

Role of Codification and Personalization in Organizational Learning, Innovation and Performance: A Conceptual Framework and Research Propositions

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Abstract: This paper first provides a literature review that summarizes the inter-relationships among knowledge management (KM), organizational learning (OL), organization innovation (INNO) and organizational performance (OP) and a conceptual framework is then proposed to improve the OP through appropriate KM strategies. Two widely-adopted KM strategies –codification and personalization– are examined. Codification is defined as the extraction and storage of explicit knowledge from employees while personalization refers to the activities, like communities-of-practice or storytelling, which facilitate the knowledge transfer and exchange in organizations. Several studies emphasize that organizations should adopt one of them predominantly, in a ratio of 80 to 20 – i.e. 80% for personalization while 20% for codification or vice versa. In contrast, some researchers advocate that organizations should strike a balance between two strategies. The prioritization or balance between codification and personalization remains questionable. Moreover, KM strategies are proven to influence the OP directly and indirectly through INNO in many studies. In addition, one recent study points out that OL plays the mediator role between KM and INNO. However, there have been limited studies to address the relationship between codification/personalization and OL. Further investigation is needed. To develop the conceptual framework in this paper, diverse literature on codification, personalization, OL, INNO and OP were reviewed. As mentioned, the key elements in KM strategies are codification and personalization. Commitment to learning, open-mindedness and experimentation and shared vision are the major components of OL. INNO is further classified into four sub-categories: administrative, technical, product and process innovation. OP is measured in financial performance, customer intimacy, learning and growth and internal operation. This proposed framework seeks to enhance the understanding of different processes mediating KM strategies and OP. Understanding the roles of OL and INNO, senior management can gain the insights in prioritizing/balancing between different KM strategies and in turn improving OP.

Keywords: codification, personalization, organizational learning, innovation, knowledge management

1. Introduction

Over the past ten years, more studies have shown that effective strategic KM improve the overall business performance (Zack et al., 2009, Choi et al., 2008, Noruzi et al., 2013, Lee et al., 2012). The two sub-strategies of KM are codification and personalization (Hansen et al., 1999). Although different studies exhibit that both codification and personalization positively influence INNO, disagreement exists between their ratios, i.e. 80-20, 60-40 and 50-50. Moreover, there is limited literature addressing the relationship between KM strategies and OL. This paper aims to propose a conceptual framework to fill these two research gaps: (1) balancing issue on codification and personalization; and (2) the relationship between KM strategies (codification and personalization) and OL. The conceptual framework also includes the propositions addressing the relationships among OL, INNO and OP. This paper first provides a review on KM strategies and the advantages and disadvantages of each sub-strategy are discussed. Another section examines several key OL models and summarizes its measurements. Thirdly, both previous studies on INNO and OP are reviewed comprehensively. A conceptual model with research propositions is then developed. In the final section, this paper provides directions for future research.

2. Knowledge management strategy

KM strategy plays a critical role in enhancing OP. A number of studies prove that the implementation of appropriate KM strategies can significantly improve the overall performance of organizations (Choi et al., 2008, López-Nicolás and Meroño-Cerdán, 2011, Rašula et al., 2012, Valmohammadi et al., 2015, Yang, 2010). For the definition of KM strategy, Zack (2002) views it as a high-level plan which provides information about processes, tools and infrastructure so as to manage the exchange of knowledge in an organization. Later, Yang (2010) define KM strategies as the competitive plans which support the organization to create and transfer knowledge, in turn providing value-added products or services and fulfilling consumers' expectations. Within the domain of KM strategy, there are several sub-strategies in literature. March (1991) first introduced the concepts of exploitation

and exploration. Secondly, Hansen et al. (1999) compared and contrasted two KM sub-strategies - codification and personalization. The former one concerned about how knowledge is codified, stored and accessed through e-databases while the latter one referred to how knowledge is shared through direct contact among employees (Hansen et al., 1999). Pourhamidi (2013) summarizes that the characteristics of codification is similar to those defined in exploitation whilst those attributes in personalization is consistent with the concept of exploration. A broader perspective has been adopted by Choi and Lee (2003) who argues that there are system-oriented and human-oriented KM sub-strategies. The adoption of different KM strategies in recent literature is summarized (Table 1). This paper focuses on the concepts of codification and personalization –in which are widely adopted in studies.

