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Intellectual capital, knowledge management practices and firm performance

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Abstract

Purpose – The purpose of this paper is to examine the association of different configurations of intellectual capital (IC) and knowledge management practices (KMP) with firm performance. Do firms with different profiles concerning their overall levels of IC and KMP differ in terms of innovation and market performance?

Design/methodology/approach – First, the firms were distributed into four distinct profiles based on their overall level of IC and utilization of KMP. Then, the four different IC/KMP profiles were evaluated with regard to their innovation and market performance.

Findings – Consistent with the extant research, this study finds that the firms characterized with high levels of IC and high use of KMP are likely to outperform the firms with low overall levels of IC and KMP. On more interesting note, this study also demonstrates that firms characterized with high level of IC but only low utilization of KMP can match the innovation performance of the firms with high levels of IC and KMP.

Practical implications – While the results indicate that the level of IC alone could predict the innovation potential of the firm, the firms should use KMP to leverage the IC and to capitalize the knowledge potential. This result shows the merits of letting innovation flourish without strict managerial control, while pinpointing the relevance of knowledge management (KM) in exploitation of IC.

Originality/value – As one of the first attempts to merge the IC and KM approaches to find out which configurations could influence firm performance outcomes, this study provides the research community with valuable insights and sets the tone for further discussion.

Keywords Performance, Innovation, Knowledge management, Intellectual capital, Knowledge management practices

Paper type Research paper

Introduction

Academics, practitioners, and policy makers broadly agree that knowledge is a crucial driver for firm performance and value creation (e.g. OECD, 1996; Grant, 1996; Makadok, 2001; Hamilton, 2006; Ferreira and Hamilton, 2010). The prominent academic discussion addressing the impact of knowledge-based issues on value creation is centered on the concepts of intellectual capital (IC) and knowledge management (KM). IC refers to the overall intellectual assets that the company owns or possesses (Roos and Roos, 1997; Stewart, 1997; Sullivan, 1998) while KM refers to the processes and practices that enable firms to manage their intellectual assets and to achieve knowledge-based competitive advantages (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Heisig, 2009; Nonaka and Takeuchi, 1995; Von Krogh, 1998).

Given that both IC and KM literatures address the effect of intangibles on value creation and organizational success, they would be expected to be intertwined and parallel. However, these literatures largely use different perspectives and foundations due to their varying scholarly traditions. IC literature often adopts a static stock perspective, and KM literature a more dynamic, processual viewpoint (Kianto, 2007; Kianto *et al.*, 2014). While the extant literatures have provided the basic understanding on how an organization's knowledge



resources and its practices to manage knowledge are associated with its performance, few studies have utilized both IC and KM approaches. This study argues that combining the static and dynamic – or the stock and flow – perspectives of knowledge yields a more comprehensive understanding of intangible bases of value creation than addressing only one side of the phenomenon.

To address the above-mentioned research gap, this study empirically examines how the firm's knowledge base (i.e. IC) and its ability to utilize and develop this base (i.e. KM) are associated with firm performance outcomes. The purpose is to examine firms with different profiles based on their overall levels of IC and knowledge management practices (KMP), and to identify any differences in innovation and market performance between firms with those profiles. The study utilizes a survey data set collected from 259 Finnish companies with at least 100 employees, and then statistically analyzes differences in innovation and market performance between four different IC/KMP firm profiles.

Categorizing the data into four groups with high/low IC and KMP profiles reveals statistically significant group differences for innovation and market performance. The comparison of the four profiles shows that the firms strong both in overall IC and KMP are likely to outperform the firms with low overall IC and low KMP on both market and innovation performance measures. In addition, firms with a high level of IC but low usage of KMP enjoy equally strong innovation performance as those firms high in IC and KMP.

This paper is among the first attempts to merge the IC and KM disciplines to find out which configurations could yield organizational benefits in terms of innovation and market performance outcomes. The results thus respond to the recent calls for research that would combine IC and KM perspectives (Hsu and Sabherwal, 2012; Kianto *et al.*, 2014; Seleim and Khalil, 2011). The results also contribute to the broader scholarly discussion of the knowledge-based view (KBV), where knowledge-based assets are seen as both resources and capabilities (Grant, 1996; Spender, 1996).

IC and KMP

The literatures of IC and KM address complementary aspects of the KBV of the firm. The KBV sees knowledge both as a resource and as a capability, where utilizing and developing it is required to achieve competitive advantages (Grant, 1996; Spender, 1996; Spender and Grant, 1996).

IC focuses on all the intangible resources that a firm can use to achieve competitive advantage (Roos and Roos, 1997; Stewart, 1997; Sullivan, 1998). Typically, researchers argue that the overall IC of the firm is made up of three dimensions: human, structural/organizational, and relational/social capital (e.g. Bontis, 1998; Edvinsson and Malone, 1997; Roos and Roos, 1997; Stewart, 1997; Nahapiet and Ghoshal, 1998). Human capital refers to the firm's employees and their knowledge, capabilities, education, skills, and characteristics (Bontis, 1998; Edvinsson and Malone, 1997; Roos and Roos, 1997; Stewart, 1997). Structural/organizational capital refers to the IC that is owned by the firm and remains in the firm even when people leave work (Roos and Roos, 1997). Relational/social capital is the value embedded in and derived from relationships with customers, suppliers, partners, institutions, and other comparable stakeholders (Edvinsson and Malone, 1997; Roos and Roos, 1997; Nahapiet and Ghoshal, 1998). Lately, researchers have started to question the tripartite model's ability to recognize and measure the diverse nature of the firm's overall IC (Kaufmann and Schneider, 2004; Kianto, 2007; Kianto *et al.*, 2014). Therefore, dimensions such as renewal capital (Kianto, 2008; Inkinen *et al.*, 2014), trust capital (Mayer *et al.*, 1995; Inkinen *et al.*, 2014), and entrepreneurial capital (Erikson, 2002; Inkinen *et al.*, 2014) have been proposed to be included as components of IC.

KM deals with the processes and practices that enable firms to achieve knowledge-based competitive advantages (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Heisig, 2009; Nonaka and Takeuchi, 1995; Von Krogh, 1998). According to a literature review by Heisig (2009), KM typically deals with four groups of critical success factors, consisting of human-oriented factors (culture, people, and leadership), organization-oriented factors (processes and structures), technology-oriented factors (infrastructure and applications), and management processes-oriented factors (strategy, goals, and measurement).

KM literature can be further divided into two categories: knowledge processes and KMP. The former area deals with the generic and broad knowledge-related activities within a firm, including knowledge acquisition, creation, sharing, and utilization (e.g. Andreeva and Kianto, 2011; Chen *et al.*, 2010; Ho, 2008; Hsiao *et al.*, 2011; Lee *et al.*, 2013). Such processes exist in a firm naturally even without managerial control (Andreeva and Kianto, 2012), and they vary based on the organizational context and different antecedents (for review, see Van Wijk *et al.*, 2008). The latter research stream, the KMPs, discusses the purposeful organizational and managerial practices that are utilized to generate knowledge-based competitive advantages and firm performance outcomes (Andreeva and Kianto, 2012; Kianto *et al.*, 2014). The KMP research avenue is characterized by dispersity and lacks established conceptualizations. Past studies, for instance, have varied from examination of knowledge-oriented leadership and knowledge-centered human resource (HR) practices (Donate and Guadamillas, 2011) to power distribution, top-management support, and information technology support (Lee *et al.*, 2012). Further, more recent papers have proposed amplified conceptualizations of KMP, such as a seven-practice model by Kianto *et al.* (2014) and a ten-practice model by Inkinen *et al.* (2015).

