

Management Innovation and Firm Performance: The Mediating Effects of Tacit and Explicit Knowledge

ABSTRACT

This paper examines the role of tacit and explicit knowledge in translating management innovation into firm performance in Japanese companies. While past research has been inconsistent on the role of management innovation on firm performance, this research considers how management innovation in organizations can promote tacit and/or explicit knowledge creation, and whether this leads to higher firm performance.

This research uses a questionnaire survey of employees of Japanese firms, and applies conditional process analysis. There was no direct effect of management innovation onto firm performance, and that instead, both tacit and explicit knowledge fully mediated the relationship between management innovation and firm performance.

While management innovation programs by themselves did not directly increase firm performance, the alignment of these programs with knowledge management initiatives enhanced performance. This highlights the need for management innovation that first considers the type of knowledge needed for enhanced performance. Previous research did not consider the role of knowledge as a means to translate management innovation into firm performance. This paper uncovers the mediating role of knowledge, potentially elucidating past inconclusive results.

Keywords: Management innovation, tacit knowledge, explicit knowledge, firm performance, Japan

INTRODUCTION

Innovation as a major force of economic development was first highlighted in 1911 by Joseph Schumpeter (1961) who proposed that change and new combinations brought about by entrepreneurs fuels economic growth. Over the last 50 years, however, the importance of leading and adapting to innovation has increased dramatically with the accelerating pace of technological progress that has been fueled by the advances in information technology, which has had a tremendous impact on all industries. Kurzweil (2001) states that the history of technological progress provides compelling evidence that change is not linear but exponential and will accelerate further in the future. As such, leading and/or adapting to innovation and change are among the most important priorities for firms and organizations of the 21st century. Transformation and change have indeed become a ubiquitous element for corporate survival. In fact, the average life span of corporations has decreased significantly over the last several decades: in 1958 the average life span for S&P 500 companies was 61 years (Foster and Kaplan, 2001), and today it is under 20 years. Foster and Kaplan (2001) state that “if history is a guide, over the next quarter century no more than a third of today’s major corporations will survive in an economically important way” (p. 41). Even high-tech companies which are considered pioneers of new technology cannot escape the need for continuous innovation as shown by the once dominant internet portal AOL losing its market share to Yahoo!, which in turn is now struggling against search engine giant Google. Today’s firms must continuously introduce innovation to meet the needs of the changing market and social environment, or face obsolescence.

In such a turbulent environment, the management of innovation at firms is increasingly difficult, and has spurred much investigation into the management innovation and how these have, or have not, led to higher corporate performance. This research examines the role of knowledge in translating management innovation into firm performance. Specifically, it analyzes the mediating effect of knowledge in the relationship between management innovation and firm performance. In the next section, we review the literature on management innovation and knowledge, and we develop hypotheses to investigate the

current understanding of the relationship between management innovation and firm performance, and whether tacit and explicit knowledge mediate that relationship.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Knowledge

Knowledge has been described as representation of the real world and conceptualized as a product of the interaction between individual cognition and reality (von Krogh, 1998). More generally, knowledge has been defined as information that has been proven true or useful through experience, and thereby embodies a high-value form of information that is structured for making decisions and taking actions. In other words, knowledge is necessary for making well-reasoned decisions in any context in both one's private (personal) and public (business) lives. Polanyi, however, infers that knowledge is not simply singularly defined. He contends that "we can know more than we can tell" (Polanyi, 1966, p. 4) and that "it is not by looking at things, but by dwelling in them that we understand their joint meaning" (Polanyi, 1966, p. 18).

Building on this concept that not all knowledge is easily verbalized or conveyed, Polanyi categorized two types of knowledge: tacit and explicit (1966). Tacit knowledge is cognitive knowledge that is highly individual and difficult to express with language or numbers; for example, beliefs, points of view, technical skills and know-how are all part of tacit knowledge. Explicit knowledge, on the other hand, is objective and rational knowledge, and can be expressed with words or numbers; texts, equations, specifications and manuals. It is therefore fairly easy to identify, store, and retrieve (Wellman, 2009).

Nonaka & Takeuchi's work on knowledge-creation theory incorporates Polanyi (1966)'s dual classification of knowledge and suggests that organizational knowledge is created through the spiral process of tacit and explicit knowledge conversions defined as Socialization, Externalization, Combination, and Internalization (Nonaka and Takeuchi, 1995). Through this SECI cycle, subjective values, expertise, etc. (tacit knowledge) are synthesized in objective and easily sharable explicit knowledge. Hislop (2013) states that the more valuable knowledge (to a firm) is tacit knowledge.

Davenport & Prusak (1998), while acknowledging that sharing knowledge is key to a firm's performance, propose that knowledge is most complex and offer the following definition: "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms" (p. 24).