Table 1: KM strategies in literature

KM Strategy Author(s)	Codification- Personalization	Exploitation-Exploration	System-oriented- Human-oriented
Ju et al. (2006)			✓
López-Nicolás and Meroño-Cerdán (2011)	✓		
Martín-de Castro et al. (2011a)	✓		
Canzano and Grimaldi (2012)	✓	✓	
Pourhamidi (2013)	✓		
Shahzad et al. (2013)			✓
Yousif Al-Hakim and Hassan (2013)	✓		
AL-Hakim and Hassan (2014)	✓		
Arvanitis and Woerter (2014)		✓	
Shamah (2014)	✓		

Codification is a “people-to-document” approach to extract explicit knowledge from employees and store them in e-database repositories (Hansen et al., 1999, Bharati et al., 2015). Organizations promote users to retrieve/search within repositories and realize the knowledge reuse concept (Liu et al., 2013, Ajith Kumar and Ganesh, 2011). In contrast, personalization is a “people-to-people” approach which has several objectives (1) connect people and build a network; (2) facilitate the interactions between knowledge owners and employees; and (3) ultimately promote the transfer of tacit knowledge (Liu et al., 2013, Ajith Kumar and Ganesh, 2011, Lin, 2011, Hansen et al., 1999). A comparison between codification and personalization is done (Table 2). Moreover, a number of studies draw attention to the balancing issue between codification and personalization (Chai and Nebus, 2012, Liu et al., 2013). Hansen et al. (1999) argue that organization should not straddle when implementing these two KM sub-strategies. Organizations are recommended to adopt one predominantly - 80% -while another one acts as the supporting role -20% (Hansen et al., 1999). The study further warns organizations that failure is the consequence if they adopt both equally or one of them alone. However, this viewpoint is challenged by several latest studies (Table 3).

Table 2: Comparison between codification and personalization

	Codification	Personalization
Media for the knowledge flow	Internet, intranet, document management systems, seminars, post-project reviews, search engines, e-learning, knowledge maps, decision support systems	Meetings, tele- and video-conference, one-to-one conversations, community of practice, story-telling, groupware, yellow pages, mentoring
Advantages	Invest once, reuse many times, creating scales economies	Moderate investment in technology
	No loss of explicit knowledge employees left	Difficult to imitate
	High breadth of audiences	Favourable to innovation
Disadvantages	Lead to information overload	Not willing to share because of the fear of losing power
	Unprocessed documents slow down the speed of retrieval, seldom used again	Complex tacit knowledge lost when employees leave
	Heavy investment in creating and maintaining technology systems	
	Explicit knowledge has a short shelf-life, imitable in nature and highly mobile	

Source: Adapted from Hansen et al. (1999),Merono-Cerdan et al. (2007),Ajith Kumar and Ganesh (2011),López-Nicolás and Meroño-Cerdán (2011),Liu et al. (2013)

Table 3: Balancing issues between codification and personalization

Author(s)	Sample	Findings
Rivière et al. (2007)	97 organizations	Codification is the dominant approach with low level of trust; nonetheless, personalization or balanced approach is recommended with high level of trust No organizations adopt 80-20 split
Ambos and Schlegelmilch (2009)	6 consulting companies	Spend 60% resources on personalization and 40% on codification These two sub-strategies contribute differently at different stages of project life cycle
Ajith Kumar and Ganesh (2011)	284 employees	At early stage, predominantly codification or personalization approach can be adopted; however, a balance one should be implemented in the later stage
Venkitachalam and Willmott (2013)	4 case studies	A dynamic approach should be adopted as it is affected by external and internal factors

3. Organizational learning

In the last ten years, there have been more and more researchers looking at the field of OL. Several studies point out that OL has a significant impact on competitive advantages (Liao and Wu, 2010, Noruzy et al., 2013, Chahal et al., 2015). OL refers to the change of the organizational knowledge (or memory) when employees acquire experience through solving problems (Liao et al., 2008, Argote and Miron-Spektor, 2011). This is consistent with another study by Chahal et al. (2015, p.380) who argue that “*Learning is the act of seeking knowledge or skill and is considered as a continuous testing of experience and its transformation into knowledge to identify and solve organisational problems*”. As a result, organizations gain new insights from employees which enhance organizational capabilities (Jiménez-Jiménez and Sanz-Valle, 2011). From KM perspective, OL is composed of the several stages: (1) knowledge acquisition/creation; (2) knowledge sharing/transferring/dissemination; and (3) knowledge utilization/integration (Noruzy et al., 2013, Liao and Wu, 2010, Argote, 2011).

