The Role Of Agility In The Relationship Between Use Of Management Control Systems And Organizational Performance: Evidence From Korea And Japan

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ABSTRACT

This study investigates the role of agility in the relationship between use of management control systems (MCS) and organizational performance by proffering the association of agility, use of MCS, and organizational performance. Using survey data collected from 185 large Korean and Japanese manufacturing companies, we analyze proposing relationships with partial least squares (PLS) structural equation approach. The result shows that diagnostic use of MCS shows no significant relationship with agility, while interactive use of MCS is positively associated with agility. Agility positively affects organizational performance, which implies that characteristics of agility are necessary to overwhelm rivals under rapidly changing environment. This study is one of the first studies that empirically examine the role of agility as an organizational capability in the relationship between MCS and organizational performance with data collected from two different countries.

Keywords: Agility; Organizational Capability; MCS; PMS; Budget Systems

INTRODUCTION

Today's business environment is characterized by continuous changes. Under this changing environment, organizational competitiveness is necessarily to be dynamic. Organizations often experience unstable business operations or the failure of business, when the dynamism of external environment overwhelms that of organizational capabilities to deal with changes (Ashkenas, Ulrich, Jick & Kerr, 1995). Organizations have initiated fundamental reformation to improve organizational flexibility to deal with a dynamic environment. Structural changes, such as process reengineering, cross functional team, and employee participation and empowerment, appear in the part of organizational efforts to improve adaptability, yet those are not evaluated successfully. Therefore, new organizational paradigm indicating broad concept of organizational agility has been suggested, which explains organizational adaptation as continuous processes rather than temporary or periodical processes (Dyer & Shafer 1998).

Agility can be defined as the organizational ability to detect and take advantages of opportunities faster than rivals. It is highlighted as a key capability due to increased importance of sense and response to environmental changes. Recently, Mackinsey & Company implemented a survey and the result shows nine of 10 executives perceive organizational agility as an inseparable and important factor for business success. They expect that agility would contribute to various benefits including high level of earnings, customer satisfaction, market share, and rapid adaptation to market (Sull, 2009). In the management accounting area, researchers studying the relationship between use of MCS and organizational capabilities mainly rely on the capabilities of organizational learning and innovativeness, while little focus on agility as an organizational capability. This study aims to examine the role of agility in the relationship between use of MCS and organizational performance. More specifically, we investigate the relationship between use of MCS and agility firstly, and then we examine how agility affect organizational financial and non-financial performance. The style of MCS use is distinguished by diagnostic and interactive use and measured

by performance measurement systems (PMS) and budget systems (Henri, 2006; Widener, 2007). Each style of MCS use can affect organizational capabilities differently. Distinct features of diagnostic and interactive use of MCS in terms of control and information flow can affect organizational agility differently. Also, agility is expected to positively influence organizational financial and non-financial performance, as agility of organizational capability can be a source of competitive advantages.

Mostly, eastern Asian countries including Korea and Japan are characterized by strong collectivism culture, high level of power-distance between management and employee, and top-down decision making (Hofstede, 1981). However, recent studies suggest that Korean corporate culture and decision making process have changed to dynamic collectivistic culture, while those of Japanese corporations tend to stick with holistic and collectivistic culture (Jun, 2009). Also, Korea's obsession with quick results, so called 'hurry up culture,' leads to distinguished features of MCS and decision making process of Korean firms different from those of Japanese firms. Hence, Korea and Japan shows different way of business and management based on each cultural feature, which drives different firm performance. Taken as a whole, business characteristics of both countries can be different, which affect organizational capabilities and performance in a different way.

This study contributes to management accounting literature in that highlighting agility as an organizational capability. Agility can be a key factor for improving competitiveness under dynamic environment, and thus it is meaningful to focus on the role of agility in the linkage of use of MCS and organizational performance. Additionally, this study implies comparability of Japanese firms and Korean firms regarding the links of MCS, agility, and organizational performance through empirical analysis using data collected from manufacturing firms of both countries.

The remainder of this paper is organized as follows. First, we describe theoretical backgrounds and hypotheses development of this study. Second, we explain the research method including variable measures, sample selection and data collection. Third, we present our empirical results. Finally, we discuss the results of additional analysis followed by a summary and conclusion in the final section.

THEORETICAL BACKGROUNDS AND HYPOTHESES

Use of MCS and Agility

Recent literature in management area has shed light on organizational agility. Yet, a number of researchers studying agility have been preoccupied with agility manufacturing (AM) emphasizing process and technological aspect or with issues of extensive agile enterprises (Goldman, Nagel & Preiss, 1995; Ashkenas et al., 1995). In this study, we introduce agility as an organizational capability and associate it with concerns of management accounting area.

A number of studies have characterized agility in different ways. According to the view of AM studies, agility helps organizations survive and grow under continuously changing environment, as it responds to dynamic market rapidly and effectively (Gunasekaran, 1999). In the concept of agile enterprises, agility means major capability to adapt changes continuously rather than conform to changes. Agile enterprises regard adaptation to organizational environment not as temporary but as continuous process (Goldman et al., 1995). McCann, Selsky and Lee (2009) note that agility is ability to move quickly, flexibly, and determinedly for initiating, seizing and exploiting opportunities and avoiding negative influence of changes. Meanwhile, Sull (2009) suggests that agility is capacity for identifying and catching business opportunities continuously and more quickly than competitors. In sum, agility can be a crucial organizational capability and described by speed, flexibility, and adaptability.

Agility appears to be similar as 'dynamic capability' (Teece, Pisano & Shuen, 1997), 'market orientation' (Kohli & Jaworski, 1990), 'absorptive capacity' (Zahra & Geroge, 2002), and 'strategic flexibility' (Grewal & Tansuhaj, 2001); however, each has distinct features regarding applicable scope and compositional dimension. Dynamic capability is ability to integrate, build, and reconstruct organizational resources and capabilities to be adaptive to changing environmental conditions. Agility is one of sub-capability of dynamic capability. Market orientation helps organizations detect needs of current and potential customers and share them entire organization to deal with (Kohli & Jaworski 1990). This market orientation emphasizes information processing; yet, agility focuses on organizational immediate response rather than reliance on process. Absorptive capacity produces dynamic organizational capabilities

by acquiring, distributing, and transforming knowledge adaptive to each organization (Zahra & George, 2002), and thus it can be characterized as continuous process of knowledge management. On the other hand, agility is related to individual events in deals with change rather than continual process. Strategic flexibility, which is ability to take precautions against economic or political risk and response to it, is closely linked to strategy while agility handles broader issues including strategic and operating aspects (Overby, Bharadwaj, & Sambamurthy, 2006).

In this study, agility is considered as an organizational dynamic capability that is crucial to respond to rapidly changing environment. Also, it is defined as ability to detect, initiate, and take advantage of opportunity more quickly than competitors (Sull, 2009). Recently, business environment has been more competitive along with globalization and thus capabilities of sensitive response to change are necessary for firms to handle increasing customers' needs and limited resources. This indicates that organizations should focus on how to foster agility to sense and respond to uncertain environment.

