An examination of strategies employed for the integration of management systems

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Abstract

Purpose – This paper is an empirical study of the organisational approaches used for integration of management systems (MSs) and the comparative effectiveness of such approaches.

Design/methodology/approach – Research employed four case studies. Results are derived from the analysis of triangulated evidence obtained from in-depth interviews, observations, internal documents analysis, archives, and short questionnaires.

Findings – Results identified two archetypes of integration strategies termed "systems approach" and "techno-centric approach". Maximum benefits are achieved by using a systems approach to integration of MSs, while using the techno-centric approach leads to benefits mainly at the operational level.

Research limitations/implications – This research is qualitative and, as such, does not investigate the integration of MSs across a large number of organisations. The research does not investigate the causality between strategies employed for integration and their outcomes.

Originality/value – There is little empirical research to date on the strategies employed for integration of MSs and their effectiveness. This research contributes to both literature and practice by demonstrating that a systems approach gives rise to greater integration throughout various organisational levels and greater benefits as compared to other approaches.

Keywords Management information systems, Research, Customer satisfaction

Paper type Research paper

1. Introduction

In recent years the number of management systems (MSs) and standards for such MSs have increased tremendously. The purpose of these MSs is to facilitate organisations to systematically address various stakeholder requirements. International Organization for Standardization (ISO) has developed standards for some of the MSs, including quality, environment, customer satisfaction, and auditing, among others. Research has shown that maximum benefits from (standardized) MSs are obtained when they are integrated into one holistic MS (Jørgensen *et al.*, 2006; Zutshi and Sohal, 2005). The realm of the MSs will continue to expand and integration remains the only meaningful way to benefit from such a development (Karapetrovic, 2008). Despite the established need for the integration of MSs, research on how to carry out integration has yet to be

fully developed (Rocha *et al.*, 2007) and an elaborated methodology of integration needs fuller realisation. The failures associated with integration of MSs (Beckmerhagen *et al.*, 2003; Wilkinson and Dale, 1999, 2002; Zeng *et al.*, 2007) also point to the need for a concrete methodology for integration of MSs. In particular, research needs to describe the various strategies of integration of MSs and the comparative effectiveness of such strategies.

In an effort to address identified gaps in the published literature, this study presents empirical research on the approaches to integration of MSs and the outcomes of such approaches. This research contributes to the body of knowledge in two ways. First, it identifies the archetypes of integration strategies through an in-depth study of the four organisations. Second, it evaluates the comparative effectiveness of these strategies. The results provide an answer to the question "what approaches can organisations employ to organize the effective integration of MSs?" To provide some context for the research, this paper begins with a review of literature. The literature review, is followed by the methodology section, to describe cases selection, data collection, and data analysis. Results and discussion are then presented. The paper ends with conclusions.

2. Literature review
The literature on the integration of MSs can be divided into three streams. The three streams represent the gradually developing literature and when considered together provide an informed understanding of integrated management system (IMS). The three streams are summarized in Table I.

2.1 First stream
This stream is the foundation literature on IMS and represents the nascent stage of the evolution of IMS. This literature addresses basic concepts related to IMS, such as how to define an IMS, and the need for integration. This literature introduced the concept of integration and provided the basis for the later IMS literature.

Stream in literature	Main topics covered	Supporting literature
First stream	Philosophy, basic concepts, and ideas regarding integration	Griffith, 2000; Karapetrovic and Willborn, 1998; Mangelsdorf, 1999; Wilkinson and Dale, 1999, 2002
Second stream	Proving legitimacy of an IMS Spin-offs from an IMS Challenges faced in integration of MSs Issues in integration of MSs	Matias and Coelho, 2002; McDonald *et al.*, 2003; Oskarsson and Malmborg, 2005; Zutshi and Sohal, 2005
Third stream	Strategies (and models) of integration Degree of integration IMS: a means to sustainable development IMS: a means to sustainable management systems	Asif *et al.*, 2009; Beckmerhagen *et al.*, 2003; Bernardo *et al.*, 2008; Douglas and Glen, 2000; Jonker and Karapetrovic, 2004; Jørgensen, 2008; Jørgensen *et al.*, 2006; Karapetrovic, 2002, 2008; Karapetrovic and Jonker, 2003; Labodova, 2004; Rocha *et al.*, 2007; Salomone, 2008; Zeng *et al.*, 2007

Table I.
Streams of literature
on IMS

2.2 Second stream

The literature in this stream focuses on further exploration of IMS. In particular the focus is on proving the legitimacy of IMS. This research is generally of an empirical nature and mainly comes from case studies and surveys. The second stream literature focuses on issues, spin-off, challenges, and factors that influence the integration of MSs. It reveals a number of strategic, tactical, and operational benefits obtainable from the integration but does not elaborate on how to carry out integration.

2.3 Third stream

As new MS standards emerge and organizations employ them, their integration with existing MSs becomes a necessity. For instance, augmenting standards (such as ISO 10001, 10002, and 10003) are used to enhance the existing quality management system of an organisation. Literature in this stream focuses on practical approaches to carrying out integration. This stream focuses on topics such as strategies and models of integration, degree of integration, and IMS as a means to other strategic programs – such as sustainable development (Jørgensen, 2008). A more recent work in this regard is the handbook titled "The integrated use of management system standards" published by ISO (2008). Research in the third stream literature is still developing.