Similarly, Brown & Duguid (2001) note that Polanyi concludes "that knowledge always has an inarticulate component," and was "not, then, arguing for two types of knowledge, merely for two dimensions—two interdependent dimensions," which rely on each other (pp. 203-204). In other words, Polanyi's explicit dimension of knowledge relies on previously "interiorized" or tacit dimension of knowledge. Botha et al. (2013) states that these two types of knowledge reflect a spectrum rather than separate categories of knowledge, and at the same time, however, that the distinction between these two theoretical opposites is necessary (when trying to investigate knowledge creation and management).

A good illustration of how each type of knowledge is mobilized in the firm can be found in the prevalent codification and personalization strategies (Hansen et al., 1999; Ajith Kumar and Ganesh, 2011). Ajith Kumar and Ganesh (2011) state that, "the codification strategy concerns extracting explicit knowledge from the person who developed it, storing it in databases, and promoting its subsequent reuse by anyone who needs it, (...) [while] the personalization strategy's primary concern is tacit knowledge and its transfer among people (...) [enabled] by facilitating direct interactions between people, by connecting people with each other" (p. 119). Codification is appropriate in mature industries where standardization is prevalent; its drawbacks consist of information overload produced by the large number of documents and messages, the relative ease of knowledge transfer to unauthorized parties, the rapid obsolescence of the codified knowledge, and the cost of dedicated IT systems (Mukherji, 2005; Ajith Kumar and Ganesh, 2011). Personalization is suitable for firms which must constantly innovate and deliver customized

solutions in a short time, and which must protect their knowledge against the competition; its shortcomings include knowledge hoarding by individuals who fear losing their competitive advantage, and key employee poaching by competitors to acquire critical tacit knowledge (Mukherji, 2005; Ajith Kumar and Ganesh, 2011).

According to Harlow (2008)'s research on American and Canadian firms, higher levels of tacit knowledge resulted in higher innovation performance. Less clear, however, was the relationship between tacit knowledge and financial measures of performance. Seidler-de Alwis and Hartmann (2008) investigated the use of tacit knowledge in organizations and found that tacit knowledge, compared to explicit knowledge, can be of greater importance for innovation. Explicit knowledge by definition is public knowledge, or knowledge that is easily accessible, and thus can be readily copied, making it less valuable or sustainable as a source of competitive advantage.

While past research has shown a positive link between knowledge management and firm performance (Chen et al., 2009; López- Nicolás & Meroño-Cerdán, 2011; Palacios & Garrigós, 2006), empirical studies on the effects of tacit and explicit knowledge have not been consistent. Park et al. (2015) remark that the "accumulated research on the performance effects of tacit and explicit knowledge has provided inconsistent results" (p. 89) and note that in some cases explicit and tacit knowledge transfers have been found to result in both positive and negative performance effects. Becerra et al. (2008) have suggested that these inconsistent results are due to the specific conditions or measures under which knowledge is transferred. In this paper, in order to evaluate the effect of knowledge on firm performance, we hypothesize the following:

Hypothesis 1: Tacit knowledge activities have a positive effect on firm performance.

Hypothesis 2: Explicit knowledge activities have a positive effect on firm performance.

Management Innovation

Management Innovation (MI), sometimes referred to as organizational innovation, is defined as the establishment of new structures, novel processes, original systems and programs or practices in firms (Evangelista and Vezzani; 2010; Lam, 2005; Zahra et al., 2000; Walker et al., 2015). Damanpour and Aravind (2012) provide an extensive review of the concept and its antecedents, and still advocate further research. Walker et al. (2015) noted however, that while the "antecedents, processes, and consequences of innovation in organizations have been studied by management scholars since the 1960s" (p. 416), the focus has been on technology-based product and process innovations rather than on non-technological innovations. Accordingly, and pursuant to their findings, they recommend further research that moves away "from the common practice found in studies of innovation in organizations to model a direct and independent effect of management innovation on performance." In other words, the mechanism of the effect of management innovation on firm performance is still unclear and requires further investigation.

Reviews of the literature on innovation in firms "continually suggest that its results are inconsistent" (Damanpour & Wischnevsky, 2006). Atalay et al. (2013) found that while product and process innovations have significant and positive impact on firm performance, no such relationship was found between non-technological innovation such as organizational and marketing innovation and firm performance. In contrast, results of research by Walker et al. (2015) showed that there were "no differences in the direction and the strength of the association of MI [management innovation] and TI [technological innovation] on organizational performance" (p. 418), and that the organizational competencies gained from initiatives such as new ways of structuring and coordinating organizations and knowledge management activities were shown to be essential, especially in competitive markets. As previous research results have been inconsistent regarding the effect of management innovation on firm performance, we hypothesize the following:

Hypothesis 3: Management innovation has a positive effect on firm performance.

