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An Empirical Study of BI-based Corporate Performance Management in North America and East Asia

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ABSTRACT

Managing corporate performance is an important yet challenging process. Recently, many enterprises have adopted business intelligence (BI) tools to facilitate more effective corporate performance management. Based on a survey with 290 organizations across North America and East Asia, this paper presents empirical evidence on the key benefits of and barriers to BI-based corporate performance management (CPM). The study reveals that the implementation of BI-based CPM faces multi-dimensional challenges. Organizations in East Asia perceived higher CPM benefits as well as higher CPM barriers than their counterparts in North America. Cultural, economic and environmental differences between the two regions explain these issues. The research findings offer important insights for multinational organizations that are planning or are in the process of implementing or reviewing their BI-based CPM, as well as for consulting companies that are assisting with CPM implementation in different countries.

Keywords

Corporate performance management, Business intelligence, Multinational organization, Intercultural, North America, East Asia, Survey.

INTRODUCTION

Managing corporate performance is a crucial yet challenging process due to its complexity and broad scope and to the turbulence characteristic of the current business environment (Bose, 2006). The process involves monitoring the strategic activities of a corporation whose performance is then “measured from the analysis of data generated from a wide range of interrelated business activities performed at different levels within the enterprise” (Bose, 2006). In view of these challenges, large corporations have recently been vigorously deploying business intelligence (BI) tools for measuring and managing corporate performance. Enterprise-scale business intelligence “summarizes massive amounts of disparate corporate data into succinct information that can help management make informed decisions, measure and improve organizational performance” (Shao, 2011). In other words, a BI system can provide managers with the ability to “integrate enterprise-wide data into metrics that link specific objectives to business performance” (Shao, 2011). Hence it allows management to better set and monitor enterprise-performance metrics and to know what is happening in the organization and why it is happening (IBM, 2011).

Today, the terms “Corporate Performance Management (CPM),”¹ “Business Performance Management,” “Enterprise Performance Management” and “Integrated Performance Management” have become catch phrases for enterprise-scale BI endeavours that measure and enhance enterprise performance (Bose, 2006; IBM, 2011; Oracle, 2011; SAS 2011). The market

¹ In this paper, the terms Corporate Performance Management, Business Performance Management, Enterprise Performance Management and Integrated Performance Management are used interchangeably.

for BI is estimated at approximately \$8.8 billion (Robinson, 2009) and is expected to grow by 6.3% (compound average growth rate) through 2013. Gartner's recent worldwide surveys have indicated that Business Intelligence consistently receives a great deal of attention from Chief Information Officers (Gartner 2007; 2008; 2009). The technologies that underlie CPM efforts such as data warehouses, data marts, online analytical processing tools (OLAP), data mining and so on have also seen increased popularity. In addition, a variety of methodologies such as the balanced scorecard (Kaplan & Norton, 1996) and value-based management (Ittner & Larcker, 2001) have been deployed as components of CPM. Accordingly, the overall investment in BI-based CPM is significant. Yet the benefits to be derived from and the barriers related to implementation of these tools and techniques have not been the subject of much empirical research.

In the management-accounting literature, extensive research has been conducted on performance measurement in general and on the balanced scorecard in particular, but little empirical evidence exists on contemporary BI-based CPM as it has been adopted by enterprises. Neely (2005) and Ittner *et al.* (2003) have pointed out that a more integrative approach to the examination of performance management in organizations would be helpful for gaining a better understanding of the dynamics of this process. This study therefore extends the current empirical literature on performance management by expanding the scope of investigation to encompass corporate-scale performance management. The objective of this research project was to explore the key benefits and barriers related to BI-based CPM practice, and the cultural differences related to CPM perception. The next section of this paper reviews the CPM literature before elaborating on the research methodology. The paper then presents the results and a discussion of the findings. Then follows the conclusion and suggestions for further research.