The existing literature has led to improved understanding of how to organize integration of MSs. However, critical analysis of these approaches reveals that literature on the strategies of integration is in need of further development for two primary reasons:

(1) Past studies omit a systematic consideration of integration strategies based on empirical data.

(2) These studies describe the techniques to combine standardized MSs and, as such, lack a focus on the broader organisational strategy to organize an IMS as the paramount business MS.

The few exceptions are Jonker and Karapetrovic (2004), Karapetrovic and Jonker (2003), Karapetrovic and Willborn (1998).

Regarding the paucity of empirical studies, Bernardo *et al.* (2008, p. 3) noted that "although IMSs have been studied in detail from a theoretical point of view, there has been very little empirical research". The existing research does not address the broader organisational strategy employed for integration of MSs; nor do they evaluate the comparative effectiveness of such approaches. This is an important point, because numerous benefits obtainable from integration of MSs require its systematic handling. There is, then, a need for research to answer questions such as: how systematic integration of MSs could be carried out? How the integration process unfolds in practice? If multiple approaches to integration exist, then how they differ from each other regarding context and starting points? This research advances one step to address this gap in the literature. The main research question addressed in this study is what strategies are employed for integration of MSs and what is the comparative effectiveness of these approaches?

3. Methodology

A better understanding of the motivation for the integration as well as the rich organisational context that drives the integration process was possible only through in-depth research. This called for case research, which allowed for a depth of observation, the use of multiple data sources, and the extraction of the findings

through a triangulation process (Yin, 2003). Subsequent sections of this paper describe the operationalisation of degree of integration and outcomes of integration, followed by a description of cases selection, data collection, and data analysis.

3.1 Effectiveness of integration: operationalisation

The effectiveness of integration is measured in terms of degree of integration (Beckmerhagen *et al.*, 2003; Bernardo *et al.*, 2008) and other general benefits resulting from integration. The degree of integration and other outcomes of integration were operationalized as follows.

3.1.1 Degree of integration. The degree of integration represents the extent to which integration of MSs takes place at different levels of the organisation. Although some authors have addressed the theoretical aspects of degree of integration – for example, Beckmerhagen *et al.* (2003); Bernardo *et al.* (2008); and Karapetrovic (2002, 2003), there is little empirical literature on degree of integration for MSs. Bernardo *et al.* (2008, p. 6) noted the absence of empirical research focused on "the degree to which companies integrate their environmental MS with other MSs". To operationalise the degree of integration, useful insights were obtained from Asif *et al.* (2009), Bernardo *et al.* (2008), Jørgensen *et al.* (2006), and Pagell (2004), which suggested three levels of integration (i.e. strategic, tactical, and operational). The nature of integration tasks is different at each level. Whereas the strategic level concerns integrated planning and resources deployment; the tactical level concerns the design of IMS and monitoring the execution of IMS; and the operational level concerns the execution of activities in an integrated fashion. This is shown in Table II.

3.1.2 Benefits of integration. In addition to degree of integration, we examined how integration is perceived by different organisations employing different strategies and how organisational actors at different levels perceive the outcomes of integration. Although "degree of integration" is itself an indicator of the outcomes of integration, we sought data on other benefits as well. This research counted on multiple sources of evidence (subsection 3.3), which revealed a number of benefits resulting from the integration of MSs. To capture the broad range of potential benefits, short questionnaires were used to determine the perceptions of respondents about benefits of integration. Three types of short questionnaires were prepared for top managers, middle managers, and operators (key words of each item provided in Table III). The items in the short questionnaires are based on the outcomes of integration revealed in this research and reported in the literature, such as, Jørgensen *et al.* (2006), McDonald *et al.* (2003), Rahimi (1995), Wilkinson and Dale (1999, 2002), and Zutshi and Sohal (2005). Since this is an in-depth study of four organizations, the data from the short questionnaires was used primarily to support other evidence (i.e. data triangulation rather than statistical sampling) from the interviewed key informants.

3.2 Cases selection

We set out to select companies that were:

- front-runners regarding the integration of their MSs; and
- mature in their integration practice.

"Front-runner" in this context refers to the companies who are early adopters of an IMS and are known to have an established IMS.

Degree of integration

Strategic level
Full integration:
An integrated policy exists. The organisational objectives relate to effective management of stakeholder requirements – such as quality, environment, health and safety, and social responsibility
Organisational plans are clear to achieve stated goals and objectives.
There is complete alignment between organisational policy, goals, and plans to achieve these goals
Partial integration:
Organisational policy, objectives, and plans are mutually aligned to some degree
They describe to some extent how the organisation will achieve its objectives
No integration:
Organisation has policies, objectives, and plans, which are aligned neither to each other nor to the operations
They give no clue to how the organisation will achieve its goals regarding various stakeholder requirements