We also investigate how management innovation supports knowledge creation. Specifically, we look at the relationship between non-technological innovation and performance by addressing Walker et al. (2015)'s recommendation. Since innovation is defined as the introduction of something new or a new

idea, method or device, it assumes the creation of something that has not been developed before, and thus requires new knowledge or insight (Damanpour, 1991).

A more recent definition of management innovation suggests that the organization must actively cultivate three resources, “human resources able to grasp and manage knowledge, effective organizational structures which support individual and group work, and technology” (Nowacki and Bachnik, 2016, p. 1578). Nowacki and Bachnik (2016) explicitly refer to knowledge, knowledge sharing, and knowledge systems when explaining their concept of social, organizational, and technological innovation. Accordingly, they suggest that the key may lie in how management innovation in organizations gives emphasis to tacit and/or explicit knowledge creation. Therefore, it can be argued that the establishment of new structures, novel processes, original systems and programs or practices in the firm – i.e. management innovation – will affect the nature and way it treats knowledge. This research focuses on the effect of deliberate management innovation, rather than the marginal or unintended influence of knowledge on the firm’s management. Management innovation requires organizational changes which have immediate effects in terms of knowledge creation, sharing and application. The mediating role of knowledge is further inferred in the very thorough definition of management innovation by Damanpour and Aravind (2012); they define it as “new approaches in knowledge for performing the work of management and new processes that produce changes in the organization’s strategy, structure, administrative procedures, and systems. Their enactment drives or enables organizational change, facilitating the organization's renewal, adaptation, and effectiveness” (p. 429, 432). Therefore, we hypothesize the following:

Hypothesis 4: Management innovation has a positive effect on tacit knowledge activities.

Hypothesis 5: Management innovation has a positive effect on explicit knowledge activities.

METHOD

Sample and Measures

The hypotheses presented above make up the research model depicted in Figure 1. To test this model, a questionnaire survey of Japanese managers and staff of Japanese domestic companies in a wide range of industries was conducted. The survey instrument was first built in English, and then translated and administered in Japanese by the authors who are fluent in both languages. The data was gathered in March 2015 using a Japanese Internet Survey service with a large database of potential respondents throughout Japan.

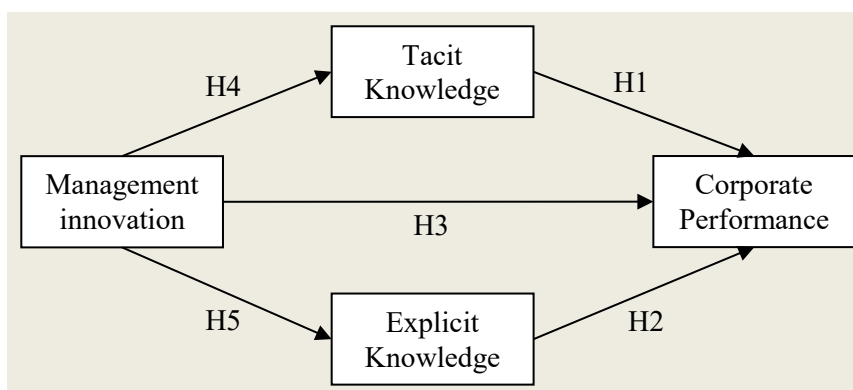


Figure 1. Research model

Respondents were selected among Japanese employees working in Japan. Respondents numbered 310, consisted of 78% male and 22% female respondents from a wide range of industries and working in different functions, and were split evenly between those employed as general staff with no supervisory duties (155) and managers with subordinates (155) (Table 1). A majority of respondents were 40 years

old or older, with an absolute majority having worked for their current company for 10 years or more, 27% of which worked at locations with less than 10 employees, 22% at sites with between 10 to 49 employees, and 23% at locations with 500 employees or more.

