in this example, may introduce unnecessary complexity and inconvenience to the operator. Similarly, Jorgenson *et al.* (2005) describe an example focused on the welding process where in addition to meeting customer specifications regarding welding; handling of waste and health and safety of the operator are also equally important. In these two examples PEDIMS requires that when these activities are designed to execute, say when their standard operating procedures / instructions are developed, the weighing process and welding process be designed so that there is no inherent risk in the process regarding quality, environment and health and safety concerns. Once this is done, the next PEDIMS requirement is to take this process to the level of operational excellence. For example, time and motion studies to identify wasteful processes and use of quality tools and techniques to make the process lean and conforming to specifications. This paves the way for the third step that is to incorporate “improved operational processes” in the “mainstream of management systems”.

A truly integrated management system can further be advanced for TQM or any other business excellence model. As Karapetrovic (2003) states “IMS can be thought of as first step towards business

excellence”. This has been illustrated in Figure 2. A complete discussion of the business excellence models is beyond the scope of this paper. In any case, an IMS built upon the core activities of the organisation helps pave the way for the outermost band of business excellence.

### **3.2 Context Specificity and Employees’ Buy-In**

Although a context specific IMS design has also been suggested by McDonald, Mors, & Phillips (2003), Matias & Coelho (2002), Holdsworth (2003), and Karapetrovic & Jonker (2003), PEDIMS is different from other approaches in that it extends deeper into organisational levels to subsume the core processes of the organization. To increase the likelihood of wide internal acceptance, the PEDIMS approach is designed around the routine tasks of employees and articulates the aspects which ensure that quality, environmental, and safety issues are appropriately addressed. Moreover, its explicit emphasis on employees’ involvement at the design and review stages further promotes employees’ buy-in. PEDIMS also explicitly recognizes that an IMS is not merely an integration of a set of management systems and a means to reduce document duplication and costs; rather a means to further advancement to business excellence models. This point is highlighted in Figure 2.

The reinforcement for the use of a “process based design of IMS” also comes from literature review in diverse areas. For sake of illustration, International Organisation for Standardization (ISO) uses process approach in the development of management system standard and not a single management system standard is currently based on the systems perspective or model. The standards belonging to the “customer focused” or “product quality” family such as ISO 9001, ISO 10012 and ISO 10018 are all based on the process approach (Jonker & Karapetrovic, 2004). Oakland (2003) also builds his TQM model around the core processes. Finally, the PEDIMS model presented here is designed to accommodate both existing and future management systems. As an illustration of the various management systems, an organization might choose to implement, management system standards for

quality (ISO 9001 : 2000), environment (ISO 14001 : 2004), occupational health & safety (OHSAS 18001 : 1999), and corporate social responsibility (AA1000 : 1999) using the PEDIMS approach.

### 3.3 IMS Enablers

In addition to appropriate strategy; IMS implementation can be facilitated by some key enablers. The IMS enablers most cited in the literature are strategic planning, support of all stakeholders (senior management and employees especially key users of IMS), facilitating cultural change, and employee training. The supporting literature for each of these enablers is summarized in Table 3.

| <b>Top Management support in IMS implementation</b> |   |
|---|---|
| <b>IMS enablers</b>                                 | <b>Supporting literature</b>  |
| Top management commitment                           | (Rocha et al., 2007; Zeng et al., 2007; Zutshi & Sohal, 2005)   |
| Strategic planning                                  | (Rahimi, 1995)  |
| Tailor-made IMS design                              | (Fresner & Engelhardt, 2004; Holdsworth, 2003; Karapetrovic & Jonker, 2003; Matias & Coelho, 2002; McDonald et al., 2003) |
| Employee training                                   | (Rahimi, 1995)  |
| Cultural change                                     | (Jorgensen <i>et al.</i> , 2005; McDonald <i>et al.</i> , 2003; Wilkinson & Dale, 2002; Zeng <i>et al.</i> , 2007),       |
| Performance measurement & reward system             | (Rahimi, 1995)  |
| <b>Other enablers of IMS</b>                        |   |
| Key users' support                                  | (Hines, 2002; Holdsworth, 2003; McDonald <i>et al.</i> , 2003; Rahimi, 1995)  |
| Experts'(or consultants') support                   | (Zeng <i>et al.</i> , 2007; Zutshi & Sohal, 2005)   |