Aligned with the recent theoretical inputs (Inkinen *et al.*, 2014, 2015; Kianto *et al.*, 2014), this study views IC as a firm's assets, and the KM explicitly from a practice perspective. In striving to understand what intangible resources the firm has and how it manages them, the practice perspective helps the study to focus on the deliberate managerial arrangements, rather than knowledge processes as "given." Likewise, this focus avoids the risk of mixing knowledge processes that take place naturally within the firm with IC, which also broadly refers to knowledge-related issues.

IC, KMP, and firm performance

Competitive advantages increasingly accrue from knowledge resources and their utilization and development, as argued by the KBV (Grant, 1996; Kogut and Zander, 1992; Spender, 1996). Therefore, overall firm performance is expected to benefit from putting together a valuable knowledge-base (i.e. IC) and managing it toward the set strategic goals (Zack, 1999) using purposeful KMP.

Various types of knowledge resources are typically needed to create value (Grant, 1996; Kogut and Zander, 1992; Spender and Grant, 1996). The empirical studies on IC have also pointed out that IC influences firm performance mainly through combinations and interactions of different IC dimensions (Kamukama *et al.*, 2010; Maditinos *et al.*, 2010; Sharabati *et al.*, 2010; Jardon and Martos, 2012; Kim *et al.*, 2012). The relationship between IC and firm performance can be also explained through improvement of innovation capabilities (Mathuramaytha, 2012; Menor *et al.*, 2007) and dynamic capabilities (Hsu and Sabherwal, 2012; Wu *et al.*, 2007). Further, a notable selection of empirical evidence suggests that IC is associated especially with innovation performance (Subramaniam and Youndt, 2005; Carmona-Lavado *et al.*, 2010; Cabello-Medina *et al.*, 2011; Leitner, 2011; Wang and Chen, 2013), particularly by unlocking the intellectual potential through relational and social capital (i.e. open innovation; see Chesbrough, 2003; Huizingh, 2011).

In terms of KMP, researchers have argued that human resource management (HRM) practices in particular are critical supporting factors for KM (e.g. Chuang *et al.*, 2013;

Hislop, 2003; Scarbrough, 2003; Wong, 2005). More recent papers have confirmed that HRM practices influence innovation performance by improving the knowledge processes such as knowledge acquisition, creation, sharing, and utilization (Chen and Huang, 2009; Kamhawi, 2012; Kuo, 2011; Soto-Acosta *et al.*, 2014); employees' affective commitment (Camelo-Ordaz *et al.*, 2011); and the trait of trust in relationships (Vanhala and Ritala, 2016). Supervisory work has been also argued as a key KMP for its capability in establishing a trustful and respectful atmosphere and a creative organizational culture (e.g. Holsapple and Singh, 2001), especially when supervisors participate, inspire, support, and delegate tasks to capable employees (Sarin and McDermott, 2003; Singh, 2008; Garcia-Morales *et al.*, 2012; Birasnav, 2014). IT practices in KM have also been a topic of vivid discussion (e.g. Alavi and Leidner, 2001; Davenport and Prusak, 1998; Kankanhalli *et al.*, 2003; Nonaka and Takeuchi, 1995). Empirical examination has indicated an association between utilization of IT practices and a firm's innovation performance (Chuang *et al.*, 2013; Inkinen *et al.*, 2015; Kamhawi, 2012; Khalifa *et al.*, 2008; Yang *et al.*, 2009). Furthermore, strategic KM enables the firms to recognize the key strategic knowledge resources and focus their efforts on leveraging them to build competitive advantage (Barney, 1991; Conner and Prahalad, 1996; Grant, 1996; Zack, 1999). Strategic planning, implementation, and updating (Inkinen *et al.*, 2015) and the protection of strategic knowledge (Hurmelinna-Laukkanen, 2011) have been noticed as firm performance-enhancing strategic KMP. Deliberate learning mechanisms can also influence firm performance by tapping into all of the available knowledge within the organization and legitimizing vicarious learning (Inkinen *et al.*, 2015). Mechanisms such as collection and utilization of best practices and mentoring programs can be considered as ones that leverage the potentially prosperous tacit knowledge base of the firm. Finally, work organizing practices, especially in terms of creation of units and roles, can improve firm performance (Lee *et al.*, 2008; Migdadi, 2009). Through different organizational design solutions, the firms can create beneficiary conditions for knowledge-based work and therefore influence firm performance.

The following section presents a research design which examines IC and KMP in the same set of firms. The research design is based on categorizing the firms into four groups, according to whether they possess high or low levels of overall IC and high or low levels of KMP usage. The measurement models attempt to capture the complexity and breadth of different types of IC and KMP, but the study adopts a deliberately simple approach in analyzing the mean differences in firm performance between firms of different types of IC/KMP profiles. Using this approach, the combinations of IC and KMP levels in firms can be unambiguously assessed, producing research results that indicate whether firms differ in terms of their performance in this regard.

This study focuses on two types of firm performance outcomes: market performance and innovation performance. The former relates to the general competitiveness of the firm in its markets as compared to its competitors (Delaney and Huselid, 1996; Harel and Tzafrir, 1999), while the latter focuses on its relative competitiveness in introducing innovations to the markets (Bell, 2005; Weerawardena, 2003). This approach to performance measurement is explorative; in other words, no specific hypotheses for either performance type are created. In general, firm performance is expected to benefit from high levels of IC and KMP, as the previous literature suggests; however, these benefits might vary between different combinations of IC and KMP. The following section discusses the research methodology for this explorative research design.

Research design

Sample and data collection

This study employed survey data collected in Finland in 2013. The initial population (identified using the Intellia database) comprised cross-industry samples of Finnish

companies with at least 100 employees. An external research company contacted all the eligible firms by telephone and asked the person in charge of human resources to respond to the questionnaire (i.e. the key informant technique was used). From the 1,523 companies, 259 responses were received with the response rate of 17.0 percent. The highest number of responses was received from the industries of manufacturing (37.8 percent), wholesale and retail trade (16.2 percent), services (9.7 percent), and transportation and storage (8.1 percent). Most of the respondents identified themselves as the director or manager of HR (77.9 percent), other director or manager (8.8 percent), or managing director (6.9 percent). These positions indicated that they were experts in the issues of HRM practices and organizational performance.

Measures

The comprehensive concept of IC is in its early stages. Additionally, previous research on KMPs is quite scarce. For example, the established measurement scales for KMP have typically incorporated only a few practices and overlooked some of those which were incorporated in the conceptual model of KMP in this study. Thus, it could be argued that established measurement scales do not exist; therefore, the measures for IC and KMP were both adapted from the previous literature and developed by the authors of this study. First, a thorough literature review was conducted to find empirically validated measurement scales. After that, to confirm the operational validity and psychometric robustness of the scales, the survey was pre-tested by means of statistical analyses with the sample of managers ($n = 146$) collected from Finnish companies. To ascertain content validity of the scales, an international panel of experts assessed the scales and gave their insights for further development. The received feedback was incorporated into the final version of the survey.