LITERATURE REVIEW

Corporate performance management (CPM) has been defined as "...an umbrella term that describes the methodologies, metrics, processes and systems used to monitor and manage the business performance of an enterprise" (Geishecker & Rayner, 2001). Frolick and Ariyachandra (2006) define it as "a series of business processes and applications designed to optimize both the development and the execution of business strategy." Daum (2002) defines CPM as follows:

"...a new breed of applications that totally integrate the management planning and control process. They allow organizations to link strategies to operational plans and budgets, support continuous monitoring and plan adjustments, and ensure that everybody involved in the decision-making process [has] the most up-to-date information and analyses at their fingertips."

Taken together, these definitions suggest that CPM is an integrative managerial process of planning, monitoring and adaptation. Hess (2006) argues that CPM in fact integrates strategy, process management and continuous monitoring through the use of performance measures. Therefore a well-functioning CPM program develops clear strategic plans, closely manages key processes and ensures the rapid delivery of relevant information to decision-makers, thereby enabling them to monitor progress and adjust activities as organizational events unfold.

Recently, CPM has been widely enabled by enterprise-wide BI applications and data-warehousing technologies. In the information systems literature, Arnott and Pervan (2008) refer to CPM as enterprise-level BI; Baars and Kemper (2008) go one step further in suggesting that BI is in fact an integrated management-support tool for planning, monitoring and controlling organizational activities. Similarly, Clark *et al.* (2007) refer to tools that extend beyond BI called "Integrated Management Support Systems." The point is that enterprise-wide BI facilitates vertical information dissemination critical to the enablement of management control (Simons, 1995); it furthermore distributes information horizontally to support coordinated decision-making (Hedgebeth, 2007; Jourdan *et al.*, 2008). The implication is that the proper use of information tools can greatly facilitate communication throughout the organization thus enabling the level of integration intended by CPM methodologies. Although BI was initially considered to be "...a set of concepts and methods to improve business decision-making by using fact-based support systems" (Luhn, 1958), contemporary BI initiatives are about integrative management processes as well as technology (Baars & Kemper, 2008).

This notion of BI-enabled CPM has largely fallen between the cracks in empirical research. The publication of academic papers addressing the general topic of performance management increased significantly between 1980 and 2005, but most of these papers focused on performance *measurement* as opposed to performance *management* (Neely, 2005). For example, a number of empirical papers have emerged on such topics as balanced scorecards and other organizational performance measurement techniques (Buhovac & Slapnicar, 2007; Davis & Wright, 2004; Haapasalo *et al.*, 2003; Ittner & Larcker, 2003; Ittner *et al.*, 2003; Malina & Selto, 2001; Malmi, 2001; Neely *et al.*, 2000). Similarly, while papers in the field of BI have examined the impact of BI in organizations (Arnott & Pervan, 2008; Jourdan *et al.*, 2008), few papers have addressed the notion of BI-based CPM and the attendant benefits to be derived from this approach.

An extensive review of the literature reveals that the key benefits of CPM are presumed to be successful execution of a company's strategy (Ittner & Larcker, 2003; Kaplan & Norton, 1996, 2000; Otley, 1999); effective execution of business processes that deliver strategic results (Bucher & Gerike, 2009; Ittner *et al.*, 2003; Kaplan & Norton, 2000; Malina & Selto, 2001; Vakkuri & Maklin, 2006; DeGeuser *et al.*, 2009); and better-informed decision-making through multidimensional fact-based analysis (Arnott & Pervan, 2008; Bose, 2006). In other words, the use of CPM methods that emphasize the strategy-operations link encourages the organization to focus attention on key operational routines. Furthermore, the use of performance measures to continually track operational results enables the articulation of linkages between operational activities and strategic intent, leading to more effective and efficient process execution. Accordingly, the following propositions were made:

- 1) BI-based CPM drives successful execution of the company's strategy and business plans.
- 2) BI-based CPM enables the organization to conduct processes more effectively and efficiently.
- 3) BI-based CPM enhances insight on key issues to drive fact-based decision-making.