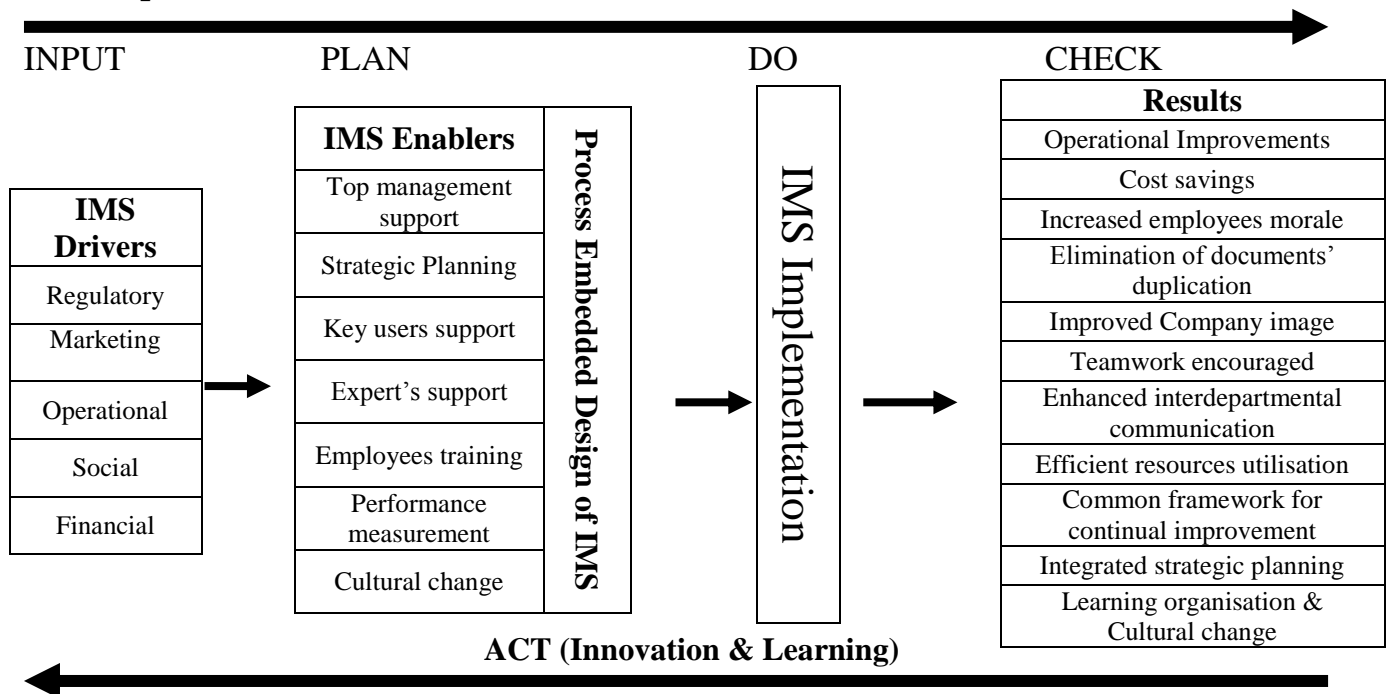
**Table 3- IMS enablers & supporting literature**

### 3.4 PEDIMS Implementation

Once a context specific and process based design of IMS (As PEDIMS is) is designed, next stage is implementation. It is critical to establish here that implementation is an iterative cycle in which feedback from the output stage is entered into inputs to restart the process of continuous improvement. This learning process is essential in order to prevent lapses in IMS design, redesign, and implementation. This

also ensures that the organisation continuously adapts to new challenges and the system never rolls back to its initial position. With that in mind, a schema for IMS implementation is illustrated in Figure 3. This schema is based on the PDCA cycle. It derives stimulus for IMS implementation from a diverse number of motives including regulatory, financial, marketing, social, and operational drivers. Once the decision to implement the IMS is made, the next step is the need evaluation of the management systems that are needed. In any case it is the responsibility of top management to decide with functional managers which functions and standards to include.

### IMS Implementation Process



**Figure 3: IMS implementation roadmap based on PDCA**

The “plan” stage is followed by implementation stage. However the implementation process is not as straightforward and requires its integration in strategy and across various functions of organisation. Hardjono, ten Have, & ten Have (1996) in their book “European Way to Excellence” have described four guiding concepts, which taken together, form the basis for a distinctive method of organisation. These concepts are direction, consistency, coherence and feedback. Direction refers to the organisations’ choices and common aims and in this case it means organisations’ intentional choice of management

systems to integrate and implement, whether integration of only management systems or sector specific systems as well. *Consistency* is predominantly the vertical translation of the common aim and organisational values into objectives and tasks (vertical fit). The integration at this stage means incorporating the broader objective of IMS implementation into organisations' management activities; which would in turn result in conducting a gap analysis, and then based on aligning the goals, allocation of crucial resources (both human and financial) and processes so that all the management functions are tuned to the achievement of same goal. *Coherence*, as they define it, relates to the horizontal coordination between processes, chains, operating companies, departments and individuals, and also includes structures, systems and competencies (Horizontal fit). Integration at this level means designing core operational activities in the PEDIMS perspective.

