The effect of Knowledge Management System on Organizational Ambidexterity: A Conceptual Model

Abstract:

Knowledge management (KM) is considered an important strategic tool to maintain performance and survive a fluctuating environment. The effective implementation of KM initiatives helps organizations gain the ability to balance contradictory demands, known as organizational ambidexterity, to gain a competitive advantage. This study aims to develop and argue a theoretical model demonstrating the connection between knowledge management systems (KMS) and organizational ambidexterity through the mediation effects of knowledge-sharing behavior (KSB). The study draws on the task-technology fit (TTF) model, KM, and organizational ambidexterity literature to build a theoretical model for how KMS (characteristics and perceived TTF) and KSB interact to produce organizational ambidexterity. This study also suggests a methodological approach and analysis procedure to test the theoretical model empirically.

Keywords: Knowledge Management System, Knowledge Sharing Behavior, Innovation, Organizational Ambidexterity

1. Introduction

In today's knowledge-based economy, knowledge management (KM) is attracting growing interest from practitioners and researchers. The imperative role that KM plays is at both individual and organizational levels. A dynamic environment, intense rivalry among organizations, and the race for innovations and sustainability emphasize the importance of knowledge as an avenue for organizations to gain a competitive advantage and survive the volatile environment (Small & Sage, 2005).

KM is about performing activities that involve discovering, sharing, and applying knowledge in terms of resources and people skills to improve the influence of knowledge on business goals (BecerraFernandez & Sabherwal, 2015). KM can reduce expenses, raise awareness among workers concerning events, promote investment in intellectual capital, and encourage technology adaptation (Alzyadat & Alqutawi, 2010). The availability of effective knowledge management systems (KMS) can help to accomplish these benefits.

However, the rising trend has resulted in the proliferation of studies attempting to determine how knowledge assets can be effectively managed and measured to bring real value to organizations (Khalique et al., 2018). There is a wide range of KM implications in organizations, but a growing body of evidence shows that few are successful. This has caused controversy regarding KM's effects on various organization performance indicators (Al Rashdi et al., 2019; Al Ahbabi et al., 2019). Due to these conflicting results, there is a call to shed more light on the organizational processes, systems, and other context-dependent factors that may determine the variations in the association between KM and organizational performance. This line of research advocates that KMS must be aligned with contextual factors and other organizational processes (Asiaei & Bontis, 2020).

This study focuses on the issues associated with the implementation of KMS. The lack of knowledge contribution from KMS users could cause system failure, which prevents employees and organizations from fully utilizing the system to maximize their learning, innovation, and capabilities to balance the contradictory demand that is known as organizational ambidexterity (Becerra-Fernandez & Sabherwal, 2015; Popadiuk et al., 2018).

In the literature, there are several studies about KM and KMS, but only a few discuss and explore KMS, knowledge-sharing behavior (KSB) (Anser et al., 2020), and organizational ambidexterity

(Yang et al., 2016; Cegarra-Navarro et al., 2021). This study aims to investigate the influence of KMS on the individual's willingness to share knowledge. In addition, the author seeks to answer the question: how does KMS influence organizational ambidexterity through the mediation roles of KSB? As such, the contribution of the present study is mainly twofold. First, it proposes a model that combines KMS, KSB, and organizational ambidexterity. Also, the study suggests some modifications that can improve the theory of task-technology fit (TTF), since several studies show it lacks the cognitive aspect of the system users (Kankanhalli et al., 2005; Wu et al., 2007; Lin & Huang, 2008).

In the next section, the theoretical background of the key concepts of this study is discussed, followed by an explanation of the proposed model and its theoretical foundation. The suggested methodological approach and measurement for empirically testing the proposed model are also presented. Lastly, the limitations and several possible streams for future studies are stated.

2. Theoretical Background

This section presents the theoretical foundations underpinning the proposed theoretical model to discuss and explain the possible associations among KMS, the TTF model, KSB, and organizational ambidexterity.

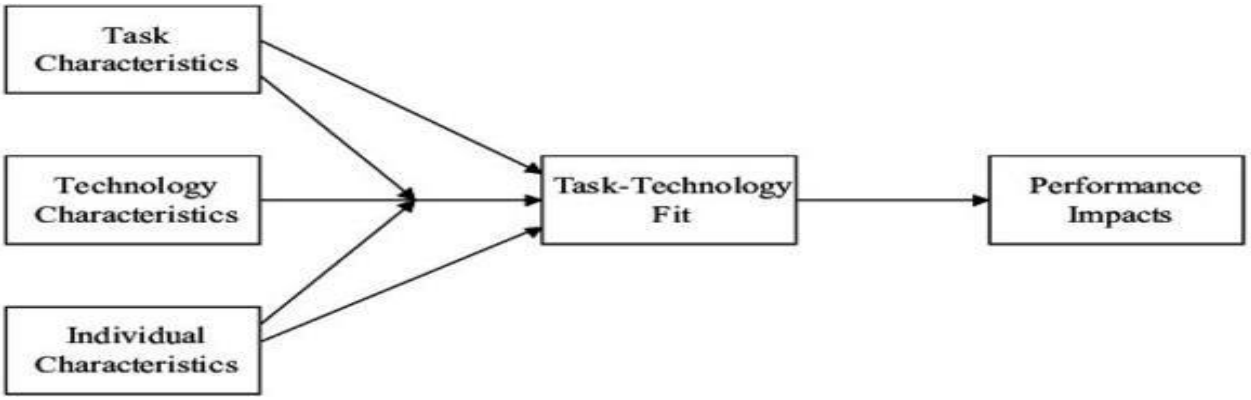
2.1 Knowledge Management System and TTF Model