Tactical level
Full integration:
Managers have combined duties for various functions
Managers develop integrated management manual and procedures
Managers emphasise the need of integrated operations, documentation, records, and overall working in their directions, training, and other formal/informal means of communication and implementation
Most of the time the managers from various functions interact, collaborate, and arrive at mutually acceptable outcomes
Integrated audits are carried out.
Partial integration:
Managers have combined responsibilities to some extent. They are primarily concerned with getting their specific job done well. Only sometimes do managers interact, collaborate, and arrive at mutually acceptable outcomes
Performance evaluation is based on getting their specific job done well (such as meeting production targets or savings in procurement) rather than integrated functioning
Audits and corrective action reports are partially integrated
No integration:
Most of the time managers do not interact, collaborate, nor do they reach mutually acceptable outcomes
There are separate procedures for each department which promote little collaboration
In general individual functions are considered the responsibility of separate departments
Separate auditing is carried out for each function

Operational level
Full integration:
Most of the work instructions, records, checklists, and data collection sheets are integrated
Various aspects of processes – representing stakeholder requirements such as quality, sustainability, health and safety, etc. – are considered jointly and in an integrated manner during the execution
Partial integration:
Some of the work instructions, records, checklists, and data collection sheets are integrated.
The execution of operational processes considers relevant stakeholder requirements in a partially-integrated manner
No integration:
Separate records, work instructions, checklists, and data collection sheets for various MSs or various aspects of processes
No integration among various aspects of processes

Table II.
Degree of integration and its operationalisation at different organisational levels

How true each of the following statement is on a scale of 1-5. 1 – Not at all; 2 – Slightly true; 3 – Somewhat true; 4 – Mostly true; 5 – Completely true. Integration of MSs resulted in:	Mean score for each outcome				Mean score for strategy
	Strategy-I		Strategy-II		
	Pharmaceutical	Textile	Auto	Dairy	
Strategic level					
Enhanced stakeholder satisfaction	5.00	5.00	4.00	1.50	
Development of holistic business MS	5.00	4.33	3.00	1.00	
Inter-departments conflicts removal	5.00	5.00	3.50	2.50	
Better coordination among departments	5.00	5.00	3.50	2.00	
Better and easier strategic planning	5.00	4.67	3.00	1.50	
More savings in resources	5.00	4.67	2.50	3.50	$\mathrm{Mean_{Strategy-I}} = 4.76$
Organisational culture improvement	5.00	4.33	3.00	3.00	$\mathrm{Mean_{Strategy-II}} = 3.15$
Better resources utilization	4.50	4.67	4.00	3.50	
Operational performance improvement	4.50	4.67	5.00	4.00	
Financial improvement	4.00	4.67	3.00	2.00	
Regulatory compliance	5.00	4.33	4.00	4.00	
Overall benefits	5.00	5.00	4.50	4.00	
Tactical level					
Job responsibilities better defined	5.00	4.57	3.80	2.00	
Training activities unification	4.25	4.57	4.40	4.25	
Cost reductions	5.00	4.57	5.00	4.75	
Work burden reduction	4.75	4.57	4.60	4.25	
Human resources savings	4.50	4.71	4.40	4.00	
Reduction in systems bureaucracy	4.75	5.00	3.80	3.50	
Employees morale and motivation	4.50	4.29	4.60	3.25	$\mathrm{Mean_{Strategy-I}} = 4.71$
Inter-department conflicts removal	5.00	4.43	4.60	2.75	$\mathrm{Mean_{Strategy-II}} = 4.19$
Resources optimization	5.00	4.86	5.00	4.25	
Procedures duplication reduction	4.25	4.43	4.60	4.75	
Cost savings in audit	5.00	4.86	4.80	4.75	
Effective communication	4.75	4.86	4.00	3.75	
Overall benefits	5.00	5.00	4.80	4.25	

(*continued*)

Table III.
Outcomes of integration:
list of indicators and
results

Table III.

How true each of the following statement is on a scale of 1-5. 1 – Not at all; 2 – Slightly true; 3 – Somewhat true; 4 – Mostly true; 5 – Completely true Integration of MSs resulted in:

| | Mean score for each outcome | | | | |
| | Strategy-I | | Strategy-II | | Mean score for strategy |
	Pharmaceutical	Textile	Auto	Dairy	
Operational level					
Documents duplication reduction	4.87	4.80	4.65	4.53	
Records duplication reduction	4.53	4.87	4.65	4.73	
Simplified work processes	4.87	4.70	4.70	4.53	
Improved understanding of processes	4.87	4.80	4.70	4.73	
Integrated operations	4.73	4.73	4.90	4.80	$\text{Mean}_{\text{Strategy-I}} = 4.74$
Time savings and efficiency improvement	4.80	4.73	4.65	4.60	$\text{Mean}_{\text{Strategy-II}} = 4.70$
Safe and responsible working	4.60	4.70	4.65	4.73	
Improved compliance to control limits	4.67	4.63	4.75	4.60	
Overall benefits	4.60	4.73	4.80	4.87	

Note: Lower scores represent the disagreement whereas higher scores represent the agreement of respondents about the questioned items

Regarding maturity a three-year period is generally considered to be the cut-off point between young and mature organizations (Ahire, 1996). Mature plants are better able to make a sound cost-benefit assessment of the value of integration practices.

