Performance Measurement Management for Small and Medium Enterprises: an Integrated Approach

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Abstract

The paper reviews the literature in the field of performance measurement and management (PMM) for small and medium enterprises (SMEs) and it proposes a framework for PMM system design. The results of the literature review carried out reveal the need for developing real integrated PMM frameworks. Based on such a structured literature review, we propose an integrated framework that rectifies the drawbacks in previous frameworks while incorporating their strengths. The integrated framework proposed is a contribution to enhance SME adoption of PMM systems and provides milestones for PMM system design. Future research would involve an in-depth examination of such milestones to facilitate implementation

Keywords

Performance Measurement and Management
Small and Medium Enterprises
Literature Review
Framework

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Introduction

Interest on Performance Measurement and Management (PMM) has notably increased in the last twenty years. Particularly, it is important to note the evolution of focusing performance from a financial perspective to a non-financial perspective. Since the middle of '80s, companies emphasized the growing need of controlling production business processes. Companies have understood that for competing in continuously changing environments, it is necessary to monitor and understand firm performances. Measurement has been recognized as a crucial element to improve business performance (Sharma, et.al, 2005). A performance measurement and management system (PMS) is a balanced and dynamic system that enables support of decision-making processes by gathering, elaborating and analysing information (Neely, et.al, 2002). The concept of "balance" refers to the need of using different measures and perspectives that tied together give a holistic view of the organization (Kaplan and Norton, 1996).

The concept of "dynamicity" refers instead to the need of developing a system that continuously monitors the internal and external context and reviews objectives and priorities (Bititci, et.al, 2000). An increasing competitive environment, the proneness of growing in dimension, the evolution of quality concept, the increased focus on continuous improvement and the significant developments in information and communication technologies are the most important changes in recent years that have created a favourable context for the implementation of PMSs in SMEs, particularly in the manufacturing sector (Garengo, et.al, 2005). Although extensive research has been carried out to investigate the needs and characteristics of PMSs in large organizations, there is a distinct lack of published research on issues related to SMEs (Hudson, et.al, 2001). However, from the literature available it is possible to collect information regarding how SMEs manage performance measure processes. In first instance, there is evidence that many SMEs already have some kind of

accounting systems in place, and these constitute the base of their monitoring process. Even though this accounting systems may be far from perfect (Fry, 1992), it nevertheless represents a useful basis for measuring various aspects of the financial performance of a company (Hvolby and Thorstenson, 2001). Given the limitations of traditional accounting systems there are significant barriers to the implementation of PMMS systems in the SME context (Manville, 2007). It is not surprising to find that studies on the use of performance measurement (PM) typically state that operational measures in SMEs are ad hoc and informal (Hudson, et.al, 1999), with no real understanding of key performance drivers (Greatbanks and Boaden, 1998). This evidence highlights the need to better understand SME characteristics, in order to point out their needs and develop tailored solutions.

Thus, the aim of this paper is first to investigate the relation between PMSs and SMEs, and coherently to develop a PMM framework specifically tailored for small businesses. The paper is articulated as follows: in the first section a structured critical review of PMM models for SMEs is presented. In the second section, starting from the dimensions and characteristics identified in PMM models available, a gap analysis between theoretical models and real application in SMEs is carried out, and then a new PMM framework is proposed. This framework is an attempt to fulfil the identified drawbacks and integrate the strengths of the models.

Research Methodology

The literature review has been conducted along three interrelated perspectives. Each of them can be summarized in a specific research question, according to the methodology adopted by Garengo, et.al (2005) and described in Figure One (revisited from Sign 2004, Tranfield, et.al, 2003). The specific questions at the base of the literature review are:

1) What are the characteristics of SMEs in relation to PMM?
2) What are the factors influencing PMM in SMEs?
3) What are the principal characteristics and dimensions of an “ideal” SME PMS?

