

# Evaluating the usefulness of two proposed performance management frameworks: evidence from business practice

Performance management frameworks

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Received 23 January 2018  
Revised 18 September 2020  
24 February 2021  
18 June 2021  
Accepted 20 June 2021

## Abstract

**Purpose** – This paper aims to evaluate the usefulness of two conceptual frameworks: levers of control (LOC) (Simons, 1995) and performance management systems (PMSs) (Ferreira and Otley, 2009) for studying PM practices using a case study.

**Design/methodology/approach** – A case study method is used whereby data are collected through semi-structured interviews, examination of the group's annual reports and internal documents.

**Findings** – A key finding of this study is the use of a PMS at the case company which is formally structured and with objectives, mechanisms and processes designed beyond a mere “performance measurement system.” While the case analysis indicates that most of the key components of the two frameworks are featured in the company's PMS design, the uses of Simons' (1995) LOC, however, are not consistent with the notion of “balance” as advocated by the model.

**Research limitations/implications** – The evidence presented in this study is based on one large manufacturing company, and hence the findings cannot be generalized.

**Practical implications** – The findings of this study can be used in enriching the design of current proposed theoretical frameworks and also in encouraging management accounting researchers to continue the efforts of studying performance management (PM) practices.

**Originality/value** – A deeper understanding of PM practices using holistic frameworks has yet to receive more contested efforts from management accounting researchers. This paper attempts to contribute to this endeavor and fill in the gap in this area of research.

**Keywords** Performance measurement, Performance management, Holistic performance management frameworks, Case study

**Paper type** Research paper

## 1. Introduction

The need for developing holistic frameworks for performance management (PM) has gathered momentum during the past three decades. Many management accounting researchers acknowledge that the issues related to PM and management control are typically complex and intertwined (Chenhall, 2005; Ferreira and Otley, 2009). Other researchers have argued that the research in this area tends to focus primarily on simplified



We would like to thank Bob Scapens and David Otley, and the participants of the Management Control Association (MCA) conference, University of Groningen, Groningen, the NETHERLANDS, June 2017, for their insightful comments. The authors also gratefully acknowledge the financial and logistical support provided by King Fahd University of Petroleum and Minerals, and valuable comments of two anonymous reviewers.

and partial settings with too much emphasis on performance measurement rather than PM (Chenhall, 2003; Stringer, 2007; Broadbent and Laughlin, 2009). Broadbent and Laughlin (2009, p. 283) point out that “too much attention in the management, management control and management accounting literature has been given to *ex-post* performance measurement as distinct from *ex-ante* performance management.” Stringer’s (2007, pp. 102–104) review of empirical PM research confirms also the lack of holism and the partial nature of the PM literature. Specifically, the review’s findings note problems such as partiality in terms of the content examined, lack of theory development, more focus on description than explanation, scant attention given to logical linkages between performance elements and the lack of longitudinal and in-depth field studies explaining the antecedents, operations and consequences of PMSs. Since then the call for developing holistic and coherent theoretical frameworks for PM has increased (Ferreira and Otley, 2009; Broadbent and Laughlin, 2009; Lawson *et al.*, 2011).

PM is generally viewed as the process by which the organization integrates its performance with its corporate and functional strategies and objectives (Bititci *et al.*, 1997). Contino (2005) and Anthony and Govindarajan (2007) argue that PM processes are needed to improve the planning and goal setting, monitor and measure performance and generate accurate profiles of cost, revenue and profitability analysis. Santos *et al.* (2002) emphasize that the design and use of adequate PM frameworks can play an important role if organizations are to succeed in an increasingly complex, interdependent and changing world. In this respect, Lawson *et al.* (2011) and Yeoh *et al.* (2014) suggest that organizations can generate both operational and strategic benefits from designing and implementing a PMS such as developing a standard process for the management of financial data; ensuring its accuracy and relevancy; increasing accountability and visibility; focusing on corporate goals; better control of operations; timely information to base critical decisions; increased operational efficiency and better allocation of resources. Chenhall (2003) also provides hints as to what are the expected qualities of a PMS framework. He suggests that judgments should be made about the extent to which the PMS considers multiple stakeholders; measures efficiency; provides vertical links between strategy, operations and horizontal links across the value chain; and generates information on how the organization relates to its external environment and its ability to adapt (p. 136).

Building on a field study investigation of a large manufacturing company, this paper attempts to evaluate the usefulness of two conceptual frameworks in explaining PM practices:

- (1) levers of control (LOC) (Simons, 1995) and
- (2) performance management systems (PMSs) (Ferreira and Otley, 2009).

These two frameworks while having their own distinguishing features, they share some common grounds and perspectives on the design and use of PMSs, specifically the need for broadening the scope of developing a more holistic and integrated approach to PMSs, building an integrative information system as a key dimension of PM, the importance of linking PM to the implementation of business strategy and the use of a combination of controls. They also offer guidelines to study in detail the design, operations and uses of PMSs in their actual organizational settings. In this regard, the current study attempts to evaluate the ability of each framework in explaining performance management practices. While there have been attempts to study these practices (Collier, 2005; Tuomela, 2005; Widener, 2007; Kruis *et al.*, 2016; Heinicke *et al.*, 2016), a deeper understanding of PMSs in business organizations using holistic theoretical frameworks have yet to receive more concerted efforts from management accounting and management control researchers

(Ferreira and Otley, 2009). Stringer (2007), for example, suggests that it would be important to spend more time in real organizations to begin developing a deeper understanding of PMSs in use over a long-time span and to move from description to analysis. This current study will attempt to add to the body of empirical research in this area evidence from developing countries as most of the previous studies in the PM literature have focused mainly on developed economies.

The remainder of this paper is structured as follows: Section 2 explores the pillars of the two conceptual frameworks with specific reference to the way they link to PM. Section 3 describes the data collection and research method. Section 4 provides a discussion that assesses the potentials of each conceptual framework in explaining PM practices in light of the results and findings of the current case study. Section 5 of the paper offers a conclusion and directions for future research.

## 2. Conceptual frameworks for performance management

### 2.1 *Simons' (1995) levers of control framework*

Simons (1995) has developed a framework for strategic management control that addresses multiple definitions of strategy including intended and emergent aspects of strategy. Although acknowledging that control in organizations can be achieved in many ways (e.g. direct surveillance, feedback systems, social and cultural controls), Simons was primarily concerned with formal-based controls such as plans, budgets, target setting, market share and monitoring systems. He defines management control systems (MCSs) as “the formal, information-based routine procedures managers use to maintain or alter patterns in organizational activities” (p. 5).

The central theme of Simons' (1995) framework is that control of business strategy is achieved by analyzing and balancing the forces of four basic LOC. Of the four LOCs, two are defined as positive (beliefs systems and interactive control systems) and two are defined as negative (diagnostic and boundary control systems). Beliefs systems are used by senior managers to define, communicate and reinforce core values, purpose and direction for the organization (Simons, 1995, p. 33). The primary purpose of beliefs control systems is to inspire and guide organizational search and discovery. Interactive control systems, which focus on areas of strategic uncertainties, are “formal information systems that managers use to involve themselves regularly and personally in the decision activities of subordinates” (Simons, 1995, p. 95). Not only do interactive controls have an attention focusing role but they also stimulate search and learning which can result in new emergent initiatives, ideas and strategies (Simons, 1995, p. 91). Diagnostic control systems, which communicate the critical performance variables, are formal information systems that managers use to monitor organizational outcomes, correct deviations from pre-set standards of performance and reward achievement of specified goals (Simons, 1995, p. 59). Finally, boundary control systems, which communicate risks to be avoided, establish explicit limits, rules, policies and directives for organizational participants to follow to avoid potential risks.