Table 4: Evolution of OL models

<p>Source : Adapted from Crossan et al. (1999)</p>	<p>Source: Adapted from Li et al. (2006)</p>	<p>Source: Adapted from Argote and Miron-Spektor (2011)</p>
<p>Figure 1: Four “I” framework of OL</p>	<p>Figure 2:Model of OL</p>	<p>Figure 3: A framework for analysing OL</p>

Several key OL frameworks are evaluated (Table 4). Due to the lack of OL theory, Crossan et al. (1999) attempt to build one which is comprised four “I” – Intuiting, Interpreting, Integrating and Institutionalizing – interplaying with learning at three levels – individual, group and organizational. The proposed model illustrates that OL is dynamic and involves feed-forward process –new ideas generated from employees transfer to groups and influence the organization – and feedback process –the impacts to organization also influence groups and then employees. From the system perspective, Li et al. (2006) develop another framework and highlight that OL is initiated by a question or a problem. Employees look for solution from the organizational memory. If solution cannot be found, employees have to enhance the existing solutions or to develop new solution which ultimately affects the organization, i.e. feed-forward process. In contrast, if solution is found, organizational knowledge is acquired and utilized by employees, i.e. feedback process. This model provides a better picture for practicing managers to understand what OL is. Argote and Miron-Spektor (2011) further enhance the model by emphasizing the environmental factor – including customer, government, regulators and rivals. OL occurs not only at individual, group and organization levels, but also at inter-organizational level (Argote and Miron-Spektor, 2011, Ingram, 2002). Different researchers have measured OL in a variety of ways. Liao et al. (2008) review several studies and adopt the measurement by Sinkula et al. (1997), in which is composed of three constructs –

(1) commitment of learning; (2) shared vision; and (3) open-mindedness. In addition to commitment and open-mindedness constructs, Liao and Wu (2010) further add two constructs, system perspective and knowledge transfer and integration for measuring OL. The dimensions of OL adopted in latest studies are summarized below (Table 5).

Table 5: Measurement of OL

Author(s) & Year	Dimensions of OL
Salim and Sulaiman (2011);Sony and Naik (2012);Battor and Battour (2013);Calisir et al. (2013);Mavondo and Tsarenko (2015)	Commitment to learning, shared-vision and open-mindedness
Alegre and Chiva (2013);Lin (2013);Fernández-Mesa and Alegre (2015)	Experimentation, risk taking, interaction with external environment, dialogue, and participative decision making

4. Organizational innovation

INNO is an important subject for KM. It represents that new and novel ideas for products, services or processes are generated, adopted and implemented(Thompson, 1965). Both Crossan and Apaydin (2010) and Martín-de Castro et al. (2011b) argue that INNO can be viewed from two perspectives – “innovation as a process” and “innovation as an outcome”. In the study by Crossan and Apaydin (2010), “innovation as a process” includes five dimensions: driver, source, locus, view, and level. This is aligned with the two-stage model –idea generation and idea implementation by Martín-de Castro et al. (2011b). Crossan and Apaydin (2010) categorize “innovation as an outcome” as a (1) form–product, services or process; (2) magnitude–incremental/radical; (3) referent–firm, market or industry; and (4) type – administrative/technical. This idea is parallel to those by Martín-de Castro et al. (2011b). The dimensions adopted in studies are tabulated (Table 6).

Table 6: Dimensions of INNO

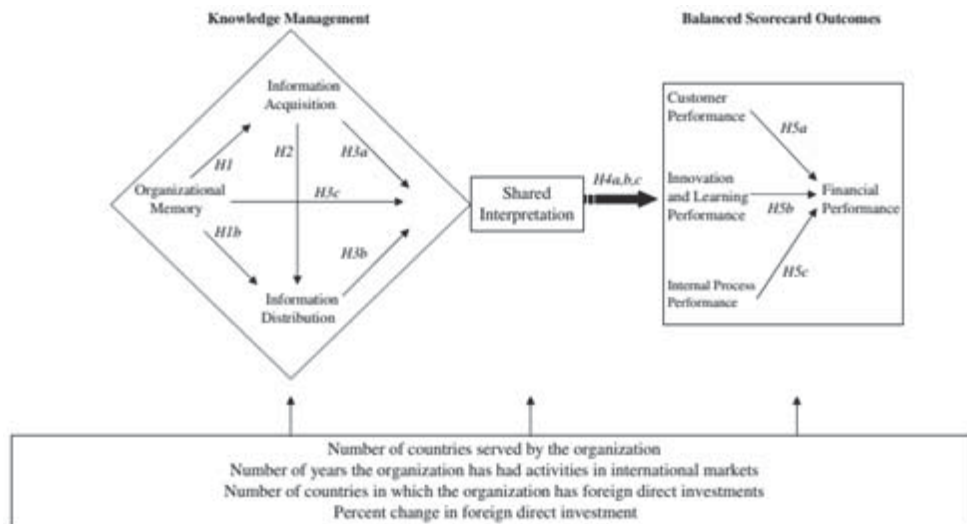
Innovation Literature	Product vs. Process	Administrative vs. Technical	Incremental vs. Radical
Chen and Huang (2009)		✓	
Jiménez-Jiménez and Sanz-Valle (2011)	✓	✓ (administrative)	
López-Nicolás and Meroño-Cerdán (2011)	✓		
Murat Ar and Baki (2011)	✓		
Parast (2011)			✓
Chang et al. (2012)			✓ (radical)
Gallego et al. (2013)	✓		
Noruzi et al. (2013)	✓		
Yousif Al-Hakim and Hassan (2013)		✓	✓
Choe (2014)	✓		

