Knowledge Management & E-Learning
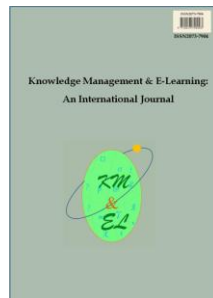
Knowledge management adoption and its impact on organizational learning and non-financial performance

Yudho Giri Sucahyo
Diyah Utari
Nur Fitriah Ayuning Budi
Achmad Nizar Hidayanto
Dina Chahyati
Universitas Indonesia, Indonesia

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Yudho Giri Sucahyo

Faculty of Computer Science
Universitas Indonesia, Indonesia
E-mail: yudho@cs.ui.ac.id

Diyah Utari

Faculty of Computer Science
Universitas Indonesia, Indonesia
E-mail: diyah.utari@gmail.com

Nur Fitriah Ayuning Budi

Faculty of Computer Science
Universitas Indonesia, Indonesia
E-mail: nurfit90@gmail.com

Achmad Nizar Hidayanto*

Faculty of Computer Science
Universitas Indonesia, Indonesia
E-mail: nizar@cs.ui.ac.id

Dina Chahyati

Faculty of Computer Science
Universitas Indonesia, Indonesia
E-mail: dina@cs.ui.ac.id

*Corresponding author

Abstract: This paper aims to investigate the determinants of knowledge management (KM) adoption on organizational and individual level, as well as its impact on non-financial performance through an intermediary of organizational learning ("OL"). The KM adoption model was constructed by using a combination of TOE (Technology, Organizational and Environment) for the organizational level and TPE (Technology, Personal, and Environmental) framework for the individual level; this we called the TOPE (Technology, Personal, Organizational, and Environment) framework. Questionnaires were sent to 60 Indonesian big companies which participated in the Most Admired Knowledge Enterprise (MAKE) Award. Data from 139 respondents (51 companies) was analysed using partial least squares (PLS). This study showed the most essential factors influencing KM adoption and practice are perceived usefulness, ease of use of KM technology, industrial factors, management

support, organization culture, and IT infrastructure. Meanwhile, the factors that are loosely connected to adoption initiative and KM practice are mimetic pressure, strategic planning, and organizational structure. In addition, the result of this study inferred that KM adoption and implementation fairly impact on the improvement of non-financial performance by the intermediary of organizational learning capability improvement.

Keywords: Knowledge management; Knowledge management adoption; MAKE Award; Non-financial performance; Organizational learning; Indonesia

Biographical notes: Yudho Giri Sucahyo is a lecturer in Faculty of Computer Science, Universitas Indonesia. He received his PhD degree from Curtin University of Technology, Australia, in 2005. His research interests are related to information systems/information technology such as e-government, IT governance, information security and data mining.

Diyah Utari obtained her master degree in computer science from Universitas Indonesia. Currently she is working as business analyst in a private company in Jakarta, Indonesia. Her research interests are related to information systems and knowledge management.

Nur Fitriah Ayuning Budi obtained her bachelor degree in Information Systems from Universitas Indonesia in 2012. Currently she is pursuing her master degree in computer science in Universitas Indonesia. Her research interests are related to information systems and information technology.

Achmad Nizar Hidayanto is the Head of Information Systems/Information Technology Stream, Faculty of Computer Science, Universitas Indonesia. He received his PhD in Computer Science from Universitas Indonesia. His research interests are related to information systems/information technology, e-learning, e-commerce, e-government, knowledge management, enterprise systems, technology adoption and information retrieval.

Dina Chahyati is a lecturer in Faculty of Computer Science, Universitas Indonesia. She received her master degree in computer science from Universitas Indonesia. Currently she is pursuing her PhD degree in computer science in Universitas Indonesia. Her research interests are related to information systems and image processing.

1. Introduction

Nowadays, knowledge is indisputably essential for any organization or enterprise. Previously, enterprises were overly busy to win from their competitors without regard to the importance of knowledge as a strategic resource (English & Baker, 2006). They gradually realized and sought better KM strategy, as it proves to beneficially impact organizational performance and innovation (Alegre, Sengupta, & Lapiedra, 2013; Birasnav, 2014; Cohen & Olsen, 2014; Dewangga, Hidayanto, & Alfina, 2014; Jokela, Niinikoski, & Muhos, 2014; Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, & Rezazadeh, 2013).

The KM adoption is not easy as it seems. Organizations or enterprises encounter scads of challenges in deciding whether they should adopt KM or not because of the complexity of an organization or of the KM adoption process itself. Generally, the level

of KM adoption covers organizational level and individual level (Kaldi, Aghaie, & Khoshalhan, 2008). The phrase "organizational level" adoption refers to an organization's decision to implement KM, from its initiation, to its adoption, and finally adaptation. On the other hand, the phrase "individual level" adoption denotes the individual acceptance of KM programs and activities integrated in one's daily tasks, from acceptance, to routines, and resulting organizational impact. Clearly, organizational level KM adoption brings about more complexity than individual level KM adoption, as the former includes and should consider the latter.

A number of studies have examined KM adoption on the individual level. In contrast, a handful of studies discuss adoption intention of KM on the organizational level, with most of them either using small to medium enterprises as the object of the study or focusing on the utilization of knowledge management systems (Alatawi, Dwivedi, & Williams, 2013; Hsu, Lawson, & Liang, 2007; Huang, Quaddus, Rowe, & Lai, 2011; Hung, Wu, & Chen, 2014; Kuo & Lee, 2011; Lin, 2014; Quaddus & Xu, 2005; Yun, 2013). These studies are mostly constructed using the concept of user acceptance of new technology, in particular Theory of Reasoned Action (TRA) and Technology Acceptance Model (TAM) theories (Lin, 2014; Huang, Quaddus, Rowe, & Lai, 2011; Quaddus & Xu, 2005), Unified Theory of Acceptance and Use of Technology (UTAUT) (Alatawi, Dwivedi, & Williams, 2013), TAM (Money & Turner, 2004), and DeLone McLean and Social Cognitive Theory (SCT) (Hidayanto, Limupa, Junus, & Budi, 2015).

Two studies by Alatawi, Dwivedi, and Williams (2013) and Kaldi, Aghaie, and Khoshalhan (2008) on KM adoption at the organizational level have limited conceptual models and have not been proved empirically. Wang and Lai (2014) also proposed a KM adoption model by integrating technology, organization, and individual (TOI). This model however lacked certain important variables such as (1) strategic planning, culture, and organizational structure (from an organizational dimension); (2) perceived usefulness and ease of use (from an individual dimension); also (3) the availability of IT infrastructure (in technological dimension). Further, as an enterprise benefits from knowledge by creating competitive advantage from its competitor, it is important to consider environmental factors driving KM adoption. Business processes within an organization are often influenced by the environment where the organization and competition exist. Porter and Millar (1985) identified five factors for industry competition; these are existing competitive rivalry between suppliers, threat of new market entrants, bargaining power of buyers, power of suppliers, and threat of substitute products. Innovation becomes key to bolster, strengthen, and elevate the competitive position of an organization. Industrial factors are also seen indirectly to be the inspiring factors for an organization to adopt KM, in particular customer expectation, market uncertainty, business process complexity, and external consultant advice. In addition, normally an organization will adapt and follow a partner perceived as successful in adopting new technology and deriving benefit from it. These factors have not been yet explored in previous studies.