IC. This study measured IC with 22 items representing seven different dimensions. The measures were based on a five-point Likert scale (1-strongly disagree, 5-strongly agree) and respondents were asked to assess how the different statements on IC dimensions were applied in the organization they represented. The internal relational capital scale (three items) was adapted from Kianto (2008) and was further inspired by Yang and Lin (2009); likewise, the scale for the structural capital (three items) was adapted from Kianto (2008) and was further developed based on Kianto *et al.* (2010). The external relational capital scale (three items) was adapted from Kianto (2008). The human capital scale (three items) utilized the insights of both Bontis (1998) and Yang and Lin (2009). The scale for renewal capital (three items) was built on work by Hughes and Morgan (2007), Kianto *et al.* (2010), and García-Morales *et al.* (2006). The authors of this paper developed the trust capital scale (four items) with conceptual inspiration from Mayer *et al.* (1995) and Vanhala *et al.* (2011). Finally, entrepreneurial capital (three items) was measured using a scale inspired by Hughes and Morgan (2007).

KMP. In total, 27 items measured ten different dimensions of KMP. The respondents were asked to assess how the different statements on KMP applied to the organization they represented based on a five-point Likert scale (1-strongly disagree, 5-strongly agree). The authors of this paper created the supervisory work scale (five items), the knowledge-based training and development scale (two items), and the work organizing scale (three items). The authors also created the learning mechanisms scale (two items) with inspiration from Becerra-Fernandez and Sabherwal (2001). The knowledge protection scale (two items) was adopted from Levin *et al.* (1987), Cohen *et al.* (2000), Hurmelinna-Laukkanen and Puumalainen (2007), Hurmelinna-Laukkanen and Ritala (2012), and Lawson *et al.* (2012). The strategic KM scale (two items) was inspired by McKeen *et al.* (2005) and Boumarafi and Jabnoun (2008). Knowledge-based recruitment (two items) was inspired by Yang and Lin (2009) and Cabello-Medina *et al.* (2011). Knowledge-based performance appraisal (three items) and knowledge-based compensation (three items) scales were inspired by

Andreeva and Kianto (2012). Finally, the IT practices scale (three items) was inspired by Handzic (2011), Negash (2004), and Pirttimäki (2007).

Performance. Market performance was measured on a scale developed by Delaney and Huselid (1996) and a scale for innovation performance relied on work by Weerawardena (2003). Market performance (two items) was covered by asking respondents to compare their company's success against other companies in its sector. For innovation performance (four items), respondents compared their company's success to the competitors' in terms of creating innovations or new operating methods. For both areas, respondents rated a list of different performance areas based on a five-point Likert scale (1-very poorly, 5-very well). Utilization of subjective performance assessments could be a potential constraint (see e.g. Starbuck, 2004). However, the extant research has suggested that measures of perceived performance do tend to correlate positively with objective measures (Acquaah, 2007; Delaney and Huselid, 1996; Kunze *et al.*, 2013; Robinson and Pearce, 1988) and combined with a rigorous research design perceptual data is an adequate option (e.g. Howard, 1994; Minbaeva *et al.*, 2012). Furthermore, this study examines market and innovation performance as relative measures, based on the respondents' assessment of how well their company fares against the competitors. This allows authors to assess the relative competitive benefits of particular IC/KMP profiles in the respondent companies' industry contexts. In addition, the validity of the subjective perceptions was ensured by consulting the practitioners and experts in the field.

See Table AI for the measures and the wording of the items.

Assessment of bias

In the research setting of the study, one respondent per company provided data for independent and dependent variables. Thus, the common method bias (CMB) might cause some concerns. To control CMB, examples from previous literature (see e.g. Minbaeva *et al.*, 2012; Vaccaro *et al.*, 2012) were utilized.

First, to reduce the risk of CMB, respondent confidentiality was explicitly assured (see Tsai and Ghoshal, 1998; Minbaeva *et al.*, 2012). Such assurance makes respondents less likely to alter their answers due to how they think others may expect them to answer. In addition, the content of the survey was modified based on practitioner feedback to ensure clear and proper grammar and to keep the survey compact (MacKenzie and Podsakoff, 2012). Also, the fact that respondents were experts in the field decreased the possibility of CMB (see e.g. Rindfleisch *et al.*, 2008; MacKenzie and Podsakoff, 2012). Moreover, this study utilized different anchoring for the scales (different for performance measures than for IC and KMP) to decrease the possibility of CMB (e.g. Podsakoff *et al.*, 2003; Rindfleisch *et al.*, 2008; MacKenzie and Podsakoff, 2012).

Second, Harman's one-factor test (Podsakoff *et al.*, 2003) was conducted to assess the risk of bias. All the items from the constructs were included in the principal component analysis, and the largest factor accounted for 28 percent of the variance. This result suggests that common method variance bias was not a major concern in this study.

Results

Correlation analysis

Table I presents the correlation matrix, mean scores, and standard deviations for all the main variables.

Measurement models and reliability

Confirmatory factor analysis (CFA) was conducted to test the measurement models. A total of 259 cases were processed by means of LISREL 8.50. PRELIS 2.50 was used to compute the covariance matrix, and the maximum likelihood estimation method was applied.

The CFA found that the loadings of all items were high and statistically significant (see Table AI), suggesting that they were all related to their specified constructs, verifying the posited relationships among the indicators and constructs. In terms of construct reliability, most of the constructs exceeded the level of 0.70. For some of the constructs, reliability measures fell somewhat short; specifically, these were structural capital (CR = 0.63), knowledge protection (CR = 0.65), and strategic KM (CR = 0.67). However, these constructs exceeded the more liberal level of 0.60 (Hair *et al.*, 2006).

Table AI presents the final scales and model fit indices for the measurement models. The following three absolute-fit measures were obtained: the likelihood-ratio χ^2 value, the root mean square error of approximation (RMSEA), and the goodness-of-fit index (GFI). Even though all the measures fell within acceptable levels, incremental measures (i.e. the non-normed fit index (NNFI), the comparative fit index (CFI), and incremental fit index (IFI)) were needed to ensure acceptability of the models from other perspectives.

In summary, the various measures of overall goodness-of-fit gave sufficient support to deem the results an acceptable representation of the constructs.

Analysis

First, summated scores (i.e. summed and averaged score of different dimension) of both IC and KMP were calculated to obtain a composite indicator for those. Based upon the scores, a median split (median for IC = 3.57 and for KMP = 3.50) was performed to obtain two sub-samples of subjects with low (sample size: 129, mean = 3.23, SD = 0.26) and high (sample size: 130, mean = 3.92, SD = 0.27) levels of IC as well as low (sample size: 129, mean = 3.06, SD = 0.32) and high (sample size: 129, mean = 3.88, SD = 0.29) levels of KMP.

Next, based on median split, the firms were distributed into four profiles:

- (1) high IC (mean of IC within the firms in this profile = 3.75) and low KMP (mean of KMP within the firms in this profile = 3.25);
- (2) high IC (3.97) and high KMP (3.94);
- (3) low IC (3.19) and low KMP (2.99); and
- (4) low IC (3.35) and high KMP (3.71).

See Table II for more detailed information about the profiles.