Cavaluzzo and Ittner (2004) defined a variety of technical and organizational challenges that can impede the implementation of CPM. Technical challenges include a lack of data and IT skills. Organizational challenges include a lack of management commitment to the program and difficulties associated with the definition of performance measures. Similarly, Bourne (2001) and Turner *et al.* (2005) characterized the barriers to CPM implementation as being the time and effort required, the difficulty in ensuring that appropriate measures are available, and employee resistance. Speckbacker *et al.* (2003) found that key difficulties included time constraints and the complexity of the process. Beer (2009) suggested that organizational challenges such as lack of leadership commitment and poor communication can interfere with the development of high performance organizations. In this research, we propose that barriers to the implementation of BI-based CPM can be divided into three broad categories, namely the lack of management engagement, technical barriers and contextual factors in the organization.

A review of the literature revealed a limited number of empirical studies on the intercultural differences of managers' perception about BI-based CPM benefits and implementation barriers. However, there are observed differences both in terms of IT implementation (Leidner & Kayworth, 2006; Martinsons, 2004) and manager information seeking and decision making style (Davies *et al.*, 1995; Park & Luo, 2001). First, the cultural-IT misfit is often criticized as one of the reasons for IT implementation failure, especially when the software is developed by programmers from a different culture (Leidner & Kayworth, 2006; Martinsons, 2004). It explains why systems originated in western countries, such as ERP systems, experience resistance and high failure rates when they were deployed in Asian countries. Second, the Asian managers tend to rely on 'Guanxi' (i.e. connections as substitutes for formal institutional support (Xin & Pearce, 1996)) for information seeking (Davies *et al.*, 1995; Park & Luo, 2001; Xin & Pearce, 1996) and gut feeling for decision making (Martinsons, 2004). Given this focus on Guanxi, there is a potential for misfit of managerial styles to BI-based CPM, an enterprise-level performance management system that advocates scientific decision-making style and systematic internal data collection and analysis. In this research, we also compare the differences between Asian and Western managers' perception about CPM benefits and implementation barriers.

RESEARCH METHOD

The study used an online survey instrument for data collection. The research was conducted in collaboration with two industry partners, PricewaterhouseCoopers (PWC) and the Canadian Advanced Technology Association (CATA). The design and administration of this survey was based on electronic-survey quality criteria as defined in Andrews *et al.* (2003). Survey questions were developed based on an extensive literature review and on the experience of the industry partners. Seven-point Likert scales were used for questions where it was possible to rank-order the responses. The questions were then reviewed by the research team and imported into an online tool. Respondents were recruited through e-mail invitations distributed to thousands of potential participants culled from PWC's and CATA's membership databases as well as from a publicly purchased mailing list of small and medium-sized companies. Four email reminders were sent during the time period resulting in 290 complete responses from Canada, the United States, China, Japan and South Korea.

According to the literature, the key benefits derived from CPM include better execution of strategy, improved process effectiveness and enhanced fact-based decision-making. Respondents were therefore asked to assess these benefits. Similarly, a list of common barriers was developed and surveyed on seven-point Likert scale ranging from 1 being "extremely disagree" to 7 being "extremely agree."

RESULTS AND DISCUSSIONS

The distribution of organizations by size and by total revenue in the sample is provided in Tables 1 and 2 respectively. The respondents included board members, executives, managers and other professionals.

Number of Employees	North America (%)	East Asia (%)	Total number of companies (%)
1 to 99	85 (41.5)	10 (11.8)	95 (32.8)
100 to 999	67 (32.7)	13 (15.3)	80 (27.6)
1,000 to 4,999	34 (16.6)	25 (29.4)	59 (20.3)
5,000 to 9,999	6 (2.9)	11 (12.9)	17 (5.9)
10,000 +	13 (6.3)	26 (30.6)	39 (13.4)
Total	205 (100)	85 (100)	N=290 (100)