The literature related to association between MCS and organizational capabilities has investigated the effects of MCS on organizational capabilities, such as innovativeness, organizational learning, market orientation, and entrepreneurship. Particularly, a number of authors have argued the influence of MCS on organizational learning and innovativeness (Widener, 2007; Henri, 2006; Bisbe & Otley, 2004; Bisbe & Malagueño, 2015). Many studies examining the linkages between use of MCS and organizational capabilities have produced mixed results. These mixed findings can be attributed to different style of MCS use which generates organizational capabilities differently (Henri, 2006). Therefore, it is necessary to define style of MCS use and its effect on organizational capabilities.

Diagnostic use of MCS performs negative role of forcing conformity to order and restricts exploring opportunity to achieve pre-established targets (Simons, 1995). Diagnostic use of MCS controls operation and strategy tightly and impedes organizational attention to change or transformation due to its mechanical approach in decision making (Van de Ven, 1986). Therefore, diagnostic use of MCS might hinder development of agility that is closely linked to acute sensing, adequate timing, and response to dynamic environments (Hofstede, 1978; Simons, 1995). Also, communication and dialogue, which are crucial to develop organizational capabilities, tend to be suppressed, as diagnostic use of MCS hinders free flow of information due to emphasize empowered authority and responsibility. Given that organizational capabilities mostly rely on cross functional process, free flow of information, and openness of communication channel, diagnostic use of MCS can negatively affect development of agility (Kobli & Jaworski, 1990).

To conclude, relevant conditions to encourage agility are hardly generated by mechanical and traditional use of MCS, that is diagnostic use of MCS (Sull, 2009; Chenhall & Morris, 1995). Based on precedent discussion, our expectation can be stated formally as follows:

H1: Diagnostic use of MCS is negatively associated with agility.

Interactive use of MCS encourages development of idea and creativity, and thus represents positive power opposed to diagnostic use of MCS. This type of MCS use leads to set pivotal agenda for top management, to encourage focused management attention periodically, and for organizational members of different levels to discuss, interpret, and challenge existing data (Henri, 2006). Therefore, interactive use of MCS generates curiosity and challenge, broadens exploring opportunity processes, encourages emergence of new strategic initiatives, and helps organizational members take attention to strategic uncertainty and organizational objectives by providing signals reflecting preference of top management (Simons, 1995).

A survey conducted by The Economist in 2009 suggests that 349 global leading firms rank the biggest impediments to developing agility in the order of delayed decision making, conflicts of goals and priorities among organizational functions, a lack of information sharing, culture of risk avoidance, and slow innovation. Interactive use of MCS, characterized by communication, cooperation, open communication channel, and free flow of information across whole organization, can attenuate those impediments to strengthening agility.

In sum, interactive use of MCS improves agility by specifying clearly objectives assigned to each organizational member, helps them take responsibilities of those goals, and motivates to initiate the important opportunities (Chenhall and Morris, 1995; Van de Ven, 1986; Sull, 2009). The following hypothesis is set based on the discussion above.

H2: Interactive use of MCS is positively associated with agility.

Agility and Organizational Performance

Organizational capabilities are strategic reform to newly deploy resources for new value creating strategy and core drivers of organizational transformation. In the view of Resource Based View (RBV), organizational specific resources and capabilities create sustainable competitive advantage, and thus lead superior organizational performance compared to competitors. Agility is valuable, hard to be duplicated, and not permanently sustainable capability in that it is related to detect and take advantage of opportunities in dynamic environment. Therefore, agility can contribute to improve organizational performance as a core organizational capability related to competitive strategy and performance (Goldman et al., 1995).

Prior studies examining the relationship of agility and performance tend to investigate empirically the linkage between agile manufacturing and value-chain performance or business performance (Chenhall & Morris, 1995; Van de Ven, 1986; Sull, 2009). Swafford, Ghosh and Murthy (2006) analyze the influence of agility on value-chain and overall competitive performance and suggest that agility is positively associated with performance. Narasimhan and Das (1999) point out organizations with higher level of agility tend to improve customer-oriented performance regarding on-time delivery, market release, and thus the more agile organizations achieve higher performance than the less agile organizations. Also, Sánchez and Perez (2005) note that profitability and market share tend to be increased as supply chain flexibility, a component of agility, controls environmental uncertainty and improves responsiveness to environmental changes.

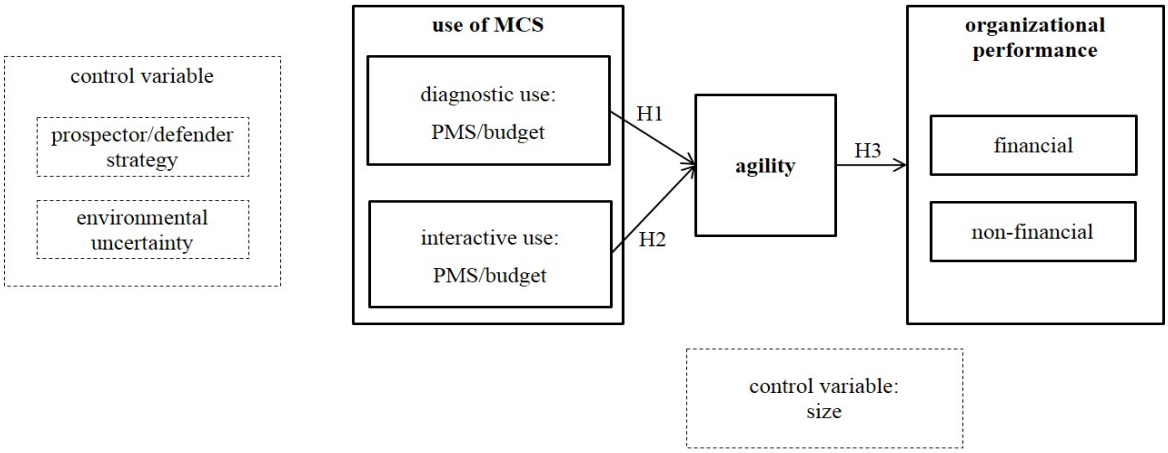
The literature review of agile enterprises tends to be associated with the higher performance. For example, Katayama and Bennett (1999) classify organizations into those of focusing on agility and not focusing on agility and compare their operational performance. They empirically support that the more agile enterprises are more competitive than the less agile enterprises considering the factors of break-even point, fixed costs, and price elasticity. Also, McCann et al. (2009) indicate that agility is positively associated with competitiveness which is a component of organizational performance measured in the study. This result implies competitiveness is caused by agility described by effective understanding, responsiveness, and quick and decisive exploitation of opportunities. Ultimately, agility affects profitability through this competitiveness. Taken as a whole, we expect the positive association between agility and organizational performance based on preceding studies and logical inference.

H3: Agility is positively associated with organizational performance.

The theoretical framework is proposed in Figure 1. The purpose of this paper is to shed a light on the links of use of MCS, agility as an organizational capability, and organizational performance. Particularly, this study introduces agility as a type of organizational capabilities not covered in management accounting research yet.