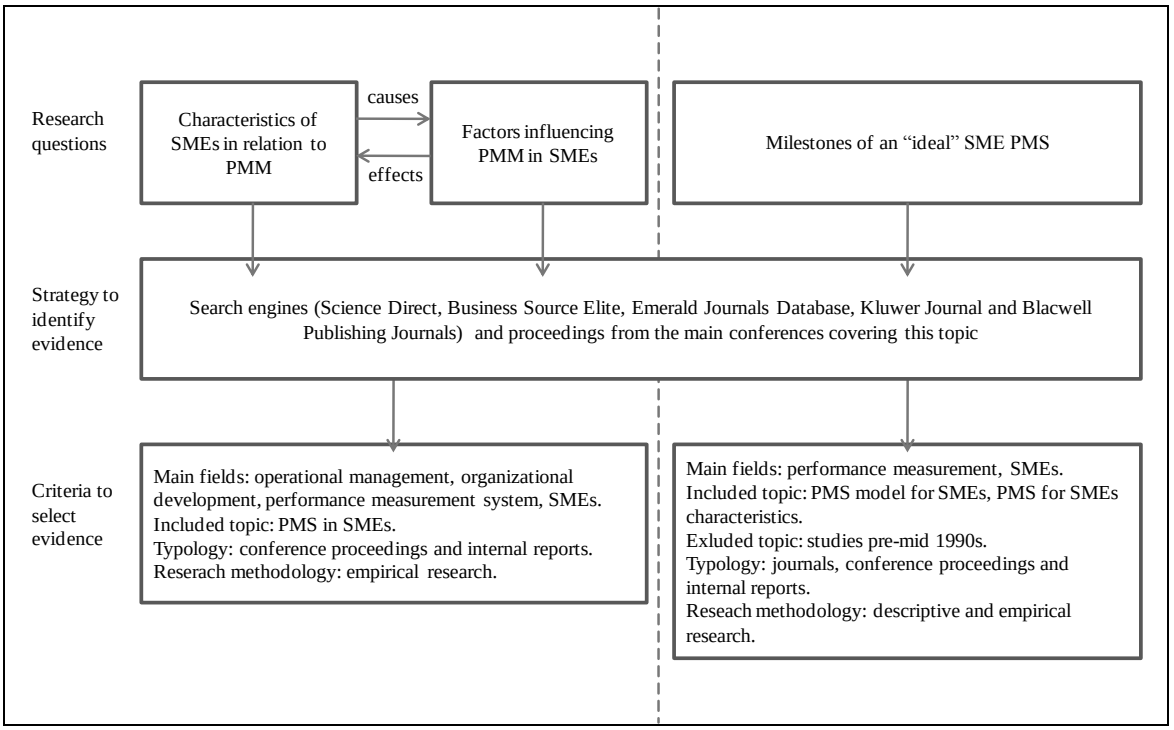
The criteria used in the review vary with the three research questions. The first two questions are investigated through conference proceedings and internal reports, because the lack of extensive published research literature covering PMSs for SMEs (Hudson, et.al, 2001). The third question instead, has been widely researched and published in journal papers though a conceptual approach rather than an empirical research is carried out to investigate PMM system milestones (Garengo, et.al, 2005). The structure of the literature review is summarized in Figure One.

Characteristics of SMEs in Relation to PMM

SMEs are characterized by their smaller firm sizes and consequent limited abilities that exhibit specific areas of weakness. SME owners and the managers typically are well aware of the local market and the clients' demands and hence the relation with the clients and the after-sales services are often more intensive in SMEs as compared to large organizations. This aspect highlights the importance of stakeholders in designing a PMS system for SMEs.

Further, the degree of bureaucracy is typically lower (Vinten, 1999) and the internal lines of communication are shorter (Winch and Mc Donald, 1999), usually guaranteeing a greater speed in the problems resolution and decision making. However, SMEs often either miss considering long-term strategies or treat them in a vague manner (Kueng et.al, 2000). This poses a problem in PMM designing since PMSs typically utilize clear and defined strategies.

Figure 1 – Structure of the Literature Review



In addition, formal communication channels in SMEs (see, Vinten 1999), are often replaced by informal alternative systems that result in subjective evaluations. This aspect affects the reliability of PMSs which need consistency of data and rely on formal communication as means for company goal alignment.