Table 1. Distribution of responding organizations by number of employees

Total revenue (USD)	North America (%)	East Asia (%)	Total number of companies (%)
Less than \$10 million	56 (27.3)	7 (8.2)	21 (8.8)
\$10 million to \$50 million	47 (22.9)	6 (7.1)	45 (18.8)
\$50 million to \$100 million	23 (11.2)	2 (2.4)	64 (26.7)
\$100 million to \$1 billion	48 (23.4)	12 (14.1)	51 (21.3)
\$1 billion to \$5 billion	11 (5.4)	24 (28.2)	19 (7.9)
\$5 billion to \$10 billion	2 (1.0)	11 (12.9)	19 (7.9)
Greater than \$10 billion	9 (4.4)	22 (25.9)	19 (7.9)
Don't know / Prefer not to disclose	9 (4.4)	1 (1.2)	40 (16.7)
Total	205	85	N=290

Table 2. Distribution of responding organizations by total revenues

Overall, 71% of the responding companies were North American (Canada and USA) and about one third of the total sample was from the East Asia region (China, Japan and South Korea). In terms of company size, 41.5% of North America respondents were small and medium enterprises (fewer than 100 employees), about 33% ranged between 100 and 1,000 employees and less than 10 percent had more than 5,000 employees. On the other hand, the majority of East Asian respondents (72.9%) were large firms with more than 1,000 employees. Hence, the East Asian respondents to this survey were overweight in larger organizations relative to the North American respondents. It is possible that smaller companies in East Asia do not have the resources to invest in resource-intensive BI-based CPM applications (Chenhall & Langfield-Smith, 1998) and therefore could not respond to the survey. It has also been suggested that BI-based CPM tools are more important for larger companies given the complexity of their internal operating environments (Hoque & James, 2000). Therefore, the distribution of respondents shown in above table might reflect the fact that large enterprises in East Asia are more motivated and have the resources to invest in large-scale BI applications for measuring and managing organizational performance. On the contrary, it appears that many small and medium-sized enterprises in North America have embraced and adopted BI tools in managing their business performance.

Perceived Benefits of BI-based CPM

The objective of this study was to examine the key benefits of and barriers to BI-based CPM endeavours. The approach used was to survey 290 organizations ranging in size from SMEs to large firms in North America (NA) and East Asia (EA). Based on the literature, three key benefits are identified, namely (1) successful execution of the company's strategy, (2) enablement of fact-based decision-making, and (3) efficient execution of processes. Table 3 provides the descriptive statistics of the three key benefits.

Key Benefits	Region	N	Mean	Std. Dev
Successful execution of the company's strategy	EA	85	4.86	1.06
	NA	205	4.83	1.45
Enablement of fact-based decision-making	EA	85	4.75	1.06
	NA	205	4.69	1.43
Efficient execution of processes	EA	85	5.19	0.91
	NA	205	4.39	1.51

Table 3. Perceived benefits of BI-based CPM grouped by region

Table 3 shows that, on average, companies agree with the benefits of CPM implementation. However, the mean scores of North American companies are relatively lower than those of East Asian companies for all three benefits. Table 4 also provides the ANOVA results related to the three key benefits of BI-based CPM in the respective regions. As depicted in Table 4, the significance value of the F test in the ANOVA table of North American firms is 0.009. Thus, the proposition that average assessment scores are equal across the three key benefit areas is rejected using $\alpha = 0.05$. In other words, there is a significant difference among the population means. Along these lines, the significance value of the F test in the ANOVA table of East Asian organizations is 0.016. Therefore the speculation that average scores are equal across the three areas is also rejected with $\alpha = 0.05$ implying that significant differences exist between the perceived benefits of CPM systems across North American and East Asian companies.