We use business strategy and environmental uncertainty as control variables for use of MCS. The importance of design and use of MCS matching with organizational business strategies has increased under highly uncertain environment. According to the view of contingency theory, fit between business strategy and the use of MCS can affect achieving competitive advantages and improving performance. Following, Miles and Snow (1978), this study classifies business strategy into prospector and defender which are associated with use of MCS. Prior studies show that firms with prospector strategy is positively associated with interactive use of MCS, while defenders firms tend to be linked to diagnostic use of MCS. As such, we control the effect of defender strategy on the diagnostic use of MCS and prospector strategy on the interactive use of MCS respectively (Miles & Snow, 1978). On the other hand, the structure of MCS might be adaptive to the degree of environmental uncertainty as well as business strategy. Previous research empirically suggests that higher operational uncertainty is associated with diagnostic use of MCS while higher competitive uncertainty is linked to interactive use of MCS (Widener, 2007).

Figure 1. Theoretical Framework



RESEARCH METHOD

Sample Selection and Data Collection

Empirical data were collected through a survey targeted to senior managers of both Korean and Japanese manufacturing firms. The survey questionnaire was written in Korean firstly, and then it was translated into Japanese. We communicated face-to-face and through email frequently to minimize the possible perceptual difference against understanding instrument. The survey instruments used in this study, drawn from the prior literature, were pre-tested among four Korean and four Japanese academics and three consultants for clarity and face validity. Using database named KIS-Value from NICE, we restrict Korean samples to the top 400 manufacturing firms of annual sales in 2010. After getting accessible e-mail address and phone number from Managements DB from Association of Listed Companies, questionnaires were distributed by ordinary post and e-mail in end of February in 2012. Of the 400 distributed questionnaires, 95 were received, providing response rate of 23.75% which is similar to those of prior literature, and 1 is excluded from final samples due to missing data. Japanese target samples are restricted to 1,035 listed firms of first and second tier of Tokyo Stock Exchange. We received 99 replies, 8 of them were unusable for missing data, leaving final samples of 91. In sum, we used total 185 samples, 94 of Korean samples and 91 of Japanese samples.

Table 1 contains the demographic data of the respondents in the usable sample and firms' industry classification. The manufacturing industry classification reports that there are little differences between respondents' distribution of Korea and that of Japan specifically; however, more than half of our samples from each country are distributed in four major industry classifications of chemistry, electric/electronic, primary metal, and transportation in which 70.81% of total samples are distributed. Also, the majority of respondents are from accounting/finance and planning departments regardless of country. Other departments include marketing, sales, R&D, general affairs and so on. In terms of sales, untabulated in this paper, overall samples are mostly within the range of annual sales of 100 billion ~ 500 billion and 1 trillion~ 5 trillion won, which are common in both countries.[1] Although the sales distribution of samples does not appear to be skewed, the variance of the range distributed is quite huge from less than 100 billion to more than 10 trillion; thus, we use natural log of sales to control effects of sample firms' size difference.

[1]Japanese Yen are converted into Korean won at the exchange rate of 12.3504 won to Japanese Yen, based on announcement of Korea Exchange Bank on December 31, 2012.

Table 1. Descriptive statistics of respondents

Panel A: Industry		
Industry	**Korea**	**Japan**
Chemical	23(24.47%)	21(23.08%)
Electric/electronic	17(18.09%)	25(27.47%)
Primary metal	11(11.70%)	9(9.89%)
Transportation	8(8.51%)	17(18.68%)
Machinery	6(6.38%)	6(6.59%)
Non-metal	2(2.13%)	1(1.10%)
Apparel and Textile	4(4.26%)	2(2.20%)
Food	14(14.89%)	6(6.59%)
Pharmaceuticals	6(6.38%)	3(3.30%)
Others	3(3.19%)	1(1.10%)
Total	94(100%)	91(100%)
Panel B: Department		
Accounting/Finance	40(42.55%)	23(25.27%)
Operation	3(3.19%)	0(0.0%)
Marketing/sales	13(13.83%)	9(9.89%)
HR	3(3.19%)	1(1.10%)
General affairs	4(4.26%)	2(2.20%)
Planning	16(17.02%)	42(46.15%)
R&D	1(1.06%)	5(5.49%)
IT	3(3.19%)	0(0.0%)
Others	11(11.70%)	9(9.89%)
Total	94(100%)	91(100%)

Measurement of Constructs

Table 2 presents an abbreviated version of the questionnaire as well as the descriptive statistics of the instrument items. The questionnaire items are drawn from existing studies and asked to respondents to indicate on a seven-point Likert scale.

We use both budget system and PMS, which are major practical control systems, to measure use of MCS, as each system can work differently in our theoretical framework. Diagnostic PMS is operationalized as a style of PMS use emphasizing improvement of current activities by monitoring and evaluating outcomes compared to pre-established goals, while interactive use of PMS is defined as challenging underlying strategy, assumption, and activities using collected information. Interactive and diagnostic use of PMS use is measured using well-established instrument developed by Henri (2006) and Widener (2007) with slight modification reflecting our research setting. Also, use of budget systems are measured by adopted instrument based on the measures developed by Abernethy and Brownell (1999) and Bisbe and Otley (2004).

Agility means organizational capability of sensing environmental changes and dealing with those changes rapidly compared to competitors. We measured agility using questions and concepts of Sull (2009) composed by 10 items: (1) providing quick and accurate information, (2) more speedy identifying and exploiting business opportunities than competitors, (3) common perception of environmental conditions, (4) specifying goals and responsibility of achieving goals for each organizational member, (5) realizability of performance measures, (6) adequate compensation for management, (7) exploration and tension for developing new business, (8) proper avoidance from recessive business, (9) establishing enterprise resource deployment systems, and (10) management's ability to detect opportunities.

Organizational performance is measured with subjective evaluating items based on instrument and concepts of Abernethy and Brownell (1999), Hoque and James (2000), Ittner, Larcker and Randall (2003), Van der Stede et al. (2006), and Henri (2006). A few authors suggest that objective and subjective measures are not significantly different regarding validity and reliability of performance measurement (Dess & Robinson, 1984; Venkatraman & Ramanujam,

1987). Financial performance constitutes of 4 items of sales growth, operational income rate, net income, and ROI. Non-financial performance is measured with market sharing, customer satisfaction, and employee satisfaction.

As we suggest above, business strategy and environmental uncertainty is used as control variables for use of MCS. Firstly, business strategy is based on the definition of Miles and Snow (1978) which classifies strategy into defender and prospector. Defender strategy is characterized by maintaining market leadership and emphasizing restrictive and stable offer of product and service, while prospector strategy has a focus on frequent change and speedy response to new opportunity. This construct is measured using an adopted version of Andrews, Boyne, Law and Walker, (2008) instrument. Environmental uncertainty is operationalized as the extent to which can predict changes of environmental conditions and measured with adopted instrument of Govindarajan, (1984). Also, studies related to management control systems indicate that organizational size can affect organizational performance. Hence, this study controls the effect of organizational size to organizational performance. Organizational size is measured using the natural log of sales.