Looking at the aforementioned challenges, the objective of this study is to identify factors influencing KM practice and adoption at an organizational level by considering personal factors. In doing so, we combine TOE (Technology, Organizational and Environment) framework for the organizational level and TPE (Technology, Personal, and Environmental) framework for the individual level; this hybrid framework was named the "TOPE" (Technology, Personal, Organizational, and Environment) framework.

In order to enrich, improve, and gain new and different perspective from previous studies, this study sought 60 big Indonesian companies which participate at the Most

Admired Knowledge Enterprise (MAKE) Award. Each company is represented in this study. Further, through this study, we want to explore more the impact of KM adoption on non-financial performance through an intermediary of OL, which has not been explored in previous works. Whereas previous studies directly measured the impact of KM implementation on organizational performance (Birasnav, 2014; Suryaningrum, 2012; Soon & Zainol, 2011; Zaied, Hussein, & Hassan, 2012; Zack, McKeen, & Singh, 2009), this study examined the impact of KM implementation through an intermediary of OL as a goal of KM implementation. Thus, we attempt to deliver a complete model and explorative analysis to examine the intentions of KM adoption at both the organizational and individual levels.

The remainder of this paper is organized as follows: The literature review is explained in the next section. Then, the research model and hypotheses are presented in Section 3. Section 4 reports instrument development and data collection. Section 5 presents results, discussion, and theoretical and managerial implications. Finally, we conclude our work in Section 6.

2.   Conceptual framework

2.1. Knowledge and knowledge management

Knowledge is an asset both for an individual and organization that is used to obtain competitive advantage. According to origin hierarchy, knowledge is a collection of information that can be used for decision-making and actions (Chen & Hew, 2015; Hemsley & Mason, 2013). In general, Nonaka and Takeuchi (1995) group knowledge into two categories - tacit and explicit knowledge (Panahi, Watson, & Partridge, 2012). Explicit knowledge is knowledge that is articulated, written, and documented in the form of books, journals, manuals, databases, and so forth. Meanwhile, tacit knowledge is knowledge that exists in the mind and heads of each individual in the form of experience, insight, expertise, trust, and so forth. Of the two types of knowledge, knowledge stored by individuals is mostly in the form of tacit knowledge (Panahi, Watson, & Partridge, 2012). Unfortunately, knowledge in the form of tacit knowledge is unstructured. Furthermore, although this knowledge is stored in most individuals, they often demonstrate resistance to document, externalize, and share their knowledge to organizations. As a result, companies which greatly rely on individuals are susceptible to 'knowledge loss', i.e., when these individuals no longer work at the company. Looking at this phenomenon, companies need to take initiative to define knowledge management strategies within the company in the form of knowledge management.

Knowledge management is defined as a systematic process to discover, select, collect, share, and communicate both tacit and explicit knowledge from employees, so that, they can utilize it effectively and productively to finish their tasks and optimize organization knowledge (Alavi & Leidner, 2001; Davenport, De Long & Beers, 1998). Another study asserts that knowledge management is a process managing various knowledge assets possessed by an organization -both tacit knowledge and explicit knowledge -to make the knowledge valuable for users to accomplish their tasks and beneficial for an organization (Tiwana, 2000). Therefore, we can conclude that knowledge management is the organization or management of knowledge in an organization so it can be used to achieve organizational goals.

2.2. Technology, organization, and environment (TOE) and technology, personal and environment (TPE) framework

Knowledge management initiatives need to consider a variety of factors. Although not all knowledge management initiatives are computerized and supported by a sophisticated system, the successful adoption of KM depends on three important legs, namely organization, people, and infrastructure (Becerra-Fernandez & Sabherwal, 2010). In this context, people factors are important to consider because the most knowledge is stored in people's minds in the form of tacit knowledge within the organization and is often unstructured. Furthermore, KM processes are basically not mandatory activities, like activities in the company's business processes. However, indirectly the KM process will have an impact on organizational performance in general (Becerra-Fernandez & Sabherwal, 2010). Therefore, to encourage individuals in an organization's KM process requires full support of top management, in the form of policies, procedures, and KM strategies. When top management and people support are met, then an organization requires supporting infrastructure (i.e., physical and information technology which support KM management processes) to equip KM practice.

Business processes within an organization are often influenced by the environment where the organization and its competition exist. Porter and Millar (1985) identified five factors for industry competition. These are existing competitive rivalry between suppliers, threat of new market entrants, bargaining power of buyers, power of suppliers, and threat of substitute products. Innovation becomes a key success factor to bolster, strengthen, and elevate the competitive position of an organization. Industrial factors are seen indirectly to be the inspiring factors for an organization to adopt knowledge management (in particular customer expectation), market uncertainty, business process complexity, and external consultant advice. In addition, an organization normally will adapt and follow a partner that is perceived to successfully adopt new technology and benefiting from it.

To investigate the driving factors of KM adoption and practice in an organization, one can use a combination of TOE (technology, organization, environment) framework and TPE (technology, personal, environment) framework. TOE framework was developed by Tornatzky and Fleischer (1990). It identifies three aspects of an organization which influence their business process to adopt and implement technological innovations; in particular technological, organizational, and environmental context. The technological context interprets an important internal and external technology for an organization, covering current practice and applications, as well as the availability of external technology (Starbuck, 1976; Hage, 1980). Then, the organizational context presents descriptive assessment of the organization, particularly related to the organization's business coverage, management structure, and size. Meanwhile, the environmental context accounts for the organization's business areas, including industry, competitors, relationship, and government policy (Tornatzky & Fleischer, 1990).

The adopted TOE framework affords the analytical framework used the opportunity to effectively examine the adoption and assimilation of various IT innovations. It has a theoretical base, consistent empirical literature, and application suitable for information systems domain, even though the identified factors in those three contexts might vary. Besides, the TOE framework is fairly consistent with Diffusion of Innovation (DOI) theory by Rogers (1995) that accentuates individual characteristics as well as internal and external characteristics of an organization as innovation enablers. Meanwhile, the environmental context elaborates the impediments, chances and opportunities for innovation. Additionally, the TOE framework presents a clear

explanation of innovation diffusion amongst enterprises or organizations (Hsu, Kraemer, & Dunkle, 2006). Hence, it can be implied that the TOE framework is more complete compared to other frameworks.