	Sum of Squares	df	Mean Square	F	Sig.
<i>North American Organizations</i>					
Between Groups	20.589	2	10.294	4.788	.009
Within Groups	1315.824	612	2.150		
Total	1336.413	614			
<i>East Asian Organizations</i>					
Between Groups	8.761	2	4.380	4.195	.016
Within Groups	263.106	252	1.044		
Total	271.867	254			

Table 4. ANOVA of benefits grouped by region

Table 5 provides the results of t-tests that compare the mean differences of perceived benefits experienced by companies in two regions. The results indicate that the benefits related to the successful execution of the company's strategy and the enablement of fact-based decision-making are significantly different between two regions. This implies that East Asian companies perceive CPM as being more useful than their Western counterparts. This might be because CPM is perceived by East Asian managers as providing a good complement to their current natural intuitive approaches and Guanxi-based management style (see explanation below).

Despite the fact that much of the literature suggests that one of the key benefits of the use of CPM systems is effective execution of strategy (Frolick & Ariyachandra, 2008; Chenhall, 2005; Ittner & Larcker, 2003; Kaplan & Norton, 1996; Otley, 1999), the data indicates that for East Asian companies, the efficient execution of *processes* was the most important benefit. For North American companies, strategic execution was the highest ranked benefit with efficient execution of processes the lowest. The findings imply that, while the use of BI applications is perceived to be an effective means of stimulating better organizational performance, the benefits to be derived likely depends on organizational context. North American companies, operating in relatively more stable environments than that of the East Asian companies, might well focus on strategic execution. Companies in the emerging markets of East Asia on the other hand, might not be able to clearly define strategies thus the key benefits to be derived tend to be related to business process efficiencies. This theme of organizational context is one that has been addressed in the management control literature (Chenhall, 2003). The findings of this study suggest that additional exploration of the impact of contextual factors on benefits derived from CPM systems across different geographical regions would be a fruitful area of study.

Benefits		Levene's Test for Equality of Variances		t-test for Equality of Means			
			Sig.	t	df	Sig. (2-tailed)	Mean Difference
Enablement of fact-based decision-making	Equal variances assumed	10.72	.001	0.38	288.00	0.71	0.07
	Equal variances not assumed			0.43	208.19	0.67	0.07
Successful execution of the company's strategy	Equal variances assumed	8.01	.005	0.17	288.00	0.87	0.03
	Equal variances not assumed			0.19	211.22	0.85	0.03
Efficient execution of processes	Equal variances assumed	28.85	.000	4.54	288.00	0.00	0.80
	Equal variances not assumed			5.50	248.76	0.00	0.80

Table 5. Comparison of the perceived benefits grouped by regions

Perceived Barriers to CPM Implementation

Table 6 presents a list of 13 known factors that were identified based on the literature and on the experience of the industry partners participating in the study. Factors 1(a) to 1(e) are related to management processes – creating linkages between strategy and operational activities, providing management support and building consensus about the CPM implementation. Factors 2(a) to 2(e) capture technical aspects of the CPM practices themselves. Factors 3(a) to 3(e) appear to be contextual – that is, related to features of the organization. The factors were evaluated using a seven-point Likert scale with 7 being “strongly agree” and 1 being “strongly disagree.” Based on the responses of survey participants, a confirmatory factor analysis was performed to analyze the collected data. It appears that the average variance extracted (AVE) for each aspect of the factors exceeds the required threshold of 0.5 hence establishing the validity for the factor dimensions (Fornell & Larcker, 1981). Table 6 presents the analysis of each of the barriers.

Barriers	Mean (NA)	Mean (EA)	Med (NA)	Med (EA)	SD (NA)	SD (EA)	AVE (NA)	AVE (EA)
1a) Ineffective linkages between strategy, plans and budgets	5.26	5.71	6	6	1.85	1.25	0.70	0.80
1b) Lack of integration and/or consistency among tools	4.91	5.46	6	6	1.93	1.63		
1c) Lack of consensus and buy in	5.01	5.59	6	6	1.91	1.54		
1d) Lack of senior management support	4.37	5.46	5	6	2.21	1.55		
1e) Too difficult to obtain the data we need	4.81	5.79	5	6	1.98	1.44		
2a) Complexity, too difficult to understand	4.47	5.80	5	6	2.02	1.43	0.68	0.84
2b) Too much information resulting in analysis paralysis	4.27	5.69	4	6	2.07	1.46		
2c) Too much work or effort	4.88	5.86	6	6	1.92	1.44		
2d) Cost	5.16	6.02	6	6	1.92	1.12		

