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Framing Operations and Performance Strategic Management System Design Process

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Abstract

The increasing competitive pressure resulting from operations activities and market globalization are forcing enterprises to reorient their strategies, operations systems and processes. Specifically, organizations are paying closer attention to the changing nature of operations systems performance, to the point where operations strategic management system used in enterprise performance evaluation becomes the main focus of redesign projects. This study explores the process rationality behind operations strategy management systems design, taking into account a content definition established by a structural specification of the management system and the integration of life cycle and implementation models. This research proposes a framework that represents reconciliation between research and practice, contributing to the development and test of practical solutions for operations strategic management system design, implementation and management. The main result is a synthesis of three frameworks that each addresses the design process in different levels: the performance management system life cycle model; the process approach for guiding design and implementation issues; and recommendations that synthesizes the design task. The study also discusses methodological choices in approaching the design, implementation and use of an operations strategic management system. Doing so, the study develops the discussion on structural and process aspects of strategic performance measurement system design.

Keywords: operations strategy, performance measurement, strategic management, system design

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Introduction

The complexity and dynamics of the business environment is challenging strategic management models, particularly at the operational level where companies are directly connected with their suppliers and customers (Melnyk et al., 2004). The associated redesign of the operations systems covers organizational and management processes. Specifically, organizations are paying closer attention to the changing nature of the performance of operations systems, to the point where the operations strategic management system (OSMS) used in enterprise performance evaluations often is the main focus of redesign projects (Gomes et al., 2004). Managers look for a more 'balanced', 'integrated', 'flexible', 'multifaceted' and 'multidimensional' management system (Gomes et al., 2004). Such properties should reflect the performance specifications when describing the operations strategic management system. However, as noted by Slack (2000) and Platts (1995), the employed systems are not well developed and integrated and do not offer the opportunity for firms to better understand their operations systems environment and to increase their performance level.

The strategic management of performance measurement systems should enable an organization to develop continuous improvement and organizational learning capabilities through continuous reviews of the measurement system (Kennerley and Neely, 2003). For improved performance, the OSMS should also be conceived to deploy enterprise strategic performance management instead of performance measurement systems; develop dynamic rather than static strategic management systems; enhance the flexibility of performance measurement systems, improving its capability to cope with organizational changes (Neely, 2005).

This study investigates performance rationality as it is perceived by operations management practitioners and its use for managing operations systems. The causal relationships between the planning and measurement systems must be set in a management framework to explain the strategies, structures and processes used to solve performance problems. The study presents a theoretical development and proposes a process based rationality for designing of a strategic management system. This is defined at the operations functional level. The strategic management system is investigated, and its boundaries identified to conceive the process rationality of operations strategic management system design. The methodological approach is founded in a theoretical construction that inter-relates structural and procedural frameworks. Specifically, the process or Cambridge approach represents a link between structural and procedural frameworks, and it is used for this purpose. Methodological implementation issues are also discussed when presenting the approach.

The main result is a synthesis of three frameworks that address the design process in three different levels: the performance management system life cycle model; the process approach for guiding design and implementation issues; and recommendations that synthesizes the design task.

Operations Strategic Management System

In order to define the strategic management system, it is necessary to conceptualize the operations function and the operations strategy content. These elements define the 'content' or 'object' the system manages. The operations function is responsible for translating and running the business strategy at the functional level (Hofer and Schendel, 1978). The operations strategy content may be organized by setting the competitive objectives and relating them to the performance dimensions. These dimensions establish references for the decision processes that take place in respective area. Performance dimensions and decision areas define the content of the operations strategy (Hayes and Wheelwright, 1984). Table 1 (a) and (b) shows the performance dimensions that may be used in manufacturing and service production processes.

The decision areas define the operations function domain, as represented in Table 2 (a) and (b), customized for manufacturing and service production processes.

Table 1 - Performance dimensions.
a) Manufacturing

Orientation	Description	Performance dimension
Doing the activities right	Do not commit mistakes; the products should be in conformity with their design specifications. When the manufacturing provides this capability to the production process, it gives to the process a quality competitive advantage.	Quality
Doing the activities faster	Lead time, defined as the total amount of time between the placing of an order and the receipt of the goods ordered, should be lower than the competitors. When the manufacturing provides this capability to the operations system, it gives to the system a speed competitive advantage.	Speed
Doing the activities on time	Keep delivery promises. Developing that manufacturing capability implies in correctly estimates the delivery dates (or alternatively being able to accept the client required deadlines); clearly communicating that dates to the client; and finally, to deliver the products on time. When the manufacturing provides this capability to the operations system, it gives to the system a dependability competitive advantage.	Dependability
Able to change the activities	Adapt or reconfigure the production system; being able to attend the client changing demands or to reconfigure the operations due changes in the production process or in the supply chain. This capability means that the manufacturing system is able to change in the right pace. When the manufacturing provides this capability to the production process, it gives to the process a flexibility competitive advantage.	Flexibility
Able to produce unique products	Design new products; being able to launch a more diversified collection of products in reduced product developing times, than the competitors. When the manufacturing provides this capability to the operations system, it gives to the system an innovation competitive advantage.	Innovativeness
Doing the activities with low costs	Manufacture the products at low cost; being more efficient than the competitors. In the long term, the only way to achieve this advantage is through the negotiation of low cost resources and efficiently running the production process When the manufacturing provides this capability to the production process, it gives to the process a cost competitive advantage.	Cost

Source: Slack and Lewis (2008) and Slack (1991).