The power of these four levers is argued, does not lie in the technical design of these systems or how each is used individually, but more importantly, in how they work together, how they complement each other, how they achieve balance and how managers understand and use them (Simons, 1995, pp. 4–5). As further explained by Simons (1995, p. 30), the effective use of these levers relies on the continual interplay between the positive and negative forces (motivation and coercion, reward and punishment, guidance and proscription, learning and control) to create a dynamic tension between goal achievement and creative innovation. These tensions are managed by what Simons calls “a balancing act” involving the use of positive and negative control systems (Simons, 1995, p. 30).

The LOC framework, however, has been criticized for the ambiguity and vagueness of its definitions and concepts (Widener, 2007; Ferreira and Otley, 2009; Krus *et al.*, 2016). One key, but unclear, concept in the LOC framework is the “notion of balance” (Ferreira and Otley, 2009; Tessier and Otley, 2012). Critics of this concept point out that Simons does not provide a definite notion of what balance is, nor how balance is achieved or reflected in the control system (Tessier and Otley, 2012; Krus *et al.*, 2016). Other researchers argue that Simons’ LOC framework explicitly excluded informal control systems and processes such as group norms, trust, socialization and culture (Collier, 2005; Ferreira and Otley, 2009; Broadbent and Laughlin, 2009). Collier’s (2005) study of the management control exercised by an Australian business entrepreneur company indicates the importance of the use of both formal-based and social control mechanisms in the implementation of the company’s strategy.

### *2.2 Ferreira and Otley’s (2009) performance management systems framework*

By drawing upon an extensive body of literature, observations and personal experiences, Ferreira and Otley (2009) extended Otley’s (1999) PM framework. This extended framework which Ferreira and Otley referred to as “performance management systems” (PMSs) was intended to “provide a broad view of the key aspects of PMSs and form the basis upon which further investigations can be developed” (p. 286). Ferreira and Otley make several changes and additions to Otley’s (1999) framework. First, the extended framework was expanded by borrowing directly from Simons’ (1995) LOC framework, specifically, the concepts of beliefs systems, diagnostic and interactive controls and critical performance variables. Second, Otley’s (1999) framework (composed of 5 main sets of issues/questions: key objectives, strategies and plans, setting performance targets, rewards and information flows) was extended to 10 “what” and 2 “how” questions. The new 7 questions address a wide number of issues ranging from the vision and mission of the organization, key success factors (KSFs), organization structure and its impact on PMS to the processes the organization use to evaluate individuals, groups and organizational performance; feedback and feed-forward information flows; and the dynamics of MCSs in light of the process of change.

A major strength of Ferreira and Otley’s (2009) framework lies in recognizing the use made of the PMS, and hence incorporating Simons’ (1995) distinction between diagnostic and interactive controls (Collier, 2005). For Ferreira and Otley (2009) the feedback information flows are critical to diagnostic use as they enable single-loop learning, while feedback-forward information, with its double loop function, can provide a check for strategic validity. Importantly, Ferreira and Otley’s (2009) framework emphasizes the importance of studying the strength and coherence of the links between the various elements of PMSs as they are crucial to understanding their operations (p. 275). As they stated:

A PMS is greater than the sum of its parts and there is a need for alignment and coordination between the different components for the whole to deliver efficient and effective outcomes (p. 275).

The value of the Ferreira and Otley’s (2009) framework lies also in emphasizing the change and dynamic nature of PMSs’ design and use: “environments change, organizations change and so PMSs also need to change to sustain their relevance and usefulness” (p. 275). The idea of change according to Ferreira and Otley (2009) applies both to the design infrastructure that underpins the PMSs as well the way PM information is used. The conception of PMSs change also considers the scope of strategic change in the increasingly competitive environments faced by organizations.

A notable feature of [Ferreira and Otley's \(2009\)](#) framework is that it does not adopt a prescriptive or normative tone on the PMSs that should be used in any specific organizational context. For [Ferreira and Otley \(2009\)](#), this is "a matter of empirical research which can study the consequences of different control configurations in different contexts" (p. 276). The framework also does not expect consistency to exist between the practices adopted from one part of an organization to another. Further, [Ferreira and Otley \(2009\)](#) point out that they would expect considerable differences between PM practices at different hierarchical levels of organizations and these practices are not expected to remain static, but rather change and evolve over time. Hence, the role of the framework as they put out is:

To help in a "snap-shot" to be taken of the package of practices that in operation at a particular point in time and to gain some sense of how these practices have evolved over time (p. 276).

Some researchers have commented on [Ferreira and Otley's](#) proposed draft framework published in 2005. For example, [Collier \(2005, p. 332\)](#), who used the proposed framework in his longitudinal study of an owner-controlled multinational company concluded that while the framework was useful in a rational-instrumental sense, it has been limited to accommodating only two of [Simons' control systems](#): diagnostic and interactive controls. [Stringer \(2007\)](#) also observes that the proposed draft framework while makes explicit the interconnections between the different components of the PMS, may only be applicable at the senior level of management. Other research studies e.g. [Broadbent and Laughlin \(2009\)](#) criticized the framework for not addressing the issue of "culture and context" which they perceived as having a fundamental bearing on the nature of the PMS in any organization.

In summary, both [Simons \(1995\)](#) and [Ferreira and Otley \(2009\)](#) have attempted to build a view of PM as a holistic and strategic management system. They stress the importance that the set of controls deployed by management should ensure that the organization's strategies are effectively implemented and performance and outcomes are properly measured. Importantly, they provide specific conception and directions on the design and expected use of PMSs. For our current case investigation, there are various common features and points of contact between [Simons' \(1995\)](#) and [Ferreira and Otley's \(2009\)](#) frameworks. A careful analysis of the two frameworks encouraged us to identify 12 main components underlying their conceptual structures ([Table 1](#)). The vision and mission component initially was part of the [Simons' \(1995\)](#) beliefs systems and later became part of [Ferreira and Otley's \(2009\)](#) framework. Strategy and strategic planning processes are the key components that explicitly common to both frameworks. The diagnostic elements of critical performance variables, key performance indicators (KPIs) and target setting are key features of both frameworks and central to the strategy implementation. Additionally, the value of [Ferreira and Otley's \(2009\)](#) framework lies in recognizing the importance of the use made of the PMSs; thereby incorporating the [Simons' \(1995\)](#) distinction between diagnostic and interactive controls; changes in the PMS over time; and the strength and coherence between the elements of the system ([Collier, 2005](#)). [Ferreira and Otley \(2009, pp. 272–273\)](#) while including performance evaluation and reward systems in their proposed PMSs framework, [Simons \(1995\)](#) incorporates them as part of the distinction between positive (i.e. rewarded) and negative (i.e. punished) control activities (pp. 117–119). Information flows, systems and networks are perceived as the essential enabling mechanisms to any PMS ([Simons, 1995](#); [Otley, 1999](#); [Bititci et al., 1997](#); [Ferreira and Otley, 2009](#)) and central to the two frameworks' concepts of feedback information (information used to enable the undertaking of corrective courses of action) and feed-forward information flows (information used to enable the organization to generate new ideas and to recreate strategies and plans).