Table 1. Sample demographics

Indicator	N	%	Indicator	N	%
Gender			Company size at location		
Male	243	78.4	Less than 10 employees	85	27.4
Female	67	21.6	Between 10 and 49 employees	67	21.6
Age range			Between 50 and 249 employees	61	19.7
20-29	20	6.5	Between 250 and 499 employees	25	8.1
30-39	66	21.3	500 employees and over	72	23.2
40-49	95	30.6	Company size in subsidiary		
50-59	89	28.7	Less than 10 employees	102	32.9
60 and over	40	12.9	Between 10 and 49 employees	71	22.9
Years at company			Between 50 and 249 employees	55	17.7
Under 3 years	66	21.3	Between 250 and 499 employees	23	7.4
3-9 years	76	24.5	500 employees and over	59	19.0
10-14 years	42	13.5	Company size in Japan		
15-19 years	33	10.6	Less than 10 employees	76	24.5
20 years and over	93	30.0	Between 10 and 49 employees	56	18.1
Position			Between 50 and 249 employees	41	13.2
Staff	155	50.0	Between 250 and 499 employees	26	8.4
Section Manager / Project Manager	56	18.1	500 employees and over	111	35.8
Department Head	30	9.7	Industry		
Division Head	7	2.3	Construction	23	7.4
Senior / Top Management	21	6.8	Manufacturing	62	20.0
CEO / Representative	41	13.2	Utilities	6	1.9
Director			Information and communications	19	6.1
Function			Transport and postal activities	11	3.5
Sales	51	16.5	Wholesale and retail trade	27	8.7
Marketing	5	1.6	Finance and insurance	8	2.6
Technology / R&D	45	14.5	Real estate, rental and leasing	8	2.6
Manufacturing / Quality Control	32	10.3	Scientific research, professional and technical services	6	1.9
Administration	38	12.3	Accommodations, eating and drinking services	4	1.3
Senior Management	15	4.8	Living-related and personal services and amusement services	7	2.3
Other	124	40.0	Education, learning support	18	5.8
			Medical, healthcare and welfare	24	7.7
			Compound services	5	1.6
			Services (not elsewhere classified)	43	13.9
			Government (except elsewhere classified)	21	6.8
			Other	18	5.8

Firm performance is typically measured using objective or subjective indicators, or a combination of both (Greenley and Foxall, 1997). While objective financial measures are straightforward, their selection is a matter of availability, which is often linked to whether the firms under study are privately- or publicly-held. Indeed, financial returns such as return on assets, return on sales, and return on investment, and firm growth use published data (Daily et al., 2002) which are often closely-held in the case of private companies.

When studying a representative cross-section of firms in any particular industry, the higher proportion of small and medium enterprises – which more often than not are privately-held – precludes the use of financial data. Subsequently, subjective measures are substituted, under the assumption that the

anonymity of the respondents and that of the firm where they work encourages them to answer candidly. Research involving small and medium enterprises has often relied on these subjective measures (Chandler and Jansen, 1992; Simpson et al., 2004). Geringer and Hebert (1991) have shown how subjective and objective measures of performance, notably in international joint-ventures, correlate positively, and therefore subjective measures alone can be used when objective measures are not obtainable. Firm performance was measured using three reflective questions on the respondents' company performance in relations to that of its main competitors', following Geringer and Hebert (1991)'s recommended use of subjective measures. The first one asked them about their firm performance in general in comparison to their main competitors', the second one about labor productivity at their site compared with other establishments in the same industry, and the third one about their site's financial performance, or profitability, compared with other establishments in the same industry.

Management innovation was assessed using reflective questions from Eldring (2009) who includes items based on Porter's four types of strategies of cost leadership, differentiation, focus, and hybrid. These questions consider whether the firm has in place specific initiatives for innovation: integration of performance measurements for innovation activities in the performance measurement for executives; initiatives for finding, developing, and retaining key people driving innovation; recruitment and training investments to help reduce skills shortages; delegation of decision-making powers of innovation for line and project managers; material incentives for innovation managers (salary, bonus, promotion, etc.); intangible incentives for innovation manager (spaces, public recognition, challenging tasks, etc.); incentives for employees to develop their ideas (employee suggestion system); and organizational initiatives to more efficiently use human resources (team work, innovation circles, etc.).

It is important to note that Eldring (2009)'s scale is especially relevant when looking at non-technological innovation, as is the purpose of this paper. Its indicators reflect management innovation through mainly novel human resource practices. One might argue that this scale is based on a dated model since Porter's generic strategies date back from 1980. However, first Porter's model has proved very resilient and has been validated in recent studies in e-commerce (Kim et al., 2004), food retailing (Morschett et al., 2006), and agribusiness (Brenes et al., 2014) to name just a few. Second, it is still highly relevant and consistent with more recent definitions of management innovation such as Nowacki and Bachnik (2016)'s mentioned previously.

For tacit and explicit knowledge, with the former more important in personalization strategies and the latter more predominant in codifications strategies, reflective questions were derived from Hansen et al. (1999)'s findings on how consulting firms manage their knowledge. The first five items, whereby higher scores reflect an emphasis on explicit knowledge, assessed whether: the company's business model focuses on using knowledge that can be used many times; the firm is more focused on gaining a large market share rather than high profit margins; the company's knowledge management strategy is focused on ICT systems that codify, store and disseminate knowledge; human resource training is mainly done using manuals, computer systems or in large groups; and the company's important knowledge can be codified, written down or stored in computers. The next five items, whereby higher scores reflect the prominence of tacit knowledge, assessed whether: the company's business model focuses on providing highly customized solutions to our customers' unique problems; the company is more focused on generating high profit margins rather than gaining a large market share; the company's knowledge management strategy is focused on facilitating conversations and face-to-face exchange of knowledge; human resource training is mainly done through mentorships and in small groups; and the company's important knowledge is not easily written down, but is the expertise and know-how of our employees that were nurtured through personal experience (Hansen et al., 1999).