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Table 1 - Continued...

b) Service

Orientation	Description	Performance Dimension
Rendering credibility through the service processes	Reliability or uniformity of successive results; absence of variability in the service operations results or processes.	Consistency
Provide high quality services	Ability and knowledge (competence) for executing the service. It is related to the technical customers needs (technical requirements).	Competence
On time delivery	Enterprise and employees promptness to service delivery. It is related to waiting time, in real terms or in the way it is perceived by the customers/clients.	Delivery speed
Fidelity relationship development	Customized attention to the customers; well developed communication channels; courtesy; pleasant relationship environment.	Service 'environment'
Able to change the activities	Being able to adapt and change the way the services are being executed and delivered, in order to attend the changing customers' demands or to adjust the operations processes for new situations in the supply chain.	Flexibility
Credibility image creation	Customer low risk perception; enterprise's ability to communicate trustiness.	Credibility/ Trustiness
Service promptness	Enterprise access readiness; properly localization; opening times.	Access
Quality perception	Tangible perceived quality obtained from physical artefacts, as equipments, facilities, personnel etc.	Tangibility
Doing the activities with low costs	To deliver low cost services.	Cost

Source: Slack and Lewis (2008), Johnston (2005), Johnston (1994) and Correa and Gianesi (1994).

Table 2 - Decision areas.

a) Manufacturing

Structural Decision Areas	
Product Design	Design for manufacturing; design for assembly; design and manufacturing processes specifications.
Capacity	Capacity flexibility, shift work management, temporary labour subcontracting policies.
Facilities	Size, localization and manufacturing resource 'focus'.
Manufacturing process technology	Automation level, technology selection, layout, maintenance policy, internal process development capability.
Vertical integration	Make-versus-buy strategic decisions, suppliers and procurement policies, suppliers' dependence level.
Capabilities	Manufacturing vision, development paths, and best practices.
Infra-structural Decision Areas	
Organisation	Structure, organisational and management processes, levels of centralization/ decentralization; planning and control systems; roles-responsibilities-autonomy; communication and learning processes.
Quality policy	Quality policies, Quality models, systems and processes, Quality techniques, procedures and tools.
Production planning and control	Materials and production planning and control systems.

Table 2 - Continued...

Human resources	Recruitment, training and development policies. Organisational culture, leadership and management styles. Reward policies. Competencies management model.
New products introduction	Manufacturing and assembly design directives. Product development cycles and matrix. Organisational issues.
Performance measurement and rewards	Performance indicators structure and use. Financial and non-financial measures. Relationships between manufacturing performance and the rewards systems and processes.
Information systems	Data and information acquisition, analysis and use processes and systems.
Continuous improvement systems	Manufacturing operations processes continuous improvement system, processes and procedures development.

Source: Slack and Lewis (2008), Mills et al. (2002) and Hayes and Wheelwright (1984).

b) Service

Structural Decision Areas	
Service design	Rendered service packages contents; 'focus'; responsiveness; value leverage (cost benefit analysis versus value creation assessment).
Capacity and demand	Volume; capacity flexibility; demand behaviour; demand and capacity adjustment.
Facilities	Localization; decentralization; layout; architecture; interior design, maintenance policies.
Service process technology	Front office and back office definition; customer interface; working process technologies: equipments, automation, capacity, flexibility.
Capabilities	Service vision, development paths, and best practices.
Infra-structural Decision Areas	
Customers/Client relationship management	Customer service process participation level; customer expectations management; customer communication and information processes; customer development and training.
Organisation	Structure, organisational and management processes, levels of centralization/decentralization; planning and control systems; roles-responsibilities-autonomy; communication and learning processes.
Human resources	Recruitment, training and development policies. Organisational culture, leadership and management styles. Reward policies. Competencies management model.
Quality policy	Quality policies, models, systems and processes; Quality techniques, procedures and tools. Faults prevention and treatment processes; service warranty policies; service standards; customer needs and expectations monitoring.
Operations planning and control	Service planning and control system; service programming; decision rules and processes.
Flux and queuing management	Service queuing policies and management processes; customer waiting time perception management.
Materials management	Materials planning and control system; supply policies; storehouse design; availability levels.
Performance measurement and rewards	Performance indicators structure and use. Financial and non-financial measures. Relationships between service delivery performance and the rewards systems and processes. Evaluation system design. Priorities definition; standards definition; techniques and tools selection.
Information systems	Data and information acquisition, analysis and use processes and systems.
Continuous improvement systems	Service operations processes continuous improvement system, processes and procedures development.

Source: Slack and Lewis (2008), Johnston (2005), Johnston (1994) and Correa and Gianesi (1994).

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The measurement system is part of a wider system - the strategic management system - which includes goal setting, feedback, and reward functions (Neely et al., 2005). As seen in Figure 1, Frohlich and Dixon (2001) employ a strategic management framework for testing and refining the manufacturing strategy taxonomy proposed by Miller and Roth (1994). The framework is based on the intrinsically closed loop nature of the strategy process.

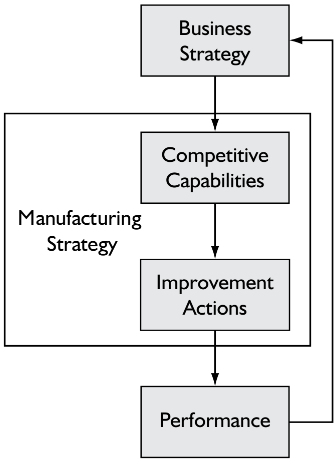

Figure 1 – Strategy process (Frohlich and Dixon, 2001).

The performance measurement subsystem creates the feedback function in the strategic control system. Neely et al. (2005) state that the introduction of a performance measure system as one element of the strategic control system can be used to influence behaviour. In their study of the performance of Japanese manufacturing plants, Daniel and Reitsperger (1991) argue that management controls of these operations are totally integrated with their strategies. Oge and Dickinson (1992) propose the adoption of closed loop performance management systems, which integrate periodic benchmarking with monitoring/measurement. The feedback loops (identified by gray lines in Figure 2) present variance control of processes and organizational system redesign through program implementation.