The significant majority of SMEs are family-run and they are characterized by lack of financial stability and face difficulty in resolving costly mistakes. They lack the resources to exploit advanced technology resulting in low efficiency, not following best practices, not collecting sufficient relevant data for analysis and face legal constraints on their operations. For these reasons it is important for SMEs to measure and understand their own performances (Yusof and Aspinwall, 2000) using cost saving PMSs. Accordingly Jarvis, et.al (2000) focus their attentions and efforts in terms of performance measures based on cash flow.

Hynes (1998) underlines the necessity for SMEs to not confine the PMS toward financial aspects. An exclusive focus on the financial perspective ignores indicators that can lead to achievement of established objectives. Several studies provide insights to approaches to overcome this problem. Yet, as noted by Addy, et.al (1994) and Hudson, et.al (1999), none of these approaches furnish a holistic perspective, reaching the conclusion that:

> *"The characteristics of limited resources, limited cash flow coupled with a reliance on few customers, a fire fighting mentality coupled with an emphasis on current performance, and potential staff turnover coupled with a flat organizational structure, means that SMEs require an alternative approach to strategic PM development*." (Hudson, et.al, 2000).

Agency issues and related performance measurement differ significantly in SME as compared to larger firms. Performance measurement is one of the critical factors that drive how workers perform in organizations. PM systems are not "stand alone systems", but they are strictly

connected to reward and punishment systems. Some of the significant differences are caused by issues of observability, moral hazard and risk taking characteristics.

Agency theory contributes to an understanding of these differences, and provides insights for developing PM systems within SMEs by explaining work incentive aspects and company-stakeholders' relations. Regarding work incentives, agency theory addresses relationships in which one party (the principal) delegates work to another (the agent) who performs the work according to a mutually agreed incentive contract. Both parties are assumed to be self-interested with incongruent goals. In large companies, moral hazard arises post-contractually when the principal is unable to observe and verify the actions of the agent and may be faced with an agent engaged in hidden-unobservable actions and not acting in the principal's interest because of goal differences between both parties. This situation leads to agency costs that the principal should absorb. Reward systems are developed based on performance measurement in order to push agent performance and create alignment. Moreover, the inability to measure directly agents' activity triggers the need for using performance indicators that result in solutions called "second best".

The agency situation is different in SMEs, where the internal lines of communication and control are shorter and often the principal can monitor and directly control the agents' activity. This means that agency costs are significantly reduced in SMEs and need for incentive reward systems to settle for a second best solution are lessened or even eliminated.

Agency problems are also reduced in analysing SMEs-stakeholders relations. SME managements (the principal) usually have direct relations with their stakeholders (the agent, e.g. customers or suppliers), typically relying on personal relations.

Consequently, agency theory applied to performance measurement in SMEs leads to the following:

- PM systems in SMEs should consider the shortened channels of communication, observability of actions and lack of agent-principal information asymmetry in the agency relationship;
- Agency costs related to performance measurement in SMEs are reduced or non-existent;
- The need for incentive reward systems in SMEs are lesser compared to large companies.

The SME characteristics presented above explain the frequent failure of existing PM initiatives and provide an impetus for future research.

Factors Influencing PMM in SMEs

The previous section highlighted some critical points that represent the context in which SMEs operate. Several factors influence PMM design initiatives. Particularly,

- SMEs find it difficult to be involved in PMM projects (Tenhunen, et.al, 2001);
- They either do not use any PMM model or they use them incorrectly (Tenhunen, et.al, 2001);
- PMM implemented in SMEs rarely has an 'holistic approach' (Rantanen and Holtari, 2000);
- SMEs approach to PMM is informal, not planned and not based on any predefined model (Chennell, et.al, 2000);
- SMEs suffer from limited resources for data analysis that is needed for PMM (Antonelli and Parbonetti, 2002).

Moreover, existing literature suggests that SMEs are differentiated from larger enterprises by a number of key characteristics, which are generally described as follows and that represent the factors influencing the implementation of PMM in small firms (Hudson, et.al,; 2001):

- personalized central management, with little devolution of authority;
- resource limitations in terms of management and manpower, R&D, finance, marketing, etc.;

- reliance on small number of customers, and operating in limited markets;
- flat and flexible structures;
- high innovative potential;
- reactive and fire fighting mentality;
- informal and dynamic strategies;
- tacit knowledge and little attention given to the formalization of processes;
- misconception of performance measurement process.