The TOE framework explains the acceptance of the technology in an organization that includes technological factors, and organizational environments. However, the focus of a TOE framework is to evaluate the acceptance of technology at an organizational level, and not on an individual one. Therefore, Jiang, Chen, and Lai (2010) developed a model derived from TOE intended to evaluate the adoption of the technology at the individual level, known as the Technology, Personal, and Environment (TPE) framework. In addition, the personal dimension represents the individual characteristics of the acceptance of the technology. In this study, existing factors in the personal dimension are derived from TAM (Technology Acceptance Model), which is perceived usefulness and ease of use.

2.3. Organizational learning (OL)

Knowledge within an organization could be a collection of experiences accumulated as the organization performs its business processes (Argote & Miron-Spektor, 2011). The accumulation of experience acquired by an organization reflects the learning performance of an organization. OL basically happens in the context of the organization itself and the external environment in which the organization exists (Argote & Miron-Spektor, 2011). The phrase "external environment" includes competitors, clients, educational establishments, and governments, which have multiple dimensions, namely volatility, uncertainty, interconnectedness, and munificence. Meanwhile, the organizational context includes the characteristics of the organization, such as structure, culture, technology, identity, memory, goals, incentives, and strategy. Both of them interact with the experiences of organizations to create knowledge. Subsequently, the acquired knowledge is shared, applied, and used in a sustainable manner by all elements in an organization to achieve better performance. It is under these conditions that OL occurs.

Generally, OL stands for dynamic process as the result of recursive knowledge interchange on several degrees, from individual level, group, and eventually the organizational level (Crossan, Lane, & White, 1999). This process emanates from knowledge acquisition of each individual and is enriched by knowledge interchange and integration until collective knowledge emerges, is ingrained and fused in the organization and culture processes.

OL is a multidimensional concept; hence, an organization should be able to demonstrate high achievement for learning capabilities in all dimensions, to be valued as a learning organization. Likewise, OL depends unquestionably on individual and group learning accumulated as OL. The essential components used to assess OL are: system perspectives, leadership and management commitment, experiment and innovation, knowledge transfer, and problem solving (Jerez-Gomez, Cespedes-Lorente, & Valle-Cabrera, 2005). These components reflect organizational characteristics and management embodied in an organization.

3.   Research model development and hypotheses

The constructed research model presented in Fig. 1 refers to literature study by selecting and clustering influential factors of KM adoption on an organizational level using the

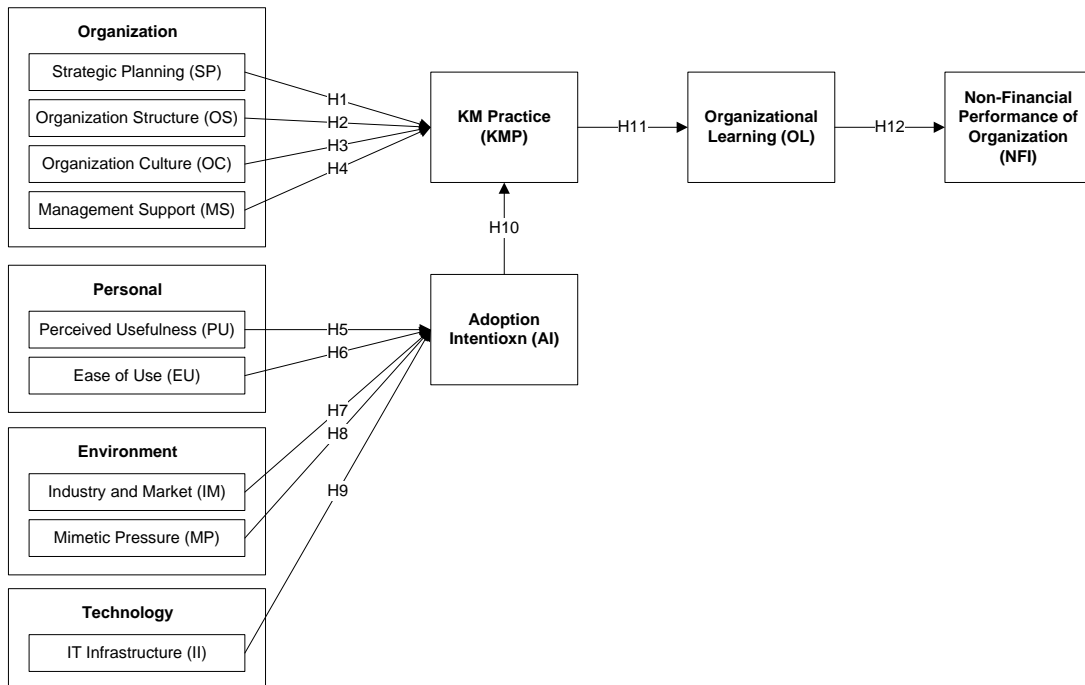TOE (Technology, Organizational and Environment) and TPE (Technology, Personal, and Environment) framework.

Fig. 1. Research model

3.1. Organizational factors

In accordance with the TOE framework, technological adoption is legitimately influenced by the organizational context that defines an organization's characteristics (Chau & Tam, 1997). This study adopts organizational context comprised of organization characteristics that influence and facilitate KM adoption and practice, which in turn consist of organizational culture, organizational structure, management support, and an organization's strategic planning.

The phrase "strategic planning" refers to a methodical approach and working guidance for required steps in decision making (Bryson, 2011). The areas covered by strategic management are vision, values and goals, business strategy, and organizational procedure. An organization that has better and well-prepared strategic planning is likely to have better KM adoption and practice. A previous study by Grover (1993) proposed this factor by using the TOE framework and proved that it showed positive correlation to system or technological adoption. In consideration of the above, we propose the following hypothesis:

Hypothesis 1: Strategic planning has significant influence on KM practice

KM implementation is essentially influenced by organizational structure (Becerra-Fernandez & Sabherwal, 2010). A pertinent aspect of organization structure is hierarchy which determines the frequency of interaction of each individual within an organization

that directly influences the knowledge sharing process. It implies that a well-chosen organizational structure will impact the KM adoption. Substantial aspects of organizational structure are centralization and formalization (Lee & Choi, 2003). Additionally, Davenport, De Long, and Beers (1998) proposed that other notable aspects of organizational structure are the size and hierarchy of an organization. Accordingly, it is emphasized that a flat organizational structure is liable to have better KM practice than a hierarchical organizational structure. Therefore, we propose the following hypothesis:

Hypothesis 2: Organizational structure has significant influence on KM practice

Culture refers to an intangible collection of beliefs, customs, and behaviors that directly shape daily activities of an individual. The right-governed organizational culture likely stimulates and motivates employees to implement KM in an organization. In this case, culture provides impetus for employees through collaboration, trust, and learning amongst them (Lee & Choi, 2003). Collaboration presents active participation and support in an organization. Meanwhile, learning and training manifest the degree of opportunity, variation, satisfaction and encouragement to learn and develop the organization. Another study examined and identified the role of culture in supporting successful implementation of KM supported by an atmosphere of trust and commitment, respect, knowledge-intensive culture, and trial and error (Huang, Quaddus, Rowe, & Lai, 2011; Ryan, Abitia, & Windsor, 2000). Therefore, we propose the following hypothesis:

Hypothesis 3: Organizational culture significantly influences KM practice

Many studies accentuate the importance of management support in the adoption and diffusion of innovation (Davis, Bagozzi, & Warshaw, 1992; Gold, Malhotra, & Segars, 2001). Multitude forms of management support are training, management initiatives, and management experiences (Huang, Quaddus, Rowe, & Lai, 2011). Equally, Davenport, De Long, and Beers (1998) concluded that management support is an essential and determinant factor for implementation of KM systems by providing infrastructure and other resources. It is an uncontested fact that without management commitment and involvement, KM will not be successful. Therefore, we propose the following hypothesis:

Hypothesis 4: Management support significantly influences KM practice

3.2. Personal factors

The Technology Acceptance Model (TAM) was formulated based on the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) (Kwon & Wen, 2010). According to TRA, humans are sufficiently rational with respect to their attitudes, and subjective norms affect behaviour intention, which in turn has a high correlation to actual behaviour (Kwon & Wen, 2010).

This theory has been used to explain the user's acceptance of information systems usage, including KM systems. This study adopts TAM to investigate determining factors for KM adoption on an individual level. For personal factors, there are perceived usefulness and perceived ease of use, mostly used to represent individuals' belief regarding KM (or Knowledge Management Systems or "KMS"). Perceived usefulness stands for a degree or level of user confidence in system capability to improve user performance (Davis, 1989). A system possesses high utilization if the users fairly believe in the correlation between positive utilization and performance. Performance expectation from the established model is the most possible and significant aspect for predicting adoption intention. Accordingly, in many cases, it is assumed an organization that

cogitates to capability of knowledge management systems for performance improvement, has an immense tendency to adopt knowledge management (Huang, Quaddus, Rowe, & Lai, 2011; Lin & Wu, 2004; Money & Turner, 2004). Ease of use refers to a user perspective level wherein the users believe that by using a system, they are free from an effort (Davis, 1989). In general, an easier system will have greater acceptance from the users. Ease of use has been proven empirically in previous studies (Davis, 1989; Moore & Benbasat, 1991; Thompson, Higgins, & Howell, 1991). According to previous studies and positive impact which significantly influence IT adoption of individuals, we can assume that ease of use of KMS predicts individual intention to adopt KM on an organizational level. Ease of use proved to significantly influence KM adoption or KMS. Therefore, we propose the following hypotheses:

Hypothesis 5: Perceived usefulness has significant influence on KM adoption intention

Hypothesis 6: Perceived ease of use has significant influence on KM adoption intention

3.3. Environmental factors

Industry consists of a group of companies that provide similar products or services and are replaceable by other products or services (Kotler, 1976). Porter and Millar (1985) identified five factors for industry competition. These are existing competitive rivalry between suppliers, threat of new market entrants, bargaining power of buyers, power of suppliers, and threat of substitute products. KM becomes a key to bolster, strengthen, and elevate the competitive position of an organization or enterprise. Industrial factors are seen indirectly to be the inspiring factors for an organization to adopt KM, in particular customer expectation, market uncertainty, business process complexity, and external consultant advice. In addition, normally an organization will adapt and follow a partner perceived being successful in new technology adoption and deriving benefit from it. In many literature reviews, KM was proven to positively impact the improvement of organizational performance (Alegre, Sengupta, & Lapiedra, 2013; Birasnav, 2014; Cohen & Olsen, 2014; Jokela, Niinikoski & Muhos, 2014; Noruzy, Dalfard, Azhdari, Nazari-Shirkouhi, & Rezazadeh, 2013), which, in turn pressures their competitors. Therefore, we propose the following hypotheses:

Hypothesis 7: Industry and market have significant influence on KM adoption intention

Hypothesis 8: Mimetic pressures have significant influence on KM adoption intention

3.4. Technological factors

Technological context accentuates the important attributes of IT innovation that significantly influence KM adoption as many KM practices rely on the use of technology. We consider an important aspect of technological characteristics that is IT infrastructure.

Information technology has a substantial role in supporting KM processes including knowledge creation, retention, transfer, and application within an organization (Alavi & Leidner, 2001). The quintessence of successful KM implementation lies in KMS as a form of support from top management, covering database, online discussion, knowledge database, expert networking, and case by case experience database. IT application is also an essential factor in KM adoption, in particularly network connection,

electronic database, communication devise, analysis and decision making tools, and knowledge management systems (Hsu, Lawson, & Liang, 2007). Support of IT infrastructure in KM adoption encompasses the availability of KMS. In providing it, one can profoundly support the utilization and practice of KM. Equally, the TAM model proposed that IT support impacts KM adoption through the existence of complexity as an intermediary (Huang, Quaddus, Rowe, & Lai, 2011). Therefore, we propose the following hypothesis:

Hypothesis 9: *Support of IT infrastructure has significant influence on KM practice*

3.5. Adoption intention, KM practice, organizational learning, and non-financial performance

The relationship between intention and behavior is demonstrated in several theories such as Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), TAM2, and Unified Theory of Acceptance and Use of Technology (UTAUT). Previous research by Huang, Quaddus, Rowe, and Lai (2011) showed the positive relationship between intention and system utilization. In this study, intention reflects individual attitude towards KMS adoption, while KM practice reflects its actual use. Thus, adoption intention of KM adoption will be reflected eventually by the actual use and KM practice in an organization.

Knowledge within an organization could be a collection of experiences accumulated as the organization performs its business processes (Argote & Miron-Spektor, 2011), and it could consist of tacit and explicit knowledge. Further, knowledge of an organization could flow in and out from its surrounding environment where the organization exists. Based on literature review, it is known that the most knowledge is stored in an individual's mind in the form of tacit knowledge. Thus, an organization needs to organize both individual and organizational knowledge.

OL basically happens in the context of an organization itself and its external environment (Argote & Miron-Spektor, 2011). Both of them interact with the experiences of organizations to create knowledge. Subsequently, acquired knowledge is shared, applied, and used in a sustainable manner by all elements in an organization to gain better performance. Under this condition, OL occurs.

An ample number of previous studies identified the direct relationship between KM and the impact of organizational performance on continuous improvement and this relationship's importance in enhancing organizational performance as well as innovations (Omerzel, 2010; Bagnoli & Vedovato, 2012). However, direct assessment of the impact of KM implementation on organizational performance is a fairly long process as explained by Becerra-Fernandez and Sabherwal (2010). A study by King (2009) implied that OL can be treated as intermediary variable to measure the impact of KM implementation on the non-financial performance of an organization.