Framework*	Key elements of PM	SIGMA's PMS
(1) and (2)	Mission and vision (beliefs systems)	- Mission - Vision - Core values - Statements of purpose
(1) and (2)	Strategic planning process	- Strategic management planning and corporate strategy <ul style="list-style-type: none"> <li>• Strategic map</li> <li>• Productivity strategy</li> <li>• Growth strategy</li> </ul>
(1) and (2)	Critical performance variables	- SBU's and group missions, vision and strategies are aligned
(1) and (2)	Key performance measures	Key results areas (KRAs)
(1) and (2)	Target setting	Key performance indicators (KPIs)
(1) and (2)	Performance evaluation and reward systems	KRA/KPI-based goal setting - Performance evaluation and development program (PEDP): <ul style="list-style-type: none"> <li>• The use of an employee appraisal scheme</li> <li>• Evaluating employee performance</li> <li>• Performance improvement plan, training and development</li> </ul> - Management career development program - The use of human resource KPIs (acceptance of job offers, employee turnover rate and safety incidences) - Establishing the higher institute for industrial training (HIIT) - A compensation program composed of financial and non-financial benefits <ul style="list-style-type: none"> <li>• The use of performance appraisal criteria</li> <li>• Occasional use of group rewards, but not a uniform and routine practice</li> </ul>
(1) and (2)	Information technology	- Investment in IT facilities and capabilities: <ul style="list-style-type: none"> <li>• Information technology global</li> <li>• Export logistics system</li> <li>• Project costing and billing module</li> <li>• ERP</li> <li>• Order life cycle management module</li> </ul> - Aligning IT operations with business processes - Tracking reports
(2)	Organization structure	Corporate planning and performance management department <ul style="list-style-type: none"> <li>• Strategic business units (SBUs)</li> <li>• Decentralization</li> </ul>
(1) and (2)	Diagnostic and interactive use of control systems	- Diagnostic use (KRAs, KPIs and target setting) - Interactive use (cross functional teams [CFTs])
(1) and (2)	PMS change dynamics	- Evolutionary changes and development in the company's PM from traditional to an integrated PMS - A clear focus on the interaction between diagnostic and interactive use of information - Some alignment between the beliefs and boundary systems and performance measurement - Continuous updating of the company's information system infrastructure and networks capabilities
(1) and (2)	Strength and coherence	Consistent with (2) and partially with (1)
(1)	Corporate governance controls (boundary systems)	- Financial, operational and technological risk management policies: <ul style="list-style-type: none"> <li>• Liquidity risk</li> <li>• Credit risk</li> <li>• Equity price risk</li> <li>• Foreign currency risk</li> </ul> Obsolescence risk (products/technology) - Human resources and workforce localization (Saudization) - Responsibility and accountability - Internal audit practices - Standards of business conduct and ethics - Policies, procedures and rules for remuneration and compensation

**Table 1.**  
PM Frameworks and  
SIGMA's PMS

Notes: \*Simons' (1995) and Ferreira and Otley's (2009) frameworks are referred to as (1) and (2), respectively



While most of these common elements are shared characteristics of the two frameworks (e.g. beliefs systems; strategic planning processes; critical performance variables/KSFs, target setting; performance management change dynamics; information flows and systems networks; performance evaluation and reward systems; others are specific to only one framework e.g. organization structure (Ferreira and Otley, 2009) and boundary control systems (Simons, 1995). As the two frameworks provide a useful research tool and templates to describe the key aspects of the design and operation of PMSs, these 12 components will be the central focus of our case study investigation. The objective is to use them to assess the ability of the frameworks in explaining PM practices at the selected case company, specifically in identifying the various components of its PMS, their uses, as well as the links among them.

### 3. Research method and data collection

A case study method is used to evaluate the usefulness of the two conceptual frameworks in studying the PM practices in a large Saudi manufacturing company. For confidentiality reasons, the identity and names of the company and its business sectors will not be disclosed. Hence, throughout the paper, the company will be referred to as SIGMA. Headquartered in Dammam, Saudi Arabia, the company was founded on July 8th, 1998. As a leading manufacturing and fabrication group, it manufactures products, engineering systems and provides services for a wide range of uses. The company's ownership is shared jointly between the private sector (95.65%) and the Saudi Government (4.35%). It operates businesses in four major industrial sectors: steel, heating, ventilating and air conditioning (HVAC), insulation materials and concrete. With manufacturing facilities in Saudi Arabia, United Arab Emirates, Egypt, India, Vietnam and Italy and total manpower of 14,000 employees, the company sells its products in more than 90 countries.

The starting point of this study was a visit to SIGMA to investigate the design and use of a balanced scorecard (BSC) scheme the company had introduced in 2003. During the visit, the interviewee team confirmed that the company and its business sectors are using PMS while the BSC scheme is just a part of its framework. According to the PM team, the BSC project was an experimental one initially introduced to overcome the deficiencies of a traditional performance measurement system the company was using prior to 2003. The traditional system was heavily dependent on financial metrics (e.g. return on investment, sales revenue, operating income and operating cash flow) derived from the group's financial statements. By the end of 1999 and early 2000, the group faced enormous problems including low profitability and fluctuation in financial performance; the poor relationship between production, sales and customer service; high operational costs; and lack of communication between the supply chain and production operations. While implementing the BSC year after year proven to be useful in making progress on performance measurement, the management has quickly realized that there were significant gaps and limitations in the overall performance system.

Data were collected during the years 2017–2019 using a variety of sources. First, the semi-structured interviews were held with a PM team from the Group consists of the Director of Corporate Planning and Performance, Manager of Planning and Performance and a senior business consultant. They were interviewed over a period of six months and meetings were held in one of the group's sites located in the Eastern Region of Saudi Arabia. Certain members of the team were interviewed more than once to clarify key issues which emerged as the study progressed. The total numbers of interviews were four. Each interview typically lasted 1.5 to 2 h each. Detailed handwritten notes were taken up during the formal interviews with the PM team and other company staff. The authors of the study were

present at each interview to enhance the reliability of the interpretation of interview materials and conclusions drawn. A larger bulk of the interviews and discussions specifically addressed issues related to controlling business strategy, PMS design and uses, information systems, compensation schemes, corporate governance and staff development. During the first interview, the PM team offered us a presentation using PowerPoints with life demonstrations on the contents of the corporate dashboard and how it links and integrates information flows and results of activities and operations from various parts of the company.

Second, the authors also benefited from discussions, project reports and presentations on PMS made by four employees of the case company and who at the time were participants in the EMBA and MBA programs of a local university. One of the four graduates who is currently working in the Corporate PM Department subsequently facilitated the connection to and arranging the interviews with SIGMA's PM team. The other three were the general managers of operations and supply chain, quality, information technology (IT) and human resources (HR) of one of the SBUs and who was closely involved in the PM processes. The discussion with these managers focused on the uses of PM information related to their departments. Third, the Group's annual reports (1999–2019) proved to be a rich source of case materials as they report on a variety of topics and issues of relevance to the case study investigation such as the mission statement and core values, strategies, corporate governance, corporate social responsibility, IT, HR and workforce localization. Importantly, access to limited internal company documents was obtained. Data and records in these documents provided insights into some of the components of the company's PMS, in particular, strategic maps, BSC dashboards, key results areas (KRAs), KPIs, employees' appraisal schemes and a sample of performance reports. The documentary evidence and company's records were carefully investigated and some insights were obtained before going to the personal interviews. Finally, other means of data collection included personal e-mail letters and telephone interviews.