A well known performance measurement frameworks is Kaplan and Norton's (1992) 'balanced scorecard', which provides a planning technique and performance measurement framework within the same system. It can be classified as a strategic management framework since it integrates strategic map processes to performance dimensions. The system creates customer focused value through the improvement and development of business processes. The balanced scorecard model is based on 'innovation action research' and uses a methodology that integrates design, implementation and operation of a strategic management system (Kaplan, 1998). Through the evolution of performance measurement frameworks, the balanced integrated approach expands to a total integrated approach, with evidence of an evolutionary or co-evolutionary process. Table 3 shows the main characteristics that could be used to define an evolutionary or life cycle model for strategic performance measurement systems (SPMS).

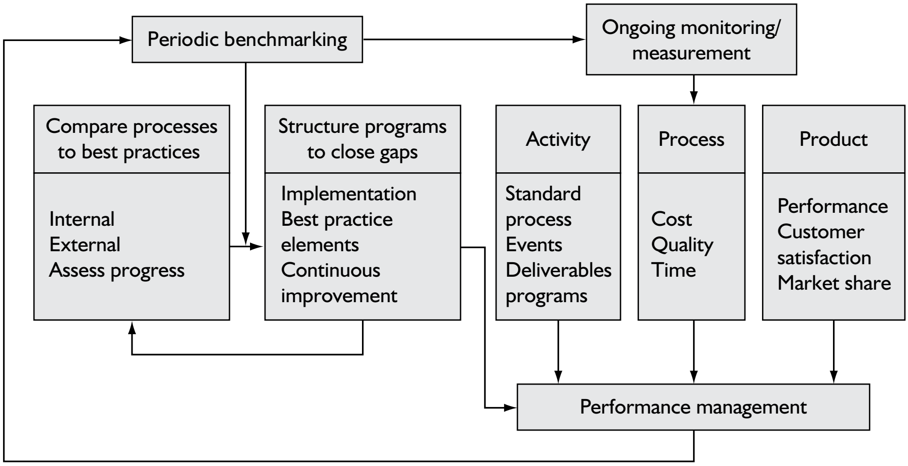

Figure 2 - Closed loop performance management (Oge and Dickinson, 1992).

Table 3 - The strategic performance evolutionary process.

Phase	Description
1	The performance measurement matrix integrates different dimensions of performance, employing the generic terms 'internal', 'external', 'cost' and 'non-cost'. The matrix enhances the perspective to external factors (Keegan et al., 1989).
2	The strategic measurement, analysis, and reporting technique – SMART – developed by Cross and Lynch (1989) uses a hierarchic, performance pyramid structure to represent the integration between organizational vision and operations actions. There is a interplay between external and internal orientations to improve the internal efficiency and the external efficacy.
3	The performance measurement model proposed by Fitzgerald et al. (1991) integrates determinants and results of the operations systems performance, exploring causalities between them. Measures are related to results (competitive position, financial performance) or are focused on the determinants of the results (e.g. cost, quality, flexibility).
4	The Balanced Scorecard (BSC), proposed by Kaplan and Norton (1992) constitute a multidimensional framework, based on financial, customer, internal processes and learning and growth dimensions, which integrates structural and procedural frameworks for designing a strategic management system.
4	The integrated dynamic performance measurement system – IDPMS – conceived by Ghalayini et al. (1997) incorporates the performance the dynamic features and the integrative properties. The integration process involves the management function, process improvement teams and the factory shop floor. The system creates a dynamic behaviour that articulates its specification and the reporting process.
5	The dynamics features are presented in the Neely et al. (2002) performance prism. This is a scorecard based system for measuring and managing stakeholder relationships. The framework is conceived to cover stakeholder satisfaction, strategies, processes, capabilities, stakeholder contribution dimensions. The main objective of the strategic management system is to deliver stakeholder value.

Empirical studies coordinated by Henry (2006), Chenhall (2005), Chenhall (2003) and Simons (1991) on the use of strategic control of measurement systems investigates the levers used in organizations to measure and manage performance. They found two patterns in managing a measurement system: diagnostic simple feedback control and interactive control. Bourne et al. (2005) use their frameworks to compare the results of average-performing and high-performing business units. In the former, the logic of

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the strategic management system is adherent to simple feedback control. In the latter, strategic management systems are based on both the interactive and simple feedback control approaches.

The literature indicates that the intensity of engagement and interaction with the performance measurement processes may have a great impact on the overall business performance if complementary roles are managed. This is suggested by Simons (1991) and here applied to the strategic management system in the manner suggested by Bourne et al. (2005).

Henry (2006) develops the understanding of performance measurement system based on a diagnostic and interactive use of management control systems. He identified two roles that work simultaneously but with different purposes: the diagnostic use represents a mechanistic control approach and the interactive use an organic control system one. The diagnostic use defines the role of performance measurements system as a measurement tool and the interactive use defines the role of performance measurements system as a strategic management tool. For the development of dynamic properties, several observations can be made:

- The diagnostic control system represents a single-loop learning process proposed by Argyris and Schön (1978), who state that the development of such process is a prerequisite for the development of a double-loop learning process. Thus, the strategic management process needs to combine both types of learning processes.
- The strategic management control system creates a dynamic tension when jointly using both approaches to manage performance. Dynamic tension is defined by a 'competitive' and 'cooperative' behaviour stated between interrelated elements (English, 2001; Lewis, 2000).
- Control systems should develop a strategic capability so as to contribute to the emergence of strategies and not be reduced to an implementation role (Simons, 1991).
- SPMS may focus their organizational attention on strategic priorities, thereby creating a knowledge company (Nonaka and Takeuchi, 1995).
- Market orientation, entrepreneurship, innovativeness, and learning capabilities are closely related to the strategic management approach used to manage the performance management system. Thus, the use of the measurement system could specifically contribute for a capability development (Henry, 2006).