With the previously mentioned selection criteria in mind, we identified seven companies in Pakistan. The industrial sector of Pakistan provided us a large population of large-sized manufacturing enterprises operating in a highly competitive environment. Out of the seven companies meeting our selection criteria, four agreed to participate in the research. A description of the selected organizations is summarized in Table IV. The selected organizations are large sized manufacturing plants (employment size 500-6,000) that started their integration endeavours at least four years earlier. All are award winners for their efforts either in quality, sustainability, health and safety, or socially responsible business practices.

3.3 Data collection

The research counted on multiple data sources such as in-depth interviews, internal documents analysis, observations, short questionnaires, and archives. We used interview protocols for managers (see Appendix 1) and for shop floor employees (see Appendix 2). Data were collected from strategic level managers – responsible for making policies and strategies for their organisations (two to three interviews in each case); departmental managers involved in the integration process (four to seven interviews in each case); and from shop floor employees (15-30 interviews in each case). Data were collected mainly through taking notes. Field notes were transcribed after each visit.

Data from companies' internal documents and archives were collected for triangulation purpose. Data from these sources provided strong evidences of managerial actions and organisational policies (see Table V). Data regarding benefits of integration were also collected from all interviewed key informants through short questionnaires (sub-subsection 3.1.2). The on-site observation of daily routines resulted

Characteristics	Pharmaceutical plant	Textile plant	Automobile plant	Dairy plant
Main products	Solid and liquid dosage forms	Fabric, yarn, denim, stitched garments	Cars	Dairy products
No. of employees	> 500	> 6,000	> 1,000	> 500
Customers/ major markets	Local, South Asia, Middle East, North Africa	Europe and the USA only	Local	Middle East, North Africa, Central Asia, Europe, the USA, and South Asia
Management systems implemented	QMS, EMS, OH&SMS, and SA 8000	QMS, EMS, OH&SMS, and SA 8000	QMS, EMS, OH&SMS, and SA 8000	QMS, EMS, OH&SMS
Plant specific technical systems	Good manufacturing/ distribution practices (GMP/GDP)	Worldwide responsible apparel productions (WRAP)	QS 9000	Hazard analysis and critical control point (HACCP)

Table IV.
Characteristics of
selected cases

Documents/records	Information generated (in general)
Company policy, objectives, and plans to achieve objectives.	Organisation's intentions, actions, and priorities regarding integration of MSs
Annual objectives and targets	Organisations' commitment to an IMS
Company management manual	Actual state of integration of MSs
Agenda of management review meetings	Organisational actions that speak of an IMS commitment
Minutes of the meeting of steering committee	Organisational actions that speak of an IMS commitment
Standard operating procedures (SOPs)	Actual state of integration of MSs
Working instructions, Integrated training checklist	Actual state of integration of MSs
Records (such as data collection sheets)	Actual state of integration of MSs at operational level
Company's technical circulars	Organisational actions that speak of an IMS commitment
Audit reports	Organisations' commitment to an IMS
Job description (roles and responsibilities)	Actual state of integration of MSs
Responsibility matrix and organogram (functional and technical)	Actual state of integration of MSs
Corrective and preventive action (requests and reports)	Actual state of integration of MSs and organisations commitment for an IMS

Table V.
List of documents and records and information generated thereof

in better understanding of the companies' processes and firsthand knowledge of integrated processes.

3.4 Data analysis
Data analysis has two main components: within and cross-case analysis. The within-case analysis was conducted to find new constructs regarding motivation of integration of MSs, strategies employed for integration, and the outcomes of integration. It also helped to determine the degree to which companies integrated their MSs. This resulted in an extensive database that was further refined on cross-case analysis. The purpose of the cross-case analysis is to find similar and contrasting underlying patterns in the data. Cross-case analysis helped in understanding similar and contrasting approaches to integration of MSs and their outcomes.

4. Within-case description
4.1 Pharmaceutical plant
The pharmaceutical company produces liquid and solid dosage forms and relies mainly on its own-patented medicines. It supplies its products to a large number of hospitals locally as well as in countries in South Asia, Middle East, North Africa, and other countries. Management of this plant has learned over time that stakeholders are of immense importance to establishing and maintaining enterprise viability and hence strives to fulfil their needs. As the plant manager observed, the:

> Pharmaceutical sector is the most sensitive and regulated sector [...] Any non-conformance in our operations is simply life threatening [...] We have to be world class in every aspect [...] An IMS is not an option; it is the only means to be world-class.

The company works in a highly regulated environment. It employed separate MSs for the effective management of quality, environment, health and safety, and social responsibilities in addition to sector specific MSs such as good manufacturing practices (GMP), good distribution practices (GDP), and good laboratory practices (GLP). The need for the integration of MSs was realized in favour of one holistic and over-ruling business MS. To transform the idea of integration into an executable MS, management started a stakeholder dialogue process to decide on the business imperatives and set the business direction. It also helped management to accordingly formulate the organisational policy, objectives, and strategy as per identified stakeholder requirements. The business strategy then was translated (by the tactical managers) into an organisational MS meant to promote joint care of quality, environment, health and safety, financial probity, and social issues in an integrated manner. The administrative imperatives (such as management reviews, organisational systems and responsibilities, and training and auditing), documentation, and operations were then redesigned and carried out in an integrated manner. The quality, environmental, and health and safety management manuals were integrated into a single "operations manual". The operations manual then resulted in generation of integrated procedures, processes, work instructions, and records. The support activities such as training and audits were also integrated.