The next section analyzes the results and interpretations of the case study in the context of the two proposed conceptual frameworks. The objective is to assess the richness, strength and explanatory power of the two frameworks in explaining PM practices at SIGMA and its affiliates. Specifically, the discussion and analysis will focus on assessing the degree of consistency or gap between the theoretical perspectives of the two frameworks and SIGMA's observed PM practices. A summary of these consistencies and gaps, in addition to observations from the field, are presented in [Table 1](#) below.

## 4. Discussion and analysis

### 4.1 *Mission and vision (beliefs systems)*

While [Ferreira and Otley's \(2009\)](#) framework identified the mission and vision as a critical component of their PM framework, [Simons' \(1995\)](#) LOC incorporates them as part of the beliefs systems. For [Simons \(1995\)](#), core values are controlled by the beliefs systems which guide the creative processes of exploring new opportunities and instill widely shared beliefs. The results of our investigations into SIGMA's PMS indicate consistency with the two proposed frameworks on this component ([Table 1](#)). The company was keen from the beginning to establish its own mission and vision that led to formulating clear strategic directions and core values for the company and its SBUs. To embrace the expectations of all stakeholders, SIGMA's mission and vision needed to move from the traditional shareholders' value focus "to be a winning industrial leader creating superior values for business and community." The mission statement was equally clear: "to win markets and stakeholders' trust through industrial competence and mutual prosperity." The missions



and visions of SBUs were also carefully aligned to the vision and mission of the corporate entity.

Simons (1995) conceptualizes that core values are controlled by the beliefs systems which guide the creative processes of explaining new opportunities and instill widely shared beliefs. SIGMA's core values are structured around five key dimensions: honesty and integrity; customers and excellence; innovation and change; leadership and prudence; and community and prosperity. Our analysis and interpretation of documents suggest that there have been clear attempts by the company to align the stakeholders' management with strategic performance measurement (Atkinson *et al.*, 1997). Top management was keen to see the vision, mission and core values be translated into PMSs. Upon examining the strategy map of the AC business sector, for example, we observed strategic goals set to achieve three community values: environment, health and safety and employment for Saudi nationals. The KRAs (e.g. develop environmentally friendly products, Saudization, promote health awareness and safety products), KPIs (e.g. products meeting global norms for environment protection; Saudi employees percent vs government targets, the retention rate for Saudi nationals; safety-related incidents/accidents, workdays lost due to injury and sickness) and areas of responsibility were also clearly identified and mapped with these strategic goals. The performance highlights in the Group annual reports of 2017 and 2018 disclosed evidence of the company's contribution to wide a network of community and social development programs such as female employment, training, occupational health and safety, energy efficiency and conservation, business disability programs, sponsorship and support of food charities and schools' activities.

While there has been a clear cultural shift in the company's mission, vision and strategy in recent years to encompass and promote the expectations of customers, employees and community, the shareholder value emphasis has not been devalued. The fact that the strategy map documenting details of strategic goals such as "growing revenues," "increasing profitability" and "improving cash flow," in addition to related KPIs e.g. suggests that the shareholder interest continues to take a center stage in the new era of PM change. It also suggests the interplay between the beliefs, strategic planning and diagnostic control systems, as the latter captures the strategic objectives and measurement mechanisms derived from the core values embodied in the beliefs systems (Simons, 1995; Widener, 2007).

#### 4.2 Strategic planning process

Simons (1995, pp. 8–9) views strategy as a plan and a pattern of actions and as "position." For Simons (1995, p. 9) the notion of strategy as "position" "focuses on the content or economic substance, of a chosen strategy." Firms may choose different ways to compete in a product market, for example, they may focus on product differentiation, cost leadership or specific customer groups (Miles and Snow, 1978; Porter, 1980; Simons, 1995). For Simons, the effective control of the selected business strategy is achieved by balancing the forces of the four LOC (Simons, 1995, pp. 28–29). It is interesting to note that Ferreira and Otley's (2009) views on strategies and plans that address the various strategy typologies are somewhat in line with Simons' conception of strategy as "position." They point out that all these typologies (e.g. intended and emergent strategies) represent a useful way of looking at a particular organization's strategy and a way to reflect on how they translated into the PMSs.

A key feature of SIGMA's strategic planning process is that it is built and designed around a strategy mapping framework; a typical BSC modeling (Kaplan and Norton, 1996). All SBUs are required to design their strategies, strategy maps and dashboards and link them to the corporate vision, mission and strategy. The AC sector's strategy map which we

were given a copy of, clearly connects in a bottom-up directional approach the strategic objectives in explicit cause-and-effect relationships. The strategic objectives were identified with four BSC perspectives: financial, customer, internal business and learning and growth which were subsequently linked to two main strategies: “productivity strategy” and “growth strategy.” Within the AC sector’s strategy map, the product strategy, for example, focused on the role and impact of operations and employees (e.g. operations management processes, customer management processes, product development processes and human capital development) to effectively delivering more value to customers (e.g. offering competitive prices, achieving high-level quality, improving delivery performance and continuously developing new products/features). The growth strategy was designed to target growing revenues, increasing profitability and improving cash flow through expanding revenue opportunities from new customers and new products/services; and from increasing revenues from existing customers and existing products.

While the company has well-defined strategies and a detailed and formal planning process, its management control system appears to be flexible to accommodate changing economic and market conditions. For example, in 2017, while the Group reported another profitable year, top management recognized the challenges facing the domestic industrial sector in general and the construction industry in particular, in addition to the difficult economic conditions and the state of the international market at the time. Several of SIGMA’s business sectors including AC, Steel and Insulation had reported declined volume of activities and lower profit margins in that year due to lower sales driven by delays in project implementation which were caused by the overall downturn experienced by the contracting and construction industries. Given these difficulties and challenges, top management was quick to act. Below extract from the CEO’s letter to the Board:

we have taken concrete steps toward expenditure control in an effort to adapt to the conditions and challenges at hand [...] redirecting more of our business to privately funded projects; enhancing operational expenditure-based activities and operations related to ongoing government projects as opposed to capital expenditure-based ventures, including maintenance, repair and aftersales service; maintaining an effective, low-cost structure; and seriously considering opportunities to reduce cost and increase productivity (The Annual Report, 2017, p. 4).

Thus, SIGMA’s strategy appears to be flexible and adaptive as it responded quickly to the environmental uncertainties and changing economic conditions. The adjustment in strategy was translated into a new strategic focus. One member of the PM team noted: “suddenly there was more talk about freezing some capital projects, cost-cutting, improving cost structure and improving processes.” Another member of the team commented on the effectiveness of the PMS in dealing with the emerging economic and market uncertainties:

The PMS helped us to search for new alternatives to strategically re-position some of the company’s activities given the uncertainties presented by the changing market environment [...]. The system also helped us to monitor and measure the impact of the strategic choices made. That was done to ensure they deliver the desired outcomes.