The line of causality between organizational capabilities and performance is important for understanding the role of operations and performance strategic management systems as this complements market based models with a resource based view. Strategic control features of long term operations strategy and a predictive control system may be realized through the development of organizational capabilities. Such in-depth comprehension about the relationship between operations capabilities, performance and competitiveness has been developed by Hayes et al. (1988). Their claim is that the main role of competence development is to sustain customer value creation better than competitors do. Concepts like dynamic capabilities (Teece et al., 1997), cumulative capabilities (Flynn and Flynn, 2004) and manufacturing vision (Maslen and Platts, 2000) have been developed to support the operations strategy resource-based approach.

The notion of manufacturing vision, describing manufacturing capabilities a company intends to develop, helps the organizations to develop a strategic thinking orientation for their strategy-making processes. The managers are stimulated to engage in a strategic learning process that produces a vision that orients the business development (Maslen and Platts, 2000; Mintzberg, 1994).

Figure 3 organizes and frames the underlying logic of operations strategic management systems. A real world system may be represented by a set of 'capabilities', strategically managed by the operations strategy subsystem, planning subsystem and its measured performance. Meanwhile, the double feedback loops represent the monitoring (operational feedback loop) and the refreshing or redesign (strategic feedback loop) functions.

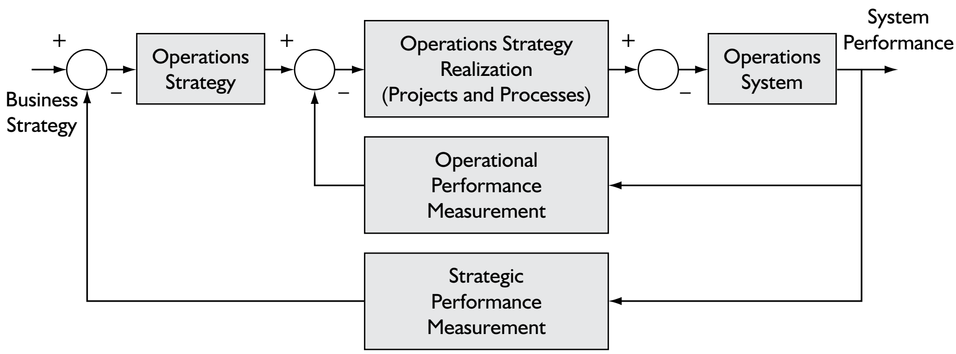

Figure 3 - The operations strategic management system (Pinheiro de Lima et al., 2008).

Two key questions emerge at this point: "Why rely on feedback control systems to strategically manage the operations system?" Does this not recede to the mechanistic view of organizational systems, deny the continuous changing nature of strategy scenery and consider the operations systems as a closed system? This section explores the causality links of main elements of a strategic management system that could help the operations system to attend its 'organic' role, through the development of the refreshing process. The operations system and the organization as a whole would develop design and subsequent operations organically, dynamically integrating in the same system a short and long term perspective of operations strategy. Having defined the object of the design project, rationalities for its development are established next.

Structural Rationality

The study assumes that theoretical constructs may be based on frameworks that inform design, implementation and management processes. This assumption help define system

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boundaries, performance dimensions and their relationships (Rouse and Putterill, 2003). The constructs, a set of interrelated recommendations based on the system content, which can be seen as a structural framework, and processes that develop the procedural framework (Folan and Browne, 2005). The integration of both structural and procedural perspectives is realized through the operations strategic management system specification.

For structural rationality, we propose the use of an organizational design framework adapted and applied to OSMS design (Pinheiro de Lima and Lezana, 2005). The framework is formed by structural, processes and spaces dimensions interfaced by a hypertext organizational model (Nonaka and Takeuchi, 1995). The structural dimension is used to explain OSMS content. The processes dimension is related to different processes that represent the material and informational fluxes and their management, and the context is developed through a space definition that establishes the locus of strategic management realization. Figure 4 shows the employed structural framework.

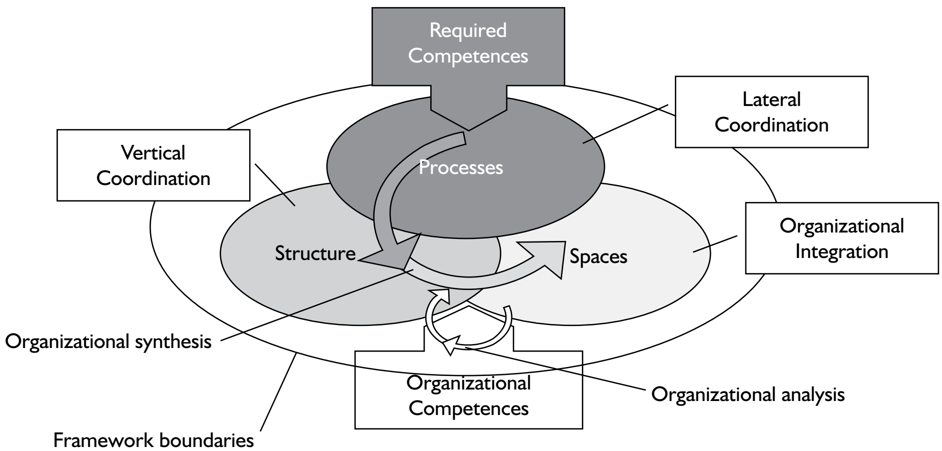

Figure 4 - The organizational design framework (Pinheiro de Lima and Lezana, 2005).