Integration resulted in significant operational improvements in terms of reduction in waste generation, batch manufacturing-time, machine set up time, and labour hours. Integration also introduced a number of behavioural changes, which occurred in terms of greater buy in of new system and were reflected in the enhanced employees' motivation and reduced labour hours and batch manufacturing time despite their enriched jobs. The integration also enhanced coordination and integration with external stakeholders (such as suppliers, customers, and regulators). Regarding degree of integration (see Table II), full integration was observed throughout strategic, tactical, and operational levels. Complete fit between organisational activities across different departments and across organisational levels was observed.

4.2 Textile plant
The textile plant is a large plant (employment size $>$ 6,000, annual denim production capacity $>$ 30 million linear meters denim) that produces denim, yarn, fabric, and stitched garments. The main customers of the textile plant are European and American companies. While operating in a highly competitive environment, the management of the textile plant realized the need to have world-class operations. With that in mind, the textile plant spent heavily on the acquisition of advanced machinery to automate operations. However, the competitive edge due to automation eroded as more and more competitors also acquired the same machinery. As the systems manager summed up,

> Initially we thought that we could beat our competitors using advanced machines, automation, and robotics [...] but it did not happen. The advanced machines are easily imitable hardware [...] you need software to manage the hardware [...] and that software is an integrated management system.

The intent to employ an IMS got significant support from key stakeholders including one customer who offered voluntary services to help the company employ an IMS. The integration process started with the objective to meet stakeholder requirements through the development of a core infrastructure that would promote integrated

operations. The "end in mind" was a system for integrated management of quality, sustainability, health and safety, and social responsibilities. The process started with redefining business policy (a focus on the systems development and competencies rather than acquisition of machines). This was accompanied with extensive structural changes in organization. Small functional silos such as the quality department and the SHE (safety, health and environment) departments were merged into one department with a new name "Systems department". Extensive changes were also introduced in the organisational organogram to re-structure responsibilities and, likewise, in the documentation. An example of fundamental changes in documentation included conversion of separate quality, environmental, and health and safety manuals into a single manual called "operations manual". This integration, in turn, led to enhanced-integration within operating procedures, work instructions, and execution of activities. These changes also helped to reduce the bureaucracy that existed due to isolated functional silos. The integration process further progressed as users realized firsthand the benefits from IMS.

Using this strategy, the textile plant achieved full integration throughout strategic, tactical, and operational levels. Complete fit between organisational activities across different departments and across various organisational levels was observed.

4.3 Automobile plant

The automobile plant is a large car manufacturing company that operates in a tough competitive arena with other car manufacturers. It employs MSs for quality, environment, health and safety, and social accountability. The automobile plant started the integration process mainly in response to external pressures. The company realized that its market share was being snatched away by its competitors. Plant management made many efforts to overcome this loss of market share, such as pushing suppliers for cost reductions, boosting promotion, etc. Such efforts however yielded little success, calling for fundamental improvements. In an attempt to improve operational performance, top management decided to employ an IMS for integrated handling of various functions, a practice recommended by a consultant and also employed by its main competitor. As the GM production noted,

> Automobile sector operates in a tough competition all over the world [...] We integrated management systems to regain our competitive edge in the market through enhanced operational efficiencies and make it easier for us to operate.

Thus, forced by intense market pressures, top management started a company-wide initiative that relied on teams with members from multiple departments. Top management also participated actively in these teams. The focus of this initiative was to achieve leaner operations and reduction in wastages, quality problems, health and safety problems, and accidents on the assembly line. The teams, which consisted mainly of the tactical managers, started the integration process by combining elements of different MSs so that they gave rise to one integrated MS. The examples of common elements in various MSs are record keeping, continuous improvement through "root cause" analysis, corrective and preventive action, internal system audits, the control of documentation and data, and the issuing of policy statements. The integration proceeded from the company's management manual and then followed the integration

in operating procedures and work instructions. The operational activities and records were also redesigned to align with the new integrated procedures and documentation.

Using this strategy, the automobile plant achieved full integration at the operational and tactical level whereas partial integration was found at the strategic level. Integration provided shop floor operators better comprehension of their processes and associated risks. The company was able to capitalise on its skilled employees to start continuous improvement initiatives, although they remained confined mainly to the operational level. The important points in the automobile plant integration process were:

- a reactive approach to integration;
- formation of multiple departments-representatives constituted teams;
- identification of common elements in various MSs and then combining them; and
- redesign of operational processes to align with new integrated procedures and documentation.

4.4 Dairy plant

The dairy plant produces a large variety of dairy products for both local and international customers. This company competes with a large number of local and international competitors and endeavours to employ state-of-the-art operations. Becoming certified in quality, environment, and occupational health and safety was an important initiative towards best practices. Over time management realized that the advantages of certification were being eroded as more and more competitors obtained certification. The need for the integration of MSs arose as a result of persuasion by consultants and an urge to imitate a competitor who also employed the same practice. As the plant manager reported:

"Imitation, benchmarking, me-too, call it what you like, this is what drives us for competitiveness [...] It was good business management practice to adopt. Yet, in the end, this is related to money.