Validity and Reliability

Factor analyses were conducted with each subset of questions pertaining to each variable – management innovation, firm performance, and the use of tacit and explicit knowledge – to ensure that the questions displayed highest loadings on the intended constructs and to assess discriminant validity. Following Costello and Osborne (2005)'s recommendations, question items with excessive cross-loadings, freestanding as one-item factors, or considerably reducing factor reliability were removed.

Marked differences were found between the intended constructs and those obtained with the current sample. All factors were found to be reliable with Cronbach alpha scores above 0.7.

For management innovation, a single factor with eigenvalue above one was generated rather than the intended four factors. This single factor explained 61% of the total variance (Table 2). For firm performance, a single factor with eigenvalue above 1 was obtained, explaining 76% of the total variance (Table 3). For knowledge type, two factors with eigenvalues above 1 were achieved, the first one consistent with an emphasis on explicit knowledge and explaining 37% of the total variance, the second one indicating the importance of tacit knowledge and explaining 17% of the total variance, for a combined total variance explained of 54% (Table 4).

Table 2. Rotated component matrix of factor analysis of questions on management innovation

	1 Management innovation
Integration of performance measurements for innovation activities in the performance measurement for executives	.793
Initiatives for finding, developing, and retaining key people driving innovation.	.810
Recruitment and training investments to help reduce skills shortages.	.721
Delegation of decision-making powers of innovation for line and project managers	.799
Material incentives for innovation managers (salary, bonus, promotion, etc.)	.740
Intangible incentives for innovation manager (spaces, public recognition, challenging tasks, etc.)	.837
Incentives for employees to develop their ideas (employee suggestion system)	.740
Organizational initiatives to more efficiently use human resources (teamwork, innovation circles, etc.)	.808
% of Variance	61.168
Items	3
Cronbach alpha	0.908
Convergent validity	0.717; 0.740; 0.638; 0.725; 0.660; 0.771; 0.658; 0.735

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

Table 3. Rotated component matrix of factor analysis of questions on firm performance

	1 Corp. Performance
What is your company's performance in comparison to your main competitors?	.892
How does labor productivity at this site compare with other establishments in the same industry?	.841
How does this site's financial performance, that is, profitability, compare with other establishments in the same industry?	.878
% of Variance	75.767
Items	3
Cronbach alpha	0.840
Convergent validity	0.741; 0.657; 0.716

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 4 iterations.

Table 4. Rotated component matrix of factor analysis of questions on knowledge types

	1 Explicit	2 Tacit
Our company is more focused on gaining a large market share rather than high profit margins.	.577	
Our company is more focused on generating high profit margins rather than gaining a large market share.		.536
Our company's knowledge management strategy is focused on ICT systems that codify, store and disseminate knowledge.	.834	
Our company's knowledge management strategy is focused on facilitating conversations and face-to-face exchange of knowledge.		.668
Human resource training is mainly done using manuals, computer systems or in large groups.	.767	
Human resource training is mainly done through mentorships and in small groups.		.595
Our company's important knowledge can be codified, written down or stored in computers.	.786	
Our company's important knowledge is not easily written down, but is the expertise and know-how of our employees that were nurtured through personal experience.		.778
% of Variance	36.644	16.527
Cumulative %	36.644	53.171
Items	4	4
Cronbach alpha	0.759	0.782
Convergent validity	0.684; 0.669; 0.591; 0.596	0.574; 0.545; 0.602; 0.542

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 3 iterations.

RESULTS

Exploratory Statistics

Based on the respondents' use of both explicit and tacit knowledge in their organizations, we assessed the levels of management innovation and relative firm performance. First, we compared respondents based on their self-reported organizational use of explicit knowledge, then based on their use of tacit knowledge. Those reporting to use more explicit knowledge (N=70 vs. N=150) worked in organizations with greater usage of management innovation (M=3.66, SD=0.60 vs. M=3.14, SD=0.73; $t(218)=-5.134$, $p=0.000$) and higher relative firm performance (M=3.23, SD=0.75 vs. M=2.73, SD=0.82; $t(218)=-4.316$, $p=0.000$). Considering their use of tacit knowledge, we found similar results, whereby those reporting to use more tacit knowledge (N=121 vs. N=77) worked in organizations with greater usage of management innovation (M=3.54, SD=0.64 vs. M=3.02, SD=0.77; $t(196)=-5.089$, $p=0.000$) and higher relative firm performance (M=3.12, SD=0.79 vs. M=2.50, SD=0.83; $t(196)=-5.294$, $p=0.000$).

