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The Interplay between Comprehensive Use of Performance Management Systems and Corporate Financial and Non-Financial Performance: Evidence from Saudi Arabia*

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Abstract

A significant body of prior research on performance management systems (PMSs) either explains the components and the design of the systems or investigates the link between particular system/s and organizational functions, capabilities, or performance. In contrast, this study investigates the comprehensive use of PMSs and relates them to corporate financial and non-financial performance. Further, this study examines whether the association between PMSs and performance varies between industries or is moderated by the size of the company. Data was collected using a questionnaire that was sent to companies from different industries operating in Riyadh province, where the most important businesses in Saudi Arabia are located. A total of 152 usable responses were received. The results of this study revealed that companies use a variety of PMSs at a balanced level. The extent of each category of PMS use is associated with the extent of other PMS categories' use. However, the larger the company, the more PMSs it uses. Importantly, the results showed a positive and significant association between PMSs' extent of use and both financial and non-financial performance. This association was minimally moderated by the company size and industry for specific categories of PMSs and performance.

Keywords: Performance Management Systems, Management Control Systems, Financial Performance, Non-Financial Performance

JEL Classification Code: M10, M12, M41

1. Introduction

Researchers assert the difficulties in establishing and providing a clear definition for the concepts of management accounting system (MAS) (Chenhall, 2003), management control system (MCS) (Malmi & Brown, 2008), business performance measurement system, (Franco-Santos et al., 2012) and performance management system (PMS) (Ferreira & Otley, 2009). Consequently,

these terms in addition to other terms like management accounting and organizational control, have been used in literature interchangeably (Chenhall, 2003). These areas of research are intertwined. For instance, researchers from various disciplines, such as management accounting, management control, human resources, operations management, strategy management, information systems, organizational behavior, and marketing, are contributing to the field of performance measurement (Franco-Santos & Bourne, 2005; Marr & Schiuma, 2003; Neely, 2005). The diverse and multi-disciplinary research, though enriching the subject matter, has led to an inconsistent description of performance management and a lack of consensus about its components (Franco-Santos et al., 2007) and produced conflicting results regarding its effect on performance (Pavlov & Bourne, 2011).

Research on PMS and MCS in recent years has shifted its focus from illustrating the design and application of the systems to understanding the way they are used within organizational contexts (Hudson et al., 2001), their consequences (Franco-Santos et al., 2012), their impact on organizational effectiveness (Pešalj et al., 2018), and

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their effect on corporate performance (Pavlov & Bourne, 2011). Further, researchers probed issues that emerged during the implementation of PMS and the practitioners' reactions to these issues leading to a better understanding of the effect these systems have (Bititci et al., 2012). While there has been a substantial body of research on PMS and MCS, much of it investigate specific component of the system or link them to a specific function within organizations. To better understand PMS and MCS, researchers need to investigate the interdependency of the several performance management and control systems operating simultaneously at an organization (Abernethy & Brownell, 1997). Further, researchers emphasize the need for investigating the effect of comprehensive PMS use, rather than a single system, on corporate performance see, e.g. (Bourne et al., 2013; Hall, 2011; Homburg et al., 2012; Micheli & Mura, 2017). However, prior research showed inconsistent results regarding the impact of PMS on performance (Bourne et al., 2013) which indicate the need for more investigation in this area of research. Moreover, the majority of prior studies on MCS and PMS have been made on large companies with less attention paid to the way those systems are used by small and medium companies (SMEs) (Bititci et al., 2012; Brem et al., 2008; Garengo et al., 2005). SMEs, beside their substantial contribution to the economy and employment, they have distinct features and characteristics different than large companies. For instance, they have more flexibility compared to large firms though they are more constrained financially and more bounded with relation to human resources (Nandan, 2010; Pešalj et al., 2018).

This study addresses these gaps by including five general PMSs each of them is represented by a group of systems to examine the association between the comprehensive use of PMSs and corporate financial and non-financial performance. Further, this study included SMEs with large companies from several industries in the analysis to test for the effect of the company's size and industry on the association between PMSs use and performance.