The same result also was found by Dimovski and Skerlavaj (2008) and Prieto and Revilla (2006). It can be done by motivating knowledge creation, dissemination, and implementation. In those ways, KM initiatives ingrain the knowledge to organizational processes for continuous practice to achieve organizational goals. Accordingly, this perspective foresees OL as a significant way for an organization to enhance continuous utilization of knowledge. Therefore, we propose the following hypotheses:

Hypothesis 10: *Adoption intention significantly influences KM practice*
Hypothesis 11: *KM practice significantly influences OL capability*

Hypothesis 12: *OL capability significantly influences non-financial performance of an organization*

4. Methodology

4.1. Data collection procedures

Data was collected by distributing questionnaires offline to 60 enterprises which consist of participants of the MAKE Award largely and other big companies in Indonesia. MAKE Award is a competition that enables local and multinational enterprises in Indonesia to benchmark how successful their knowledge strategy is when compared to competitors or the world's leading knowledge-driven enterprises and encourages leaders to create intellectual capital and wealth through the transformation of individual or enterprise knowledge into world class products or services or solutions. This competition is held by Dunamis - Human Resource Consultants (dunamis.co.id). This study takes organizations that have implemented KM. We asked 2-3 respondents per company to fill-out our questionnaire. The criteria for respondents is that they should have a minimum 2-year experience, and understanding the concept and implementation of KM in their organization, such as senior staff members, KM team members, manager, and other higher level position. Each respondent described their role as an "individual" (employee) and "organizational" representative. Questionnaires were disseminated directly one-to-one or by email to the organizational representative within 6 months from March 2013 – August 2013.

4.2. Research instrument

The research instrument was designed in accordance with several references and literature. The measurement scale of the questionnaire uses a five-point Likert scale to know the degree of respondent conformity in range from "1" for "highly disagree" until "5" for "highly agree". The questionnaire consists of two parts. The first part represents respondent demography such as company name, gender, age, education, and length of work experience, department, position or role, and the availability of KM systems in their organization. The second elaborates the indicators that will be analysed and examined to measure influential factors that affect KM adoption, practice, and implementation, as well as the implication of KM implementation on OL and non-financial performance in an organization. The indicators for each variable are presented in Appendix I.

5. Results and discussions

5.1. Respondents demographic

Respondents comprise of staff, senior staff, KM team, manager, and other higher level position who understand KM implementation in their organization. There was a total of 139 respondents representing 51 companies. As listed in Table 1, 75% organizations are state-owned enterprise. Even though it is somewhat proportional in business type, the highest percentage is comes from telecommunication enterprises (21%). Further, 47% respondents are senior staff members and 45% have worked for 2-5 years. It is significant

to note that 61% respondents claimed their respective organizations have implemented KM systems.

Table 1
Respondent demographics

Type of Organization	%-age	Availability of KMS	%-age
State-owned enterprise (BUMN)	75%	Available	61%
Private enterprise	25%	Not available	39%
Type of Business	**%-age**		
Telecommunication	21%	**Respondent Position/Role**	**%-age**
Information Technology	17%	Staff	36%
Banking	12%	Senior Staff	47%
Manufacture	10%	Department Head	6%
Oil and Gas	5%	Manager	11%
Electricity	9%	**Working Experience Length**	**%-age**
Service	10%	2-5 years	45%
Transportation	5%	5-10 years	39%
Others	11%	> 10 years	16%

5.2. Measurement model test

The Measurement Model Test aimed to evaluate reliability and validity, whereas the Structural Model Test examines research hypotheses and model fitness. Data analysis is performed by PLS (partial least squares) and uses SmartPLS software.

The validity test encompasses convergent validity and discriminant validity test, whereas the reliability test is measured by Cronbach's Alpha (CA) and composite reliability (CR) value. As a result of the convergent validity test, there is one indicator that has a standardized loading factor (SLF) value of ≤ 0.5; the item is MP1. According to the result, the invalid indicator (MP1) was eliminated from the model as it did not fit the threshold for individual item reliability test. After it was eliminated, the result of the test showed a loading factor value of ≥ 0.50. On the other hand, AVE and CR values are ≥ 0.5 and ≥ 0.7 respectively. For the CA value, a good scale of CA should satisfy ≥ 0.7 for all variables. However, there is a variable of – IA (0.693) – that has a CA value of ≤ 0.7. In this case, the CR value is more advisable than the CA one as it has a tendency to undervalue the reliability test, and the CR has closer approximation for an accurate parameter estimate (Chin, 1998). For this reason, we can concede all indicators have good validity and reliability scale. Table 2 lists the result of the Measurement Model Test which is comprised of a standardized loading factor (SLF), average variance extracted (AVE), composite reliability (CR) and Cronbach Alpha (CA) values after elimination of the invalid indicator.

Table 2
SLF, AVE, CR and CA values

Variables		SLF	AVE	CR	CA
Strategic Planning (SP)	**SP1**	0.796	0.765	0.928	0.897
	SP2	0.857			
	SP3	0.936			
	SP4	0.904			
Organization Structure (OS)	**OS1**	0.836	0.549	0.825	0.742
	OS2	0.877			
	OS3	0.647			
	OS4	0.556			
Organization Culture (OC)	**OC1**	0.745	0.562	0.837	0.741
	OC2	0.760			
	OC3	0.719			
	OC4	0.776			
Management Support (MS)	**MS1**	0.865	0.66	0.885	0.825
	MS2	0.844			
	MS3	0.844			
	MS4	0.684			
Perceived Usefulness (PU)	**PU1**	0.742	0.596	0.855	0.773
	PU2	0.825			
	PU3	0.795			
	PU4	0.724			
Ease of Use (EU)	**EU1**	0.688	0.623	0.868	0.797
	EU2	0.876			
	EU3	0.791			
	EU4	0.793			
Industry and Market (IM)	**IM1**	0.789	0.706	0.905	0.864
	IM2	0.851			
	IM3	0.872			
	IM4	0.849			
Mimetic Pressure (MP)	**MP1 (eliminated)**	**0.450**	0.504	0.736	0.842
	MP2	0.960			
	MP3	0.624			
IT Infrastructure (II)	**II1**	0.875	0.698	0.902	0.856
	II2	0.832			
	II3	0.801			
	II4	0.832			
Adoption Intention (AI)	**AI1**	0.599	0.521	0.811	0.693
	AI2	0.673			
	AI3	0.778			
	AI4	0.816			

KM Practice (KMP)	**KMP1**	0.776	0.575	0.844	0.753
	KMP2	0.779			
	KMP3	0.693			
	KMP4	0.783			
Organizational Learning (OL)	**OL1**	0.742	0.536	0.902	0.876
	OL2	0.784			
	OL3	0.787			
	OL4	0.714			
	OL5	0.696			
	OL6	0.739			
	OL7	0.691			
	OL8	0.697			
Non-Financial Impact (NFI)	**NFI1**	0.778	0.621	0.928	0.913
	NFI2	0.841			
	NFI3	0.802			
	NFI4	0.819			
	NFI5	0.806			
	NFI6	0.769			
	NFI7	0.709			
	NFI8	0.771			