Different dimensions of innovation are defined (Rowley et al., 2011, Kim et al., 2012):

- *Product/Service* - new products or services offered to clients.
- *Process* - new ideas implemented in operations and production.
- *Administrative* - changes in social structure/administrative processes
- *Technical* - innovations triggered by the advancement of technology and affect operations.
- *Incremental* - “add-on change” of existing concept which aims to fulfil the customers’ needs.
- *Radical* - “fundamental change” which creates a demand not yet recognized.

5. Organizational performance

The relationship between strategic KM and OP is widely investigated in the past fifteen years. Organizations attempt to gain competitive advantages for survival or growth through KM (Ho, 2009, Wang and Wang, 2012, Zhao et al., 2012). This section aims to examine the different dimensions of OP and its measurements. A number of studies adopt balanced scorecard (BSC) to measure the OP (López-Nicolás and Meroño-Cerdán, 2011, Yousif Al-Hakim and Hassan, 2013, Lin, 2014, Valmohammadi et al., 2015).



Source: Adapted from Gonzalez-Padron et al. (2010)

Figure 4: A framework linking KM and OP with BSC

In order to have a clear picture of OP, Kaplan and Norton (1992) develop a cross-functional tool –BSC– which measures not only the financial performance, but also the customer perspective, learning and innovation perspective and the internal process. Gonzalez-Padron et al. (2010) conduct a study with more than 160 multinational companies to examine the relationship between KM and OP with BSC. Aligned with the concepts in previous sections, employees acquire knowledge from organizational memory and distribute across different units (Figure 4). Through knowledge sharing, the study confirm that the performance in customer intimacy, earning and growth and internal process is enhanced (Gonzalez-Padron et al., 2010). However, only customer intimacy has a positive relationship with the financial performance.

6. A conceptual framework of KM strategies, organizational learning, innovation and performance

Previous sections provide a literature review in KM strategies, OL, INNO and OP. The inter-relationships among variables and research gaps will be addressed in this section. After all, several propositions are constructed and a framework is proposed. Firstly, López-Nicolás and Meroño-Cerdán (2011) prove that both codification and personalization have a direct positive impact on OP in Spanish companies. Such impact is particularly significant on financial perspective, followed by process and internal performance. This result is consistent with that obtained in Iraq (Yousif Al-Hakim and Hassan, 2013). Moreover, the positive relationships between codification and personalization and OP are identified in a study with 192 Indonesian manufacturing firms (Hasan et al., 2015). Although this positive association has been proven in many studies, López-Nicolás and Meroño -Cerdán (2011) suggest that this relationship can be further validated in different countries. Thus, this paper proposes that

- P1: Both (a) Codification and (b) Personalization strategy have a positive impact on OP

The second set of propositions is related to the relationship between KM strategies and INNO. Brusoni et al. (2005) explore the relationship between codification and innovative behaviour in a firm. The empirical result exhibits that there is no such impact in between. However, this result is challenged by several recent studies. Rhodes et al. (2008) demonstrate that personalization has a greater impact on INNO than codification. More studies also confirm the significant positive relationship exists between KM strategies (both codification and personalization) and INNO (Yousif Al-Hakim and Hassan, 2013, López-Nicolás and Meroño-Cerdán, 2011). López-Nicolás and Meroño-Cerdán (2011) analyse that INNO can be enhanced through both the implementations of “hard IT practices” (i.e. codification) and “soft human resources practices” (i.e. personalization). Such association is also proved in the mobile and telecommunication sector (Yousif Al-Hakim and Hassan, 2013); however, the authors put forward that the result is limited to Iraqi telecommunication sector and may not be generalizable to other industries. As these relationships are still questionable, the following propositions are developed:

- P2: Both (a) Codification and (b) Personalization strategy have a positive impact on INNO