2. Literature Review and Hypotheses Development

Despite the extensive use of the terms performance management (PM), performance management system (PMS), and management control system (MCS), there are significant differences in what is meant by each term. PMS and MCS are complex and intertwined in organizational and research settings (Ferreira & Otley, 2009). Early literature on PMS discussed its issues under management control (Ferreira & Otley, 2009) which was defined by Anthony (1965) as "the process by which managers assure that

resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives". Later, Chenhall (2003) categorized management accounting (MA) and management accounting system (MAS) under the broader term of MCS. He demonstrated that while MA is a group of tools or practices such as budgeting and costing, MAS is the systematic use of MA whilst MCS encompasses MAS and other types of controls.

Ferreira and Otley (2009) provided a holistic view of management and control of organizational performance, emphasizing that PMS covers the components of MA, MAS, and MCS. They define PMS as the evolving formal and informal mechanisms, processes, and systems used by management to attain organizational objectives. They elucidated that PMS assists in managing performance through planning, controlling, rewarding, analysis, measurement, and facilitating organizational learning and change. Broadbent and Laughlin (2009) built on the work of (Ferreira & Otley, 2005, 2009). They provided a view that PMS consists of processes and controls used to manage the outcomes as well as the means used to achieve those outcomes at the organizational and societal levels. However, PMS is often used in the context of controlling individual behavior within human resource management research (Broadbent & Laughlin, 2009).

A substantial volume of MA and MCS research has been dedicated to studying the development, adoption, implementation, and effect of innovations such as activity-based costing (ABC), balanced scorecards (BSC), target costing, etc. However, investigating an individual MCS and its impact on performance separately may yield inconclusive results if the innovation is not related to the existing broader MCS (Malmi & Brown, 2008). Malmi and Brown (2008) emphasized the importance of studying and designing MCS as a package. They provided a comprehensive framework for MCS with a broad scope of controls that include planning controls (an ex-ante form of control that sets goals, provides standards, and enables congruence of organizational goals and activities), cybernetic controls (a process that stipulates measures and determines targets provides feedback, analyses variances, and modifies systems or activities), reward and compensation controls (motivating individuals and groups), administrative controls (governance, structure, policies, and procedures), and cultural controls (values, beliefs, and social norms). It is evident that companies, including SMEs, use multiple PMS in which researchers attempted to understand how they are used simultaneously, e.g. (Pešalj et al., 2018). Accordingly, the following hypothesis is proposed:

H1: *There is a positive association between the level of each performance management system's use and the use of other systems.*

The size of the firm has been considered by contingency-based research, diffusion of innovations research, institutional theory-based research, and other empirical research. Yet, there is no agreement about the role of the firm's size in the design of MCS and PMS. Rather, it has been the most controversial factor that showed inconsistent influential results (Askarany & Smith, 2008; Askarany et al., 2010). Large firms have advantages over smaller firms in adopting advanced PMS. For instance, large firms have greater financial resources affordability and more specialist availability (Abdel-Kader & Luther, 2008; Clarke, 1997; Firth, 1996). Haldma and Lääts (2002) explained that managers in large firms need to maintain a large volume of information as large firms tend to be more decentralized. Therefore, managers are expected to utilize more advanced PMS. Thus, we posit that:

H2: *The larger the size of the company, the higher the level of performance management systems use.*

Performance measurement and management systems have been used to implement strategy (Franco-Santos et al., 2012; Melnyk et al., 2014), facilitate organizational alignment (Chenhall, 2005; Hanson et al., 2011), and improve organizational capabilities and performance (De Leeuw & Van Den Berg, 2011; Koufteros et al., 2014). The tremendous change in the business environment related to the increased competition, advanced technology, and global operations made the financial measures no longer sufficient for evaluating the corporate performance as they reflect the short-term achievements, led to a loss of strategic focus, and failed to provide information related to non-financial business functions (Abdel-Maksoud et al., 2016; Banker & Mashruwala, 2007; Hoque, 2005; Kagioglou et al., 2001). Prior research on PMSs explored the effect of PMSs on corporate performance following two approaches. Some studies discussed the direct effect of particular PMS on financial performance. Other studies considered the indirect effect of PMSs on corporate performance through one or more mediating variables that are components of non-financial performance. Those studies found a positive effect of a particular PMS or group of PMSs on organizational learning (Chenhall, 2005), operational performance (De Leeuw & Van Den Berg, 2011), role clarity, and managerial performance (Hall, 2008), business survival in the changing environment (Wichitsathian & Ekkaphol, 2022), and organizational capabilities (Henri, 2006). Based on prior research findings and discussion, we put forward the following hypotheses:

H3: *Higher non-financial performance is associated with more intensive use of performance management systems.*

H3a: *Higher non-financial performance is associated with more intensive use of planning systems.*

H3b: *Higher non-financial performance is associated with more intensive use of control systems.*

H3c: *Higher non-financial performance is associated with more intensive use of costing systems.*

H3d: *Higher non-financial performance is associated with more intensive use of directing and motivating systems.*

H3e: *Higher non-financial performance is associated with more intensive use of decision-making systems.*

Micheli and Mura (2017) examined the role of PMSs that use financial and non-financial measures, which they termed “comprehensive PMS,” in mediating the effect of corporate strategy on corporate performance. Their findings indicated that the type of strategy affects the performance measures used. On the other hand, comprehensive PMS positively affects innovative and organizational performance under both cost-leadership and differentiation strategies. While accounting controls such as budgeting, when it is used interactively, assist in the strategic change process (Abernethy & Brownell, 1999), management controls systems that are non-accounting-based contribute to organizational effectiveness (Abernethy & Brownell, 1997), including systems that are designed for performance management of human capital (Lawler, 2003) which is the building block of organizational success (Aguinis et al., 2011). Specific control systems such as total quality management (TQM) improve performance through customer focus, continuous improvement, and employee empowerment (Anggadini et al., 2021). Researchers assert that the use of information provided by PMS in decision-making leads to improved management and better utilization of resources (Bourne et al., 2005; Stede et al., 2006) that would eventually enhance the effectiveness and efficiency of resource use (Ahrens & Chapman, 2004; Hudson et al., 2001) and improve financial performance. Further, business management practices related to logistic operations, marketing, human resources, etc., proved to have a positive influence on financial performance (Matias & Bungato, 2021). Hence, the following hypotheses are suggested:

H4: *Higher financial performance is associated with more intensive use of performance management systems.*

H4a: *Higher financial performance is associated with more intensive use of planning systems.*

H4b: *Higher financial performance is associated with more intensive use of control systems.*

H4c: *Higher financial performance is associated with more intensive use of costing systems.*

H4d: Higher financial performance is associated with more intensive use of directing and motivating systems.

H4e: Higher financial performance is associated with more intensive use of decision-making systems.

Empirical research that has used the size of the firm as a determinant factor for MAS, MCS, and PMS has shown mixed results (Abdel-Kader & Luther, 2008; Cinquini & Tenucci, 2006; Hyvonen, 2005; Joshi, 2001; Libby & Waterhouse, 1996; O'Connor, Chow & Wu, 2004; Smith et al., 2008; Waweru, 2008; Williams & Seaman, 2001). For example, Joshi (2001) noted that large firms use more sophisticated MAS than medium-sized firms. According to Joshi, large firms have enough resources to invest in new MAS or to improve the existing systems. Abdel-Kader and Luther (2008) also found this view to be true in the U.K. This argument was supported by (the Chartered Institute of Management Accountants (CIMA), 2009; Kimberly & Evanisko, 1981; Waweru et al., 2004). The influence of firm size was emphasized in the CIMA survey, as larger firms were more likely to adopt more MAS. Hyvonen (2005) stated that larger firms reported more relative benefits and more future emphasis on the use of advanced MAS. Since the large firms employ more advanced MAS and sophisticated PMS, it is expected then the effect of those systems on performance is higher. Accordingly, the following hypotheses are introduced:

H5: The size of the company has a moderating effect on the association between higher corporate performance and more intensive use of performance management systems.

H5a: The size of the company has a moderating effect on the association between higher non-financial performance and more intensive use of performance management systems.

H5b: The size of the company has a moderating effect on the association between higher financial performance and more intensive use of performance management systems.