Table I.
Correlation matrix

Variable	Mean	SD	1	2	3
1. IC	3.58	0.43			
2. KMP	3.47	0.52	0.734**		
3. Market performance	3.39	0.74	0.319**	0.298**	
4. Innovation performance	3.33	0.57	0.427**	0.360**	0.371**

Note: **Correlation is significant at the 0.01 level

Table II.
IC-KMP profiles

	Profile 1 High IC, low KMP (n = 31)	Profile 2 High IC, high KMP (n = 98)	Profile 3 Low IC, low KMP (n = 98)	Profile 4 Low IC, high KMP (n = 31)
1. IC	3.75	3.97	3.19	3.35
2. KMP	3.25	3.94	2.99	3.71

Finally, this study tested the differences of levels in market and innovation performance between the four profiles. This step used a one-way analysis of variance (ANOVA) comparison of means, with the Bonferroni *post hoc* test for the comparisons.

Table III shows the level of market and innovation performance for different profiles as well as the results for the ANOVA tests. Based on ANOVA, there are statistically significant differences between profiles in both market and innovation performance.

A *post hoc* test of the ANOVA (see Table IV) shows in more detail the origin of the statistically significant differences between profiles and their performance. First, in terms of market performance, firms belonging to the profile 2 performed better than companies under the profile 3.

Second, in terms of innovation performance, the profile 2 outperformed the profiles 3 and 4. In addition, the innovation performance of the companies under the profile 1 seems to be better than those companies under the profile 3.

Table III.
Performance in the
profiles and results of
the ANOVA

Performance		Profile	Mean
Market	$F = 7.519$, sig. 0.000	(1) High IC, low KMP	3.50
		(2) High IC, high KMP	3.63
		(3) Low IC, low KMP	3.14
		(4) Low IC, high KMP	3.40
Innovation	$F = 19.208$, sig. 0.013	(1) High IC, low KMP	3.52
		(2) High IC, high KMP	3.59
		(3) Low IC, low KMP	3.05
		(4) Low IC, high KMP	3.20

Performance	Profiles		Sig.
Market	(1) High IC, low KMP	(2) High IC, high KMP	1.000
		(3) Low IC, low KMP	0.107
		(4) Low IC, high KMP	1.000
	(2) High IC, high KMP	(1) High IC, low KMP	1.000
		(3) Low IC, low KMP	0.000
		(4) Low IC, high KMP	0.791
	(3) Low IC, low KMP	(1) High IC, low KMP	0.107
		(2) High IC, high KMP	0.000
		(4) Low IC, high KMP	0.495
	(4) Low IC, high KMP	(1) High IC, low KMP	1.000
		(2) High IC, high KMP	0.791
		(3) Low IC, low KMP	0.495
Innovation	(1) High IC, low KMP	(2) High IC, high KMP	1.000
		(3) Low IC, low KMP	0.000
		(4) Low IC, high KMP	0.104
	(2) High IC, high KMP	(1) High IC, low KMP	1.000
		(3) Low IC, low KMP	0.000
		(4) Low IC, high KMP	0.002
	(3) Low IC, low KMP	(1) High IC, low KMP	0.000
		(2) High IC, high KMP	0.000
		(4) Low IC, high KMP	0.918
	(4) Low IC, high KMP	(1) High IC, low KMP	0.104
		(2) High IC, high KMP	0.002
		(3) Low IC, low KMP	0.918

Table IV.
Post hoc test of
the ANOVA

Discussion

The objective of this study was to examine how various IC and KMP profiles are associated with firm performance. Overall, the findings provide support for the idea that knowledge-based issues are important drivers of firm performance. This study is a response to the calls for more research combining IC and KM perspectives (Hsu and Sabherwal, 2012; Kianto *et al.*, 2014; Seleim and Khalil, 2011). Thus far, the two streams have remained rather separated, and these results are among the valuable early steps in providing more understanding to help combine these research avenues. With an explorative empirical research design, this study examined the differences between firms with different IC/KMP configurations in terms of their market performance and innovation performance. These results generally back up the claims about knowledge-based competitive advantage and firm performance gains (e.g. Kogut and Zander, 1992; Grant, 1996; Spender, 1996; Zack, 1999; Inkinen *et al.*, 2015), but with some managerially interesting notions related to innovation performance of the firm.

First, in terms of market performance, the comparison of the four IC/KMP profiles showed that firms strong in both overall IC and KMP are likely to outperform firms with low overall IC and low KMP. This finding indicates that both possession of sufficient levels of IC and the active utilization and development of it (KM) are required to increase a firm's competitiveness. This finding strengthens the arguments of Kianto *et al.* (2014), Seleim and Khalil (2011), and Wiig (1997) that the IC and KM approaches should be studied together to provide improved understanding of the bases of firm performance.

Second, regarding innovation performance of the firm, this study revealed that firms characterized by a high level of IC and high utilization of KMP (profile 2) are typically more innovative than the firms that possess a low overall amount of IC (profiles 3 and 4). On more interesting note, firms with high overall IC and low utilization of KMP (profile 1) fared equally well in terms of innovation performance, when compared to firms in profile 2. Together, these two findings demonstrate that especially IC functions as an important resource for innovation and development activities, and that a sufficient overall amount of IC is a necessary precondition of innovativeness in a firm. This supports the suggestions of previous studies (e.g. Cabello-Medina *et al.*, 2011; Leitner, 2011; Hsu and Sabherwal, 2012) which have provided evidence on a relationship between IC and innovation performance. A notable and interesting distinction to previous KM literature is that a high level of KMP did not significantly improve the innovation performance of the firm. Existing research has demonstrated that utilization of KMP, including HRM practices (e.g. Soto-Acosta *et al.*, 2014; Vanhala and Ritala, 2016), supervisory work (e.g. Holsapple and Singh, 2001), and IT practices (e.g. Alavi and Leidner, 2001; Davenport and Prusak, 1998; Kamhawi, 2012), improves the innovation output of the firm. As the results of this paper deviate from earlier discussion, it creates an opportunity for further debate and research. It might be that, for innovativeness, the high potential embedded in different elements of IC (this study measured human capital, relational capital, structural capital, renewal capital, entrepreneurial capital, and trust capital) will help the company's innovation outputs to flourish in various types, levels, and contexts even without the purpose and control aspects provided through KMP. While this study provides evidence in this direction, the issue warrants more studies that could provide greater understanding of the underlying mechanisms of IC, KM, KMP, and innovation performance.

Conclusion

Categorizing companies into four groups with high/low IC and KMP profiles exposed statistically significant group differences in terms of their innovation and market performance. The comparison of the four profiles demonstrated that knowledge-based issues show up on a company's bottom line, as the firms strong both in overall IC and KMP outperformed the firms with low overall IC and low KMP, on both market and innovation

performance measures. Peculiarly, companies with a high level of IC but low usage of KMP were found to be as innovative as those companies with high overall IC and KMP.