The dairy plant used an integration approach similar to the automobile plant. The integration process started with the formation of a team consisting of members from the operations, quality, maintenance, and procurement departments. The main objective was to merge the employed MSs through bolting together the common elements of individual MSs. The stated purpose of this merger was operational improvement. The integration started from the company's management manual that was redesigned, followed by integration in operating procedures and work instructions. The operational activities and records were also redesigned to align with the new integrated procedures and documentation. The supporting activities such as auditing were also integrated.

This approach led to full integration at the operational level, while only partial integration occurred at the tactical level with no evidence of integration at the strategic level. Integration resulted in significant reduction in documentation; and employees acquired an enhanced understanding of their tasks. The important points in the dairy plant integration process were:

- integration was carried out to imitate competitors without internal needs assessment;
- the perceived scope of integration was tactical and operational benefits; and
- integration was carried out by combining common elements in various MSs.

5. Cross-case comparison

5.1 Strategy of integration

The pharmaceutical and textile plants show similar patterns in their strategy of integration. The common elements in their integration approach are:

- the initiation of a key stakeholders dialogue to better understand the stakeholder requirements;
- deriving business policy, strategy, objectives, and targets encompassing the key stakeholders' requirements;
- cascading of integration to tactical and operational activities; and
- the whole process was carried out proactively in anticipation of future needs.

The automobile and dairy plants carried out integration through bolting together of common elements in various MSs. A clear contrast in the integration approach of the automobile and dairy plant compared to the pharmaceutical and textile plants was that in former:

- the integration started at the tactical level through development of teams;
- the integration was carried out by combining the common elements in various MSs; and
- the integration efforts were carried out reactively in response to external pressures.

The results indicate that pharmaceutical and textile plant can be categorized – based on the strategy of integration – into one group (Strategy-I): this group used the strategically-steered approach to systematically shift integration down to the tactical and operational level. Integration proceeded from abstract stakeholders' requirements into an executable IMS. The automobile and dairy plant, on the other hand, fall into another category (Strategy-II) that used a team-based approach to bolt together common elements in various MSs with the objective to develop one integrated MS.

5.2 Effectiveness of integration

The findings reveal varying degrees of integration and an unequal distribution of IMS benefits across three organisational levels when using the two different approaches to integration (see Table III). Due to the small sample size, non-parametric statistics are used. It turns out that benefits of integration (high mean score) are observed at the bottom level in all four cases regardless of the approach used. However, benefits of integration at the middle and top management level are not uniform for all cases. The pharmaceutical and textile plants showed identical outcomes – complete fit among various functions and a uniform degree of integration throughout strategic, tactical, and operational levels. The automobile and dairy plants also show similar outcomes. The automobile plant was highly integrated at the operational and tactical level, whereas partial integration was found at the strategic level. The dairy plant was highly integrated at the operational level, but partially integrated at the tactical level with no evidence of integration at the strategic level.

The outcomes of integration summarised in Table III provide an important validity check for our findings and confirmation of IMS benefits reported in literature. The similarity of outcomes facilitates the categorisation of pharmaceutical and textile

plants in one group, and the automobile and dairy plants in another group. This is in line with the categorization made in reference to strategy of integration (subsection 5.1).

6. Results

Two archetypes of integration strategies are found. The pharmaceutical and textile plants followed an integration process based on stakeholder dialogue process. The essence of this approach is a stakeholders-oriented MS that deals with integration at the strategic level and then cascades downward so that it results in complete strategic fit and everyone (both internal and external stakeholders) benefits from such a system. This approach is referred to here as the "systems approach" (Jonker and Karapetrovic, 2004; Karapetrovic, 2003; Van Gigch, 1991). The degree of integration is high throughout the organisation and positive effects of integration are uniformly realized at all levels of organisation.

At both the automobile and dairy plant the integration process was initiated in response to external pressures. The management in these two cases was more interested in the benefits of IMS that were immediately visible (such as documents duplication reduction, integrated procedures, and audit costs reduction) so they ignored other possible strategic level benefits such as development of holistic business MS. The approach used for integration was combining common elements of various MSs and then aligning the documents and operational activities accordingly. This approach is referred to here as the "techno-centric approach" because it treated the IMS as a technical sub-system of organisation. The benefits of integration remained confined to the operational level and IMS could not develop into an overruling business MS. The results are summarized in Table VI.

7. Discussion

7.1 Archetypes of strategies of integration

Using four cases we identified two archetypes of integration strategies. These archetype strategies are called the systems approach and the techno-centric approach. An important difference between the systems approach and techno-centric approach is the starting point for consideration. The starting point for the systems approach (see Figure 1) is the identification of stakeholders and their requirements in contrast to the identification of common elements in the techno-centric approach (see Figure 2). The latter is thus confined to the MSs, an organisation is currently practicing or accredited to. The techno-centric approach resulted in significant benefits but mainly at the operational level and to some extent at the tactical level.