Traditionally, management accounting and control research focuses on manufacturing firms (Pavlatos & Paggios, 2008). The focus of management accounting and control research on manufacturing companies is a result of the diversity and complication of manufacturing activities that require timely, accurate, complete, and relevant information about product costing, cost management, planning, performance evaluation, and other critical information for decision-making. Researchers argue that there are certain MASs that are more appropriate by nature for the manufacturing industry than they are for non-manufacturing industries. Chongruksut (2009) explored

the use of advanced MAS in Thailand and found that the majority of companies that have adopted the advanced MAS were in the manufacturing sector, with a significant difference for the non-manufacturing sectors. Lower use of MAS in the trading sector was also observed by Anh et al. (2011) when compared to the manufacturing and service sectors. Therefore, the following hypotheses are consequently developed:

H6: The association between higher corporate performance and more intensive use of performance management systems is more profound in some industries than others.

H6a: The association between higher non-financial performance and more intensive use of performance management systems is more profound in some industries than others.

H6b: The association between higher financial performance and more intensive use of performance management systems is more profound in some industries than others.

3. Research Methodology

3.1. Data Collection

The data for the present study was collected using a survey questionnaire that was distributed to companies operating in Riyadh province, where the most important businesses in Saudi Arabia are located. The questionnaire was sent to different-sized companies in several industries using a variety of electronic tools. The total number of the questionnaires distributed was approximately 387, whereas the valid responses received were 152, with a response rate of 39%. The respondents' companies are categorized for the purpose of analysis into manufacturing companies with 36 (24%) responses, service companies (including banks, financial service, health care, and tourism) with 76 (50%) responses, and trading companies with 40 (26%) responses. Further, the responding companies are classified based on their sizes into large companies with 30 (20%), medium companies with 56 (37%), and small companies with 66 (43%) responses. The number of employees was used as a criterion for companies' sizes. Companies with employees from 10 to 50 were considered small, while companies with employees from 51 to 150 were classified as medium, whereas companies with several employees that are over 150 were regarded as large companies. A substantial body of research has used the number of employees to determine the size of companies (Forsaitth et al., 1995; Gosselin, 1997).

However, the definition of small, medium and large companies varies from one country to another and from

one industry to another. According to Askarany and Smith (2008), a company in the service sector could be defined as large if it employs more than 50 employees, while a company in the manufacturing sector is not defined as large unless it employs more than 200 employees. Askarany and Smith (2008) confirmed that the most globally used definition to determine the size of the firm is by the number of employees. This study used the categories of employees number for the company's size, which is similar to the one used by Askarany et al. (2010).

3.2. Instrument Design

The questionnaire survey that was used for data collection has been designed to capture information about the use of a variety of PMSs by the responding companies and the results of their usage that were operationalized by several financial and non-financial performance indicators. The first section of the questionnaire was designed to collect data about the responding companies. Aiming to make the questionnaire as short as possible to encourage the respondents to participate and provide objective responses, this section sought information about the company size and industry only. The second section of the questionnaire aimed to find out the level of PMSs usage by responding companies. On a seven-point Likert scale, respondents were requested to indicate to what extent each system is used by the respondent's company. This section includes five PMSs, namely, planning, controlling, costing, directing, and decision-making systems. The items that were used to measure each construct of each PMS are adopted from (Waweru et al., 2004) with minor modifications to suit the purpose and setting of this study. The final section includes the financial and non-financial performance indicators that are assessed by the respondents with reference to the last three years. The self-reporting of organizational performance as reported by respondents, is a widely used measurement in research (Wall et al., 2004). When objective measures of performance are unavailable or cannot be reached by the researcher, the self-reporting measure is a proper alternative (Dess & Robinson, 1984; Govindarajan & Fisher, 1990; Venkatraman & Ramanujam, 1987).

3.3. Data Analysis

To test the research hypotheses, Pearson Correlations, One-way between-groups Analysis of Variance (ANOVA), and Independent Samples *T*-Test, were employed using SPSS 21 software. First, Pearson Correlations was used to examine the association between the level of each PMS's use and the use of other systems. Then, ANOVA was used to find out whether the level of PMS extent of use is

affected by the company's size. To examine the association between PMS use and corporate performance, two steps analysis was performed. First, the median split technique was used to categorize the companies with regard to their financial and non-financial performance into high performers and low performers. Then, the Independent Samples *T*-Test was performed to find out where there is a significant difference between high and low performers in the use of each PMS. These two steps were also used for each size and each type of company separately to find out whether the size of the company and the type of industry have a moderating effect on the association between the use of PMS and financial and non-financial performance.