These factors point to the need of utilizing a different approach to PMM in SMEs as opposed to traditional large firms. Moreover, these factors are useful for investigating crucial dimensions of PMSs for use in SMEs. These dimensions should be tailored should emphasize SMEs advantageous features and overcome its limitations. The next section describes the principal characteristics and dimensions of an "ideal" PMM system suitable for SMEs.

Milestones of an "Ideal" SME Performance Measurement System

From the SME characterization previously carried out, this section describes the principal characteristics and dimensions of an "ideal" SME performance measurement system to facilitate designing an appropriate PMM system.

Assessment. SMEs typically have some kind of an accounting system in place (Hvolby and Thorstenson, 2001). A proposed PMM system should start with an assessment system to evaluate the capability of the current system, in order to define a base for implementing eventual lacks identified. This element is very important for the success of a PMM system initiative, since it clarifies at the beginning what the actual PM architecture can offer and which efforts and actions are needed to be taken to improve it (Balachandran, et.al, 2007).

Design. PM systems should reflect the company business so, there is need to design a specific architecture and proper measures (Balachandran, et.al, 2007). The design of PMSs for SMEs should consider the linkage between strategy and operations (Garengo, et.al, 2005); should integrate different stakeholders perspectives (Neely, et.al, 2002); performance should be measured through a holistic approach that incorporates the financial and non-financial measures as well as time element and the integration of external and internal parameters (Noci, 1995).

Implementation. Limitations on SME managerial skills point to difficulties for successful PM implementation (Noci, 1995). For this reason, once the framework and measures are designed, accurate indications for successful implementation should be clearly furnished (Balachandran, et.al, 2007). A focused approach to performance measurement may also have advantages in attracting attention to and facilitating implementation of the measurement system (Hvolby and Thorstenson, 2001).

Communication/Alignment. The aim of achieving company goal and strategy alignment should be accomplished with clear guidelines to effectively communicate performances inside the company. Communication is an important driver to achieve company alignment to strategy, but is not the only one. The literature evidences in fact that PM systems should integrate compensation systems to promote company alignment and performance growth (Balachandran, et.al, 2007).

Review. A dynamic PM system should include a system for periodic reviewing measures and objectives so as to ensure reactivity to changes in the internal and external contextual environments, and systematically asses the company's strategy in order to support continuous improvement. The review system should also verify if the PM system contributes to an overall improvement in performance (Robson, 2004), that is an essential purpose of any PM system.

These dimensions have been employed in a review of the literature and further to evaluate the characteristics of PM frameworks reviewed.

Review of PMM Research

For clarity and briefness, in this section a summary of characteristics of models identified in the literature review is presented in the form of a table (Table One). This furnishes a clear understanding of results achieved; specifically the table highlights the models references, the period of development, the strengths and weaknesses.

Table Two evaluates the models in Table One with respect to parameters identified by Balachandran, et.al (2007) to define the milestones that PM systems should have (Assessment, Design, Implementation, Communication/Alignment, Review).

Note that the last two works reviewed (Manville, 2007; Gin Chong, 2007) are conducted using a survey analysis. Hence, they are not included in the analysis process, presented in Table Two.

Table Two highlights that none of the models reviewed satisfies all the criteria simultaneously. This underlines the necessity to develop integrated frameworks that can address SMEs needs.