The results also imply that a failure to address the integration at the strategic level would promote a techno-centric approach resulting in IMS as a parallel technical-structure rather than an over-riding business MS. It is suggested that performance improvement program (such as integration) should be embedded in organisational strategy to avoid failures (Porter, 1996). Our findings confirm and reiterate the need of carrying out integration at the strategic level. Otherwise, the benefits of integration would remain confined mainly to tactical and operational level. Our findings characterise the integration modus operandi as techno-centric in half of the cases. Thus many managers have yet to learn the strategic implications of integration of MSs. While the use of systems approach is advocated, its impact on the
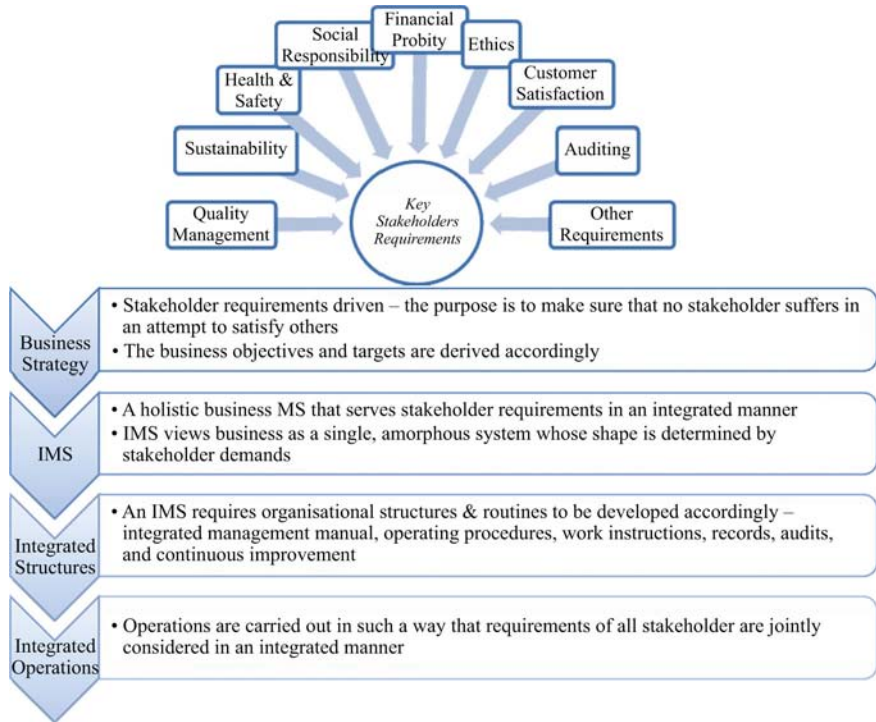
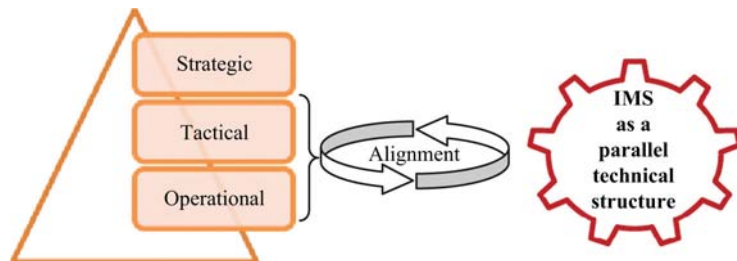| Company	Motive of integration	Approach to integration	Essential features	Archetype of integration strategy	Degree of integration (level)	Outcomes of integration	
						Benefits of integration	Overall impact on organisation
Pharmacetical and textile	*Proactive*: internal needs assessment to assure key stakeholders satisfaction	Stakeholder dialogue based management	Integration organized at the strategic level through a stakeholder dialogue based management. The integration efforts then cascaded downward to diffuse into administrative imperatives. Ultimate objective is to develop a holistic business MS. The starting point is the stakeholder's requirements identification (macro organisational business strategy)	Systems approach	*Strategic*: full *Tactical*: full *Operational*: full	Benefits uniformly distributed all over organisation (strategic, tactical, and operational)	Development of a holistic business management system

(*continued*)

Table VI.
A summary of the approaches employed for integration of MSs and their outcomes

Company	Motive of integration	Approach to integration	Essential features	Archetype of integration strategy	Degree of integration (level)	Outcomes of integration	
						Benefits of integration	Overall impact on organisation
Automobile	*Reactive*: mainly in response to pressure from competitors	Commonalities based approach	Integration carried out through identifying common elements in the (standardized) MSs. Integration perceived as the tool/technique meant to combine common elements in the manual, procedures, and work instructions. Ultimate objective is the development of integrated operations and associated documentation and records. The starting point is the identification of common elements in different MSs (Micro practice).	Techno-centric approach	*Strategic*: partial *Tactical*: partial *Operational*: full	Benefits were availed mainly at the operational level and also at the tactical level	Development of an operational performance enhancing micro-practice
Dairy	*Reactive*: in response to pressure from competitors and consultant				*Strategic*: none *Tactical*: partial *Operational*: full	Benefits were availed mainly at the operational level. Some benefits were also obtained at the tactical level	

Table VI.

Figure 1.
Systems approach to
integration of MSs

Figure 2.
Techno-centric approach
to integration of MSs

degree of integration and its outcomes had never been empirically investigated. To our knowledge this is the first empirical research exploring the strategies of integration together with their comparative effectiveness.