4. Results

The following subsections present the empirical results for hypotheses testing. The first section presents the association between each PMS and other systems used, in addition to the effect of the company's size on the extent of each PMS use. The second section demonstrates the association between PMSs use and both financial and non-financial performance. Finally, the third section examines whether the association between PMSs use and performance depends on the size of the company or type of industry.

4.1. PMS Use

Table 1 presents the results of Pearson correlation analysis for the association between the extent of each PMS use and other systems' use. Further, it shows the association between PMS and; financial and non-financial performance. Pearson coefficients and their respective level of significance at (0.01 level) indicate a positive and significant association between the use of each PMS and the use of other systems. Accordingly, hypothesis 1 is supported.

To assess the effect of the company's size on the use of PMSs, responding companies were categorized into small, medium, and large companies using the number of employees as discussed in the methodology section. Then, the ANOVA test was used to determine whether the mean of each PMS use significantly varied among the three groups. Results presented in Table 2 show that the mean responses of the five PMS usage by medium companies are all higher than the mean responses of the same PMS usage by small companies, whereas the mean responses of the five PMS usage by the large companies are all higher than the mean response of both medium and small companies. The results presented in Table 2 revealed that the mean differences between groups (small, medium, large) are significant at ($p < 0.01$) for all PMSs' use except for the directing

Table 1: Pearson Correlations of PMS Extent of Use, Financial, and Non-Financial Performance

	Planning	Controlling	Costing	Directing	Decision	FinPer	Non-FinPer
Planning Systems							
Control Systems	0.715**						
Costing Systems	0.607**	0.830**					
Directing and Motivating Systems	0.456**	0.643**	0.735**				
Decision Making	0.546**	0.754**	0.780**	0.658**			
Financial Performance	0.438**	0.594**	0.556**	0.487**	0.614**		
Non-Financial Performance	0.402**	0.596**	0.581**	0.552**	0.674**	0.809**	

**Correlation is significant at the 0.01 level (2-tailed).

Table 2: ANOVA: Performance Management Systems Extent of Use by Different Sized Companies

	Dependent Variables	Mean Score For Each Size			ANOVA (Between Groups)	
		Small (<i>n</i> = 66)	Medium (<i>n</i> = 56)	Large (<i>n</i> = 30)	<i>F</i> -value	<i>p</i> -value
1	Planning Systems	4.47	5.08	5.90	17.67***	0.000
2	Control Systems	4.74	5.27	5.93	12.64***	0.000
3	Costing Systems	4.53	4.84	5.81	10.88***	0.000
4	Directing and Motivating Systems	4.68	5.04	5.27	2.03	0.135
5	Decision Making	4.62	5.13	5.71	6.62***	0.002

***Significant at the 0.01 level; **Significant at the 0.05 level.

and motivating systems, which showed an insignificant difference between the three groups. The results indicate that the larger the company, the more planning ($F = 17.7$, $p < 0.01$), controlling ($F = 12.6$, $p < 0.01$), costing ($F = 10.9$, $p < 0.01$), and decision-making systems ($F = 6.6$, $p < 0.01$) it uses. Based on these results, hypothesis 2 is supported.

4.2. The Association between PMS Use and Corporate Performance

It was proposed that the more the company usage of PMS, the higher the company's financial and non-financial performance. To test this proposition, the scale of the financial and non-financial constructs (1–7) was transformed into dichotomous variables using the split median statistical technique. As a result, the companies were categorized into high performers and low performers for both financial and non-financial performance. Then, the independent group's *t*-test is used to find out whether the uses of PMSs by high-performing companies are different than their uses by low-performing companies. To ensure that the data in hand is valid for the *t*-test analysis, the research design (independence of groups, random sampling, and scale of measurement) and statistical assumptions

(normality and homogeneity of variance) of the *t*-test were examined and were found satisfactory. Levene's test for homogeneity of variance was used to ensure that the two groups are from a population with equal variance. When Levene's test has a probability greater than 0.05, it is assumed that the population variances are relatively equal, and the *t*-test results of equality of variance estimates were interpreted. In case Levene's test revealed significant variances (indicated by the probability value that is less than 0.05), the *t*-value and the two-tail significance for the unequal variance estimates were interpreted.