Table One – Summarization of the Literature Review Carried Out

Model	Author and Period	Strengths	Weaknesses
Application of Balanced Scorecard to Small Companies	Chow, Haddad, Williamson, 1997	Step-by-step operations for implementation are furnished. It provides indications for management to design a scorecard to fix the needs of the company. A survey is proposed to four different typologies of firms. Multi-perspective dimension analysis. It defines four innovative perspectives which link long-term strategic objectives with short-term actions.	The framework proposed is not clearly structured, and consequently application is subjective.
Customer orientation and performance	Appiah-Adu, Singh, 1998	It is focused on the effects of customer orientation on performance measures. It links customer orientation, innovation orientation, market dynamism and competitive intensity. It has been validated on a large number of UK firms.	The model focuses only on a market perspective. The model doesn't permit an holistic view of performance
Activity Based Costing in small and medium enterprises	Gunasekaran, Marri, Grieve, 1999	It defines the criteria to implement ABC in SMEs. It provides guidelines for implementation	The model exclusively focuses on costs. There are just few cases of application of this model, which still require validation.
Computer Integrated Manufacturing (CIM)	Marri, Gunasekaran, Grieve, 2000	CIM defines guidelines for achieving long-term benefits for SMEs: strategic benefits and intangibles benefits. The model has been tested through on an empirical study which remarked good results. A framework has been developed on the basis of CIM performance measures specifically for SMEs. With CIM, SMEs have achieved significant performance measurements in different areas, e.g.: improvement of quality, responsiveness, improvement of sales and marketing information,	Improvement in shop floor operations can be a hindrance for some SMEs. This high level of automation requires resources that could not be available in SMEs. There is need to define criteria which would fix the conditions for implementing CIM projects in SMEs

		growth in line productivity, increased staff productivity and lower overhead costs, reduce WIP inventory, reduction of lead times, reduction of floor space, and reduced set-up costs.	
Organizational Performance Measurement (OPM)	Chennel, et.al, 2000	Specifically developed for SMEs. The system has been developed from an empirical case study research in both large enterprises and SMEs.	Objectives are not clearly defined. The system proposed is in the dissemination phase and it has to be tested yet.
Quality models in an SME context	McAdam, 2000	The model has increased the measurements and links between strategy and operational processes. The model provides a classification of factors influencing PM initiatives in SMEs	The model uses a balanced scorecard as quality model. The model permits only qualitative analysis.
Indicators for performance measurement in SMEs	Hvolby, Thorstenson, 2001	The model focuses on moving from performance measurement to performance management and try to reduce the efforts that need to be allocated for PM initiatives in SMEs Performance measures are linked to strategy.	There are few non financial indicators To obtain a balanced performance there is need to retain some of the financial performance measures that could be derived from the company's accounting system. The model still needs validation.
Improving control through effective performance measurement in SMEs	Hudson, Lean, Smart, 2001	Specifically developed for SMEs. Incremental and iterative process to measure performance. Simple, clear and well defined to implement. The model has been applied in a case study.	The model has been tested only in one company. It has to be proved the effective flexibility and adaptability of the model. The model is specifically developed for the manufacturing sector.
Theory and practice in SME performance measurement systems	Hudson, Smart, Bourne, 2001	Identification of critical characteristics of performance measures. Identification of critical dimensions of performance. It uses a survey to establish whether SMEs measure performance strategically. It uses a case study to investigate whether the process identified is appropriate within a SME context. The failure of the case study has allowed the gap analysis between the theoretical model and the PM system, which resulted in a greater understanding of SMEs.	Application of an existing and non-ad-hoc model to the case study: the Cambridge process. Failure of the case study: the company did not achieve the implementation of the new balanced system. The model is too strategic oriented and requires too many resources for application. Little short-term benefits. The model is not enough dynamic and flexible.