#### *4.3 Critical performance variables, key performance indicators and target setting*

To assess the achievement of strategy, both [Simons \(1995\)](#) and [Ferreira and Otley’s \(2009\)](#) frameworks agree on translating the firm’s strategy into critical performance variables/KSFs. The critical performance variables/KSFs are those activities, attributes, competencies and capabilities that are seen as vital prerequisites for the success of any organization in its

industry at a certain point of time (Sousa de Vasconcellos e Sá and Hambrick, 1989; Ferreira and Otley, 2009). They need to be achieved if the organization is to progress toward achieving its vision and aspirations.

As presented in Table 1, the diagnostic elements of critical performance variables, KPIs and target sets were a key feature of SIGMA's PMS which suggests a consistency with the two conceptual frameworks. These diagnostic elements are used at corporate, business sector and departmental levels and are closely linked to the corporate and business sectors' strategy maps and four BSC perspectives: financial, customer, internal business and learning and growth perspectives. The KPIs are set through parameters such as financial, quantity, quality, time and expected behavior. In the AC sector, for example, the dashboard contained KPIs for measuring and reporting on revenue growth, cash flow, productivity, asset utilization, delivery performance, risk management, supply chain operations and regulatory and social processes. At the IT Department in the same sector, KRAs, KPIs and targets were identified for the speedy resolution of incidents/requests, business process improvements, transformation application, information systems' capability building and capacity readiness. For performance monitoring and control, all departments are required to discuss their performance on a periodical basis with top management:

All departments have to analyze their performance according to the scorecards. Departments review their performance on a monthly basis to identify the weaknesses and teams are formed to analyze the causes and find solutions. At the same time, top management reviews the departments' performance every three months against their strategic objectives and operating plans and then continuous improvement programs are implemented for the outcomes and target areas, which are not meeting expectations (The Director of Corporate Planning and Performance).

Finally, a key characteristic of SIGMA's performance measurement is that is very visible and much more explicit and formal. They are apparently designed to measure different aspects of performance in a more objective manner. According to the Director of the Corporate Planning and Management Performance:

Desirable outcomes should be measurable, transparent and documented and this what we hoped that our performance measurement systems to achieve.

#### *4.4 Performance evaluation and reward systems*

Ferreira and Otley (2009, pp. 272–273) while including performance evaluation and reward systems as key components in their proposed PMSs framework, Simons (1995) incorporates them as part of the distinction between positive (i.e. rewarded) and negative (i.e. punished) control activities (pp. 117–119). A central feature of SIGMA's performance evaluation and rewards system is that it is more concerned with individuals than the evaluation of various groups of individuals such as teams, departments and divisions. The discussion with the senior staff from the personnel department of the AC business unit indicates the use of a staff appraisal scheme and a "Compensation and Benefits Program" both were developed to support this system.

During the beginning of each appraisal period, managers and employees discuss the KRAs as defined by the employees and agree on KPIs or performance criteria for each KRA. This process begins by reviewing the business unit/department business plans and strategic objectives and then translated into an employee's objectives by developing the KRAs of the employee where a weight value will be assigned per KRAs. From this process, performance targets and expected outcomes are determined for the employee. Importantly,

the company has developed and implemented a scoring system where a manager will be able to rate the performance of an employee on a 5-point scale: “consistently exceeds,” “meets and exceeds,” “successfully meets,” “meets some” or “falls below expectations.” Consequently, the rates earned for each employee determine the percentage of the increase in his/her basic salary and other non-financial benefits such as promotion and recognition. However, if performance does not meet objectives in terms of the performance criteria established or the employee fails to achieve targets, management may recommend frequent monitoring and substantial direction from the supervisor/manager concerned where a comprehensive improvement plan is necessary. In this sense, the compensation and benefits scheme has designed to link employees’ performance with compensation and training. To achieve this objective, the company created the “Management Career Development Program.” This program is managed by the HR department and coordinated with the Higher Institute for Industrial Training (HIIT). The company’s strategic view in this respect is to recognize and reward achievement, retain qualified and productive employees, encourage accountability and provide the necessary support for employees. [Simons \(1995\)](#) notes that careful selection and training of individual workers can provide assurance that tasks will be performed in the desired way:

In rare situations in which it is impossible to monitor either the work process or the outputs directly, the selection and training of workers are the only viable means of control (p. 4).

Some commentators e.g. [Alder \(2011\)](#) argue that employee development has not been given attention in [Ferreira and Otley’s \(2009\)](#) framework.

While SIGMA’s performance evaluation and reward system focus mainly on an individual evaluation, our case analysis indicates that in rare situations group rewards are offered in exchange for achieving certain tasks such as resolving critical problems. This happened, for example, in the coil shop in the AC sector where the members of a cross-functional team (CFT) who were involved in a project were rewarded for their collective achievement. The team worked on identifying setup parameters for the furnace machine and made it a standard, which subsequently improved the yield to around 95.5 which exceeded the target set at 90%. However, this is not a uniform, formal or routine pattern of practice at SIGMA and its business units according to the PM team interviewed. Overall, our analysis did not observe any forms of other reward and compensation schemes used by the company such as risk-reward systems ([Langfield-Smith, 2008](#)), gain sharing ([Chenhall and Langfield-Smith, 2003](#)), tangible and cash rewards ([Heninger et al., 2019](#)).

#### *4.5 Information technology*

IT, information flows and networks are perceived as essential enabling mechanisms to any PMS ([Bititci et al., 1997](#); [Otley, 1999](#)). [Simons \(1995\)](#) notes that organizational constraints of time, distance and space often limit the ability of managers to codify and diffuse information in the most effective way. For Simons, IT and networks systems, if properly designed, can overcome these constraints and allow the control levers to function more effectively. Similarly, [Ferreira and Otley’s \(2009\)](#) framework considers information flows (feedback and feed-forward information) systems and networks as “the binding agent that keeps the system together” (p. 273).

No business function has received considerable attention in SIGMA than the IT. To build an advanced IT infrastructure and an effective service framework, SIGMA IT global (ITG) was established in 2009 to serve and link all SIGMA’s businesses inside and outside the Kingdom. Currently, the Group as a whole has advanced facilities and capabilities which the PM team described as in its maturity stage. As of early 2014, all business units were

integrated into a single point Oracle ERP system. As a result, significant progress in standardizing business processes across the company internally and globally has been achieved. Many processes in SIGMA and its SBUs were improved and automated in the area of production, sales, engineering, material planning, finance, HR, supply chain and logistics. At SIGMA Steel, for example, the Oracle Discrete Manufacturing Module has been enabled, which allows for a lean manufacturing approach intended to improve production efficiency, optimize information and resources and reduce costs. The scrap monitoring feature in Oracle ERP has been also enabled to allow users to track costs associated with scrap materials. In the HVAC sector, the Order Life Cycle Management Module has been developed and implemented and applied to Sales and Engineering Departments to assist in determining the estimated delivery schedule and tracking the status of projects. For SIGMA Finance, the Letter of Credit Request module for foreign suppliers has been developed in-house, enabling online-processing Letter of Credit requests. Finally, in an effort to manage the budget for projects effectively and automate resource sharing and utilization more efficiently, Project Costing and Billing modules have been enabled for SIGMA Steel Egypt.