Defining the organizational design framework elements, we revisit the strategy-structure model (Chandler, 1962) to establish a connection with the competence-based model proposed by Sanchez et al. (1996). The resulting relationships define the framework inputs. The strategy defines a set of required competences, which represent the input reference set for the organizational design development. Moreover, the organizational competences influence the strategy definition, through the combination of the organization resources and abilities, developing a capability to accomplish such strategy (Hayes and Wheelwright, 1984). The required and organizational competences could be related to the operations strategic management system.

Three main organizational design areas define the design domain: processes (strategic management processes) represent the horizontal flows; structure (operations strategy structure/content) realize the vertical coordination; and spaces (strategic management system) are the locus of strategic and control actions. These three levels are defined by the hypertext organizational model, providing specific contexts for the organizational studies (Nonaka and Takeuchi, 1995). The organizational model integration is obtained by their structural definition (processes, structure and spaces) and by their strategic orientation that are represented by a set of required and stated competences.

The reference framework shown in Figure 4 incorporates dynamics features to the organizational model. These features define the normative and participative modes of 'operation'. The management of the conceptual framework could be done by navigating through their three contexts: vertically, in the participation or normative structure; and horizontally, through the material and information flows perspective (Pinheiro de Lima and Lezana, 2005). Note, however, that the operations strategy and the reference framework relationship are obtained through the organizational competences. The competences represent the operations strategy content as well as the normative reference for the OSMS design. The presented design dimensions delimit the aspects to be managed. Figure 5 represents the interfaces developed by the management and production system.

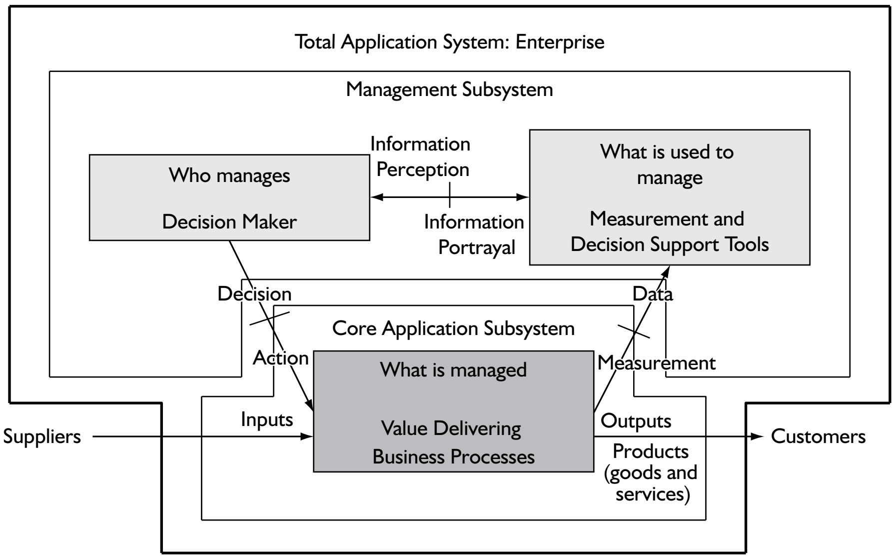

Figure 5 - The enterprise system (Sousa et al., 2005).

Figure 4 defines the systemic dimensions for designing the management system that is presented in Figure 5. Figure 5 could be used as a structural framework for the SPMS and this system should be conceived in its structural, processes and spaces dimensions.

Having identified the design dimensions and OSMS boundaries, the design process rationality is explored next.

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Process-Based Rationality

This section presents the process rationality underlying OSMS design. Frohlich and Dixon (2001) comment that Operations Management field, particularly in strategic related themes, has brought forward new ideas, but that it has been less effective in validating concepts after their introduction. Hence, the underlying OSMS processes must be related to its knowledge life cycle. Our study does this by employing propositions in three different perspectives incorporating system design, implementation and realization processes, and the role that findings play relating theory and practice.

The three perspectives are related to the design of a strategic management system, implemented at the operations function level. The design approach is based on the practice versus theory reconciliation logic (Slack et al., 2004), using a process that continuously interplay empirical and theoretical assumptions (Neely, 2005). The practical application is set by the operational and management processes developed by Slack (2000) and Platts (1993) respectively.

The first perspective asks the question: "How does the Operations Management (OM) field build and refresh its knowledge basis?" To address this question, rationalities used in OM for producing knowledge that are consolidated in theories, models, frameworks and processes are presented. For this purpose, theoretical constructions developed by Neely (2005) and Slack et al. (2004) are used to illustrate process rationality of the knowledge creating cycle.

Slack et al. (2004) propose that selected OM orientation should continually look for a point of reconciliation between research and practice. They acknowledge that this is not a trivial task, but it is logical if OM's principal academic role is to 'conceptualise' practice and 'operationalise' theory. Therefore, OM would be better recognized not as a 'normal' functional management discipline but rather as a knowledge broker in the whole knowledge producing process (Nonaka and Takeuchi, 1995). OM methods provide an important contribution in improving the enterprises operational and strategic activities. The results or 'design solutions' contribute to the development and test of practical solutions for the operations strategic management system design, implementation and management.

The theoretical construction of Neely (2005), represented in Figure 6, may be used as a meta-framework to position the presented discussion in the evolutionary life cycle process that founds the discipline of Performance Management (PM).