Descriptive statistics for the multi-item variables are shown in Table 2. In terms of business strategy, mean of prospector strategy is higher than that of defender strategy. Regarding the use of MCS, diagnostic PMS appear to be used more than diagnostic budget systems, while the interactive use of MCS shows opposed tendency. On the other hand, considering observed results of respective control systems, diagnostic use of PMS shows higher mean value than interactive use of PMS (5.05 of diagnostic use, 4.73 of interactive use), while budget systems are perceived to be used a little more interactively (4.97 of diagnostic use, 5.08 of interactive use). All of 10 items for measuring agility report the mean value of 4.04~ 4.95. Organizational performance shows little variation of mean value generally, while non-financial performance reports a little higher mean value than financial performance (4.27 of financial performance and 4.68 of non-financial performance).

Table 2. Descriptive statistics of survey items

Construct		Item	Mean	S.D.
DCa	PMS (DPMS)	①Track progress towards goals (PMS1)	5.10	1.419
		②Monitor results (PMS2)	5.06	1.445
		③Compare outcome to expectations (PMS3)	5.10	1.419
		④Review key measures (PMS4)	4.95	1.388
		Total	5.05	1.418
	Budget Systems (DBUD)	①Enable to review the goals being achieved (BUD1)	5.35	1.133
		②Provide Information mainly used when outcomes are not matching with plans	4.72	1.494
		③Staff specialists play a pivotal role in information process (BUD3)	4.83	1.314
		Total	4.97	1.314
ICa	PMS (IPMS)	⑤Enable discussion in meetings of superiors, subordinates and peers (PMS5)	4.82	1.440
		⑥Enable continual challenge and debate of underlying data, assumptions, and action	4.82	1.346
		⑦Provide a common view of the organization (PMS7)	4.80	1.413
		⑧Enable the organization to focus on critical success factors (PMS8)	4.74	1.433
		⑨Develop a common vocabulary in the organization (PMS9)	4.48	1.452
		Total	4.73	1.417
	Budget Systems (IBUD)	①Enable to discuss unit managers' decision making and action plan (BUD4)	4.96	1.144
		②Demands regular and frequent attention from managers at all levels (BUD5)	5.21	1.203
		③Enable top management and department/unit managers to interact in budgeting	5.08	1.231
		Total	5.08	1.193

(Table 2 continued on next page)

(Table 2 continued)

Construct		Item	Mean	S.D.
Agility		①Our systems provide us with detailed, reliable market data in real time (AGIL1)	4.21	1.450
		②We consistently spot and exploit changes in the market before our competitors do (AGIL2)	4.28	1.241
		③We have a shared understanding of the situation across units and levels (AGIL3)	4.83	1.179
		④Objectives are clear to all, and everyone is held accountable for delivery (AGIL4)	4.95	1.280
		⑤We are not overwhelmed by a large number of key performance indicators and objectives (AGIL5)	4.48	1.114
		⑥Our organization attracts, retains, and rewards entrepreneurial managers (AGIL6)	4.08	1.285
		⑦We maintain the same sense of urgency as a start-up venture even in good times (AGIL7)	4.94	1.309
		⑧Management admits mistakes and does not delay in exiting unsuccessful businesses (AGIL8)	4.23	1.199
		⑨Top executives systematically reallocate cash and top management talent across units (AGIL9)	4.04	1.259
		⑩Top executives have the courage to seize major opportunities when they arise (AGIL10)	4.76	1.301
		Total	**4.48**	**1.262**
OPa	Financial Performance (FP)	① Sales growth (FP1)	4.39	1.166
		② Operating income (FP2)	4.32	1.372
		③ Net profit (FP3)	4.20	1.417
		④ Return-on-investment(ROI) (FP4)	4.16	1.303
		Total	**4.27**	**1.315**
	Non-financial Performance (NFP)	① Market share (NFP1)	4.64	1.419
		② Customer satisfaction (NFP2)	4.88	1.107
		③ Employee satisfaction (NFP3)	4.51	1.104
		Total	**4.68**	**1.21**
BSa	Prospector (PS)	①We seek to be first to identify new modes of delivery (STR1)	4.13	1.416
		②Searching for new opportunities is a major part of our overall strategy (STR2)	4.98	1.220
		③We often change our focus to new areas of service provision (STR3)	3.39	1.426
		Total	**4.17**	**1.055**
	Defender (DS)	①The service emphasizes efficiency of provision (STR4)	5.08	1.122
		②We focus on our core activities (STR5)	5.15	1.142
		③We seek to maintain stable service priorities (STR6)	4.26	1.414
		Total	**4.50**	**1.290**
Environmental Uncertainty (EU)		① The development of production and information technology (EU1)	3.99	1.401
		② Market activities of competitors (EU2)	3.90	1.319
		③ Customer demands, tastes and preferences (EU3)	3.83	1.265
		④ Product features or design (EU4)	3.82	1.354
		⑤ Raw material price and quality (EU5)	4.55	1.406
		⑥ Suppliers' actions (EU6)	3.98	1.236
		⑦ Change in government regulations/policies (EU7)	4.06	1.352
		Total	**4.02**	**1.333**

Note: a. BS=business strategy; DC=diagnostic use of MCS; IC=interactive use of MCS; OP=organizational performance

Evaluation of Measurement Models

To test the research hypotheses, we employed a Partial least squares (PLS) method. PLS has been preferred due to several methodological advantages. Above all, PLS put less restriction in terms of sample size or residual distributions for sufficient statistical power, compared to covariance-based approach, such as LISREL and AMOS. Also, PLS is

able to assess both measurement and structural models at once. Therefore, management accounting research has recently used PLS to test theoretical frameworks (Chin, 1998; Sholihin & Pike, 2009; Hartmann & Maas, 2011; Van Rinsum & Verbeeten, 2012; Bisbe & Malagueño, 2015).

We first analyze separately the measurement model to guarantee the reliability and validity of construct measures before assessing the relationships between the constructs (Bisbe and Malagueño, 2015). Table 3 and Table 4 are summarized the results.