The implementation is followed by the monitoring of the implementation process and its outputs. This includes evaluating gains from implementation and impediments faced in the implementation process. The monitoring process can be facilitated by “integrated auditing”, which is the simultaneous auditing of all components of PEDIMS. The role of top management and middle management is very important in the review process and management reviews and feedback are important mean for the execution of this activity. Feedback refers to the arrangement of an organisation in such a way that that learning can take place at all levels and over varying time-frames. The experiences and feedback from the implementation stage would be used in the next iterative cycle of implementation. The later is a typical characteristic of learning organisations and when executed systematically, ensures continuous improvement of performance.

Finally figure 3 shows a brief list of the results (benefits of IMS), as described by Jorgensen et al.(2005), Douglas & Glen (2000), Zeng et al.(2007), Zutshi & Sohal (2005) that could be reaped from successful

implementation of IMS; however IMS is not a destination, it is only a critical milestone in the journey towards business excellence.

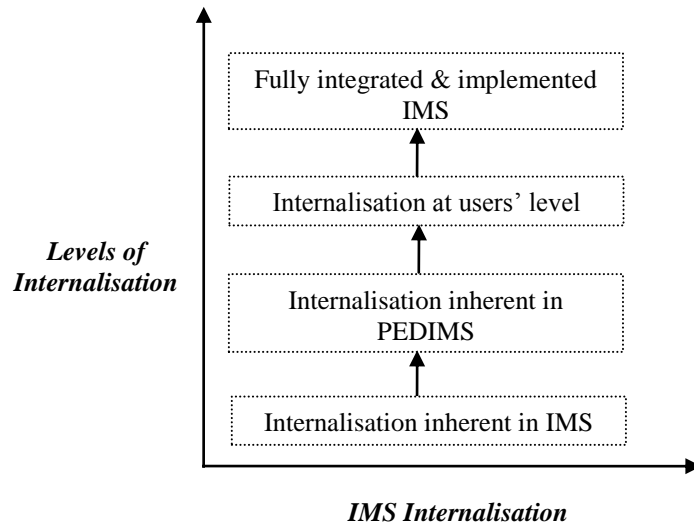
### **3.5 IMS INTERNALISATION**

Once the PEDIMS design and implementation is complete, the next challenge is its internalisation, maintenance, and continued improvement. Internalisation could be described as “embeddedness of IMS in the organisations’ routine operations and in the culture”. The need for a focus on this challenge is underlined by the law of entropy. Essentially, it means that things left to themselves, gradually move towards chaos and disorder. To keep them in an order, one has to spend energy. Some effort/input is therefore required. This is the same case with an IMS. Left to itself, the system moves towards deterioration and degradation with the passage of time. The underlying philosophy behind this is that people resist change in their status quo and want to return back to their old zone of comfort. The notion of resistance in change from people is heavily supported by literature in organisational psychology (Dent, 1999; Kotter, 1979, 1995, 1996; O’Toole, 1995).

Another common problem faced in the implementation of advanced management systems is that they are not effectively implemented and so not completely harnessed. Even the advanced management systems like “total quality management” appear to many practitioners as a faded star (Williams, Wiele, Iwaarden, Bertsch, & Dale, 2006) and jaded tree (Dale, 2003). Sathiendrakumar (1996) has expressed similar concerns about sustainable development. Dale (2003), however, has noted that there is no problem with advanced management systems, rather the problem arises in the way they are implemented. This is the same case with an IMS. It is thus imperative to appropriately harness the IMS so that it appears as a potential reality rather than a quick passing fad.