#### *4.6 Organization structure*

According to [Ferreira and Otley \(2009, p. 269\)](#), organization structures include “the functional, the multidivisional, the holding company, the matrix, the transnational, the team-based and the project-based.” For them, organization structure decisions determine the responsibilities and accountabilities of organizational participants and that the company’s decisions are linked to KSFs, as well as to its strategies (p. 269). The identification of KSFs such as the ‘ability to respond quickly to market conditions’ according to [Ferreira and Otley \(2009, p. 269\)](#) may require the organization to embrace decentralization, forming strategic alliances or establishing team-based structures to re-engineer processes. Interestingly, [Simons’ \(1995\)](#) LOC framework has not addressed the organization structure as a PM component.

Our field investigations indicate that SIGMA’s organizational structure is very much in line with the initial suggestions of [Ferreira and Otley \(2009\)](#). SIGMA is a multi-divisional company and as mentioned above operates four major industrial sectors: steel, HVAC, insulation materials and concrete. According to the PM team, all sectors are given a large degree of discretion in running their operations, including formulating strategies, preparing annual operating plans, designing KPIs, setting targets and monitoring performance. It is the perception of top management that a decentralized structure would facilitate and speed decision-making and allows sectors to respond faster to changing market conditions and customer demand. [Paladino \(2007\)](#) highlights the importance of establishing and deploying a corporate PM office as a key principle of PM. This has been a unique feature of SIGMA’s PMS. The system is managed by a separate and specialized department at the corporate level i.e. the corporate planning and PM department which is accountable to top corporate management. The department’s responsibilities include overseeing the corporate sectors’ performance, data collection and analysis, monitoring, evaluation, reporting and coordinating among SBUs. The department also coordinates with CFTs that deal with evaluating performance results, adjusting plans and developing corrective actions.

Some researchers note that both [Simons \(1995\)](#) and [Ferreira and Otley \(2009\)](#) while making explicit interconnections between the different components of the PMSs, frameworks focus mainly on the informational needs of senior-level of management ([Stringer, 2007](#); [Broadbent and Laughlin, 2009](#)). [Simons \(1995, pp. 5–6\)](#) was mainly concerned with the information needed by top managers (e.g. information about the strategic domain, intended strategies and plans, progress in achieving intended strategies

and emerging threats and opportunities) to implement the strategy. What we observed at SIGMA, unlike Simons and Ferreira and Otley's conception, that the company's PMS focuses on all levels of management across the organizations. For example, the strategic goals, KPIs and targets are designed and operated for all sectors, divisions and departments. There is also a high level of coordination between all sectors and top management regarding the results of operations and corrective actions needed to adjust and modify the implementation of strategies.

Interestingly, only [Ferreira and Otley \(2009, p. 269\)](#) discuss the issue of virtual organizations such as outsourcing, strategic alliances, networks, however, without explaining how relationships will be managed and measured by the PMS. Although SIGMA's PMS offers attention to the link between strategy and supply chain and establishes measures for suppliers' performance (e.g. the use of KPIs for reducing lead time for vendors, reducing material cost and improving vendor performance via rating scores), the focus seems to be limited to the internal dynamics of the organization. Unlike previous studies ([Langfield-Smith, 2008](#); [Stouthuysen et al., 2019](#); [Reusen and Stouthuysen, 2020](#)), our study did not observe the existence of horizontal links across the supply chain as part of the company's organizational structure and PMS.

#### *4.7 Diagnostic and interactive use of control systems*

[Ferreira and Otley's \(2009\)](#) conception of the "uses" of PM while borrows directly from [Simons' \(1995\)](#) LOC, it includes also the role of strategic validity controls ([Mintzberg, 1978](#)). The role of strategic validity controls according to [Ferreira and Otley \(2009, pp. 274–275\)](#) is to provide a signal to management for the need to review strategies. This revision can be facilitated by open and frank discussions between managers and employees. [Ferreira and Otley \(2009\)](#), however, stress that the "use of strategic validity controls" should not be confused with Simons' "diagnostic and interactive use of controls." For [Simons \(1995, p. 7\)](#) diagnostic control systems are designed to trigger the adjustment of the targets embedded in the plans and programs and the interactive control systems are used to stimulate organizational learning and the emergence of new ideas and strategies.

The use made of performance information by SIGMA and its SBUs suggests that the company relies heavily on its PMS in communicating information and providing managers at all levels with feedback information that allows them to monitor the outcomes of implementing strategies and also in taking necessary actions to deal with problems occurring. This what the General Manager of Operations and Supply Chain stated:

The PMS makes the control possible [...] it alerted me to several issues of concern to us back in our department. Now, I know that I have to worry about material cost reduction, the performance of local and global vendors, long and healthy partnership with them, better lead-time, lower production cost through productivity, efficiency and shorter time delivery.

[Simons \(1995, pp. 96–97\)](#) highlights the role of interactive control systems in their demand for frequent and regular attention from operating managers at all levels of the organization. The data generated by the system are interpreted and discussed in face-to-face meetings of superiors, subordinates and peers. At SIGMA, the involvement of CFTs in dealing with operational and strategic issues can be also interpreted as "interactive use" ([Simons, 1995](#)) and "strategic validity controls use" ([Mintzberg, 1978](#); [Ferreira and Otley, 2009](#)) of PMS. CFTs meet on a monthly and quarterly basis to discuss and review issues related to improving business processes; product



development; cost control; quality control, employee training and development; and optimizing the use of shared services, as well as reviewing strategies when corrective actions are needed to improve performance. These functional ‘teams usually act on the basis of the information generated by the diagnostic measures. At the Quality Department of the AC sector, for example, we were oriented to the use of quality measurement for organizational performance referred to as “Quality at Glance Reporting.” The purpose of this measurement and reporting is to provide a summary of the key quality performance indicators that highlight all critical issues that require management’s attention and decisions. Improving quality as reported by the PM team required the involvement of managers at different departments to diagnose the emerging problems and searching for effective solutions. Thus, this interactive use of controls enables the managers of the Quality Department to make the necessary adjustment of strategy and strategy implementation.

#### *4.8 Performance management systems change dynamics*

For [Ferreira and Otley \(2009\)](#) the idea of change in the PMSs applies to

- the design infrastructure that underpins the PMSs,
- the way PM information is used and
- the type of change that has taken place in the PMSs design and use as a response to or in anticipation of changes in the organization and its environment (p. 275).

Additionally, [Ferreira and Otley \(2009, p. 275\)](#) stress the importance of paying attention to the antecedents (i.e. the causes) and consequences (i.e. the outcomes) of change in the PMSs. The LOC model also underscores the importance of PMSs’ change dynamics. [Simons \(1995, p. 13\)](#) identifies three organizational dynamics that reflect different facets of organizations:

- (1) the dynamics of creating value,
- (2) the dynamics of strategy making and
- (3) the dynamics of human behavior.

For Simons, each of these dynamics leads to organizational tensions that must be reconciled and balanced to allow the effective control of business strategy.

In our interpretation, both [Simons \(1995\)](#) and [Ferreira and Otley’s \(2009\)](#) frameworks are helpful in explaining the dynamic features inherent in SIGMA’s PMS and changes. The company’s PMS has been evolving over the past 15 years. First, in terms of system design, the company’s system developed through three stages:

- (1) the traditional system,
- (2) BSC model and
- (3) an integrated approach to PMS.