Dynamic performance measurement system (IPMS)	Laitinen, 2002	Innovative PMM system specific for SMEs. Dynamic and Integrated, Balanced and Logical. Based on a managerial view: it identifies the useful dimensions to evaluate for the increase of firms performance. The model is mainly intended as a general tool for measuring and improving performance without any special reference to the type of industry.	The industry type may affect the relative importance of alternative factors in the IPMS. Absence of implementation guidelines. The author uses a survey to present preliminary empiric evidences of the importance of PMs, but the work is still in progress.
Adaptation of Balanced Scorecard to SMEs	Davig, Elbert, Brown, 2004	Balanced approach. Guidelines for implementation are given. Multi-perspective dimension analysis. It individuates indicators largely used by firms.	The model refers to companies that have from 20 to 250 employees, a too large range. The measures suggested highly depend from company strategies It may take a couple of years to achieve a pay off.
Balanced Scorecard (BSC) in no profit SMEs	Manville, 2007	It is used a consolidated model of PMM The scorecard provides an opportunity to reconcile the analysed organization business plan with its operational activities. The barriers for successful implementation seem to have been addressed. Clear correlation between indicators and financial performance. The model bases on cause-and-effect linkages. There is an holistic view of the organization.	Only one SME is analysed in the study. Only the service sector is analysed in the study. Continuous improvement is necessary to evolve the framework to an integrated PMs. The model is static and does not follow business dynamics. Four perspectives are limiting. The survey provides suggestions but not specific guidelines for implementation.
Measuring performance of small-and-medium sized enterprises	Gin Chong, 2007	Measures used by SMEs have been identified. Multiple case studies. Multiple data collection methods minimize the threats to validity and reliability of information. The process underlines the fact that SMEs place equal attentions on both the financial and non-financial measures.	Grounded theory use can lead to errors. Cross-sectional analysis gives only a snapshot on the approaches used by firms. Results are specific of single cases, difficult generalization of findings. Further research and tests need to be conducted. The survey provides suggestions but not specific guidelines for implementation.

Table Two – Analysis of the Literature Review

Model	Assessment	Design	Implementation	Communication/ Alignment	Review
Dynamic Performance Measurement System (DPMS)	√	√			√
Application of Balanced Scorecard to Small Companies		√	√	√	√
Customer Orientation and Performance					
Activity Based Costing in SMEs	√	√		√	√
Computer Integrated Manufacturing (CIM)		√			
Organizational Performance Measurement (OPM)	√	√		√	√
Quality models in an SMEs context	√			√	
Indicators for performance measurement in SMEs					
Improving control through effective performance measurement in SMEs			√	√	√
Theory and practice in SME performance measurement systems	√				
Adaptation of balanced scorecard to SMEs	√	√			√
Balanced scorecard in not profit SMEs	It is a survey, classification criteria are not applicable				
Measuring performance of small and medium sized enterprises	It is a survey, classification criteria are not applicable				

An Integrated Framework for SME Performance Measurement and Management Design

The previous section set the milestones of a "traditional" PM system along with a discussion of the main frameworks available in literature.

In this section, an integrated framework for SME performance measurement and management is presented incorporating all the dimensions identified by Balachandran, et.al (2007). The need for such integration has been largely discussed and promoted by Robson (2004). It is particularly important for the framework and implementation design issues. Accordingly, a multi-system/multi-level model representing a starting point for the design and implementation of PMM frameworks and measures is elaborated. In the following sub-section, the framework related to design and implementation together with the "global framework" for PMS design is presented.

Reference Model for PMM Framework and Measures Design

The framework proposed integrates five systems:

1. A performance system;
2. A cost system;
3. A capability evaluation system;
4. A benchmarking system;
5. A planning system.

The framework is based on the belief that PMM is based on a good comprehension of the business and begins with an analysis of the company activities and their drivers. Hence, the framework proposed defines "what" information should be analysed, "how" they should be processed and "how" they could be integrated for generating value adding information for managers' actions.

The five systems interact in a multi-level way, as depicted in Figure Two. The bottom level of the framework defines that value chain processes are the inputs to the three upper systems of analysis. This means that processes should be analysed by highlighting activities and related drivers so as to provide a comprehensive understanding of the company business.