This paper is among the first attempts to merge the IC and KM approaches to find out which configurations could yield organizational benefits in terms of innovation and market performance outcomes. While it represents one of the first incremental steps toward constructing a comprehensive understanding of knowledge-based firm performance and value creation, it is laden with limitations. For example, this paper utilized rather rough average measure scores for constructing the IC/KMP profiles for the firms. In future studies, a more fine-grained assessment of different configurations of specific elements of IC and KMP should be built. That approach could bring about valuable managerial implications for which exact IC and KMP elements should the firms aim to combine to create competitive advantage. Second, to enable contrasting of the profiles, the IC, and KMP constructs were aggregated in a simple, explorative manner (i.e. as dichotomous high/low variable pairs). This approach left unaddressed the nature of the IC/KMP pairing, which might be described in terms of mediation or moderation types of relationships (see Kianto *et al.*, 2014). Third, the contextual and contingent nature of knowledge and related processes (Sergeeva and Andreeva, 2016) means that the sample of Finnish firms with at least 100 employees is not sufficient to portray the full truth of the phenomenon. Instead, more studies with different kinds of companies from other regions are needed to understand the limits of these findings. Fourth, this study used subjective managerial assessments to measure innovation and market performance. Even though single-respondent bias was not detected in this study, the future studies should gather objective financial information for dependent firm performance variables. Fifth, the relationship between IC, KMP, and firm performance is an issue of considerable complexity, and various kinds of firm-level characteristics are likely to moderate and mediate it. For example, the firm's business model and its strategic choices may function as important moderators. Examining these in-depth provides one potential fruitful avenue for future research. Overall, combining the IC and KM approaches to organizational performance is expected to represent a wide and fruitful field for future studies.

The managerial learning point of this study is that different configurations of IC and KMP could yield equally good firm performance outcomes. In knowledge economy one size does not fit all. Specifically, this study points out that, while the level of IC alone could predict the innovation potential of the firm, organizational and managerial practices to leverage the IC are needed to unchain the knowledge potential and convert it into market performance. This result is interesting for knowledge and innovation management research and practice, since it shows the merits of letting innovation flourish without much managerial control, while pinpointing the increasing relevance of KM when creating IC-based competitive advantage. In practice, organizations should grant their members a freedom to explore and innovate during times when innovations are in the strategic focus, but as well steer attention to efficiency and effectiveness when the accumulated knowledge needs to be leveraged to maintain competitiveness.

References

- Acquaah, M. (2007), "Managerial social capital, strategic orientation, and organizational performance in an emerging economy", *Strategic Management Journal*, Vol. 28 No. 12, pp. 1235-1255.
- Alavi, M. and Leidner, D.E. (2001), "Review: knowledge management and knowledge management systems: conceptual foundations and research issues", *MIS Quarterly*, Vol. 25 No. 1, pp. 107-136.
- Andreeva, T. and Kianto, A. (2011), "Knowledge processes, knowledge-intensity and innovation: a moderated mediation analysis", *Journal of Knowledge Management*, Vol. 15 No. 6, pp. 1016-1034.
- Andreeva, T. and Kianto, A. (2012), "Does knowledge management really matter? Linking KM practices, competitiveness and economic performance", *Journal of Knowledge Management*, Vol. 16 No. 4, pp. 617-636.

- Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.
- Becerra-Fernandez, I. and Sabherwal, E. (2001), "Organizational knowledge management – a contingency perspective", *Journal of Management Information Systems*, Vol. 18 No. 1, pp. 23-55.
- Bell, G.G. (2005), "Clusters, networks, and firm innovativeness", *Strategic Management Journal*, Vol. 26 No. 3, pp. 287-295.
- Birasnav, M. (2014), "Knowledge management and organizational performance in the service industry: the role of transformational leadership beyond the effects of transactional leadership", *Journal of Business Research*, Vol. 67 No. 8, pp. 1622-1629.
- Bontis, N. (1998), "Intellectual capital: an exploratory study that develops measures and models", *Management Decision*, Vol. 36 No. 2, pp. 63-76.
- Boumarafi, B. and Jabnoun, N. (2008), "Knowledge management and performance in UAE business organizations", *Knowledge Management Research and Practice*, Vol. 6 No. 3, pp. 233-238.
- Cabello-Medina, C., López-Cabrales, A. and Valle-Cabrera, R. (2011), "Leveraging the innovative performance of human capital through HRM and social capital in Spanish firms", *International Journal of Human Resource Management*, Vol. 22 No. 4, pp. 807-828.
- Camelo-Ordaz, C., García-Cruz, J., Sousa-Ginel, E. and Valle-Cabrera, R. (2011), "The influence of human resource management on knowledge sharing and innovation in Spain: the mediating role of affective commitment", *The International Journal of Human Resource Management*, Vol. 22 No. 7, pp. 1442-1463.
- Carmona-Lavado, A., Cuevas-Rodríguez, G. and Cabello-Medina, C. (2010), "Social and organizational capital: building the context for innovation", *Industrial Marketing Management*, Vol. 39 No. 4, pp. 681-690.
- Chen, C.-J. and Huang, J.-W. (2009), "Strategic human resource practices and innovation performance – the mediating role of knowledge management capacity", *Journal of Business Research*, Vol. 62 No. 1, pp. 104-114.
- Chen, C.-J., Huang, J.-W. and Hsiao, Y.-C. (2010), "Knowledge management and innovativeness: the role of organizational climate and structure", *International Journal of Manpower*, Vol. 31 No. 8, pp. 848-870.
- Chesbrough, H. (2003), *Open Innovation: The New Imperative for Creating and Profiting from Technology*, Harvard Business School Press, Boston, MA.
- Chuang, S.-H., Liao, C. and Lin, S. (2013), "Determinants of knowledge management with information technology support impact on firm performance", *Information Technology and Management*, Vol. 14 No. 3, pp. 217-230.
- Cohen, W.M., Nelson, R.R. and Walsh, J.P. (2000), "Protecting their intellectual assets: appropriability conditions and why US manufacturing firms patent (or not)", Working Paper No. 7552, National Bureau of Economic Research, Cambridge, MA, February.
- Conner, K.R. and Prahalad, C.K. (1996), "A resource-based theory of the firm: knowledge versus opportunism", *Organization Science*, Vol. 7 No. 5, pp. 477-501.
- Davenport, T.H. and Prusak, L. (1998), *Working Knowledge, How Organizations Manage What They Know*, Harvard Business School Press, Boston, MA.
- Delaney, J.T. and Huselid, M.A. (1996), "The impact of human resource management practices on perceptions of organizational performance", *Academy of Management Journal*, Vol. 39 No. 4, pp. 949-969.
- Donate, M.J. and Guadamillas, F. (2011), "Organizational factors to support knowledge management and innovation", *Journal of Knowledge Management*, Vol. 15 No. 6, pp. 890-914.
- Edvinsson, L. and Malone, M. (1997), *Intellectual Capital: Realising Your Company's True Value by Finding its Hidden Brainpower*, Harper Collins, New York, NY.
- Erikson, T. (2002), "Entrepreneurial capital: the emerging venture's most important asset and competitive advantage", *Journal of Business Venturing*, Vol. 17 No. 3, pp. 275-290.
- Ferreira, S. and Hamilton, K. (2010), "Comprehensive wealth, intangible capital, and development", Working Paper No. 5452, World Bank Policy Research, Washington, DC, October 1.