2e) Takes too long to implement	4.86	6.04	5	6	2.02	1.30		
3a) Company silos – can't agree on what to do or how to do it	4.49	5.60	5	6	2.19	1.49	0.55	0.74
3b) Cultural resistance, fear of change	5.18	5.38	6	6	1.93	1.56		
3c) Unionized environment	1.97	4.48	1	5	1.78	1.91		
<i>Note: NA=North America; EA=East Asia; Med = Median; SD = Standard Deviation; AVE = Average Variance Extracted</i>								

Table 6. Analysis of Barriers

		Levene's Test for Equality of Variances		T-test for Equality of Means			
Barriers			Sig.	t	df	Sig. (2-tailed)	Mean Difference
1a	Equal variances assumed	17.55	0.00	2.04	288	0.04	0.45
1a	Equal variances not assumed			2.38	226.93	0.02	0.45
1b	Equal variances assumed	4.4	0.04	2.29	288	0.02	0.55
1b	Equal variances not assumed			2.45	182.88	0.02	0.55
1c	Equal variances assumed	5.06	0.03	2.47	288	0.01	0.58
1c	Equal variances not assumed			2.70	192.82	0.01	0.58
1d	Equal variances assumed	29.91	0.00	4.14	288	0.00	1.09
1d	Equal variances not assumed			4.76	219.6	0.00	1.09
1e	Equal variances assumed	20.39	0.00	4.09	288	0.00	0.97
1e	Equal variances not assumed			4.64	213.08	0.00	0.97
2a	Equal variances assumed	30.03	0.00	5.52	288	0.00	1.33
2a	Equal variances not assumed			6.33	218.06	0.00	1.33
2b	Equal variances assumed	28.57	0.00	5.76	288	0.00	1.43
2b	Equal variances not assumed			6.63	219.72	0.00	1.43
2c	Equal variances assumed	19.32	0.00	4.22	288	0.00	0.98
2c	Equal variances not assumed			4.74	206.71	0.00	0.98
2d	Equal variances assumed	31.32	0.00	3.89	288	0.00	0.87
2d	Equal variances not assumed			4.79	256.2	0.00	0.87
2e	Equal variances assumed	30.97	0.00	4.93	288	0.00	1.17
2e	Equal variances not assumed			5.86	237.67	0.00	1.17
3a	Equal variances assumed	38	0.00	4.27	288	0.00	1.11
3a	Equal variances not assumed			4.98	226.58	0.00	1.11
3b	Equal variances assumed	8	0.01	0.83	288	0.41	0.20
3b	Equal variances not assumed			0.90	192.12	0.37	0.20
3c	Equal variances assumed	3.58	0.06	10.66	288	0.00	2.51
3c	Equal variances not assumed			10.33	146.88	0.00	2.51

Table 7. T-tests of mean differences in perceived barriers

Table 6 shows that the level of perceived barriers in East Asia is higher than those in North America. Moreover, T-tests of equality of means were performed (shown in Table 7) and the results show that all items are significantly different between the two regions. The cultural, economic and environmental differences between these two regions can explain some of the differences in perceived barriers and benefits depicted in the tables above. In the following explanation, the pertinent items in Table 6 are indicated in the bracket when relevant.