Table 3. Cross-loadings

	DPMS	DBUD	IPMS	IBUD	Agility	FP	NFP	PS	DS	EU	Size
STR1	0.9623	0.11	0.7954	0.4379	0.5058	0.2259	0.2127	0.5041	0.3326	0.0763	0.1715
STR2	0.9746	0.1179	0.7991	0.4414	0.4792	0.1947	0.1781	0.4937	0.3763	0.0235	0.2131
STR3	0.9666	0.1472	0.7926	0.4862	0.4949	0.2143	0.1682	0.4482	0.379	0.0424	0.2446
STR4	0.9528	0.1601	0.8254	0.4377	0.4978	0.1929	0.1627	0.4887	0.3607	0.0864	0.1805
STR5	0.1027	0.9124	0.0661	0.0586	0.222	0.0983	-0.0353	0.111	0.1775	0.0558	-0.086
PMS1	0.1403	0.7256	0.1591	0.1639	0.0441	0.0367	-0.0725	0.0098	0.16	0.07	-0.017
PMS2	0.8118	0.0724	0.9237	0.4516	0.5456	0.2271	0.2054	0.4877	0.3852	0.0243	0.1749
PMS3	0.7912	0.112	0.9306	0.4916	0.5434	0.2139	0.189	0.5011	0.4123	0.1171	0.2063
PMS4	0.7785	0.151	0.9404	0.4409	0.5576	0.23	0.187	0.533	0.4191	0.1151	0.1792
BUD2	0.75	0.1111	0.9343	0.4058	0.5464	0.2601	0.2455	0.5471	0.3736	0.0958	0.2167
BUD3	0.703	0.1023	0.8777	0.3669	0.4329	0.1663	0.1522	0.4542	0.3034	0.1011	0.2806
PMS5	0.4471	0.1431	0.4895	0.8713	0.4201	0.2522	0.2689	0.2998	0.4121	-0.0751	0.0945
PMS6	0.3759	0.1901	0.3128	0.8595	0.3418	0.1565	0.2086	0.175	0.2514	0.0475	0.1643
PMS7	0.3825	-0.0178	0.3904	0.8704	0.4327	0.1451	0.2413	0.2242	0.3589	0.0287	0.2419
PMS8	0.4294	0.1816	0.521	0.2653	0.6877	0.3704	0.249	0.4428	0.2265	0.0362	0.2395
PMS9	0.3751	0.2305	0.3961	0.2779	0.7632	0.4034	0.3562	0.5609	0.3631	-0.1412	0.1259
BUD4	0.3759	0.0607	0.425	0.3701	0.6824	0.2026	0.3046	0.4663	0.3495	0.0422	0.1905
BUD5	0.5127	0.1226	0.4905	0.4454	0.7337	0.312	0.3754	0.4987	0.4184	0.0598	0.1679
BUD6	0.3604	0.1816	0.4242	0.3349	0.7246	0.3197	0.4488	0.3861	0.2144	0.1208	0.1181
AGIL1	0.3917	0.1926	0.4209	0.3635	0.7434	0.303	0.3823	0.4945	0.4006	0.1236	0.1029
AGIL2	0.2163	0.1457	0.2892	0.227	0.7103	0.3732	0.352	0.4112	0.2151	0.1959	0.0299
AGIL3	0.3006	0.0855	0.3775	0.3606	0.7788	0.3842	0.4653	0.4603	0.243	0.062	0.0484
AGIL4	0.3831	-0.0071	0.4001	0.3875	0.726	0.2649	0.3601	0.4425	0.3274	0.021	0.1182
AGIL6	0.1239	0.1137	0.1471	0.1283	0.3772	0.7783	0.4628	0.268	0.1941	-0.0869	-0.0293
AGIL7	0.1374	0.0459	0.1592	0.1394	0.3513	0.9171	0.4727	0.2354	0.1089	-0.0951	0.0682
AGIL8	0.1554	0.0429	0.195	0.1996	0.3744	0.9207	0.5158	0.239	0.1243	-0.0711	0.04
AGIL9	0.3106	0.104	0.3191	0.2798	0.464	0.9056	0.4961	0.378	0.1989	0.0023	0.095
AGIL10	0.1408	-0.0713	0.1398	0.1067	0.3034	0.528	0.7756	0.2158	0.1787	-0.2243	-0.0041
FP1	0.1777	0.0019	0.1965	0.279	0.4523	0.513	0.9103	0.351	0.3204	-0.0814	0.0125
FP2	0.1584	-0.0831	0.1994	0.2864	0.497	0.411	0.8632	0.3697	0.2041	0.0871	0.0848
FP3	0.4555	0.0475	0.4856	0.2371	0.6048	0.3292	0.3748	0.8717	0.2802	0.107	0.1077
FP4	0.4341	0.0649	0.453	0.2936	0.5109	0.2508	0.3404	0.8219	0.448	0.0963	0.1852
NFP1	0.2453	0.1131	0.3268	0.0673	0.3262	0.1498	0.1134	0.6207	0.1425	0.2952	0.0873
NFP2	0.3176	0.1892	0.414	0.3133	0.4195	0.2236	0.2528	0.427	0.8514	0.0155	0.0881
NFP3	0.2978	0.1404	0.2525	0.3531	0.2596	0.0614	0.201	0.2013	0.7872	-0.0942	0.0261
EU2	0.0846	0.1108	0.0781	0.0313	0.1159	-0.0004	-0.0175	0.2348	0.0823	0.8461	0.0142
EU3	0.0747	-0.0311	0.0914	0.0393	0.0617	-0.0439	-0.084	0.1368	-0.03	0.7456	0.1202
EU4	0.0356	-0.0689	0.1095	-0.0676	0.0295	-0.1242	-0.0744	0.1195	-0.0865	0.7408	0.1203
EU5	0.0055	0.1163	0.0522	-0.0266	0.0258	-0.1027	-0.029	0.0315	-0.1278	0.6966	0.0306
EU6	-0.0346	0.0517	0.0387	-0.0757	-0.0191	-0.0125	-0.0379	0.1027	-0.1291	0.6889	0.0662
Size	0.2096	-0.0715	0.2263	0.189	0.1735	0.0517	0.0439	0.1667	0.0725	0.0753	1

Note: Discriminant validity requires that an indicator's loading (in bold) should be higher than all of its cross-loadings.

Table 4. Overall reliability test

		AVE	Composite Reliability	R2	Cronbach's Alpha	Communality
Diagnostic Use of MCS	PMS	0.9295	0.9814	0.2895	0.9747	0.9295
	Budget	0.6781	0.8059	0.0479	0.5511	0.6781
Interactive Use of MCS	PMS	0.8494	0.9657	0.3484	0.9556	0.8494
	Budget	0.7514	0.9007	0.1795	0.8370	0.7514
Agility		0.5305	0.9103	0.3883	0.8892	0.5305
Organizational Performance	Financial	0.7786	0.9333	0.2038	0.9037	0.7786
	Non-financial	0.7261	0.8879	0.2986	0.8144	0.7261
Business Strategy	Prospector	0.6069	0.8196		0.6754	0.6069
	Defender	0.6722	0.8037		0.5149	0.6722
Environmental Uncertainty		0.5560	0.8616		0.8108	0.5560
Size		1	1		1	1
Global of Fit		0.4335				

Table 5. Correlations and SQRT of AVE

	DPMS	DBUD	IPMS	IBUD	Agility	FP	NFP	PS	DS	EU	Size
1	0.9641										
2	0.1385	0.8235									
3	0.8330	0.1196	0.9216								
4	0.4674	0.1162	0.4696	0.8668							
5	0.5130	0.1847	0.5730	0.4645	0.7284						
6	0.2148	0.0894	0.2403	0.2183	0.4499	0.8824					
7	0.1875	-0.0583	0.2143	0.2801	0.5060	0.5535	0.8521				
8	0.5020	0.0869	0.5493	0.2765	0.6353	0.3248	0.3796	0.7790			
9	0.3753	0.2029	0.4134	0.4035	0.4210	0.1814	0.2786	0.3933	0.8199		
10	0.0595	0.0725	0.0982	-0.0071	0.0777	-0.0668	-0.0555	0.1834	-0.0425	0.7457	
11	0.2096	-0.0715	0.2263	0.189	0.1735	0.0517	0.0439	0.1667	0.0725	0.0753	1

Note: The diagonal of the matrix is the squared value of AVE.