Second, there were other design changes in the performance measurement systems. In areas of the way PM information is used, there was a clear move from a diagnostic use to an interactive deployment by concentrating on the strategic use. Third, the high emphasis on linking the beliefs and boundary control systems (e.g. core values, mission, vision and corporate governance controls) to performance measurement created the opportunity for the company to manage its strategy. Fourth, as the company moved from the traditional to a mature PMS, SIGMA needed to update its information system infrastructure as a

component of the company's PMS. For example, during the past 10 years and as reported in the corporate and shared services section of the group annual reports, a number of strategic IT network projects were completed with the intention of upgrading the company's information system infrastructure. These included the Windows Privilege Management System, End-User Monitoring, Data Labeling and Encryption projects and Cloud Disaster Recovery.

#### *4.9 Strength and coherence*

[Ferreira and Otley \(2009\)](#) note that the strength and coherence of the links in the PMSs while are fundamental and key to the efficiency and effectiveness of a sound PMS, they represent a challenge for using the system. [Ferreira and Otley \(2009\)](#) also stress that PMSs should be evaluated in terms of the balance, harmony, consistency and coherence of the links in the whole PMS package:

A PMS is greater than the sum of its parts and there is a need for alignment, coordination between different components for the whole to deliver efficient and effective outcomes (p. 275).

[Simons \(1995\)](#) on the other side, views the strength and coherence in the PMS in terms of how the four LOC work together in a combined fashion to achieve a successful implementation of the strategy. [Simons \(2000\)](#) emphasizes that each of the control levers cannot be used alone; rather, effective control is achieved through the integration of the levers. The idea is that, as each of the control levers serves a different purpose, they must be "nested" and work together simultaneously in balance to create a powerful control system ([Simons, 1995](#), p. 5).

The framework of [Ferreira and Otley \(2009\)](#) is more helpful in explaining SIGMA's PM practice, in particular, the links between the components of the system than [Simons' \(1995\)](#) four levers. Our analysis and interpretation of data collected seem to indicate that the company and its SBUs had attempted to build an integrated PMS to manage operations and use of its resources. First, the SBUs' visions, missions and strategies were aligned to the corporate's vision, mission and strategy. Values reflected in the visions and missions of the Group and SBUs have been translated into strategies, KPIs, actions and outcomes. Second, KRAs, KPIs and ownership and responsibilities for results and outcomes are linked back to the SBUs' strategies. Third, the tracking reports provide the CFTs (from production, marketing, sales operations, quality and accounting) with feedback of performance results and outcomes from all SBUs across the organization that allow them to deal with issues of concern that require corrective actions. Fourth, in addition to rewards and compensations which are determined on the basis of employees' performance evaluation, appropriate training and development programs are determined for each employee.

Although the impact of [Simons' \(1995\)](#) framework perspectives on SIGMA's PMS can be observed across the Group (e.g. the use of core values, strategies, KPIs, performance evaluation and corporate governance controls), the dynamic tension and balance assumed to be created by the forces of the four levers in the management control process is not clearly feasible in the business practice of the company. However, we observed some combinations of two levers working together in the strategy implementation. For example, the use of financial and operational risk policies and national workforce regulations (boundary controls) is evident in the formulation of strategic objectives, design and use of KPIs and target setting (diagnostic controls) for these policies and regulations. The use of KPIs and target setting in monitoring, measuring and reporting on translating the company and its SBUs' values (shareholder expectations; community

and prosperity; customer and excellence) into strategies, actions and outcomes also suggest a close linkage between diagnostic control and belief systems. Importantly, the fact that the performance results generated by the KPIs initiate discussions and ongoing dialogue and actions by CFTs (closed-loop feedback mechanisms) are another example of the interaction between diagnostic and interactive control systems. Previous studies reported similar observations. Henri's (2006) study, for example, found some evidence of two opposing forces; interactive and diagnostic work simultaneously but for a different purpose. Heinicke *et al.* (2016) survey study of large-size firms (relative to small and medium-size firms) demonstrated that the beliefs and boundary controls' uses of performance measures are more reinforcing of each other while the diagnostic use of performance measures and boundary controls act more as a replacement for each other. Recently, Müller-Stewens *et al.* (2020), using data from a survey of research and development professionals from North America and Europe, found that the combination of interactive and diagnostic controls' uses is directly and positively associated with product newness and innovation rate.

#### 4.10 Corporate governance controls (boundary systems)

Among the two conceptual frameworks, only Simons' (1995) LOC model emphasizes the importance of corporate governance controls (boundary systems) as a key element in the design of a PMS which is largely consistent with what we observed at SIGMA (Table 1). Boundary systems according to Simons (1995) "define the acceptable domain of activity for organizational participants. They comprise rules, limits, prescriptions, codes of behaviors and risks to be avoided" (pp. 7–10). Simons (1995, p. 42) lists three sources of business conduct:

- (1) society's laws,
- (2) the organization's beliefs systems and
- (3) codes of behavior promulgated by industry and professional associations.

For Simons, the purpose of these systems is to allow individual creativity within defined limits of freedom.

Our analysis of the case materials indicates that SIGMA's corporate governance controls are no exception:

The Board of Directors has ultimate responsibility for ensuring the formalization of the company's values and policies and the ongoing application of good governance across the group. The directors assess performance on an annual basis, determine a suitable balance between strategy and financial and operational performance, oversee risk management, internal controls and the safeguarding of assets while also keeping the board and executive succession plan up to date (The Annual Report, 2013, p. 39).

SIGMA Industrial Corporate Governance principles and practices are wholly integral to the company's activities. They seek to ensure that the group as a whole is committed to creating long-term value for all its stakeholders, be they customers, employees, shareholders [...] and the communities in which the company operates. The importance of honoring this commitment is enshrined in the Company's Code of Business Conduct and Ethics, Corporate Governance Guidelines, The Charters of the Board of Directors' sub-committees and the Company's Disclosure Policies, which seek to ensure the transparency and veracity of all information disseminated (The Annual Report, 2013, p. 39).

SIMGA's boundary controls were also clear as related to environmental protection. While the company's annual reports and performance highlights pay considerable attention to environmental issues (e.g. improving energy efficiency, reducing gas and toxic emissions, conserving water and energy and recycling of waste and materials), the company's KPIs scheme includes only one strategic objective "develop environmentally and friendly products" and one KPI "products meeting global norms for environmental protection." The activities and programs related to the company's social responsibility, environmental protection, sponsorships and recognitions are reported regularly in the company annual report. The Codes of Conduct also clarifies the responsibilities of the members of the board of directors and committees such as internal audit, nomination and remuneration committees.

[Simons \(2000\)](#) recognizes that risk presents a source of potential harm to business organizations. He identifies three types of risks:

- (1) operational risks,
- (2) asset impairment risk and
- (3) competitive risk.

For [Simons \(1995, 2000\)](#) these strategic risks should be managed through the diagnostic control systems. At SIGMA, analysis of documents related to risk management policies and practices shows different types of risks: operational (e.g. order backlog); financial risks (e.g. market risk, commodity risk, commission rate risk, foreign currency risks, equity price risk, credit risk and liquidity risks) and technological (obsolescence of current products/technology). The diagnostic reporting of risk measurement is also evident in the company's measurement system. KPIs were designed to report on risk management such as bad debts, exposure from foreign currency exchange and inventory obsolescence. According to the PM team, the Group's senior management oversees the management of these risks and regularly reviews the policies and procedures to ensure that all risks are identified, measured and managed in accordance with the Group's policies and risk objectives.