First, different management styles might contribute to the difference in perceived benefits and barriers related to management process: managers in East Asia rely more on so-called “gut-feel” decision-making, while managers in North America rely more on data analysis for decision-making (Martinsons, 2004). The differences in management style are caused by both

historical and environmental factors. Historically, managers in East Asia typically do not have formal education in management, and lack knowledge on strategic management and management science. The concept of management planning, linking strategy to operational activities (1a in Table 6), data-based management and quantitative analysis (1d) are vague to many Asian companies and managers (Martinsons, 2004). This is especially true for SME managers who do not have such education and for senior managers whose knowledge may be outdated due to age and historical reasons. Consequently, Asian managers tend to rely on “Guanxi” (i.e. connections as substitutes for formal institutional support (Xin & Pearce, 1996)) for information collection rather than on structured databases (Davies *et al.*, 1995; Park & Luo, 2001), and on intuition for information processing and decision-making. Given the fact that the modern management concepts embedded in CPM are not generally well understood by Asian top managers, it follows that they usually have no clear vision on how to implement it and thus are unlikely to show their support (1c and 1d in Table 5). In addition, the East Asian market (especially China and South Korea) is growing and quickly changing. According to entrepreneurship researchers (Eisenhardt & Martin, 2000; Santos & Eisenhardt, 2009), management with few rules and with so-called “gut-feel” decision-making is considered better due to the rapidly changing business conditions that are characteristic of emerging markets, in contrast to more mature markets in North America. Situational knowledge is considered better for those managers – and “Guanxi” is an excellent source of this situational knowledge.

Furthermore, lack of history in IT and database usage also causes the difference in perceived technical barriers. Unlike those North American companies that started using information systems in the 1970s and thus have rich databases and IT knowledge and experience, East Asian companies do not have such a reservoir of data, knowledge and experience on which to draw. Reimers *et al.* (2004) argue that, whereas Western companies experienced the database era, the PC era and the network era in their history of IT usage, which began in the 1960s, Chinese companies only started to use IT after the advent of the network era. More specifically, the lack of advanced computer knowledge, the lack of prior systems/databases on which to build, inadequate experience in working with massive amounts of information and a shortage of experienced IT personnel, cause many difficulties in the implementation of modern information systems. For example, the implementation of large-scale, enterprise-level systems such as ERP has a high failure rate in China (Li *et al.*, 2003). So it is very likely that an enterprise-scale BI system for CPM is beyond the experience base of many managers in East Asian companies and is perceived as being too complicated, costly and time-consuming to implement.

CONCLUSION AND SUGGESTION FOR FUTURE RESEARCH

This paper presents empirical evidence related to the key benefits and barriers of BI-based CPM in North America and East Asia. One of the theoretical contributions of this study is to systematically investigate the managers’ perception of CPM benefits and implementation barriers. Integrated from diverse set of literature, three types of BI-based CPM benefits (strategy execution, processes efficiency, and fact-based decision-making), and seven key CPM implementation barriers were found and further supported by empirical evidence. This study also contributes to the cultural-IT fit literature by comparing intercultural differences related to CPM benefits and barriers. How culture affects IT implementation is studied in various contexts such as ERP (Martinsons, 2004; Li *et al.*, 2003), but not for BI-based CPM. This research found that organizations in East Asia perceived relatively higher CPM benefits but also higher CPM barriers than their counterparts in North America likely due to cultural and socio-economic differences.

The implication of these findings for managers is that they have a better and comprehensive understanding of BI-based CPM benefits and implementation barriers. One of the problems at the moment in fully understanding CPM is that the various components of CPM are often studied in isolation. For example, the notion of strategic execution is well entrenched in the performance-measurement literature; the notion of fact-based decision-making is reflected in the information systems literature and process efficiency is often discussed in the quality management literature. This compartmentalized approach to CPM is also frequently reflected in organizational structures: strategic execution is often discussed at strategic levels, decision support is often the domain of the IT department, and process efficiency is the domain of operations management. If organizations are to optimize the benefits of CPM, a more integrated approach to BI-based CPM implementation should be considered. The second implication for managers is that when they interpret the benefits and barriers of CPM, they should take into account individual cultural differences that may ultimately affect CPM implementation.

As for future research, researchers might be interested in the study of two key issues. First, what contextual factors influence the benefits to be derived from CPM systems? Second, how do management knowledge and understanding of CPM and the leadership practices associated with CPM influence both the benefits realized and the challenges to implementation?

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