Firstly, convergent validity of the variables is based on examining individual factors' reliability which is assessed by factor loadings. Generally, factor loading higher than 0.6 is considered as acceptable to assess the reliability of individual factors (Yoo & Alavi, 2001), while some researchers suggest factor loading above 0.5 is also adequate (Chin, 1998; Hulland, 1999). We eliminated a few items of which factor loadings are below 0.5.[2] As shown in Table 3, factor loadings of all items are above 0.6, indicating that each of constructs exhibits adequate convergent validity.

Secondly, internal consistency is assessed by average variance extracted (AVE) statistics above 0.5, composite reliability above 0.7, and Cronbach's alpha above 0.6 (Fornell & Larcker, 1981). As reported in Table 4, most observed variables show adequate internal consistency. Although Cronbach's alpha of diagnostic budget systems and defender strategy report below 0.6, it is above the commonly accepted cut-off value of 0.5~0.6 suggested by Nunnally, (1978).

Thirdly, discriminant validity can be assessed by factor loadings and AVE statistics (Gefen & Strauß, 2005). Table 3 shows that factor loadings of observable variables to theoretically related latent variable are higher than those of other latent variables, discriminant validity of constructs appears to be satisfied. Also, as shown in Table 5, square root AVEs reported in diagonal are all higher than correlations among the latent variables (Gefen & Strauß 2005).

Communality statistics are used to assess the fit of measurement model, and it should be at least 0.5. Table 4 reports communality statistics of the latent variables all greater than 0.5; thus, the measurement model has acceptable fit. Overall, the results from the PLS measurement model implicate that all of constructs reflect acceptable validity and reliability.

[2] We eliminated the first item of diagnostic use of budgets, the fifth item of agility, the first and seventh item of environmental uncertainty, and the last item of defender strategy as their factor loadings are below 0.5 according to the result of the first confirmatory analysis.

RESULTS

Hypotheses test using PLS model

In this study, we test hypotheses using structural model in PLS. The hypotheses are tested by verifying the significance of path-coefficient between two constructs concerned. To evaluate the statistical significance of path coefficient, bootstrapping with recommended sample size of 500 is used (Hall, 2008).

Recently, a global fit (GoF) measure for PLS path modelling has been proposed by Tenenhaus, Vinzi, Chatelin, and Lauro (2004). It is calculated by extracted square root from product of endogenous variable's average value of R2 and the average of communality. The effect size of fit above 0.36 is regarded as validating model (Wetzels, Odekerken & Van Oppen, 2009). As shown in Table 4, we obtained a GoF value of 0.4335 indicating satisfactory fit. Also, R2 is used to assess the average fit of structural model in PLS with evaluating path models of each endogenous variable. Cohen, (1998) classifies R2 value of 0.26 to be high, 0.13~0.26 is to be middle, and 0.02 ~ 0.13 is to be low. Table 4 reports that all variables except diagnostic use of budget systems (0.079) exceeds value of 0.13. This result indicates that the average fit of structural model in PLS is satisfactory. Taken as a whole, we test hypotheses with structural model in PLS, as its overall fit appears to be acceptable. The results from the structural model, reported in Table 6, describe how the latent variables are related to each other.

Table 6. Hypotheses test using PLS path analysis

Hypothesis	Path	Coefficient	t-statistics	Test result
H1	Diagnostic PMS → Agility	0.0443	0.3699	not supported
	Diagnostic Budget → Agility	0.1016	1.1566	not supported
H2	Interactive PMS → Agility	0.4119	3.4581***	supported
	Interactive Budget → Agility	0.2386	3.3441***	supported
H3	Agility → Financial performance	0.4594	5.2330***	supported
	Agility → Non-financial performance	0.5728	7.4907***	supported
Control variable: business strategy	Prospector → Interactive PMS	0.4514	6.1776***	significant
	Prospector → Interactive Budget	0.1438	1.7092*	significant
	Defender → Diagnostic PMS	0.2092	2.8790***	significant
	Defender → Diagnostic Budget	0.2109	2.3466**	significant

Notes: *p<0.1, **p<0.05, ***p<0.01; Environmental uncertainty does not affect both style of MCS use; Size does not have significant association with organizational performance.

Regarding the relationship of use of MCS and agility, H1 is not supported, while H2 is strongly supported. Firstly, there is no significant relationship between diagnostic use of MCS and agility. Secondly, interactive use of MCS has strongly positive linkage with agility (p<0.01), which is consistent with Henri (2006)'s result indicating the positive link between interactive use of MCS and organizational capabilities. Interactive use of MCS is the notion of supporting development of ideas and creativity, and thus emphasizes organizational common attention, open communication, and free flow of information. Therefore, it can contribute for organizations to identify and exploit opportunities from environmental changes more quickly than competitors, which means development of agility. Yet, diagnostic use of MCS, which focuses on limited authority and responsibility, monitoring, and variance analysis of outcome compared to goals, seems not to improve the capability of agility.

H3 suggesting the positive link between agility and organizational performance is strongly supported. The result indicates that agility is positively associated with organizational performance regardless of financial or non-financial (p<0.01), which is coherent with Henri's (2006) findings of organizational capabilities, such as innovativeness, organizational learning, entrepreneurship, and market orientation positively influence on organizational performance. Agility is an organizational capability to exploit opportunities flexibly as well as to detect and adapt to environmental changes quickly and consistently. Therefore, organizations with higher agility can be expected to improve organizational performance. Also, according to the view of Sull (2009), agility will positively affect to organizational performance by sensing and taking advantages of opportunities more quickly than competitors.

Regarding control variables of using MCS, business strategy has significant control effects on use of MCS, while environmental uncertainty does not affect use of MCS significantly. Also, the size does not significantly affect organizational financial and non-financial performance. The result showing the significant positive association between prospector strategy and interactive use of MCS, both PMS and budget systems, is consistent with prior studies' suggestions. On the other hand, the defender firms usually emphasize efficiency due to focus on decreasing uncertainties resolving problems, which is closely related to centralized and feed-forward control. Thus, prior studies suggest the possible strong relationship of defender strategy or cost-leadership strategy and diagnostic use of MCS (Porter, 1980; Govindarajan, 1988). In this study, defender strategy shows significant positive association with diagnostic use of MCS regardless of individual control systems ($p<0.01$) which is coherent with prior findings.

Overall, the results from PLS-SEM approach indicate that interactive use of MCS, both of PMS and budget systems, are likely to affect organizational performance through its effect on agility. Prior study on relationship of MCS, organizational capability, and organizational performance argues that use of MCS has not clear direct association with organizational performance, yet it is possibly linked to performance via organizational capability (Henri, 2006). Hence, this study further investigates the indirect effects of interactive use of MCS on organizational performance with the role of agility as an organizational performance. To analyze the mediating effect of the agility, we present the effect size of indirect effects and additional result of Sobel's Z-test (Lau & Moser, 2008).