The results of the *t*-test that are presented in Table 3 show that the mean responses of the PMSs usage by the companies with higher non-financial performance are greater than the mean responses of the PMSs usage by the companies with lower non-financial performance. The mean responses of the two groups are significantly different for planning systems at $t = 3.54$ ($p < 0.01$), control systems at $t = 6.44$ ($p < 0.001$), costing systems at $t = 5.87$ ($p < 0.01$), directing and motivating systems at $t = 3.62$ ($p < 0.01$), and decision making systems at $t = 7.72$ ($p < 0.01$). Based on these results, hypotheses 3a, 3b, 3c, 3d, and 3e are supported.

Likewise, the mean responses of PMSs usage by the companies with higher financial performance are greater

Table 3: Independent Samples T-Test Results: Performance Management Systems and Corporate Performance

	Independent Variables	Mean Score		Levene's Test for Equality of Variances		t-test for Equality of Means	
		Low Performers	High Performers	F-value	p-value	t-value	p-value
	Non-Financial Performance	(n = 66)	(n = 86)				
1	Planning Systems	4.60	5.26	6.09	0.015	3.539***	0.001
2	Control Systems	4.58	5.62	6.77	0.01	6.438***	0.000
3	Costing Systems	4.24	5.40	0.968	0.327	5.869***	0.000
4	Directing and Motivating Systems	4.47	5.28	0.028	0.867	3.618***	0.000
5	Decision Making	4.15	5.69	0.027	0.87	7.718***	0.000
	Financial Performance	(n = 76)	(n = 76)				
1	Planning Systems	4.42	5.54	0.867	0.353	6.335***	0.000
2	Control Systems	4.56	5.78	0.237	0.627	7.477***	0.000
3	Costing Systems	4.28	5.52	4.262	0.041	6.447***	0.000
4	Directing and Motivating Systems	4.44	5.41	6.517	0.012	4.485***	0.000
5	Decision Making	4.37	5.68	0.235	0.628	6.244***	0.000

***The mean difference is significant at the 0.01 level.

than the mean responses of PMSs usage by the companies with lower financial performance. The differences are significant at $t = 6.34$ ($p < 0.01$), $t = 7.48$ ($p < 0.01$), $t = 6.45$ ($p < 0.01$), $t = 4.49$ ($p < 0.01$), and $t = 6.24$ ($p < 0.01$), for planning systems, control systems, costing systems, directing and motivating systems, and decision making systems respectively. According to these results, hypotheses 4a, 4b, 4c, 4d, and 4e are supported.

4.3. The Moderation Role of Company Size and Industry on the Association Between PMS Use and Performance

To examine the moderating effect of the company size on the association between corporate performance and the use of PMSs, the responding companies were classified into three groups, small, medium, and large companies. Then, the independent t -test analysis was performed to compare the use of PMSs by the low and high-performing companies in each group separately. The results presented in Table 4 show that the use of planning systems by higher and lower non-financial performers is not significantly different for the small and medium groups. The difference between the mean responses of the planning systems usage by high-performing companies (4.54) and low-performing companies (4.42) in the small companies group is not significant ($t = 0.49$, $p > 0.05$). Similarly, no significant difference was detected between the mean responses of the planning systems usage

by higher performers (5.21) and lower performers (4.92) in the medium companies group ($t = 0.88$, $p > 0.05$). Only the large companies group showed a significant difference between the higher performers and lower performers in the use of planning systems. Further, the use of directing and motivating systems by high and low-performing companies is not significantly different in the small and large companies groups for the non-financial and financial performance. Other than that, there are significant differences between the higher and lower performers in the use of control systems, costing systems, and decision-making systems in the small, medium, and large companies groups for financial and non-financial performance. Hence, it can be concluded that hypotheses 5a and 5b are partially supported.