- García-Morales, V., Llorens-Montes, F. and Verdú-Jover, A.J. (2006), "Antecedents and consequences of organizational innovation and organizational learning in entrepreneurship", *Industrial Management and Data Systems*, Vol. 106 No. 1, pp. 21-42.
- García-Morales, V.J., Jiménez-Barrionuevo, M.M. and Gutiérrez-Gutiérrez, L. (2012), "Transformational leadership influence on organizational performance through organizational learning and innovation", *Journal of Business Research*, Vol. 65 No. 7, pp. 1040-1050.
- Grant, R.M. (1996), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, Vol. 17 No. S2, pp. 109-122.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (2006), *Multivariate Data Analysis*, 6th ed., Pearson Prentice Hall, Upper Saddle River, NJ.
- Hamilton, K. (2006), *Where is the Wealth of Nations? Measuring Capital for the 21st Century*, World Bank Publications, Washington, DC.
- Handzic, M. (2011), "Integrated socio-technical knowledge management model: an empirical evaluation", *Journal of Knowledge Management*, Vol. 15 No. 2, pp. 198-211.
- Harel, G.H. and Tzafrir, S.S. (1999), "The effect of human resource management practices on the perceptions of organizational and market performance of the firm", *Human Resource Management*, Vol. 38 No. 3, pp. 185-199.
- Heisig, P. (2009), "Harmonisation of knowledge management – comparing 160 KM frameworks around the globe", *Journal of Knowledge Management*, Vol. 13 No. 4, pp. 4-31.
- Hislop, D. (2003), "Linking human resource management and knowledge management via commitment: a review and research agenda", *Employee Relations*, Vol. 25 No. 2, pp. 182-202.
- Ho, L.-A. (2008), "What affects organizational performance?", *Industrial Management and Data Systems*, Vol. 108 No. 9, pp. 1234-1254.
- Holsapple, C.W. and Singh, M. (2001), "The knowledge chain model: activities for competitiveness", *Expert Systems with Applications*, Vol. 20 No. 1, pp. 77-98.
- Howard, G. (1994), "Why do people say nasty things about self-reports?", *Journal of Organizational Behavior*, Vol. 15 No. 5, pp. 399-404.
- Hsiao, Y.-C., Chen, C.-J. and Chang, S.-C. (2011), "Knowledge management capacity and organizational performance: the social interaction view", *International Journal of Manpower*, Vol. 32 Nos 5/6, pp. 645-660.
- Hsu, I.-C. and Sabherwal, R. (2012), "Relationship between intellectual capital and knowledge management: an empirical investigation", *Decision Sciences*, Vol. 43 No. 3, pp. 489-524.
- Hughes, M. and Morgan, R.E. (2007), "Deconstructing the relationship between entrepreneurial orientation and business performance at the embryonic stage of firm growth", *Industrial Marketing Management*, Vol. 36 No. 5, pp. 651-661.
- Huizingh, E.K.R.E. (2011), "Open innovation: state of the art and future perspectives", *Technovation*, Vol. 31 No. 1, pp. 2-9.
- Hurmelinna-Laukkanen, P. (2011), "Enabling collaborative innovation – knowledge protection for knowledge sharing", *European Journal of Innovation Management*, Vol. 14 No. 3, pp. 303-321.
- Hurmelinna-Laukkanen, P. and Puumalainen, K. (2007), "The nature and dynamics of appropriability – strategies for appropriating returns on innovation", *R&D Management*, Vol. 37 No. 2, pp. 95-112.
- Hurmelinna-Laukkanen, P. and Ritala, P. (2012), "Appropriability as the driver of internationalization of service-oriented firms", *Service Industries Journal*, Vol. 32 No. 7, pp. 1039-1056.
- Inkinen, H., Kianto, A. and Vanhala, M. (2015), "Knowledge management practices and innovation performance in Finland", *Baltic Journal of Management*, Vol. 10 No. 4, pp. 432-455.
- Inkinen, H., Kianto, A., Vanhala, M. and Ritala, P. (2014), "Intellectual capital and performance – empirical findings from Finnish firms", in Carlucci, D., Spender, J.C. and Schiuma, G. (Eds), *Knowledge and Management Models for Sustainable Growth, Proceedings of the 9th International Forum on Knowledge Asset Dynamics*, June 11-13, University of Basilicata, Matera, pp. 2918-2933.

- Jardon, C.M. and Martos, M.S. (2012), "Intellectual capital as competitive advantage in emerging clusters in Latin America", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 462-481.
- Kamhawi, E.M. (2012), "Knowledge management fishbone: a standard framework of organizational enablers", *Journal of Knowledge Management*, Vol. 16 No. 5, pp. 808-828.
- Kamukama, N., Ahiauzu, A. and Ntayi, J.M. (2010), "Intellectual capital and performance: testing interaction effects", *Journal of Intellectual Capital*, Vol. 11 No. 4, pp. 554-574.
- Kankanhalli, A., Tanudidjaja, F., Sutanto, J. and Bernard, C. (2003), "The role of IT in successful knowledge management initiatives", *Communications of the ACM*, Vol. 46 No. 9, pp. 69-73.
- Kaufmann, L. and Schneider, Y. (2004), "Intangibles: a synthesis of current research", *Journal of Intellectual Capital*, Vol. 5 No. 3, pp. 366-388.
- Khalifa, M., Yu, A.Y. and Shen, K.N. (2008), "Knowledge management systems success: a contingency perspective", *Journal of Knowledge Management*, Vol. 12 No. 1, pp. 119-132.
- Kianto, A. (2007), "What do we really mean by dynamic intellectual capital?", *International Journal of Learning and Intellectual Capital*, Vol. 4 No. 4, pp. 342-356.
- Kianto, A. (2008), "Development and validation of a survey instrument for measuring organizational renewal capability", *International Journal of Technology Management*, Vol. 42 No. 1, pp. 69-88.
- Kianto, A., Hurmelinna-Laukkanen, P. and Ritala, P. (2010), "Intellectual capital in service- and product-oriented companies", *Journal of Intellectual Capital*, Vol. 11 No. 3, pp. 305-325.
- Kianto, A., Ritala, P., Spender, J.-C. and Vanhala, M. (2014), "The interaction of intellectual capital assets and knowledge management practices in organizational value creation", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 362-375.
- Kim, T., Kim, W.G., Park, S.S.-S., Lee, G. and Jee, B. (2012), "Intellectual capital and business performance: what structural relationships do they have in upper-upscale hotels?", *International Journal of Tourism Research*, Vol. 14 No. 4, pp. 391-408.
- Kogut, B. and Zander, U. (1992), "Knowledge of the firm, combinative capabilities, and the replication of technology", *Organization Science*, Vol. 3 No. 3, pp. 383-397.
- Kunze, F., Boehm, S. and Bruch, H. (2013), "Organizational performance consequences of age diversity: inspecting the role of diversity-friendly HR policies and top managers' negative age stereotypes", *Journal of Management Studies*, Vol. 50 No. 3, pp. 413-442.
- Kuo, T.-H. (2011), "How to improve organizational performance through learning and knowledge?", *International Journal of Manpower*, Vol. 32 Nos 5/6, pp. 581-603.
- Lawson, B., Samson, D. and Roden, S. (2012), "Appropriating the value from innovation: inimitability and the effectiveness of isolating mechanisms", *R&D Management*, Vol. 42 No. 5, pp. 420-434.
- Lee, C.-L., Ho, C.-T. and Chiu, Y.-L. (2008), "The impact of knowledge management enables on non-financial performance in small and medium enterprises", *International Journal of Technology Management*, Vol. 43 Nos 1/3, pp. 266-283.
- Lee, S., Kim, B.G. and Kim, H. (2012), "An integrated view of knowledge management for performance", *Journal of Knowledge Management*, Vol. 16 No. 2, pp. 183-203.
- Lee, V., Leong, L., Hew, T. and Ooi, K. (2013), "Knowledge management: a key determinant in advancing technological innovation?", *Journal of Knowledge Management*, Vol. 17 No. 6, pp. 848-872.
- Leitner, K.-H. (2011), "The effect of intellectual capital on product innovativeness in SMEs", *International Journal of Technology Management*, Vol. 53 No. 1, pp. 1-18.
- Levin, R.C., Klevorick, A.K., Nelson, R.R. and Winter, S.G. (1987), "Appropriating the returns from industrial research and development", *Brookings Papers on Economic Activity*, Vol. 18 No. 3, pp. 783-831.
- McKeen, J.D., Smith, H.A. and Singh, S. (2005), "Developments in practice 124 XVI: a framework for enhancing IT capabilities", *Communications of the Association for Information Systems*, Vol. 15 No. 1, pp. 661-673.
- MacKenzie, S.B. and Podsakoff, P.M. (2012), "Common method bias in marketing: causes, mechanisms, and procedural remedies", *Journal of Retailing*, Vol. 88 No. 4, pp. 542-555.