Table 7, summary of result of analyzing mediating effect, supports significant mediating effect of the agility in the relationship between the interactive use of MCS and organizational performance, referring to the value of indirect effect of both PMS and budget systems higher than cut-off value of 0.05 suggested by Lau and Moser (2008), and significant result of Sobel's Z-test. Therefore, agility mediates the relationship between the interactive use of MCS, both PMS and budget systems, and organizational financial and non-financial performance.

Table 7. Indirect effects test results

Path	Indirect effect	Sobel's z-values	Bootstrapping Results	
			t-value	Confidence level (95%)
IPMS → Agility → FP	0.189***	2.8852***	2.7338***	0.054 - 0.325
IPMS → Agility → NFP	0.236***	3.1397***	2.9236**	0.078 - 0.394
IBUD → Agility → FP	0.11**	2.8164***	2.5136**	0.024 – 0.195
IBUD → Agility →N FP	0.137***	3.0516***	3.0387***	0.049 – 0.225

Notes: *p<0.1, **p<0.05, ***p<0.01

This study collected data from manufacturing firms in both Korea and Japan to empirically test our theoretical framework. Thus, there is necessity to control the effect of distinct characteristics of each country. First, we conduct t-test to identify which latent variable significantly differs along each country. Second, we control the constructs which are different between two countries, and then the results show that control variable of nation is positively associated with diagnostic use of budget systems ($p<0.01$), and agility ($p<0.01$), and interactive use of PMS ($p<0.05$), while it is negatively linked to interactive use of PMS ($p<0.05$). This result can be interpreted as Korean samples tend to more positively affect diagnostic use of budget systems, interactive use of PMS, and agility, while they tend to more negatively associated with interactive use of budget systems compared to Japanese samples. Taken as a whole, distinct features of each country may affect constructs differently. Hence, in next section, we conduct additional test for separated samples to investigate different effects of each country.

Additional Analysis

In this section, we investigate if samples from each country influence on main constructs differently. Table 8 summarizes result of t-test and Table 9 describes correlations of concerned variables for each country's samples.

As shown in Table 8, the mean value of prospector strategy, diagnostic use of MCS, interactive use of PMS, agility, and financial performance are significantly different between Korean respondents and Japanese respondents. Specifically, Korean firms seem to take prospector strategy more than Japanese firms. Also, Korean samples tend to use PMS more than Japanese samples regardless of the style of PMS. On the other hand, in case of budget systems,

Korean firms seem to use budget systems more diagnostically than Japanese firms, while mean difference between two countries for interactive use of budget systems is not significant.

Table 8. t-test result of Korean and Japanese samples

Variables		Country	n	Mean	S.D.	t-test
Diagnostic Use of MCS	PMS	Korea	94	5.489	1.034	4.65***
		Japan	91	4.599	1.519	
	Budget Systems	Korea	94	5.255	0.947	6.17***
		Japan	91	4.286	1.174	
Interactive Use of MCS	PMS	Korea	94	5.109	1.012	4.16***
		Japan	91	4.338	1.456	
	Budget Systems	Korea	94	4.993	0.934	-1.18
		Japan	91	5.172	1.130	
Agility		Korea	94	4.806	0.919	5.19***
		Japan	91	4.143	0.819	
Organizational Performance	Financial	Korea	94	4.465	1.236	2.37**
		Japan	91	4.066	1.053	
	Non-financial	Korea	94	4.592	1.115	-1.12
		Japan	91	4.762	0.939	
Business Strategy	Prospector	Korea	94	4.493	0.961	4.51***
		Japan	91	3.828	1.047	
	Defender	Korea	94	5.170	0.882	0.80
		Japan	91	5.060	0.977	

Note: *p<0.1, **p<0.05, ***p<0.01

Regarding agility, Korean firms generally perceive their agility high in comparison with Japanese firms. It indicates that Korean firms perceive their ability to detect environmental changes pre-emptively, respond changes consistently, and take advantages of opportunities flexibly higher than that of Japanese firms. Agility shares similar feature with prospector strategy in that both emphasize identifying and exploiting opportunities and flexibility. Table 9 that represents PLS correlation of each country shows the high correlation between agility and prospectors strategy in both countries (0.6611 of Korea, 0.5438 of Japan). The fact that Korean firms show higher agility compared to that of Japanese firms can be interpreted reflecting Koreans' hurry-up culture, aggressive attitude, and quick and initiative decision-making process of top management emerged from unique hierarchical culture (Jun, 2009). Korean firms tend to be sensitive to environmental changes and emphasize quick response to them as a key success factor. Also, manly large-sized Korean firms are commonly managed by 'Chaebol', which drives quick and high centralized decision making and practice of it. For example, Khanna, Song, and Lee, (2011) point out Samsung's hybrid systems combining Japanese business systems and Western best practices are main success factor. Its hybrid systems facilitated Samsung could overtake Japanese firms with detecting and exploiting opportunities and developing agility, innovativeness, and creativeness quickly.

Table 9. Separate correlation matrix of Korean and Japanese samples

	DPMS	DBUD	IPMS	IBUD	Agility	FP	NFP	PS	DS	EU	Size
1		-0.0811	0.8393	0.5321	0.475	0.1071	0.1667	0.454	0.3516	0.133	0.2407
2	0.2572		-0.0236	0.0667	-0.2132	-0.064	-0.1691	0.2252	0.3708	0.1175	-0.1109
3	0.7741	0.129		0.5309	0.5336	0.1018	0.1194	0.5522	0.2668	0.1559	0.2108
4	0.5663	0.4661	0.545		0.5179	0.0956	0.1517	0.4978	0.4532	0.1403	0.2434
5	0.4594	0.2975	0.5556	0.6007		0.2436	0.4355	0.6611	0.4371	0.1632	0.187
6	0.2806	0.0764	0.3558	0.4088	0.5607		0.4117	0.3902	0.2844	-0.1705	-0.0912
7	0.4711	-0.2164	0.4953	0.2136	0.5438	0.1944		0.5427	0.3531	0.1862	0.1907
8	0.3974	0.0836	0.5106	0.3979	0.4213	0.0515	0.2181		0.5427	-0.0048	0.1483
9	0.3253	0.1067	0.4292	0.4083	0.6783	0.6981	0.2489	0.5925		-0.1872	-0.1387
10	-0.1618	-0.257	-0.0441	-0.2108	-0.1741	-0.1065	-0.0341	-0.0297	-0.3053		0.129
11	0.1828	-0.019	0.2609	0.1526	0.1678	0.1696	0.1859	0.1312	-0.014	0.1064	

Note: Below diagonal is correlation matrix of Korean samples, while above diagonal is correlation matrix of Japanese samples.