The internalisation of IMS could be described at three levels. At the first level lies the fact that some of the internalisation is inherent in the IMS itself; as Douglas & Glen (2000), Zutshi & Sohal (2005) and McDonald et al. (2003) have noted that IMS has the potential for making key users' jobs simpler and easier which in turn increases its acceptability and internalisation. But this is not sufficient as failures associated with poor IMS implementations have been widely reported in literature and thus we need to go beyond this basic level. Internalisation also comes from the PEDIMS design of IMS as the PEDIMS is designed over the core activities of organisation and thus promotes greater buy-in by employees. As is the case with PEDIMS, designing IMS with the support of key users and designing the IMS to the specific needs and competencies of the organisation will better serve the purpose of the organisation than any generic IMS system (Fresner & Engelhardt, 2004; Matias & Coelho, 2002; McDonald *et al.*, 2003). So such a system (as the PEDIMS is) promotes firm internalisation of the IMS and prevents it from rolling back to its initial state. This is the second level of internalisation.

The third level is the internalisation of the IMS at the level of employees, particularly the key users of the IMS. The need of internalisation at this level is evident from the previous discussion which emphasises that significant resistance is faced from key users. Internalisation could be facilitated by incorporating their feedback in the design and redesign of IMS, training, education and motivation so that they don't feel alien to the new system. The three levels of IMS internalisation have been shown in figure 4. Internalisation of the IMS is an important issue because in the past many organisations suffered from this problem and that mistakenly led to the notion of "management systems as quickly passing fads". A failure to embed the IMS may put the whole effort and resources at stake.



**Figure 4: Various levels of IMS internalisation**

#### 4. CONCLUSION AND DISCUSSION

Integration of management systems is seen as a viable organisational approach to cost reduction, operational improvements, employee motivation, efficient management and utilization of resources, and a means to sustainable development. However difficulties (and even failures) have been faced in IMS implementation (integration of individual management systems and their implementation) due to lack of formal MSS for IMS and unavailability of methodologies for IMS implementation. Due to the varying nature of specific core strengths and weaknesses of firms, an IMS that works well for one organisation may not work for another, a true IMS would therefore be one that has been designed specifically for that organisation. Moreover, organisations aspiring for business excellence must build their IMS over the core processes that have reached operational excellence. Process embedded design of IMS (PEDIMS) is a strategy that helps design an IMS over an organization's core processes, the core processes which are designed to meet all the requirement of quality, environment, health and safety and are lean (free of wastages) and productive enough. These improved processes are then incorporated in the management systems. IMS implementation can be facilitated through enablers such as securing senior management's full support, addressing IMS in strategic planning, allocating and prioritizing resources, establishing goals, targets and milestones for IMS, involvement of end users of IMS in the design and

implementation phase, support of IMS experts, fostering a culture of teamwork, and through employees' training. PEDIMS approach counts upon feedback as the dynamising process to design, implement and improve IMS. Finally, internalisation of IMS is an important concern, because of failures reported in the literature; however PEDIMS approach, owing to its specific context based design, process based approach and involvement of key users throughout the designing phase, facilitates its internalisation which could further be augmented by the training and motivation of key users. PEDIMS design and implementation is based on the plan-do-check-act cycle (PDCA) which provides a strong backbone for continual improvement and stabilizes it by keeping from getting rolled back. The process embedded design of IMS can further be enhanced for the business excellence models.

## **REFERENCES:**

- Basu, R. (2004). Six-Sigma to operational excellence: role of tools and techniques. *International Journal of Six Sigma and Competitive Advantage*, 1(1), 44-64.
- Crowe, T. J. (1992). Integration is not synonymous with flexibility. *International Journal of Operations and Production Management*, 12(10), 26 -33.
- Dale, B. G. (2003). *Managing Quality* (4th ed.). Oxford: Blackwell Publishing.
- Dent, E. B. (1999). Challenging "Resistance to Change". *The Journal of Applied Behavioral Science*, 35(1), 25-41.
- Douglas, A., & Glen, D. (2000). Integrated management systems in small and medium enterprises. *Total Quality Management*, 11(4/5&6), 686-690.
- Fresner, J., & Engelhardt, G. (2004). Experiences with integrated management systems for two small companies in Austria. *Journal of Cleaner Production*, 12(06), 623-631.
- Garvare, R., & Isaksson, R. (2001). Sustainable development: extending the scope of business excellence models. *Measuring Business Excellence*, 05(03), 11-15.
- Garvin, D. A. (1991, November-December). How the Baldrige Award really works. *Harvard Business Review*, 69, 80-93.