- Maditinos, D., Šević, Z. and Tsairidis, C. (2010), "Intellectual capital and business performance: an empirical study for the Greek listed companies", *European Research Studies Journal*, Vol. 13 No. 3, pp. 145-167.
- Makadok, R. (2001), "Toward a synthesis of the resource-based and dynamic-capability views of rent", *Strategic Management Journal*, Vol. 22 No. 5, pp. 387-401.
- Mathuramaytha, C. (2012), "The impacts of intellectual capital on innovative capability: building the sustain competitive advantage on a resource-based perspective of Thailand industrials", *International Business Management*, Vol. 6 No. 4, pp. 451-457.
- Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995), "An integrative model of organizational trust", *Academy of Management Review*, Vol. 20 No. 3, pp. 709-734.
- Menor, L.J., Kristal, M.M. and Rosenzweig, E.D. (2007), "Examining the influence of operational intellectual capital on capabilities and performance", *Manufacturing and Service Operations Management*, Vol. 9 No. 4, pp. 559-578.
- Migdadi, M. (2009), "Knowledge management enablers and outcomes in the small-and-medium sized enterprises", *Industrial Management and Data Systems*, Vol. 109 No. 6, pp. 840-858.
- Minbaeva, D., Mäkelä, K. and Rabbiosi, L. (2012), "Linking HRM and knowledge transfer via individual-level mechanisms", *Human Resource Management*, Vol. 51 No. 3, pp. 387-405.
- Nahapiet, J. and Ghoshal, S. (1998), "Social capital, intellectual capital and the organizational advantage", *The Academy of Management Review*, Vol. 23 No. 2, pp. 242-266.
- Negash, S. (2004), "Business intelligence", *Communications of the Association for Information Systems*, Vol. 13 No. 1, pp. 177-195.
- Nonaka, I. and Takeuchi, H. (1995), *The Knowledge-Creating Company*, Oxford University Press, New York, NY.
- OECD (1996), *The Knowledge-Based Economy*, Organisation for Economic Co-operation and Development, Paris.
- Pirttimäki, V. (2007), "Business intelligence as a managerial tool in large Finnish companies", Doctoral Dissertation, Publication No. 464, Tampere University of Technology, Tampere.
- Podsakoff, P.M., MacKenzie, S.B., Lee, J.-Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903.
- Rindfleisch, A., Malter, A., Ganesan, S. and Moorman, C. (2008), "Cross-sectional versus longitudinal survey research: concepts, findings, and guidelines", *Journal of Marketing Research*, Vol. 45 No. 3, pp. 261-279.
- Robinson, R.B. and Pearce, J.A. (1988), "Planned patterns of strategic behaviour and their relationship to business-unit performance", *Strategic Management Journal*, Vol. 9 No. 1, pp. 43-60.
- Roos, G. and Roos, J. (1997), "Measuring your company's intellectual performance", *Long Range Planning*, Vol. 30 No. 3, pp. 413-426.
- Sarin, S. and McDermott, C. (2003), "The effect of team leader characteristics on learning, knowledge application, and performance of cross-functional new product development teams", *Decision Sciences*, Vol. 34 No. 4, pp. 707-739.
- Scarbrough, H. (2003), "Knowledge management, HRM and the innovation process", *International Journal of Manpower*, Vol. 24 No. 5, pp. 501-516.
- Seleim, A.A.S. and Khalil, O.E.M. (2011), "Understanding the knowledge management-intellectual capital relationship: a two-way analysis", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 586-614.
- Sergeeva, A. and Andreeva, T. (2016), "Knowledge sharing research: bringing context back in", *Journal of Management Inquiry*, Vol. 25 No. 3, pp. 240-261.
- Sharabati, A.-A.A., Jawad, S.N. and Bontis, N. (2010), "Intellectual capital and business performance in the pharmaceutical sector of Jordan", *Management Decision*, Vol. 48 No. 1, pp. 105-131.

- Singh, S.K. (2008), "Role of leadership in knowledge management: a study", *Journal of Knowledge Management*, Vol. 12 No. 4, pp. 3-15.
- Soto-Acosta, P., Colomo-Palacios, R. and Popa, S. (2014), "Web knowledge sharing and its effect on innovation: an empirical investigation in SMEs", *Knowledge Management Research and Practice*, Vol. 12 No. 1, pp. 103-113.
- Spender, J.C. (1996), "Making knowledge the basis of a dynamic theory of the firm", *Strategic Management Journal*, Vol. 17 No. S2, pp. 45-62.
- Spender, J.C. and Grant, R.M. (1996), "Knowledge and the firm: an overview", *Strategic Management Journal*, Vol. 17 No. S2, pp. 5-9.
- Starbuck, W.H. (2004), "Methodological challenges posed by measures of performance", *Journal of Management and Governance*, Vol. 8 No. 4, pp. 337-343.
- Stewart, T. (1997), *Intellectual Capital: The New Wealth of Organizations*, Doubleday, New York, NY.
- Subramaniam, M. and Youndt, M.A. (2005), "The influence of intellectual capital on the types of innovative capabilities", *Academy of Management Journal*, Vol. 48 No. 3, pp. 450-463.
- Sullivan, P. (1998), *Profiting from Intellectual Capital: Extracting Value from Innovation*, Wiley, New York, NY.
- Tsai, W. and Ghoshal, S. (1998), "Social capital and value creation: the role of intrafirm networks", *Academy of Management Journal*, Vol. 41 No. 4, pp. 462-476.
- Vaccaro, I.G., Jansen, J.J.P., Van Den Bosch, F.A.J. and Volberda, H.W. (2012), "Management innovation and leadership: the moderating role of organizational size", *Journal of Management Studies*, Vol. 49 No. 1, pp. 29-51.
- Van Wijk, R., Jansen, J.J. and Lyles, M.A. (2008), "Inter-and intra-organizational knowledge transfer: a meta-analytic review and assessment of its antecedents and consequences", *Journal of Management Studies*, Vol. 45 No. 4, pp. 830-853.
- Vanhala, M. and Ritala, P. (2016), "HRM practices, impersonal trust and organizational innovativeness", *Journal of Managerial Psychology*, Vol. 31 No. 1, pp. 95-109.
- Vanhala, M., Puumalainen, K. and Blomqvist, K. (2011), "Impersonal trust – the development of the construct and the scale", *Personnel Review*, Vol. 40 No. 4, pp. 485-513.
- Von Krogh, G. (1998), "Care in knowledge creation", *California Management Review*, Vol. 40 No. 3, pp. 133-153.
- Wang, D. and Chen, S. (2013), "Does intellectual capital matter? High-performance work systems and bilateral innovative capabilities", *International Journal of Manpower*, Vol. 34 No. 8, pp. 861-879.
- Weerawardena, J. (2003), "Exploring the role of market learning capability in competitive strategy", *European Journal of Marketing*, Vol. 37 Nos 3/4, pp. 407-429.
- Wiig, K.M. (1997), "Integrating intellectual capital and knowledge management", *Long Range Planning*, Vol. 30 No. 3, pp. 399-405.
- Wong, K.Y. (2005), "Critical success factors for implementing knowledge management in small and medium enterprises", *Industrial Management & Data Systems*, Vol. 105 No. 3, pp. 261-279.
- Wu, S.-H., Lin, L.-Y. and Hsu, M.-Y. (2007), "Intellectual capital, dynamic capabilities and innovative performance of organisations", *International Journal of Technology Management*, Vol. 39 Nos 3/4, pp. 279-296.
- Yang, C. and Lin, C. (2009), "Does intellectual capital mediate the relationship between HRM and organizational performance? Perspective of a healthcare industry in Taiwan", *International Journal of Human Resource Management*, Vol. 20 No. 9, pp. 1965-1984.
- Yang, C.-C., Marlow, P.B. and Lu, C.-S. (2009), "Knowledge management enablers in liner shipping", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 45 No. 6, pp. 893-903.
- Zack, M.H. (1999), "Developing a knowledge strategy", *California Management Review*, Vol. 41 No. 3, pp. 125-145.