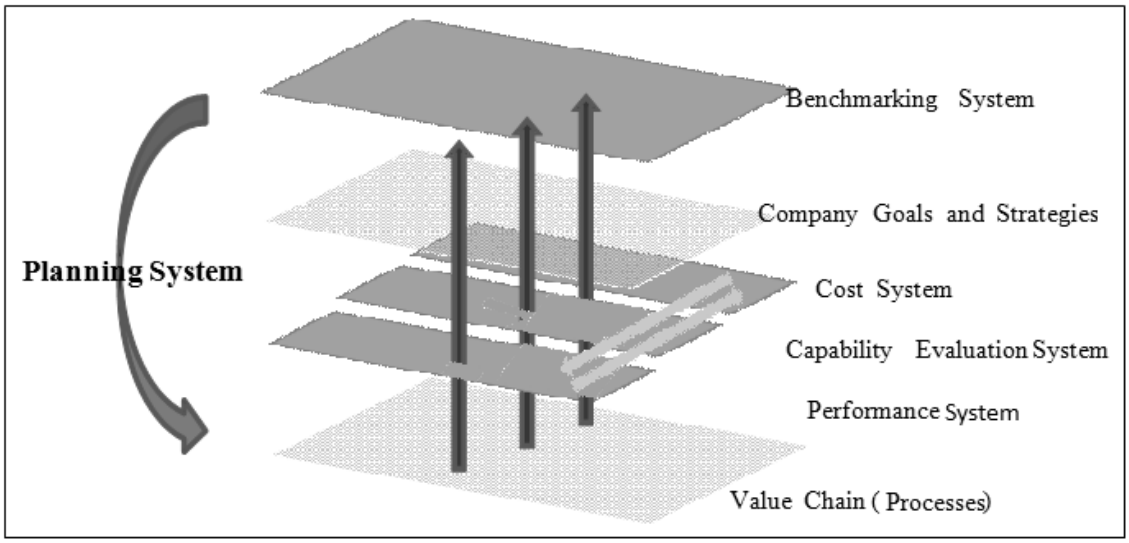
Several companies (especially SMEs) have no defined process and activities list and therefore effort should be put in order to identify the company value chain, and thus company processes, activities and related drivers. No doubt, this work can be time and resource consuming, but the detail achieved in this phase affects the overall PMM system effectiveness. Once processes are identified, they are evaluated by the performance system which reports the results achieved. The performance system focuses on the measurement of company processes and other particular parameters (key performance indicators, KPIs) which are relevant for the business. Particularly, a good performance measurement system, should not only be limited to a list of KPIs, but should identify relationships among them and their level of impact over the business. KPIs should refer both to the internal and external ambit, should be financial and non-financial and should incorporate effects on stakeholders.
In order to understand the information coming from the performance system and make it useful for decision-making, results have to be analysed in conjunction with the "physical capabilities" of the company. The term "physical capabilities" mean the reasons that limit the performance of a specific process (e.g. the production flexibility could be limited by technological aspects or the materials availability, could be limited by an inadequate MRP system or the purchasing activity could be limited by human resources).

The comparison between performance and physical capability is particularly important in SMEs, where limited resources can often be the reason of limitations on performances.

In order to support managers in their decision-making processes, at this point the information coming from the Cost System is taken in to consideration. In fact, the Cost System has the key role of providing information regarding process and activity costs which is essential to resolve the trade off that arises from a comparison of the Performance and Capability Systems.
The output of this comparison should result in a clear understanding of the process performance that is an input to the optimization of performance and the identification of possible physical constraints that need to be removed: however, trade-offs should be made on a cost/revenue-basis.

The information coming from the performance system and from the comparison with the company physical capability should be compared with company strategies and goals to ensure alignment of the overall structure. Therefore, performances achieved should be benchmarked with top-performing-companies, so as to identify further targets coherently with company capabilities. Planning is the next process to be undertaken so as to move towards new goals identified. It is important to note that planning activity is not restricted to financial budget setting, instead we extend it to non-financial measures budgeting and to overall business planning.

Figure Two: How the Five Systems Work Together in a Multi-Level Way



Reference Framework for PMS Design

The framework for PMM and measures design discussed above represents an important step in PMM.

Balachandran *et al.* (2007) has identified milestones that provide guidelines for the remaining aspects of the design system-assessment, communication/alignment and review. Thus, a global framework for PMMS design is presented in Figure Three.