- Hardjono, T. W., ten Have, S., & ten Have, W. D. (1996). *The European Way to Excellence*. London: European Quality Publications.
- Hines, F. (2002). Integrated Management Systems -inclusivity of approach or dilution of problems?, *Poster presentation at 10th International Conference of the Greening of Industry Network*. Sweden.
- Holdsworth, R. (2003). Practical applications approach to design, development and implementation of an integrated management system. *Journal of Hazardous Materials*, 104(1), 193-205.
- Jonker, J., & Karapetrovic, S. (2004). Systems thinking for integration of management systems. *Business process management journal*, 10(06), 608-615.
- Jorgensen, T. H., Remmen, A., & Mellado, M. D. (2005). Integrated management systems-three different levels of integration. *Journal of Cleaner Production*, 14(08), 713-722.
- Karapetrovic, S. (2002). Strategies for the integration of management systems and standards. *The TQM Magazine*, 14, 61-67.
- Karapetrovic, S. (2003). Musings on integrated management. *Measuring Business Excellence*, 7(01), 4-13.
- Karapetrovic, S., & Jonker, J. (2003). Integration of standardized management systems: searching for a recipe and ingredients. *Total Quality Management*, 14(04), 451-459.
- Karapetrovic, S., & Willborn, W. (1998). Integration of quality and environmental management systems. *The TQM Magazine*, 10(3), 204-213.
- Kotter, J. P. (1979). Choosing strategies for change. *Harvard business review*, 57(2).
- Kotter, J. P. (1995). Why transformation efforts fail. *Harvard Business Review*, March-April, 59-67.
- Kotter, J. P. (1996). *Leading change*. Boston: Harvard Business School Press.
- Labodova, A. (2004). Implementing integrated management systems using a risk analysis based approach. *Journal of Cleaner Production*, 12(06), 571-580.
- Lagrosen, S. (2003). Exploring the impact of culture on quality management. *International Journal of Quality & Reliability Management*, 20(4), 473-487.

- Matias, J. C. D. O., & Coelho, D. A. (2002). The integration of the standards systems of quality management, environmental management and occupational health and safety management. *International Journal of Production Research*, 40(15), 3857-3866.
- McDonald, M., Mors, T. A., & Phillips, A. (2003, October). Management system integration: Can it be done? *Quality Progress*, 36, 67-74.
- O'Toole, J. (1995). *Leading Change: Overcoming the Ideology of Comfort and the Tyranny of Custom*. San Francisco: Jossey-Bass Publishers.
- Oakland, J. S. (2003). *TQM: Text with Cases* (3rd ed.). Oxford: Butterworth-Heinemann.
- Pettigrew, A. M., & Whipp, R. (1991). *Managing Change for Competitive Success*. Oxford: Oxford: Blackwell.
- Rahimi, M. (1995). Merging strategic safety, health and environment into total quality management. *International Journal of Industrial Ergonomics*, 16(02), 83-94.
- Raouf, A. (2004). Productivity enhancement using safety and maintenance integration: An overview. *Kybernetes*, 33(07), 1116-1126.
- Rocha, M., Searcy, C., & Karapetrovic, S. (2007). Integrating sustainable development into existing management systems. *Total quality management*, 18(1-2), 83-92.
- Sathiendrakumar, R. (1996). Sustainable development: passing fad or potential reality? *International Journal of Social Economics*, 23(4/5/6), 151-163.
- Seghezzi, D. (2000). *Proceedings of 44th European Quality Congress*. Paper presented at the 44th European Quality Congress, Budapest.
- Sigler, T. H., & Pearson, C. M. (2000). Creating an empowering culture: examining the relationship between organizational culture and perceptions of empowerment. *Journal of Quality Management*, 5(1), 27-52.
- Wilkinson, G., & Dale, B. G. (1999). Integrated management systems: an examination of the concept and theory. *The TQM Magazine*, 11(2), 95-104.

- Wilkinson, G., & Dale, B. G. (2001). Integrated Management System: A model based on total quality approach. *Managing Service Quality*, 11(05), 318-330.
- Wilkinson, G., & Dale, B. G. (2002). An examination of the ISO 9001:2000 standard and its influence on the integration of management systems. *Production Planning & Control*, 13(03), 284-297.
- Williams, R., Wiele, T. V. D., Iwaarden, J. V., Bertsch, B., & Dale, B. (2006). Quality Management: The New Challenges. *Total Quality Management*, 17(10), 1273–1280.
- Zeng, S. X., Shi, J. J., & Lou, G. X. (2007). A synergetic model for implementing an integrated management system: an empirical study in China. *Journal of Cleaner Production*, 15(18), 1760-1767.
- Zutshi, A., & Sohal, A. S. (2005). Integrated management system: The experiences of three Australian organisations. *Journal of Manufacturing Technology Management*, 16(02), 211-232.