To examine whether the association between corporate performance and the use of PMSs is more profound in some industries than others, the responding companies were classified into three groups, trading, service, and manufacturing companies. Thereafter, the use of PMSs by high and low-performing companies was compared for each industry. The t -test results presented in Table 5 show that the differences between the higher and lower non-financial performing companies in the level of PMSs use were significant for service and manufacturing companies but not for trading companies. Therefore, hypothesis 6a is supported. However, with regard to financial performance, the use of all PMSs was significantly different between higher and lower-performing companies in trading, service,

Table 4: Independent Samples T-Test Results of the High Performers and Low Performers for Each Size Separately

	Independent Variables	t-test for Equality of Means								
		Small-Sized Companies			Medium-Sized Companies			Large-Sized Companies		
		Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value
	Non-Financial Performance	LP (n = 38)			LP (n = 26)			LP (n = 2)		
		HP (n = 28)			HP (n = 30)			HP (n = 28)		
1	Planning systems	4.42	0.492	0.624	4.92	0.881	0.382	3.83	2.7**	0.012
		4.54						5.21		
2	Control Systems	4.48	2.254**	0.028	4.76	3.731***	0.000	4.14	2.818***	0.009
		5.10						5.70		
3	Costing Systems	4.26	2.073**	0.042	4.22	3.574***	0.001	4.20	2.42**	0.022
		4.90						5.37		
4	Directing and Motivating Systems	4.59	0.654	0.515	4.37	3.438***	0.001	3.50	1.768	0.088
		4.80						5.62		
5	Decision Making	4.04	4.077***	0.000	4.37	4.734***	0.000	3.50	3.032***	0.005
		5.42						5.79		
	Financial Performance	LP (n = 42)			LP (n = 28)			LP (n = 6)		
			HP (n = 24)			HP (n = 28)			HP (n = 24)	
1	Planning systems	4.30	2.203**	0.031	4.39	5.059***	0.000	5.33	1.269	0.215
		4.76						5.76		
2	Control Systems	4.39	3.673***	0.000	4.71	4.575***	0.000	5.10	2.39**	0.024
		5.37						5.82		
3	Costing Systems	4.20	3.002***	0.004	4.30	3.262***	0.002	4.73	3.229***	0.003
		5.12						5.37		
4	Directing and Motivating Systems	4.46	1.842	0.07	4.45	3.209***	0.002	4.25	1.92	0.065
		5.06						5.63		
5	Decision Making	4.13	3.786***	0.000	4.63	3.048***	0.004	4.83	2.102**	0.045
		5.47						5.63		

***The mean difference is significant at the 0.01 level, ** at the 0.05 level; LP: Low Performers, HP: Higher Performers.

and manufacturing companies. Therefore, hypothesis 6b is not supported.

5. Discussion and Conclusion

This study attempts to find out how different-sized companies in different industries use a variety of PMSs. Unlike many studies that investigate a single PMS or MCS, this study evaluates the comprehensive use of PMSs and seeks to test whether various PMSs are associated with

financial and non-financial performance. The results indicate that companies use a balanced level of various PMSs. The results revealed that the level of each PMS use is associated with the level of other PMSs use. These results are consistent with previous studies that confirmed the importance of using PMSs comprehensively for companies to achieve the required outcomes, e.g. (Hall, 2011; Homburg et al., 2012; Micheli & Mura, 2017). Further, the results showed that the larger the company, the more it uses of PMSs. This is due to the resources needed for adopting and implementing a large

Table 5: Independent Samples T-Test Results of the High Performers and Low Performers for Each Industry