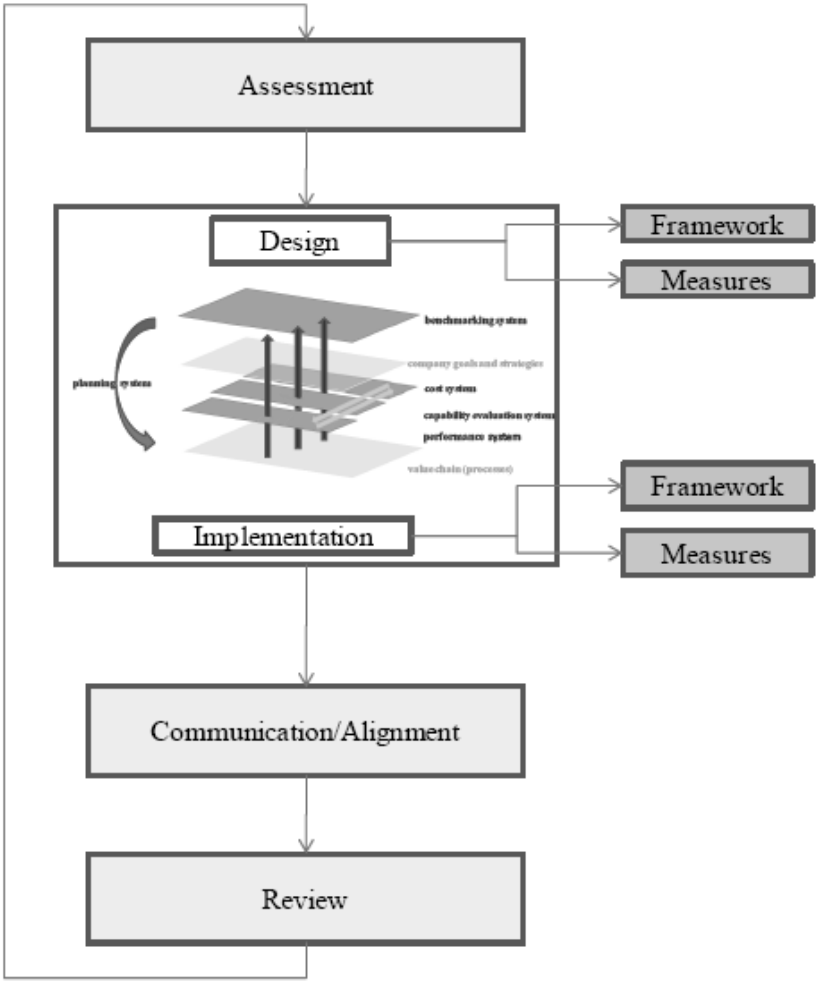
The "assessment" process, see the methodologies proposed by Dixon, et.al (1990), Bititci, et.al (1997; 2000), the European Foundation for Quality Management (EFQM, 2007a), St-Pierre and Delisle, (2006).

For the "communication/alignment" process, the methodologies proposed by Kaplan and Norton (1992), Kanji (1998), Bititci, et.al (2000), St-Pierre and Delisle, (2006) are useful.

And finally, for the "review" process, the methodologies proposed by Cross and Lynch (1988), Dixon, et.al (1990), Neely, et.al (1996), Bititci, et.al (1997), Epstein and Westbrook (2001) can be incorporated. These processes are not elaborated in this paper.

The framework proposed has an integrated approach to PMS design, by providing guidelines for assessment, design, implementation, communication/alignment and review.

Figure Three – Reference Framework for PMS Design



Conclusions

This paper carried out a structured literature review highlighting the state of the art of PMM research applied to Small and Medium Enterprises. By focusing on Performance Measurement System design, the paper analysed the characteristics of PMM models available in literature through the classification proposed by Balachandran, et.al (2007).

Based on this analysis, a framework is presented incorporating the PMM models available in the literature together with an integration of key missing elements. Particularly, importance is placed on the design of frameworks and measures in SMEs. With a strong emphasis on processes, the framework enables an analysis of systems information, and provides explanation of how this system value for managerial decision-making processes. Nanni, et.al (1992) likens a performance measurement system to a room thermostat, which assess the room temperature by sensing it and sends proper feedback signals to the air conditioning system. Likewise, the integrated PMM system proposed here is capable of understanding the physical constraints that limit the "temperature" range and helps to move it to the "ideal temperature" through a benchmarking process.

The majority of PMM models available today limit their focus on the performance system, thereby loosing much information and potential effectiveness. By integrating instead the five mentioned systems, the complexity and peculiarities of today businesses are better understood and analysed, and an effective support can be given to management in decision-making processes. The final framework proposed constitutes the base for PMS design, by providing guidelines for achieving an integrated approach to performance measurement and management.

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