In our sample, a relative majority of respondents rate their use of explicit and/or tacit knowledge as average (score of 3). And more importantly, an absolute minority of respondents reported using high levels of explicit knowledge and low levels of tacit knowledge in their organizations. Assuming that the sample is representative of the population of Japanese employees, this would suggest that Japanese firms make more use of tacit knowledge compared to explicit knowledge, which is consistent with previous research (Nonaka and Takeuchi, 1995).

Several statistically significant differences for management innovation and relative firm performance, using independent sample T-tests, were found by comparing the 3 groups of respondents based on their use of both explicit and tacit knowledge. The high explicit and low tacit knowledge group was omitted as it consisted of only eight individuals.

As aggregate statistics only give the big picture, we divided the population into a taxonomy based on the respondents' levels of explicit and tacit knowledge use in their organizations. We calculated the mean of the 4 items of each factor for every respondent and clusters were made according to the mean of each respondent's aggregate score and labeled as follow (Figure 2).

When the mean of the respondent's aggregate score on explicit and tacit knowledge use are both greater than 3, he/she falls in the category of high explicit and high tacit knowledge use (N=46, 14.8%). When the mean of the respondent's aggregate score on explicit and tacit knowledge use are both lower than 3, he/she falls in the category of low explicit and low tacit knowledge use (N=57, 18.4%). When the mean of the respondent's aggregate score on explicit knowledge use is greater than 3 and that on tacit knowledge use is lower than 3, he/she falls in the category of high explicit and low tacit knowledge use (N=8, 2.6%). When the mean of the respondent's aggregate score on explicit knowledge use is lower than 3 and that on tacit knowledge use is greater than 3, he/she falls in the category of low explicit and high tacit knowledge use (N=58, 18.7%). The remaining respondents (N=141, 45.5%) ranked either their tacit or explicit knowledge use, or both, as average, and make up the "other" category.

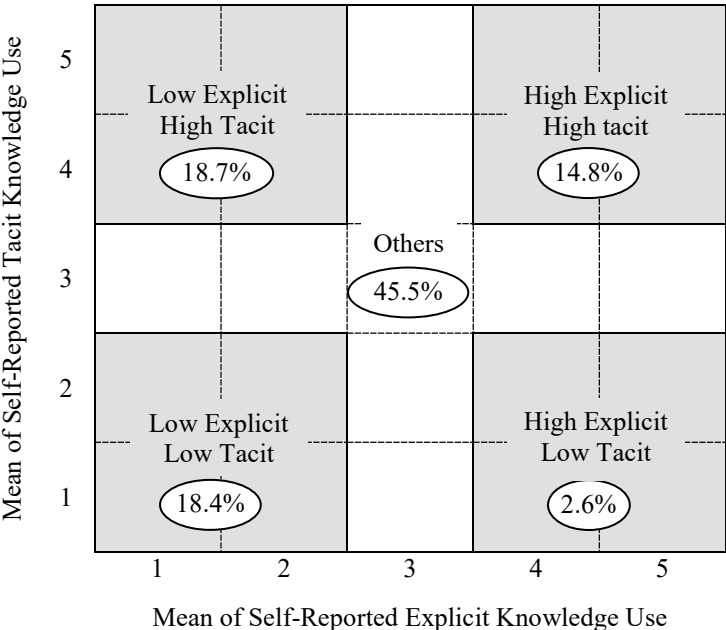


Figure 2. Taxonomy of respondents' perceived usage of tacit and explicit knowledge