Table 3
The square root of AVE (shown as bold at diagonal) and factor correlation coefficients

Variabel	SP	OS	OC	MS	PU	EU	IM	MP	II	IA	KMP	OL	NFI
SP	**0.875**												
OS	0.345	**0.741**											
OC	0.387	0.337	**0.750**										
MS	0.680	0.244	0.485	**0.813**									
PU	0.401	0.133	0.353	0.319	**0.772**								
EU	0.279	0.372	0.484	0.343	0.313	**0.790**							
IM	0.533	0.408	0.306	0.414	0.337	0.375	**0.841**						
MP	-0.056	-0.134	0.077	-0.051	0.094	0.109	0.061	**0.711**					
II	0.404	0.267	0.284	0.395	0.316	0.211	0.219	-0.169	**0.836**				
IA	0.556	0.216	0.399	0.629	0.415	0.427	0.435	0.030	0.323	**0.722**			
KMP	0.508	0.308	0.583	0.665	0.353	0.481	0.353	0.053	0.425	0.653	**0.759**		
OL	0.482	0.281	0.505	0.619	0.383	0.363	0.304	-0.083	0.481	0.556	0.713	**0.732**	
NFI	0.494	0.346	0.421	0.524	0.373	0.238	0.332	-0.146	0.386	0.438	0.541	0.692	**0.788**

The discriminant validity test is examined by comparing the square root of AVE and factor correlation coefficients. A valid variable is reflected if the square root of AVE

is greater than the factor correlation coefficients. A comparison of the square root of AVE and factor correlation coefficients is in Table 3. According to Table 3, it is inferable from results that there is no correlation value greater than the square root of AVE. In other words, all variables are valid for the discriminant validity test. We also examined cross-factor loadings and they showed that all indicators have the highest loading factor to their respective variable (due to space constraint, we do not show the results).

5.3. Structural model test

The examination of the structural model test is conceived by comparing the root square of R for each variable to predict the structural model. Variable knowledge management practice (KMP) has the highest square root of 0.618, which means the 61.8% variance for knowledge management practice (KMP) is simultaneously affected by variable adoption intention (AI), organizational culture (OC), and management support (MS), while the remaining 38.2% is affected by other factors. The R Square value of KM is categorized as a good scale according to Chin (R2 > 0.67 shows strong model). Whereas, the R Square value of other variables is grouped from moderate to strong, markedly OL (OL) 50.82% and organizational performance (NFI) 47.88%. The smallest R Square value is hold by adoption intention 0.342. It means only 32.4% adoption intention (AI) simultaneously influenced by variable perceived usefulness (PU), ease of use (EU), and industrial factor (IM), instead, the unobservable-factors in hypotheses have far implication for adoption intention (AI) 67.6%.

The next step in the structural model test is the examination of path coefficient value and T-values resulting from the use of Bootstrapping algorithm to determine the conformity and significance levels of the hypotheses proposed. Likewise, the significance value depicts the correlation between latent variables. A latent variable has significant correlation with other latent variables if it has a T-value of ≥ 1.96 in significance level 0.05; or has a path coefficient value of > 0.1. Table 4 summarizes T-values and path coefficient values for each latent variable.

Table 4
Results of structural model test by PLS

Hypothesis	Path	Path Coeffecient	T Statistics (|O/STERR|) ≥ 1.96	Hypothesis Accepted/Rejected?
H1	SP → KMP	-0.058	0.884	Rejected
H2	OS → KMP	0.057	1.096	Rejected
H3	OC → KMP	0.272	3.212	Accepted
H4	MS → KMP	0.296	3.364	Accepted
H5	PU → AI	0.252	3,548	Accepted
H6	EU → AI	0.257	2,871	Accepted
H7	IM → AI	0.256	3,419	Accepted
H8	MP → AI	-0.037	0,379	Rejected
H9	II → KMP	0.13	2.174	Accepted
H10	AI → KMP	0.336	3.303	Accepted
H11	KMP → OL	0.713	14.135	Accepted
H12	OL → NFI	0.692	12.308	Accepted

Further, Table 4 shows 9 out of 12 tested hypotheses are accepted, while three other hypotheses are rejected. The three hypotheses are mimetic pressure (MP), strategic planning (SP), and organizational structure (OS) which have a T-statistic value < 1.96, i.e. there is no significant correlation to KM adoption intention or practice.

5.4. Discussions

This study examines the relationship amongst KM adoption intention, practice, and impact of KM. OL is used as an intermediary between KM practice and impact on non-financial performance upon KM implementation. This study is likely to be considered as a novel research as none of previous studies simultaneously discussed KM adoption model both on organizational and individual levels, as well as its impact using a parallel model. Previous studies mostly discussed adoption model for individual acceptance toward KM or KMS. Discussion of the result of this study and previous studies is as follows.

Determinant factors of adoption intention and knowledge management practice

The results of this study proved influential factors which affect adoption intention and practice of knowledge management of organization in Indonesia are: management support, organizational culture, perceived usefulness, ease of use, industrial factor, and IT infrastructure.

The result of this study shows that management support is an influential factor in KM adoption intention as proved in previous studies. Davis, Bagozzi, and Warshaw (1992) and Davenport, De Long, & Beers (1998) proved management support as an external factor that influences KMS adoption and diffusion through perceived usefulness by using the Technology Acceptance Model (TAM). The rationale might be because knowledge management processes are basically not mandatory, in contrast to a company's business process activities. However, top management understands that the process of knowledge management will have an indirect impact on organizational performance (Becerra-Fernandez & Sabherwal, 2010). Therefore, to encourage individuals in the organization's KM process requires full support of top management, in the form of policies, procedures, and KM strategy. The result is different compared to the study by Quaddus and Xu (2005) which concluded management support does not significantly affect the KM adoption intention through perceived usefulness. In that case, management should confer special attention for obstructive conditions for KM implementation (Quaddus & Xu, 2005).

Another finding on organizational factors proved that organizational culture supports KM practice in an organization. The result of this study is similar to previous studies which concluded that organizational culture significantly influences perceived usefulness of KMS (Huang, Quaddus, Rowe, & Lai, 2011; Quaddus & Xu, 2005). This is because culture is embedded within an organization and reflects organization-wide values. Culture does not only influence such behaviours as knowledge sharing and seeking, but it also influences technology selection and appropriation, KM evolution, knowledge transformation and sharing within an organization, the role of KM leaders, and the expected outcomes from KM use (Alavi, Kayworth, & Leidner, 2006). Organizational culture in Indonesia has had multiple programs that support employee self-development, training, mutual trust among employee, coordination, and collaboration.