	Independent Variables	t-test for Equality of Means								
		Trading Companies			Service Companies			Manufacturing Companies		
		Mean	t-value	p-value	Mean	t-value	p-value	Mean	t-value	p-value
	Non-Financial Performance	LP (n = 16)			LP (n = 30)			LP (n = 20)		
		HP (n = 24)			HP (n = 46)			HP (n = 16)		
1	Planning systems	4.88	0.567	0.574	4.40	3.05***	0.003	4.68	2.544**	0.016
		5.07			5.22			5.69		
2	Control Systems	4.82	1.852	0.072	4.36	4.671***	0.000	4.71	3.87***	0.001
		5.38			5.64			5.95		
3	Costing Systems	4.20	0.467	0.474	4.25	3.257***	0.002	4.26	3.64***	0.001
		5.42			5.30			5.65		
4	Directing and Motivating Systems	4.44	1.91	0.064	4.33	2.709***	0.008	4.70	1.711	0.096
		5.21			5.23			5.53		
5	Decision Making	3.77	5.197***	0.000	4.20	4.826***	0.000	4.38	3.541***	0.001
		5.69			5.68			5.73		
	Financial Performance	LP (n = 20)			LP (n = 38)			LP (n = 18)		
		HP (n = 20)			HP (n = 38)			HP (n = 18)		
1	Planning systems	4.42	3.645***	0.001	4.32	4.458***	0.000	4.61	2.664**	0.012
		5.57			5.46			5.65		
2	Control Systems	4.59	4.62***	0.000	4.53	4.522***	0.000	4.62	4.537***	0.000
		5.73			5.74			5.90		
3	Costing Systems	4.10	6.649***	0.000	4.43	2.861***	0.005	4.16	4.105***	0.000
		5.76			5.35			5.60		
4	Directing and Motivating Systems	4.18	4.258***	0.000	4.51	2.207**	0.03	4.58	2.048**	0.048
		5.63			5.24			5.56		
5	Decision Making	3.92	5.872***	0.000	4.61	3.027***	0.003	4.39	3.02***	0.005
		5.93			5.59			5.57		

***The mean difference is significant at the 0.01 level, ** at the 0.05 level; LP: Low Performers, HP: Higher Performers.

number of MASs, MCSs, and PMSs, which are available to larger companies. A considerable body of contingency-based research confirmed that the size of the company is one of the MAS and MCS adoption and implementation determinants. See for instance (Al-Dhubaibi et al., 2015; Clarke, 1997; Haldma & Lääts, 2002; Joshi, 2001). Among the reasons that explain why larger companies use more PMSs are a large number of activities and the complicated nature of operations that need to be coordinated and controlled, huge resources that need to be planned and used efficiently, and the large

number of employees that need to be directed, motivated, and controlled.

The main objective of this study is to test the proposed association between PMSs and companies' financial and non-financial performance. The findings confirmed the positive association between the extent of each PMS use (planning, controlling, costing, directing and motivating, and decision-making system) and both financial and non-financial performance. This finding is in line with prior research that confirmed the positive effect of a single

MCS or PMS or group of PMSs on performance, such as (Baines & Langfield-Smith, 2003; Davis & Albright, 2004; Henri, 2006). Planning systems facilitate the management of operations, set priorities, improve the optimal use of resources, and ensure that employees work together with different departments towards achieving common goals. Further, strategic planning defines a common vision about results and assesses management to adjust the direction of the organization in response to a changing environment. Meanwhile, control systems ensure that operations and activities are progressing as planned, measure the outcomes, detect deviations from plans, and take the necessary actions. They are also used to measure the efficiency of plans' implementation and the level of organizational objectives' achievement. In addition, control systems assist management in coping with uncertainty, detecting irregularities, identifying opportunities, and enabling coordination to handle complex situations. Moreover, directing and motivating systems increase cooperation among employees, enhance their acceptance to work in a team spirit, and improve their creativity which leads to a higher quality of their work, more productivity, and more efficiency in their performance. Motivation encourages personnel to achieve the organizational goals and work in harmonization with the company's vision which results in improved financial and non-financial performance. Finally, using the proper costing systems aids management to 1- determine the cost of products and services, 2- improve cost management, 3- assist management in making decisions related to products, pricing, and outsourcing, and 4- measure products, services, and customer profitability. Further, the use of advanced costing systems such as ABC enables management to identify and eliminate non-value-added activities and enhance operational excellence. It is obvious that when PMSs are used and coordinated properly and comprehensively, financial and non-financial performances are improved.

To conclude, these findings provide empirical evidence about the positive effect of utilizing a wide range of PMSs at a balanced level on corporate financial and non-financial performance. These findings imply that companies' management should invest in adopting and implementing several PMSs to improve the planning, controlling, directing, and decision-making process. Further, various PMSs should be implemented with better harmonization and alignment with organizational objectives to achieve the desired outcomes on corporate performance. The limitation associated with survey research that is related to the assessment of respondents applies to this study. Another limitation is that PMSs might be different between industries that were not considered by this study. Future research may investigate the fit between each type of PMS and the nature of operations and activities of the

company. Future research may also investigate why some companies tend to invest less in PMSs or are not successful in implementing them.

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