The separate PLS path analysis of each country shows a little difference between firms of Korea and Japan. Considering Korean firms' more diagnostic use of PMS suggested in Table 8, Korean firms use PMS more diagnostically regardless of types of strategies employed. Regarding H1, the predicted negative association between diagnostic use of MCS and agility is presented only in Japanese samples, while this is not supported by full sample analysis. On the basis of the result from separate PLS path analysis, we investigate whether there are significant differences between each country's samples (Sánchez-Franco, 2006; Bisbe & Malagueño, 2015). The significance of path coefficient difference is analyzed by using below equation (1) and (2).

$$t = \frac{\beta_{Korea} - \beta_{Japan}}{S_p \times \sqrt{\frac{1}{m} + \frac{1}{n}}} \quad (1)$$

$$S_p = \sqrt{\frac{(m-1)}{(m+n-2)} \times SE^2_{Korea} + \frac{(n-1)}{(m+n-2)} \times SE^2_{Japan}} \quad (2)$$

*m(number of Korean samples), n(number of Japanese samples), SE(Standard Errors)

Table 10. Separate hypotheses analysis of Korean and Japanese samples

Path		Korea		Japan	
		Coefficient	t-value	Coefficient	t-value
H1	Diagnostic PMS → Agility	-0.1028	0.7115	-0.0616	0.3481
	Diagnostic Budget → Agility	0.0885	0.8388	-0.2331	2.2434**
H2	Interactive PMS → Agility	0.4027	2.6232***	0.3886	2.5175**
	Interactive Budget → Agility	0.3947	3.5429**	0.3598	3.6839***
H3	Agility → Financial performance	0.5476	6.5694***	0.2701	1.7404*
	Agility → Non-financial performance	0.6658	10.4548***	0.4782	6.1290***
Control	Size → Financial performance	0.0777	0.8986	-0.1417	0.9010
	Size → Non-financial performance	0.0742	0.7789	-0.2281	2.5086**
	Prospector → Interactive PMS	0.5515	4.9726***	0.3639	4.1655***
	Prospector → Interactive Budget	0.3611	3.7612***	0.0852	0.7385
	Defender → Diagnostic PMS	0.1131	0.8711	0.2921	3.0005***
	Defender → Diagnostic Budget	0.2827	2.0926**	0.1672	1.4603

Note: *p<0.1, **p<0.05, ***p<0.01

Table 11 shows the result of path coefficient difference analysis including only significant coefficients from PLS structural model analysis with full samples, while Table 10 provides result of all established path analysis. Thus, we highlight the relationship predicted by H2, and H3 in investigating whether there are significant differences in path coefficient between Korean and Japanese firms. The results indicate that Korean samples show higher path coefficient than Japanese samples in the associations of interactive use of budget systems and agility and agility and organizational performance respectively. On the other hand, the higher path coefficient of Korean firms in the relationship of interactive use of budget systems and agility can be interpreted as Korean firms perceive the importance of agility more than Japanese firms, due to their emphasis on rapid change under competitive environment. Also, agility shows stronger effect to organizational performance in Korean samples than Japanese samples, which might reflect agility implements more crucial role in improving organizational performance for Korean firms that emphasize speed and flexibility dealing with environmental changes.

Table 11. Path coefficient difference of Korean and Japanese samples

Path	Standard Errors(SE)		Sp	$\beta_{Korea} - \beta_{Japan}$	t-value
	Korea	Japan			
Interactive PMS → Agility	0.1535	0.1544	0.1539	0.0141	0.6228
Interactive Budget → Agility	0.1114	0.0977	0.1049	0.0349	2.2626**
Agility → Financial Performance	0.0834	0.1552	0.1240	0.2775	15.2150***
Agility → Non-financial Performance	0.0637	0.0780	0.0711	0.1876	17.9434***

Note:*p<0.1, **p<0.05, ***p<0.01

CONCLUSIONS

Recently, it is difficult for firms to predict when and which opportunities and crisis come out due to rapid change of business environment. Successful companies often fail to detect and exploit new opportunities emerging from environmental change, as they abide by past strategy and perception of environment. To deal with uncertain environment, it is important to monitor environmental change continuously, identify and exploit new business opportunities, and reallocate resources. Therefore, this study defined agility as an organizational capability and found out the relationship of use of MCS, agility, and organizational performance.

We collected empirical data from Japanese and Korean manufacturing firms through survey. The results show that diagnostic use of MCS does not have significant relationship with agility, while interactive use of MCS is positively linked to agility. This indicates that the features of organic control, characterized by organizational common attention, target setting, free flow of information, and emerging curiosity and creativity, improves agility. Agility positively affects organizational performance, which implies the attributes of ability, such as openness to surroundings and ability to detect and take advantages of opportunities faster than competitors, are necessary to overwhelm rivals under rapidly changing environment. Overall, the interactive use of MCS might improve organizational financial and non-financial performance by emphasizing development of agility as an organizational capability.

Additional analysis was performed to investigate whether the relationships of main variables show differences between each country. T-test results show that there are significant mean differences between samples of each country in terms of prospector strategy, both diagnostic and interactive use of PMS, diagnostic budget systems, agility, and financial performance. Also, applying method from Sάnchez-Franco (2006), we test whether there are significant differences between path coefficients of two sub-group samples. Korean samples show significantly higher path coefficients than Japanese samples regarding the associations of the interactive use of budget systems-agility, and agility-organizational performance. In terms of links between agility and organizational performance, Korean samples show higher value than Japanese samples. The results indicate that Korean firms emphasizing speedy response to environment perceive agility more importantly than Japanese firms, and thus the differences in links among interactive use of budget systems, agility, and organizational performance reflect the distinct perception against agility of each country.

This study contributes to the management accounting literature in three ways. Firstly, it highlights the linkages of use of MCS-both PMS and budget systems-agility, and organizational performance in terms of dealing with needs for changing business processes and control mechanisms under environmental changes. Secondly, this study defines agility as an organizational capability and investigates how agility works in the relationship of use of MCS and organizational performance. Finally, it contributes to the line of research providing comparability of different countries. This study implements additional analysis to manifest the possible differences of Korean and Japanese firms in the links of variables concerned in this research. Particularly, the tendency of using budget systems of each country shows interesting results in that Japanese firms report larger difference between each style of budget systems use relative to that of Korean firms, while they use budget systems more interactively than Korean firms. This implies the possibility of further research regarding comparative analysis for budget systems of each country.

In line with other empirical studies, this study is subject to potential limitations. Firstly, data for the study collected by self-reported survey method creates the possibility of common response bias. Secondly, even though the links in the path model are substantiated by theoretical backgrounds, cause and effect relation is hard to be demonstrated empirically using cross-sectional survey. Thirdly, introducing new concept of agility in the context of management accounting, it is overlooked to consider other precedents which might affect agility, such as organizational learning and organizational culture. Hence, further research needs to verify other variables potentially associated with agility. Finally, as its empirical analysis is based on data from two distinct countries, the underlying response tendency of each country should be controlled more sophisticatedly. Although this study indicates potential differences in each country regarding the use of MCS, more diverse approaches and analyzes should be considered to substantiate comparison of Korean and Japanese features.

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