SIGMA's boundary controls also appear to be influenced by its political environment. For example, the inclusion of KPIs for using Saudi employees is clearly an attempt by the company to comply with the Saudi Government's labor policies and regulations. These policies and regulations require all companies operating in Saudi Arabia to achieve a target Saudization percentage of 15% as part of its integral labor force in the first year of operation and increase that percentage annually by 5%. The company's annual report for the year 2018, indicates that the number of Saudi nationals working in all SIGMA's sectors increased by 1.5% ensuring an overall Saudization ratio of 30% compared to 22%, 22.7% and 25% in years 2014, 2015 and 2017, respectively, ensuring compliance with the government regulations.

Finally, SIGMA's boundary controls also covered the ownership and accountability of concerned managers. To make managers accountable within the PM governance structure, the company identified the owners for each performance measurement. Within the Air Conditioning Sector, for example, we observed responsibility center owners such as the vice-president, operations managers, quality heads and customer service managers. In certain ownership areas, the responsibility is shared by two managers such as the purchasing manager and quality head. Thus, [Simons' \(1995\)](#) framework is more helpful as it reflects the importance, demonstrated in this study, of the boundary controls reflected in the use of diagnostic reporting of risk measurement, attention given to environmental issues,

compliance with government labor policies and ownership and accountability of concerned managers. Although [Ferreira and Otley \(2009\)](#) have developed their framework in part on the LOC framework, the boundary controls have not been incorporated in their framework, an exclusion that has been previously criticized ([Collier, 2005](#); [Tessier and Otley, 2012](#)). Given the evidence of the use of different types of boundary systems demonstrated in this current study and also reported by other studies ([Collier, 2005](#); [Widener, 2007](#)), we suggest that [Ferreira and Otley's \(2009\)](#) framework needs to be extended to accommodate this important dimension to strengthen its explanatory power of PM practices.

## 5. Conclusion and directions for future research

This study attempted to evaluate the usefulness of two conceptual PM frameworks: LOC ([Simons, 1995](#)) and PMSs ([Ferreira and Otley, 2009](#)) in explaining PM practices. A major finding of this field investigation is the existence of a relatively sophisticated PMS at the selected company site which certainly has objectives, components and dimensions beyond a mere “performance measurement system.” The company’s system is composed of major components (a vision and vision, a strategic map, KRAs, KPIs, a compensation and reward system and corporate governance controls) and supporting infrastructure (IT and networks, a dedicated PM department and CFTs); all were carefully designed and built to manage and operate the system. The company’s PMS appears to be the backbone and central command for supporting strategic decision-making, policy design, policy changes, monitoring, accountability and continuous improvement.

The analysis of the company’s PM structure demonstrates consistency with the two proposed frameworks’ perspectives, specifically with respect to the key components of vision and mission, strategic planning processes, target setting, critical performance variables, KPIs, incentive and reward systems, IT, strength and coherence, change dynamics and PMS use. However, some components are specific with only one framework, but not with both. For example, the organization structure component is consistent with [Ferreira and Otley's \(2009\)](#) framework and the corporate governance controls component are consistent with [Simons' \(1995\)](#) framework. Thus, in our interpretation, no one of the two frameworks alone will be capable of explaining the PM practices observed in SIGMA and its SBUs. However, at the very least, the two frameworks can be complementary to each other and together they may provide a powerful means of obtaining an overview and appreciation of the structure of the PMs that is currently in use by the company and its SBUs. This means that the two frameworks need to be further developed to accommodate the areas of deficiencies outlined above which are left out in the initial design of the two frameworks; e.g. [Ferreira and Otley \(2009\)](#) to consider adding more components such as the corporate governance controls (boundary system) and [Simons \(1995\)](#) to pay attention to the organizational structure dimension.

In the context of the data collected and analyzed, we can conclude that each of the two conceptual frameworks has its own strengths and weaknesses in explaining SIGMA’s PM practices. First, while [Simons' \(1995\)](#) four LOC were observed in SIGMA’s PM practices, their uses do not seem to be consistent with the notion of “balance and trade-offs” as advocated by Simons. Second, our case analysis indicates that the four LOC are present in SIGMA’s PM practice, but there was no clear focus on diagnostic and interactive use of control as [Ferreira and Otley's \(2009\)](#) conceptual framework implicitly emphasized. Third, among the two frameworks, only Simons’ LOC model emphasizes the importance of corporate governance controls (boundary systems) as a key element in the design of a PMS which is largely consistent with what we observed at SIGMA. SIGMA’s boundary controls were clear in some areas such as risks management, internal audit, environmental protection

and workforce localization. As corporate governance is gaining increasing attention, specifically in business practice, we recommend that [Ferreira and Otley's \(2009\)](#) framework needs to be further developed to integrate this dimension to improve the model's ability to explain PM practices.

A key aspect of SIGMA's PMS is its "formal structure." Formal PM controls observed included stated strategic objectives, corporate governance controls, KPIs and compensation plans that were intended to guide and monitor the behavior of its managers and other employees. The goals and objectives were clearly communicated and understood throughout the organization both at the corporate and SBUs levels. Management has access to performance data and there is an extensive level of information sharing, specifically on operational and strategic activities. There is also evidence of the mechanisms of measuring achievement, via growth in cash flow, financial and non-financial performance measurement and the performance reporting mechanisms were perceived as valuable and key management control devices for the company and its business units. Unlike other studies ([Collier, 2005](#); [Langfield-Smith, 2008](#); [Reusen and Stouthuysen, 2020](#)), our investigation found less evidence of the use of informal control mechanisms and processes in SIGMA's PM practice. One reason for this difference in results may be to do with the fact that SIGMA is a large manufacturing company with multi-business units, a diverse product mix and operations in different countries. Another reason may be to do with the style of formal managerial culture in large Saudi organizations both private and the public which is more conservative and heavily dependent on bureaucratic forms of control including accounting and technical controls ([Drummond and Al-Anzai, 1997](#)). Some prior studies report similar results. For example, [Speckbacher et al. \(2003\)](#) found that large firms, as opposed to smaller firms, are more likely to implement and rely on formalized strategic performance measurement systems. Similarly, [Chenhall and Morris \(1995\)](#) suggest that entrepreneurial organizations are likely to de-emphasize formal accounting control while conservative entities place heavier reliance on formal accounting procedures. Interestingly, [Collier's \(2005\)](#) field study which used both [Ferreira and Otley's \(2009\)](#) and [Simons' \(1995\)](#) frameworks found that formal and systems-based controls were not a significant feature in the small entrepreneurial company his study investigated.

This study has several limitations. First, the evidence presented in this case description and analysis is based on a single case of a manufacturing company, and hence lacks generalization of the research findings to broader populations of organizations. Further research investigation across a larger sample of organizations would help in a better understanding of PM practices, in addition to evaluating the abilities of the two proposed theoretical frameworks in explaining these practices. Second, [O'Grady et al. \(2016, p. 12\)](#) argue that while PM and control systems offer insights on different views on the components comprising control systems, they provide little guidance for assessing their effectiveness. Due to the limited time and access to data, our case study has focused on evaluating the usefulness of the two proposed PM frameworks in explaining PM practices rather than assessing the effectiveness of the chosen company's PMS. Future research could be directed to focus on assessing the effectiveness of PMS in achieving its strategic management purpose.

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