For the theme of KM and OL, Dasgupta and Gupta (2009) illustrate the interplay effect between KM strategies and OL. However, there is a lack of empirical evidence. Later, Liao and Wu (2010) confirm that more OL capability can be achieved through more KM activities. However, this study did not specify whether KM activities refer to codification and personalization. As there are limited studies addressing the relationship between KM strategies and OL, this paper develops:

- P3: Both (a) Codification and (b) Personalization strategy have a positive impact on OL

Moreover, Liao et al. (2008) show that positive relationships exist between OL and administrative/technical innovation. In the ceramic tile sector, Alegre and Chiva (2008) prove that a higher level of OL lead to a better performance in product innovation. In a later study by Liao and Wu (2010), the result recommends that both organizations and members could learn in an active and novelty way. As a result, learning inertia is eliminated and OL is enhanced, thus leading to greater INNO. This association is also identified in high-tech sector (Hung et al., 2011, Salim and Sulaiman, 2011), manufacturing/service sectors (Jiménez-Jiménez and Sanz-Valle, 2011), automotive and chemical sectors (García-Morales et al., 2012). This paper proposes:

- P4: OL has a positive impact on INNO

García-Morales et al. (2006) examine the relationships between both OL and INNO with OP. A positive association between the abovementioned constructs is found in food-farming, manufacturing/service and construction sectors. Noruzy et al. (2013) further examine the relationships between OL and OP and between INNO and OP in manufacturing industry. The first finding demonstrates that manufacturing firms can gain competitive advantages and achieve long-term superior performance through continuous and speedily learning. Secondly, the study recommends managers should establish a learning culture that can support the execution of INNO, in turn enhance the competitive advantages and overall performance of organizations (Noruzy et al., 2013). Moreover, the statistical analysis conducted by López-Nicolás and Meroño-Cerdán (2011) reveals that INNO is a significant mediator between KM strategy and OP. Result from the high-tech sector also demonstrate a positive relationship between INNO and OP (Rhodes et al., 2008, Salim and Sulaiman, 2011). However, Yousif Al-Hakim and Hassan (2013) only confirm the partial mediation effect between KM strategy and OP. Therefore, this study develops:

- P5: OL has a positive impact on OP
- P6: INNO has a positive impact on OP

A conceptual framework is developed as below (Figure 5).

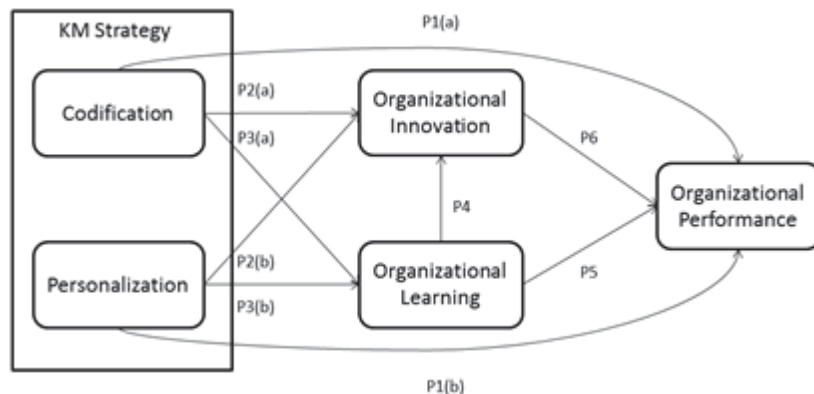


Figure 5: The conceptual framework

7. Implications for future research

The contribution of this paper is to develop a conceptual framework in which to fill the research gaps – (1) balancing issue between codification and personalization; and (2) the relationship between KM strategies and OL. As this framework has not been tested empirically, it is not suggested to be used as a management tool. In order to test the propositions, this paper recommends researchers to collect data from organizations with different size. Data can be collected from questionnaire. When designing the questionnaire, scale items can be drawn from previous studies. In order to test the inter-relationships among variables, structural equation modelling (SEM) is recommended. An empirical study will enhance the understanding of managers on the relationships between KM, OL, INNO and OP.

8. Conclusion

It is crucial for organizations improve OP and competitive advantages through effective strategic KM. The first section discusses two KM sub-strategies - codification and personalization. Moreover, this paper summarizes recent findings on the balancing issue between two sub-strategies. By evaluating several key OL models, its evolution in the past ten years are presented. Furthermore, a comprehensive review of INNO is conducted and it can be classified as "innovation as a process" and "innovation as an outcome". In most of the studies, the effect of KM on OP is measured using BSC. The proposed conceptual framework is presented and researchers are encouraged to test it empirically. Through SEM, the conceptual model can be validated the relative importance of variables can be examined.

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