IC	To what extent do the following statements on ... apply to your company? (1 = completely disagree, 5 = completely agree)	
Internal relational capital	Different units and functions within our company – such as R&D, marketing and production – understand each other well	0.616 ^a
	Our employees frequently collaborate to solve problems	0.771***
	Internal cooperation in our company runs smoothly	0.721***
	CR	0.75
External relational capital	Our company and its external stakeholders – such as customers, suppliers and partners – understand each other well	0.62 ^a
	Our company and its external stakeholders frequently collaborate to solve problems	0.776***
	Cooperation between our company and its external stakeholders runs smoothly	0.776***
	CR	0.77
Structural capital	Our company has efficient and relevant information systems to support business operations	0.518 ^a
	Our company has tools and facilities to support cooperation between employees	0.602***
	Our company has a great deal of useful knowledge in documents and databases	0.679***
	CR	0.63
Human capital	Our employees are highly skilled at their jobs	0.736 ^a
	Our employees are highly motivated in their work	0.626***
	Our employees have a high level of expertise	0.827***
	CR	0.78
Renewal capital	Our company has acquired a great deal of new and important knowledge	0.613 ^a
	Our company can be described as a learning organization	0.748***
	The operations of our company can be described as creative and inventive	0.773***
	CR	0.76
Trust capital	The way our company operates is characterized by an atmosphere of trust	0.73 ^a
	We keep our promises and agreements	0.677***
	Our company seeks to take the interests of its stakeholders into account in its operations	0.603***
	The expertise of our company inspires trust in stakeholders	0.613***
Entrepreneurial capital	CR	0.75
	Our employees are excellent at identifying new business opportunities	0.746 ^a
	Our employees show initiative	0.745***
	Our employees have the courage to make bold and difficult decisions	0.752***
	CR	0.79
	χ^2 (df)	326.97 (188)
	<i>p</i> -value	0
	RMSEA	0.054
	GFI	0.897
	CFI	0.978
	NNFI	0.973
	IFI	0.978

(continued)

Table AI.
Measurement items,
factor loadings and
model fit indices

KM practices	To what extent do the following statements on ... apply to your company? (1 = completely disagree, 5 = completely agree)	
	Supervisory work	Supervisors encourage employees to share knowledge at the workplace Supervisors encourage employees to question existing knowledge Supervisors allow employees to make mistakes, and they see mistakes as learning opportunities Supervisors value employees' ideas and viewpoints and take them into account Supervisors promote equal discussion in the workplace CR
Knowledge protection	Our company's strategic knowledge is protected from those stakeholders to whom it is not intended	0.803 ^a
	If necessary, our company uses patents, agreements, legislation and other formal means to protect its strategic knowledge CR	0.714*** 0.663*** 0.727*** 0.704*** 0.85
Strategic KM	Our company strategy is formulated and updated based on company knowledge and competences	0.806 ^a
	Our knowledge and competence management strategy is communicated to employees clearly and comprehensively CR	0.579*** 0.65 0.644 ^a 0.776*** 0.67
Knowledge-based recruiting	When recruiting, we pay special attention to learning and development ability	0.672 ^a
	When recruiting, we evaluate the candidates' ability to collaborate and work in various networks CR	0.746*** 0.67
Knowledge-based training and development	We offer our employees opportunities to deepen and expand their expertise	0.758 ^a
	Our employees have an opportunity to develop their competence through training tailored to their specific needs CR	0.838*** 0.78
Knowledge-based performance appraisals	The sharing of knowledge is one of our criteria for work performance assessment	0.751 ^a
	The creation of new knowledge is one of our criteria for work performance assessment The ability to apply knowledge acquired from others is one of our criteria for work performance assessment CR	0.765*** 0.737*** 0.81
Knowledge-based compensation	Our company rewards employees for sharing knowledge	0.81 ^a
	Our company rewards employees for creating new knowledge Our company rewards employees for applying knowledge CR	0.8*** 0.809*** 0.85
Learning mechanisms	Our company systematically collects best practices and lessons learned	0.867 ^a
	Our company makes systematic use of best practices and lessons learned CR	0.911*** 0.88
IT practices	Our company uses information technology in internal communication throughout the organization	0.65 ^a
	Our company uses information technology to communicate with external stakeholders Our company uses information technology to collect business knowledge related to its competitors, customers and operating environment, for example CR	0.62*** 0.661*** 0.68

Table AI.

(continued)

			IC, KMP and firm performance
Work organizing	Our employees have an opportunity to participate in decision-making in the company	0.674 ^a	
	In our company, work duties are defined in a manner that allows for independent decision-making	0.649***	
	When necessary, we use working groups with members who possess skills and expertise in a variety of fields	0.565***	
Model fit indices	CR	0.66	921
	χ^2 (df)	363.83 (279)	
	<i>p</i> -value	0.00047	
	RMSEA	0.034	
	GFI	0.905	
	CFI	0.989	
	NNFI	0.986	
Performance	IFI	0.989	
	Compared to other companies in its sector, how do you think your company has succeeded in the following areas over the past year? (1 = very poorly, 5 = very well)		
Market performance	Net sales growth	0.704 ^a	
	Profitability	0.757***	
	CR	0.70	
Innovation performance	Compared to its competitors, how successfully has your company managed to create innovations/new operating methods in the following areas over the past year? (1 = very poorly, 5 = very well)		
	Products and services for customers	0.540 ^a	
	Management practices	0.592***	
	Marketing practices	0.535***	
	Business models	0.771***	
Model fit indices	CR	0.71	
	χ^2 (df)	15.70 (8)	
	<i>p</i> -value	0.04695	
	RMSEA	0.061	
	GFI	0.980	
	CFI	0.981	
	NNFI	0.965	
IFI	0.981		

Notes: ^aSignificance level is not available because the coefficient is fixed at 1. ***Statistically significant at 0.01 significance level

Table AI.

About the authors

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