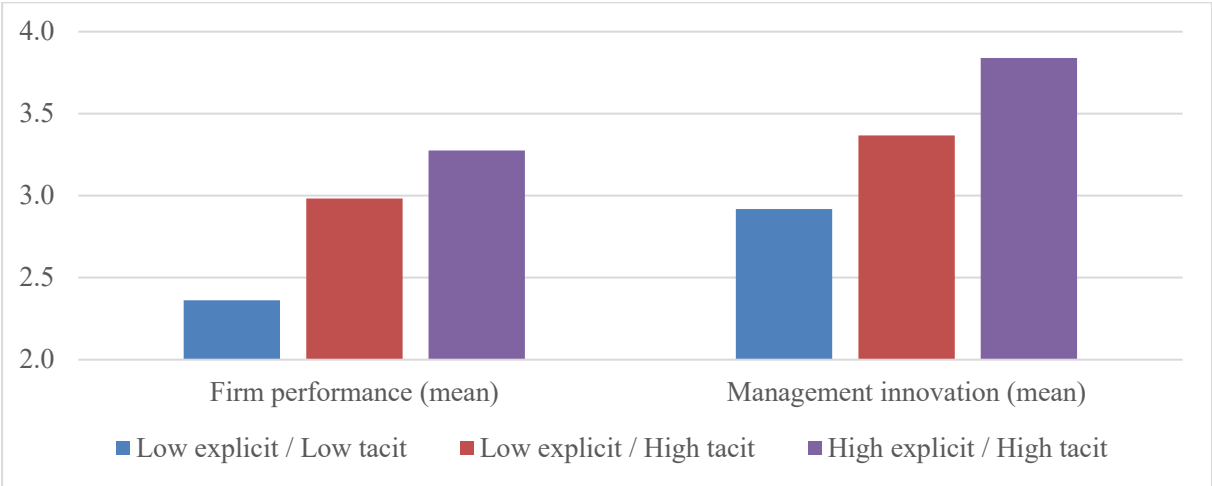


Figure 3. Firm performance and innovation measure by taxonomy of respondents

The results clearly suggest that firms with higher levels of management innovation and with higher relative firm performance display greater self-reported use of both explicit and tacit knowledge. However, we cannot tell from the data whether low tacit knowledge and high explicit knowledge use, or the opposite combination of high tacit knowledge and low explicit knowledge use, are favorable since the differences in management innovation and firm performance were not statistically significant.

Mediation Model

The following statistical tests use SPSS and PROCESS, a freely-available computational tool for SPSS that specifically addresses mediation, moderation, or conditional process analyses (Hayes, 2012).

We assessed the effect of organizational management innovation on relative firm performance both directly and indirectly through the levels of tacit and explicit knowledge. This corresponds to the model depicted in Figure 2, which estimates an unmoderated mediation model. The regression coefficients, standard errors, and other statistics pertinent to the model are summarized in Table 5, and the path coefficients are shown on the statistical diagram in Figure 4.

Table 5. Regression coefficients, standard errors, and model summary information for the presumed management innovation influence multiple mediator model

Antecedent	Consequent								
	M1 (Tacit K.)			M2 (Explicit K.)			Y (Corp. Performance)		
	Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	P
X (Management innovation)	0.324	0.054	0.000	0.381	0.053	0.000	0.067	0.061	0.272
M1 (Tacit K.)	-	-	-	-	-	-	0.276	0.056	0.000
M2 (Explicit K.)	-	-	-	-	-	-	0.224	0.057	0.000
	R ² =0.145			R ² =0.105			R ² =0.155		
	F(1, 308)=36.051, p=0.000			F(1, 308)=52.357, p=0.000			F(3, 306)=18.644, p=0.000		

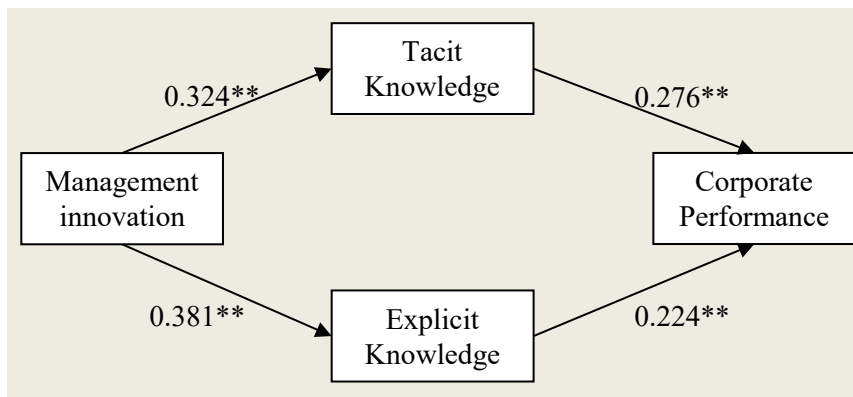


Figure 4. Standardized regression coefficients for the relationship between management innovation and firm performance mediated by tacit and explicit knowledge. **p<0.001

The total effect is statistically significant (0.242, p<0.001) and signifies that higher organizational management innovation result in higher relative firm performance. Additionally, only the indirect effects (0.090 and 0.085 respectively) through tacit and explicit knowledge are statistically significant. It is important to note that the significance of the indirect effects is not assessed based on the statistical significance of the paths that define them but rather on asymmetric bootstrap confidence intervals which are entirely above zero (0.041 to 0.141 and 0.030 to 0.160, respectively) (Hayes, 2012). The normal theory-based Sobel tests (Z=3.778, p<0.001 and Z=3.410, p<0.001, respectively) agree with the

inference made using a bias-corrected bootstrap confidence interval (Hayes, 2012). These findings indicate a full mediation of both tacit and explicit knowledge on the relationship between organizational management innovation and relative firm performance, thus providing support for H1, H2, H4, and H5, while there is no effect of management innovation on firm performance, suggesting H3 is not supported. Tests of moderation effects of both tacit and explicit knowledge by evaluating the statistical significance of the interaction terms revealed no such effect.