In the early stages of PM, effort was on identifying problems, followed by a structuring activity based on theoretical frameworks proposition that organize and address the knowledge body to solve problems. Based on the proposed frameworks, processes were developed to test them and to verify their robustness and correctness through empirical investigation. This interplay between analysis and synthesis allowed an evolution and consolidation of the theoretical body of the PM discipline. The cycle process developed by Neely (2005) identifies a specific context used to explain the approach used in this

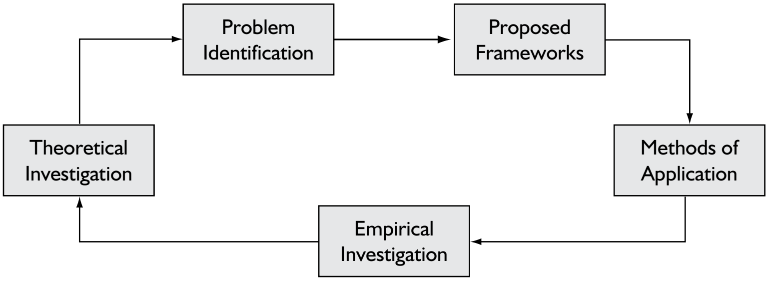

Figure 6 - The evolutionary life cycle process (Neely, 2005).

study for producing and testing models and methodologies for designing the operations strategic management system. Simplified, the main logic that governs OSMS may be explained by the design and engineering of a general management system, as presented in Figure 7 (Sousa and Groesbeck, 2004). The OSMS (re)design process should be linked to real operations systems and all the theoretical constructions formulated based on previous work and experiences related to the knowledge production continuous flow in the OM field. Therefore, it should be recognized that the OM field is in a continuous, complex and dynamic evolution. Operations managers and professionals are facing in their day-to-day decision process situations that are questioning their mental models and this characterizes events that are continually restarting the redesign process (Slack et al., 2004; Zilbovicius, 1997).

The second perspective employed in this study explains how practical issues may be addressed in designing, implementing and managing OSMS. The process approach may be used to found all implementing activities, integrating in a participative way the design and management processes (Platts et al., 1996; Platts, 1994; Platts, 1993). The Cambridge approach, developed by Platts (1993), presents a prescriptive process, 'operationalising' a set of concepts through a structured process provided with the data collection instruments, a dynamic management process and evaluation criteria. The approach entails various advantages for OSMS development. Table 4 synthesizes the main characteristics of the Process approach implementation (Gouvêa da Costa, 2003; Platts, 1994).

The underpinning rationality of the design process addresses the implementation and managing processes, creating the conditions for a double loop learning process development.

Slack (2000) identifies three main activity phases in the process of redesigning a manufacturing system: structuring, suppositional and assimilation activities. The structuring activity is used to construct, in social terms, a common sense of the design objectives and options. The design options may be defined in terms of the performance trade-offs within the systems' strategic context. The suppositional activity extends the common language developed to approach the performance issues in the structuring activity, to a process of creating the scenarios for the design choices. This phase stimulates

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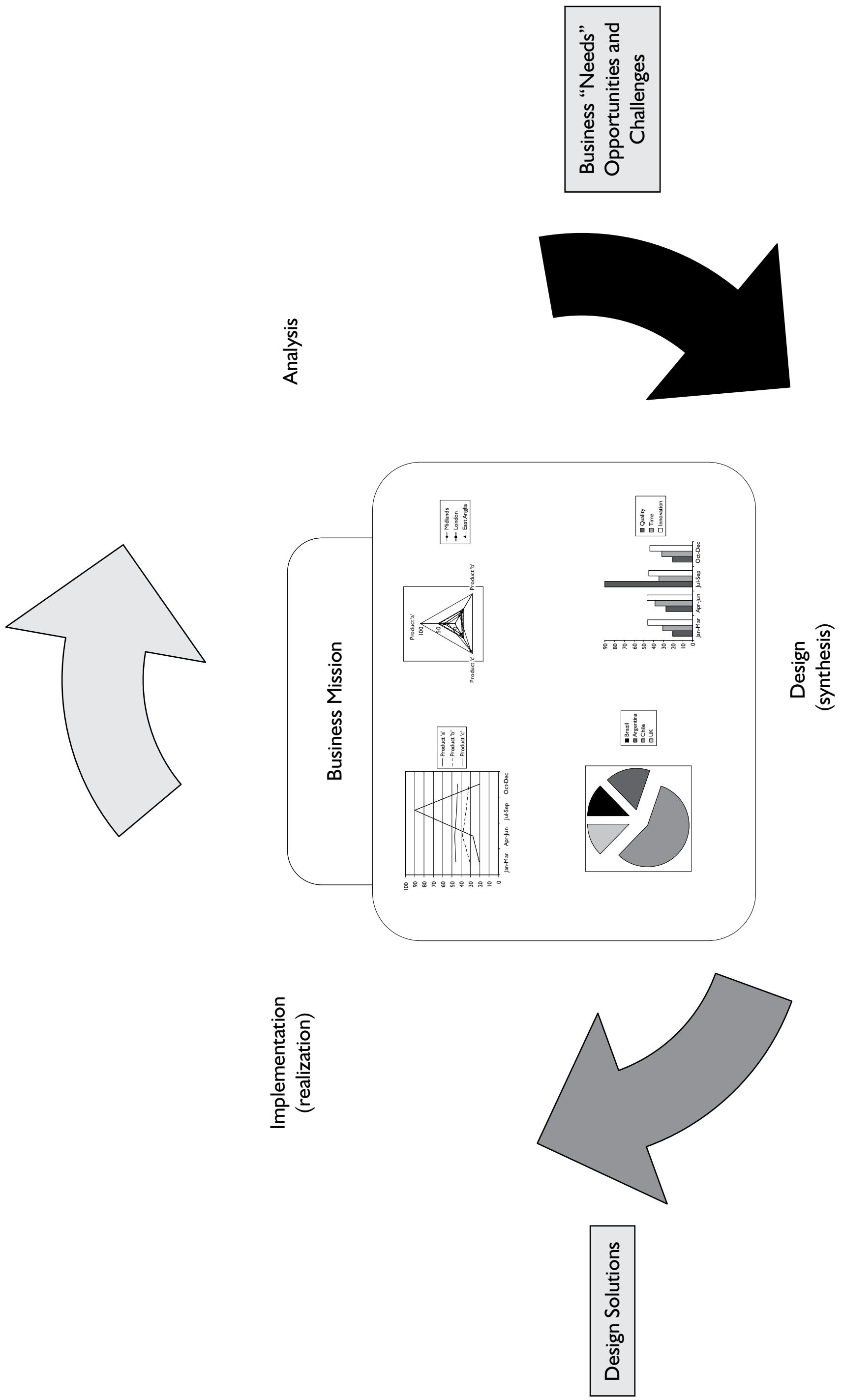

Figure 7 - The system design and engineering logic (Sousa and Groesbeck, 2004).