7.2 Role of managerial perceptions and motivation
The findings also highlight the role of managerial perceptions and motivation regarding integration of MSs. The strategy of integration is determined by how management perceives and responds to the call for integration. The pharmaceutical and textile plants initiated the integration process proactively based on internal needs assessment and stakeholder-dialogue. They were, thus, very clear about their objectives, which were stakeholders-driven. A systems approach was employed.

On the other hand, the automobile and dairy plants took this initiative reactively in order to mitigate external pressures. Management confined the teams' activities to a search for common elements. There is then a clear contrast between how IMS was perceived and implemented in the first two cases and last two cases. This infers that the benefits of IMS depend on, at least in part, how management perceives an IMS. When IMS is perceived and used as micro-tactics its benefits will be limited mainly to the operational level. However, when IMS is used as a macro-organisational strategy its benefits will be of a strategic nature and accrue to the whole organisation (see Table VI).

7.3 Contribution to theory and practice
This research makes both a theoretical and practical contribution. The archetypes abstract a complex organisational phenomenon involving social and technical sub-systems of the organisation. The technical sub-system includes general control and monitoring techniques as well as tools and techniques for integration; whereas the social sub-system consists of people and teams who use the technical sub-system to produce goods or services. These archetypes also condense the macro (strategic choices) and micro (operational practices) aspects into an abstract form of knowledge that is easy to relate and grasp. The research also reveals how the two strategies unfold in practice and makes reference to performance effectiveness. The research also provides practitioners an idea of micro-practices (labelled as integration approaches) that are actually counter-productive to the overall organisational performance.

8. Conclusions
The literature is clear about the importance of the integration of MSs. But literature on how to organize this integration is generally lacking. This research takes a first step towards exploring the processes and strategies of integration. Integration proceeds through a number of socio-technical changes and is accompanied by behavioral changes. The findings reveal two types of integration strategies: the systems approach and the techno-centric approach. The system approach starts from the identification of stakeholders and their requirements. Addressed strategically, the systems approach cascades down to the tactical and operational levels giving rise to a uniformly integrated system; the benefits of which accrue to the whole organisation. The techno-centric approach, on the other hand, proceeds by combining common elements in various MSs with benefits arising mainly at the operational level. The effectiveness of the IMS is a function of:

- managerial perceptions – whether it is perceived as an operational level performance improving tool or a MS for whole organisation; and
- whether the motivation to adopt is internal needs assessment or external pressures.

The integration of MSs is a developing area and further research is needed on this topic. Future research should focus on whether these results replicate in other settings. The link between integration strategy and its outcomes unveiled in this study also needs further research.

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Further reading

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Appendix 1. Interview protocol for managers
General company information

- Plant employment?
- Plant sales – last three years?
- Products made at plant?
- Single/multiple plants?
- IMS is in practice since –?

Motivation for integration of MSs

- What type of MSs, organisation employs (especially regarding the management of quality, sustainability, health and safety, social responsibility, etc.)?
- What is the role of IMS in the overall management system of organisation?

- What is your motivation for integration of MSs?
- Did any stakeholder demand this MS?
- What do you think is the most important factor in the decision to carry out integration of MSs?
- What are the essential features of this MS?
- Do you employ some mechanism to identify and then meet the requirements of various stakeholders? If so, what mechanism?
- Do you employ some mechanism to determine whether the requirements of various stakeholders are effectively met? If so, what mechanism?
- To what extent has the IMS has fulfilled the requirements of stakeholders?

Strategy for integration of MSs

- How did you organize the integration of MSs?
- Who was/were involved in the integration process?
- Why ... (person/team/department) was/were involved in the integration process?
- What strategy/mechanism was employed for integration of MSs?
- What is the starting point in the integration process? What are main steps in the integration process?
- Can you give me a few examples?
- What other options were available for integration of MSs?
- Why did you use this strategy for integration of MSs?
- What sources of advice were sought for integration purposes?
- Do you use cross-functional teams? If so, how often and where (managerial or operational)?
- What mechanism does your company use to promote integration?

Measurement

- How are the individuals assessed and rewarded? In other words, what percentage of your rewards depends on integrated planning and execution of activities?
- How do you measure the performance of IMS?
- What are the indicators of effective integration of MSs? Could you please give me a few examples of these indicators?
- How do you determine the degree of integration at various organisational levels?
- How do you determine the stakeholders' satisfaction with the IMS?
- How do you address the concerns of stakeholders regarding performance of IMS?

Appendix 2: Interview protocol for shop floor employees

- Serving in this company/position since ...?
- Please mention your job designation/ routines activities?
- Why the new system was deployed?
- Do you think it was absolutely necessary to implement this system? Why do you think so?

- Was your feedback/involvement solicited in the integration process?
- What is the impact of the new system on the technical aspects of your work in terms of compliance to control limits and managerial expectations?
- What about social implications (teamwork, inter-departmental conflicts, behavioral changes, motivation)?
- What types of operational benefits did you receive from the new system? Which are the most important of these benefits?
- What is the most prominent change after the introduction of new system?
- What are the drawbacks of the new system? Are there any unanticipated undesirable outcomes?

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