DISCUSSION AND CONCLUSION

Aligning Managing Innovation and Knowledge Management

A relative majority of respondents rate their firm's use of explicit and/or tacit knowledge as average (score of 3). However, statistical results showed that firms with higher use of explicit and tacit knowledge reported higher firm performance (Figure 3), supporting Hypotheses 1 and 2. In addition, firms with more management innovation had employees reporting using both more tacit and explicit knowledge, thus providing support for Hypotheses 4 and 5. These two findings suggest that management innovation results in both higher tacit and explicit knowledge use, which positively affect firm performance.

In our analysis of the initial research model (Figure 1), we found no direct link between management innovation and firm performance, leading us to reject Hypotheses 3. We did, however, find that both tacit and explicit knowledge had a full mediating effect on the relationship between management innovation and firm performance, indicating an indirect link. This finding may explain why past theoretical models investigating the direct effect of management innovation on firm performance have given inconsistent results (Atalay et.al, 2013; Damanpour & Wischnevsky, 2006).

While the link between management innovation and firm performance may seem obvious on the surface, the lack of observed support in the literature requires that the models be reinvestigated. Indeed, Mol and Birkinshaw (2009, p. 1270) remarked that "the literature offers very little evidence of the empirical relationship between the introduction of new management practices and firm performance." The authors argue that as internal management innovation in itself is not a product or service that is delivered to the market, a simple model for the relationship between management innovation and firm performance is not sufficient. Contributing to current theory on management innovation, knowledge creation and firm performance, our findings suggest that the model needs the mediating constructs of tacit and explicit knowledge, which lead to the creation, delivery and services of market deliverables. In other words, management innovation must create new knowledge to "drive or enable organizational change, facilitating the organization's renewal, adaptation, and effectiveness" (Damanpour and Aravind, 2012, p. 432).

These findings also highlight the major practical contribution of this research: 1) firms must support tacit and/or knowledge creation activities in today's society and market of ever-increasing change and complexity; and 2) management innovation initiatives must support and corroborate these activities in order to enable the creation of pertinent knowledge. Referring to the comprehensive definition by Damanpour and Aravind (2012) cited earlier, management innovation is precisely new knowledge and processes, that can be interpreted as explicit and tacit knowledge, which become sources of change in the firm's strategy and inner working. In other words, while management innovation programs by themselves may not directly increase firm performance, aligning these programs with knowledge management initiatives enhanced the corporate performance of the Japanese companies surveyed in this study.

This can be illustrated with the case of Rakuten, sometimes dubbed the "Japanese Amazon". Rakuten is a Japanese electronic commerce and Internet company based in Tokyo, Japan, and its e-commerce platform Rakuten Ichiba is the largest e-commerce site in Japan. Its sales in 2015 topped JPY 713 billion (USD 5.8 billion) (Rakuten, 2015). In 2010, Rakuten embarked on an 'Englishnization' project whereby it shifted its language of business to English, starting from its headquarters in Tokyo. Within the first

two years, employees were required to use English in all internal presentations and documents, as well as all internal meetings, training sessions and emails (Martin, 2015).

The purpose of this management innovation, was three-fold: to internationalize the company, especially in light of its flurry of international acquisitions (Buy.com, PriceMinister) to hedge against the slow growth in its domestic market; to ensure the sharing of Rakuten's best practices world-wide, hence supporting global learning in a business founded on the power of the internet; and leading Japan toward internationalization, a very strong position advocated by its co-founder Hiroshi Mikitani, since followed by other large Japanese companies such as Bridgestone, Fast Retailing (Uniqlo), and Honda.

While in 2010 Rakuten's novel approach was often derailed and criticized, the verdict is clear. In five years, the average employee score on the Test of English for International Communication, or TOEIC, had reached 802.6 out of a possible 990 points, up from 526.2 in 2010. Mikitani stated that "one reason behind Rakuten's success is how we are fully able to share know-how and skills on a global basis, what we call the knowledge ecosystem" (Martin, 2015). Mikitani evidently makes the link between management innovation and knowledge sharing, although the outcome of increased firm performance can obviously originate from a combination of business decisions, market conditions, and management innovations. The company has since acquired many more companies outside of Japan, such as Viber and Ebates, leveraging its integration capabilities brought about by its Englishization management innovation (Martin, 2015). Rakuten's case shows that management innovation must indeed focus or highlight the knowledge it intends to create or share. This was previously suggested by Hansen et al. (1999), who stated the need for firms to clearly pick a knowledge strategy understood by employees and highlighting the creation of both tacit and explicit knowledge. It is especially important in today's world of ubiquitous change whereby new knowledge is necessary to cope with the changing environment.

Limitations

This study uses data for dependent and independent variables that were collected simultaneously in the same survey instrument, raising the risk of common method variance. However, this paper has uncovered an important link between management innovation and firm performance, and future research should collect such data separately for further validation. Last, the data for this research includes only responses about Japanese companies in Japan and future research should evaluate whether the results obtained extend to firms in other countries. The authors suggest both quantitative and qualitative research across countries for upcoming investigations.

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