Supporting the result of this study, several studies have proved significant influence of individual factors (perceived usefulness and ease of use) to the intention of KM and KMS adoption (Hester, 2010; Huang, Quaddus, Rowe, & Lai, 2011; Quaddus &

Xu, 2005). Perceived usefulness and ease of use are the main components of the TAM, UTAUT, or IDT that have been verified by various studies related to user behaviour and acceptance in new technology. Because these two factors represent individuals' belief regarding KM (or KMS), it is perceivable that they significantly affect KM adoption intention on an individual level. However, in contrast to this study, a study by Hester (2010) produced a different result which concluded that perceived usefulness and ease of use do not affect the adoption intention, but only affect KMS practice. Hester (2010) indicates that the result might be influenced by expertise level of the sample taken related to KMS, which has an expertise level of 5 or greater (measured on a scale from 1, low, to 7, high).

The proposed industrial factor has a direct impact on KM adoption intention. Accordingly, it indicates that a company intends to adopt KM because of complexity on their transaction processes, business growth, competition, and market uncertainty. This result is in line with results of a previous study by Hsu, Lawson, and Liang (2007). The industrial factors proved to affect KM adoption intention are transaction complexity and business processes, information complexity in the market, competitor growth, and partners.

IT infrastructure has a direct impact on KM practice and implementation. A previous study that supports the result of this study proved that IT maturity level positively affects KM practice (Hsu, Lawson, & Liang, 2007). Equally important, another proven component of IT infrastructure important for KM adoption, practice, and complexity is infrastructure capability (technology, structure, and culture) (Gold, Maholtra, & Segars, 2001; Huang, Quaddus, Rowe, & Lai, 2011). Accordingly, information technology has a substantial role in supporting KM processes including knowledge creation, retention, transfer, and application within an organization (Alavi & Leidner, 2001). Support of IT infrastructure in KM adoption encompasses the availability of KMS. Thus, by providing it, it can profoundly support KM utilization and practice.

Further analysis shows strategic planning, organization structure, and mimetic pressure, do not have great impact on KM adoption intention and practice.

Strategic planning focuses on strategic management, but does not involve top management in its entirety. Studies in Indonesia show only a few of organizations with clearly documented and detailed KM planning and strategic planning. Additionally, many KM teams were not created to manage KM implementation, and KMS are often managed by SDM or IT division. Not many studies put strategic planning into KM practice and implementation. Another study discussed KM promotion and the combination between KM planning, team, project, management support, and reward. Those studies indicated positive influences between perceived usefulness and KM promotion, but KM promotion does not fairly influence KMS complexity (Huang, Quaddus, Rowe, & Lai, 2011).

Another less influencing factor analysed is organizational structure. A flat, informal, and decentralized organizational structure is liable to have better KM practice, rather than the hierarchical organizational structure. Those characteristics support more seamless communication and interaction among employees (Mahmoudsalehi, Moradkhannejad, & Safari, 2012). Most organizations in Indonesia are characteristically less informal; less centralized; and have protracted hierarchical structures. These structures are not likely to encourage communication, discussion, interaction, and knowledge sharing amongst employees. For this reason, organizational structure does not influence KM practice and implementation in Indonesia.

Mimetic pressure represents a trend in adopting KM by following other organizations or competitors or looking at successful achievement of an organization after KM adoption. This factor is not prominently suitable for organization in Indonesia since the decision for KM adoption depends on organization readiness and need. KM adoption trends are not merely an underlying decision to adopt KM. Meanwhile, there has been no similar study which has adopted and empirically proven the influence of mimetic pressure on KM adoption. Previous studies assessing KM adoption and which consider pressure as a research variable are limited in the proposed conceptual model (Alatawi, Dwivedi, & Williams, 2013; Kaldi, Aghaie, & Khoshalhan, 2008). However, a study by Teo, Wei, and Benbasat (2003) proved that mimetic pressure has significant influence in the adoption intention of financial electronic data interchange (FEDI) technology.

The impact of knowledge management practice on organizational learning and non-financial performance

None of the empirical studies discussed OL as an intermediary variable and a goal of KM implementation. The study of this aspect has been limited to the conceptual model proposed by King (2009). However, this study proved KM practice affects significantly OL and non-financial performance.

KM practice urges an organization to create and provide potential and beneficial knowledge for their employees. The availability of knowledge increases the effectiveness of knowledge utilization. Generally, high utilization of knowledge will produce better OL. Therefore, it is advisable to embed KM processes in daily business processes in an organization, covering knowledge discovery, knowledge capture, knowledge sharing or transfer, and knowledge application activities.

KM practice also allows all members of an organization to carry out activities and tasks better particularly individual learning. In turn, better individual learning will influence better activities in group learning, and eventually will better impact OL fused in organizational culture and work processes. Thus, organizational capabilities can be reflected in innovation and experimental process, individual learning, group or collaborative learning, decision making, vision and mission, and management support.

A final analysis of the study results infers that the improvement of OL significantly affects non-financial performance of an organization. As an intermediate outcome, the improvement of OL will improve non-financial performance by improving employee learning capabilities and adaptation to change, reducing employee turnover impact, service quality improvement, successful innovation on new product, and improving continuous competitive advantage. This result is similar to the results of previous studies which proved KM has a direct impact on management performance, particularly product and service innovation, better product processing, customer satisfaction, operational efficiency, adaptation to response changes, and reducing employee turnover (Cofriyanti & Hidayanto, 2013; Hsu, Lawson, & Liang, 2007; Huang, Quaddus, Rowe, & Lai, 2011).

5.5. Implication of research

This study is expected to give suggestive contribution and implications for enterprises and management. The following are some practical implications that can be drawn based on our research findings:

- Organizations need to consider technological factors, notably perceived of usefulness and ease of use in KM adoption and practice. Accordingly, KMS is unquestionably important to support the development of knowledge management in an organization, moreover to help their employees to accomplish their tasks easily and effectively.

- Management support and organization culture are keys to in KM implementation. It is advisable for management to arrange and evaluate programs or curricula for employee self-development, such as trainings and workshops that are likely to encourage them to be knowledge workers. Further, it is equally important for management to consider a reward program for active employees as contributors in innovation and knowledge sharing. Organizations need time and processes to develop core values and behaviour that shape a good culture for KM practice, such as trust amongst employees, collaboration and team work, and openness to deliver ideas and opinions.

- Our results also showed that KM implementation influences OL and non-financial performance. It indicates KM is markedly important to be implemented by organizations or enterprises in Indonesia to gain competitive advantage. KM undoubtedly inspires an organization to create, identify, and update organization knowledge to deliver breakthrough and innovative products and services for customers. It can be achieved by managing intellectual resources effectively and fusing relevant and unique knowledge of an organization to enhance competitive advantages.

In the context of theoretical contribution, the proposed research model can be adopted as the reference for KM adoption research on an organizational level. The model is mainly based on the TOE framework which consists of technological context and environmental context that result the unprecedented combination of integrative and complete model. Further, the TOE framework is legitimately suitable to depict KM adoption and practice model using case study of organizations or enterprises in Indonesia. For this reason, this study is expected to be a novel literature reference for study in assessing the impact of KM implementation on non-financial performance by intermediary of OL.