Table 4 - The main characteristics of the Process Approach.

Procedure	Participation	Project Management	Point of Entry
The process is properly defined in terms of organization and operational procedures.	Individual and team based activities interrelates all the involved actors.	It is important to check if all the required resources are addressed and available.	It is important to clearly define the scope, content and pretended results of the project.
Phases: • information searching and scanning; • information analysis; • change and/or improvement opportunities identification.	The participative characteristics increases: • the enthusiasm; • the comprehension; and • the involvement.	It is important to define: • coordinator group; • support group; and • operational or executive group.	The start and development of the project should have the acknowledgement and concordance of the coordinator group.
The applied techniques and tools should be simple enough to attend the requirements of the operational processes. Their use must be easily understood.	The participation 'spaces' could be run through workshop to: • achieve the concordance around the objectives of the project; • identify and to formally declare the main problems; • propose and develop improvement actions; and • create a locus for involvement and participation.	Project planning and chronogram should be produced by a participative and consensual process.	It is a necessary condition for the project starting activities that the groups are fully involved and identified with their roles. The coordinator group, especially their leader must receive all the required support from the involved actors.
The results of each phase of the project should be documented and reported.	The participative process creates a decision making forum that guides the actions.		

Source: Gouvêa da Costa (2003) and Platts (1994).

the debate around the resource capabilities needed and the trade-offs of the design process. The externalization process developed in the suppositional activity creates the right conditions for identifying the knowledge gaps. At this point, an assimilation activity is running as a result of a learning process, which was emerging in the suppositional phase and was consolidated in the assimilation phase, with the identified knowledge gaps. The three interrelated activities may play a special role in integrating design, implementation and management of an operations strategic management system.

Figure 8 shows the interrelated design activities proposed by Slack (2000). They follow the interactive process of knowledge creation proposed by Nonaka and Takeuchi (1995) as they apply the different modes of knowledge creation. The structuring phase socializes and externalizes knowledge, the suppositional activity combines knowledge and the assimilation phase internalizes the produced knowledge. The importance of knowledge creation in producing sustainable and reinforced learning processes is noteworthy.

A key objective of the research is to conceive a methodology for designing the operations strategy management system. The method rationality follows the Slack (2000) framework in the initial prescription and then employs management and implementation using the process approach developed by Platts (1993).

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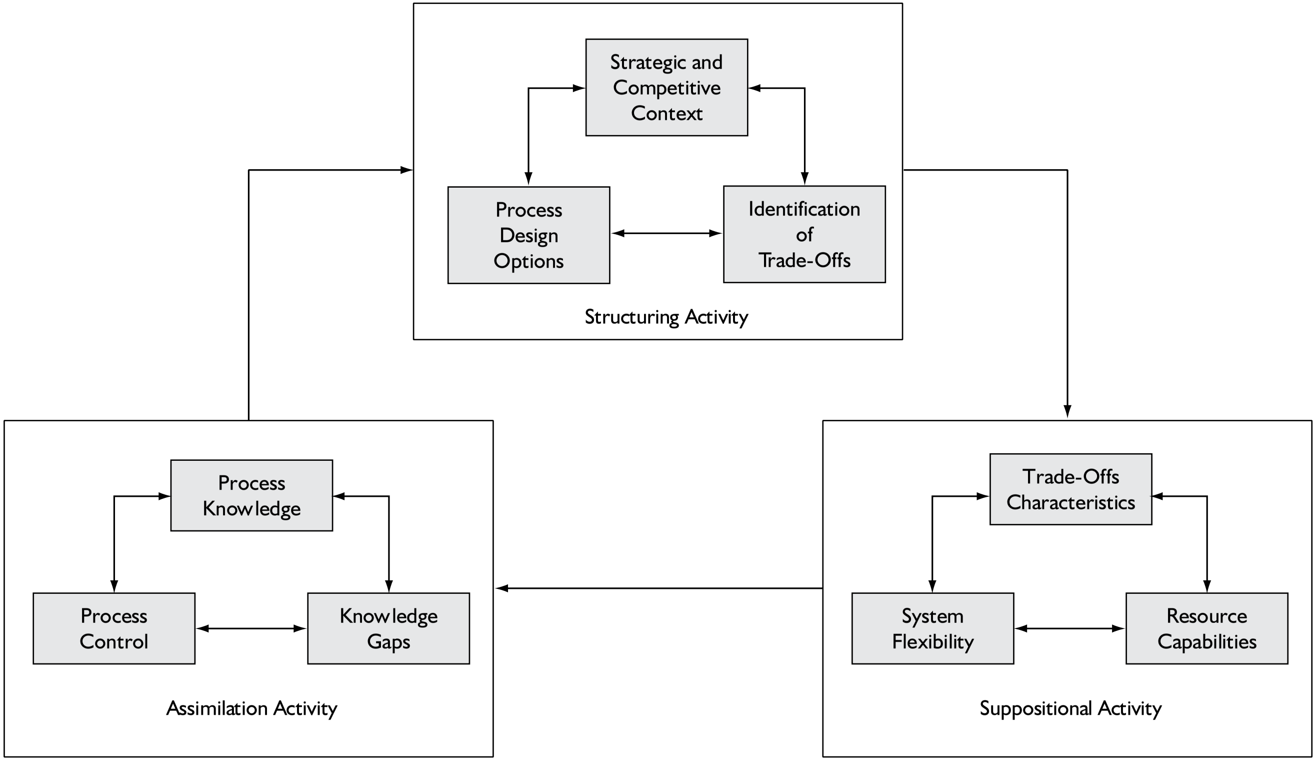

Figure 8 - A model of the underlying design activity (Slack, 2000).

The presented OSMS implementation and use is summarized in Table 5, which was developed by the authors.

Table 5 - The strategic performance framed by process approach.

Dimension	Main characteristic	Description
Design, implementation and management (use)	Organisational learning	The system structurally establishes organisational learning as an important outcome of the design (Slack, 2000) implementation (Platts, 1993) and management processes (Slack, 2000).
Implementation and management (use)	Dynamic behaviour	It develops an understanding of company operations process dynamics, helping firms develop a strategic vision based on dynamic capabilities (Slack, 2000; Teece et al., 1997).
Management (use)	Continuous improvement	The learning processes and the enhancing knowledge basis may lead to an improvement of the perception of having the strategic management system under control. This confidence may in turn reinforce a continuous and virtuous cycle of learning and improvement (Slack, 2000).

The study's third perspective is that may be formally declared, defining initial design choices in the context of OSMS, for the strategic performance measurement system design (Henry, 2006; Folan and Browne, 2005). This can be seen in Table 6 that was developed by the authors.

The discussed structural and procedural models suggest the following propositions:

- The strategic management of the operations functions leads to a better management of organizational actions' efficiency and effectiveness.
- Operations and performance strategic management systems should develop a balanced approach in designing and running their monitor and control functions and their continuous improvement capability development.
- Operations and performance strategic management systems should be designed, implemented and managed as dynamic systems.
- Operations and performance strategic management systems system boundaries definition, structure and causal relationships could be used as a guide for implementation; i.e. in producing processes, techniques and procedures for the effective implementations of OSMS and SPMS design.
- The methodological approach is based on research and practice reconciliation, contributing to the development and test of practical solutions for OSMS and SPMS design, implementation and management.

The three perspectives form a complete view of system design, inter-relating a methodological approach, a development research life cycle and an implementation process. This systemic view gives to the research a strong methodological basis that guides a sequence of research projects over time, creating consistency.

Table 6 - Strategic performance measurement system design recommendations.

Recommendation	Description	Use
Action leads to performance	According to Neely et al. (2005) a performance measurement system is the set of metrics used to quantify both efficiency and effectiveness of actions. Central to these definitions is that action leads to performance and that there are internal and external factors that affect the efficiency and effectiveness of this relationship.	Quantify efficiency and effectiveness of actions.
Strategy as a pattern of actions	Mintzberg (1978) argues that a strategy only can be identified through a consistent pattern of actions. The strategy only exists if it is realized. It is assumed that there is interplay between actions' results and the consistency that is established over time; an OSMS should mediate that interaction.	The strategy only exists if it is realized. OSMS mediates strategy and performance.
Operations strategic management system context	The performance measurement systems should be designed, implemented and managed as part of a strategic management system. The measures should be derived from strategy and should provide consistency for decision making and action. In particular, the production function should be managed in terms of its own strategic management system (Neely et al., 2005; Skinner, 1969).	Measures are derived from strategy and provide consistency for decision making and action.
Strategic management properties	The strategic management control systems should be used as a means to provide surveillance, motivation, monitoring performance, stimulating learning, sending 'signals', anticipating events, introducing constraints and managing scenarios to the operations system. It is important to realize that the control function is defined exploring the complementary features of mechanic and organic behaviour, reacting and tracking the strategy but also reviewing the system design (Henry, 2006; Neely et al. 2005).	Strategic performance management systems are used to provide surveillance, motivation, monitoring performance, stimulating learning, sending 'signals', anticipating events, introducing constraints and managing scenarios to the operations strategic management system.
Causalities comprehension and predictive behaviour	The performance measurement systems should be able to manage the determinants and results of the operations systems outputs, exploring the causalities between them and developing a predictive approach for the whole operations strategic management system (Kaplan and Norton, 1992; Fitzgerald et al., 1991; Keegan et al., 1989).	Management of determinant and results of operations system's performance

Conclusions

This study explores the process rationality behind OSMS design. It has presented and framed structural and procedural rationalities and founded the process design development and its implementation. The design process rationality proposed makes several contributions:

- Theoretical production, whereby the process framework developed contributes to OM theory by testing concepts and establishes relationships between theory and practice.
- Solution construction, whereby the proposed process rationality contributes to the process framework test. The use and application of the developed tools challenges the established structures and processes, restarting the redesign process.

The study employs a set of methodological choices in approaching the design, implementation and use of an operations and performance strategic management system. It is important to point out the fact that these choices represent the first set of design recommendations. All the choices are based on structural and life cycle models, representing respectively content and process decisions.

The discussion indicates that a set of design recommendations may lead to the development of system capabilities that enable the system to play and desired role. The presented discussion is positioned in the research life cycle and its evolution, defined by the refinement and validation process, will depend of the practice and theory reconciliation of its implementing activities. The evolution of the presented theoretical discussion is related to its implementation and test, in order to understand some characteristics of research project management in the field of operations management.

The reconciliation between theory and practice is studied and framed in the process rationality. The life cycle, the Cambridge approach and the recommendations realized (in practical terms) the design and implementation of SPMS. This rationality could be used for guiding the implementation process assisting companies in reviewing their strategic performance measurement system.

The main contribution of this paper could be stated in terms of framing the design and implementation issues related to operations and performance strategic management systems. Life cycle models and procedural frameworks are powerful concepts to explain and describe operations strategy issues.

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Submitted: 13th June, 2008.
Accepted: 12th November, 2008.