6. Conclusion

As the key for strategic resource, knowledge adoption becomes particularly essential for organizations to create numerous innovations and deliver unique competitive advantages. By using a TOE (Technology, Organizational, and Environment) framework, this study aimed to identify influential factors of knowledge management (KM) adoption and its impact on non-financial performance through an intermediary of OL. Based on final analysis, we conclude that factors which significantly influence KM adoption and practice in an organization are perceived usefulness, ease of use, KM technology, industrial factors, management support, organizational culture, and IT infrastructure. Meanwhile, factors loosely connected to the intention to adopt KM and practice are mimetic pressure, strategic planning, and organization structure. The further analysis implied KM implementation and practice encourage the emergence of OL which, in turn, can be measured by using several dimensions, particularly system perspective (vision and mission), leader commitment, experiment and innovation, knowledge transfer, integration, and team collaboration. Finally, the result of this study inferred that knowledge management adoption and implementation fairly impact the improvement of non-

financial performance by the intermediary of organization learning capability measured by employee perspective, customer perspective, and organization sustainability.

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Appendix I.

Research Instrument

Code	Indicator
Strategic Planning (SP) (Jalaldeen, 2010; Wei, 2009)	
SP1	My organization understands the importance of knowledge and knowledge management ("KM") adoption.
SP2	My organization has a specific goal for KM implementation.
SP3	My organization has a strategic planning for KM implementation.
SP4	My organization has procedures that support KM adoption.
Organization Structure (SO) (Chang & Lee, 2007; Lee & Choi, 2003)	
OS1	Employees have not to ask their supervisor before they do their tasks.
OS2	The established rules and procedures are usually in the form of written documents.
OS3	Employees can make a decision without approval.
OS4	Employees can disobey the rules and use informal approval in a particular situation.
Organization Culture (OC) (Lee & Choi, 2003; Chang & Lee, 2007)	
OC1	My organization provides several training programs, seminars, and knowledge sharing to improve employees' skills and talents.
OC2	My organization gives an opportunity for talents and skill development of employees
OC3	Employees believe that their colleagues are competent and skilled in their field.
OC4	Employees mutually support each other in my organization.
Management Support (MS) (Hung, Huang, Lin, & Tsai, 2005; Davenport, De Long, & Beers,1998; Holt, 2000; Mohammadi, Khanlari, & Sohrabi, 2009; Thompson, Higgins, & Howell,1991)	
MS1	Top management supports, facilitates and encourages KM utilization in my organization.
MS2	Top management emphasizes the importance of knowledge sharing using KM in my organization.
MS3	Top management established an exclusive team responsible for KM utilization and development in my organization.
MS4	There is initiative in managing utilization and development of KM in my organization, such as an award for the most active employee in utilizing and developing KM.
Perceived Usefulness (PU) (Alavi & Leidner, 2001; Davis, 1989; Quaddus & Xu, 2005)	
PU1	The use of KM technology facilitates my seeking of knowledge and information related to my tasks.

Code	Indicator
PU2	The use of KM technology increases efficiency and effectiveness of my tasks.
PU3	The use of KMS speeds up the time needed for problem solving
PU4	The use of KMS increases service quality to customers.
Ease of Use (EU) (Davis, 1989; Thompson, Higgins, & Howell, 1991)	
EU1	I find and seek the information and knowledge needed easily using KMS.
EU2	I opine that KMS is easily used.
EU3	KMS is cumbersome and cuts off my working hours.
EU4	It is needs scads of time for me to learn how to use the KMS.
Industrial and Market Factors (IM) (Huang, Quaddus, Rowe, & Lai, 2011; Hsu, Lawson, & Liang, 2007; Kaldi, Aghaie, & Khoshalhan, 2008; Quaddus & Xu, 2005)	
IM1	My organization is urged to adopt KMS because of market uncertainty and fluctuation.
IM2	My organization is urged to adopt KMS because of the complexity of business transaction processes.
IM3	My organization adopts KMS because of the rapid growth of the organization.
IM4	My organization adopts KMS to improve competitiveness in industry competition.
Mimetic Pressure (MP) (DiMaggio & Powell, 1983)	
MP1	My organization adopts KMS is cognizant of the trend for KMS utilization by other big organizations, without conducting a feasibility study for benefits and processes arising from KMS.
MP2	My organization adopts KM because competitors do.
MP3	My organization adopts KMS because of performance improvement noted in competitors after implementing KMS.
IT Infrastructure (II) (Lee & Choi, 2003; Chang & Lee, 2007)	
II1	My organization provides IT support for information seeking and sharing needed amongst employees.
II2	My organization provides electronic storage (shared folder) for knowledge safekeeping.
II3	My organization provides intranet and internet network to support inbound and outbound communication processes
II4	My organization provides IT support for communication among employees (such as email or chat)
Adoption Intention of KMS (IA) (Compeau, Higgins, & Huff, 1999; Herscovitch & Meyer, 2002)	
AI1	The adoption of KM is a good strategy for my organization.
AI2	KM is no longer needed by my organization.
AI3	My organization will implement KM.
AI4	My organization will improve and optimize the implementation and utilization of KM.

Code	Indicator
— Knowledge Management Practice (KM) (Huang, Quaddus, Rowe, & Lai, 2011)	
KMP1	The experiences or knowledge gained are documented
KMP2	Knowledge needed by employees is easily accessed.
KMP3	Employees actively communicate and share their knowledge and information with colleagues.
KMP4	KM assists employees to finish their daily tasks.
Organization Learning (OL) (Goh & Richards, 1997; Jerez-Gomez, Cespedes-Lorente, & Valle-Cabrera, 2005)	
OL1	All the members of an organization (individual, team and department) realize the importance of their contribution to achieve organization goals.
OL2	Employees can express their opinion and make suggestions on procedures in order to do their tasks.
OL3	Based on experience, new ideas from employees are often disregarded and barely responded to seriously by management.
OL4	Experiment and innovation are encouraged and revised to improve work processes.
OL5	Employees are empowered and involved in decision making.
OL6	The potential working process or new ideas are usually disseminated to all employees.
OL7	Employees have an opportunity to share their new ideas, programs, and activities that are useful for the organization.
OL8	Employees are encouraged by the organization to solve their problems cooperatively before they discuss with their manager.
Non-Financial Performance (NFI) (Alavi & Leidner , 2001; Dimovski & Skerlavaj, 2008; Huang, Quaddus, Rowe, & Lai, 2011; Zack, McKeen, & Singh, 2009)	
NFI1	Employees feel more motivated because of the ease in retrieving knowledge for skill improvement
NFI2	There is improvement in employee learning capabilities and adaptation.
NFI3	Employee satisfaction for work conditions and organization increases.
NFI4	The impact on employee turnover decreases because of the availability of effective knowledge sharing media.
NFI5	Customer satisfaction increases.
NFI6	Response time to customer complains decreases.
NFI7	My organization has a sustainable competitive advantage.
NFI8	The reputation of organization performance increases.