KMS is a relatively new field of research that emerged in the literature around 1994. It is the result of a synergic application of the latest technology and social and structural mechanisms (Becerra-Fernandez & Sabherwal, 2015). KMS refers to the process of using technology to support the use of KM mechanisms to create, transfer, and implement knowledge (Dimitrijevic, 2014). Alavi and Leidner (2001) defined a KMS as an information system (IS) developed to support and enhance the organizational processes of knowledge creation, storage, retrieval, transfer, and application. Effective implementation of KMS can help an organization effectively use existing knowledge, create new knowledge, take suitable action, and accomplish sustainable and competitive goals. Moreover, a KMS is vital in improving organizational learning, innovation, and competitiveness by enhancing organizational and individual performance (Lin & Huang, 2008; El Said, 2015).

There are four kinds of KMS that provide KM solutions for organizations: knowledge discovery system, knowledge capture system, knowledge sharing system, and knowledge application system (Becerra-Fernandez & Sabherwal, 2015). Nevertheless, Hansen et al. (1999) argued that regardless of the different formats and types of KMS, they can be classified into two main categories based on the technology employed to support either a personalization approach or a codification approach (as cited in Lin & Huang, 2008). This argument was later upheld by Alavi's (2000) two proposed models: the network and repository models. The network model focuses on socialization and connecting individuals to exchange knowledge. The repository model focuses on the codification and storage of knowledge to facilitate knowledge reuse (Alavi & Leidner, 2001). Moreover, the dimensions of the organizational impacts of KMS are people, processes, products, and organizational performance, which means that KMS can affect an organization at several levels through two main processes. First, the KMS process can improve organizational performance by creating knowledge that participates in the four dimensions' improvement. Second, it can enhance performance by directly improving all four dimensions (Becerra-Fernandez & Sabherwal, 2015).

The TTF model developed by Goodhue (1995) argues that there should be a good fit between information technology (IT) and the tasks it supports so that the system is efficiently used and improves the system user's performance (Goodhue & Thompson, 1995). As depicted in Figure 1, the TTF model consists of five constructs: task characteristics, technology characteristics, and individual characteristics that jointly affect the TTF, with performance as the outcome. According to the TTF model, the outcome of KMS usage might vary depending on the "configuration and the task for which it is used" (Lin & Huang, 2008, p. 411; Goodhue & Thompson, 1995). Goodhue claimed that TTF positively influences performance. Later, Goodhue and Thompson developed the TTF model to include utilization as a mediation between TTF and performance; this model is called the technology-to-performance chain. Tasks are any actions that are performed to convert inputs to outputs to fulfill the necessity of information. Another important term in the TTF model is technology, which is composed of a vast array of IT, including hardware, software, etc. (Lin & Huang, 2008). This study is interested in two important constructs in the TTF model: technology characteristics and task-technology fit. According to Goodhue and Thompson, technology characteristics refer to the underlying features of the technology of the IS used by individuals. Tasktechnology fit refers to "the degree to which a technology assists an individual in performing his or her portfolio of tasks…. the correspondence between task requirements, individual abilities, and the functionality of the technology" (Goodhue & Thompson, 1995, pp. 216–218).

Figure 1 *TTF model (Goodhue & Thompson, 1995)*



Several studies have tested the validity of the TTF model. Ye and Johnson (1995) conducted an empirical study that elaborated on the ability of the explanation facilities of KMS to encourage usage and enhance user performance. In addition, Wixom and Todd (2005) suggested that information accuracy and accessibility positively influence perceived usefulness, thus motivating system used in the KM context. Nevertheless, the TTF model neglects the "personal cognition dimension," which several empirical studies proved to have an influence on the use of KMS, eventually influencing the individual's contribution to the system and KSB. Therefore, several authors attempted to overcome this limitation by expanding the TTF model or integrating it with existing models to offer explanatory power. According to Lin & Huang (2008), these studies can be categorized into three themes based on their contributions: 1) integrating TTF with Davis' (1989) technology acceptance model (TAM) (Wu et al., 2007; Klopping & McKinney, 2004), 2) extending TTF with Ajzen's (1991) theory of planned behavior (TPB) (Kankanhalli et al., 2005; Lam et al., 2007), and 3) combining TTF with individual ability constructs, such as self-efficacy and individual differences (Jarupathirun & Zahedi, 2007; Lee et al., 2007).

The previous studies have shed light on the importance of the user's acceptance of the KMS for its successful implication and achievement of the intended goals. Several studies, similar to those stated previously, agreed on the importance of the users' cognition, such as perceived usefulness, trust, and behavioral intention (Strong et al., 2006; Lin & Huang, 2008; Chai & Kim, 2012; Wang et

al., 2013). Specifically, KSB is an important concept that considers that perceived TTF and technology characteristics can substantially impact the users' engagement in KSB. Recent research focused on personal cognition, such as studies by Strong et al. (2006) and Lin and Huang (2008), that investigated the influence of TTF on self-efficacy concepts. Other studies examined the impact of TTF on social ties, such as Chai and Kim (2012) and Wang et al. (2013). This study argues that TTF and a system's technological characteristics are important influencers on KSB in the workplace. **2.2 Knowledge-Sharing Behavior (KSB)**

Knowledge is an intangible asset that increases when shared with other individuals (Halal, 2008). Organizations constantly strive to encourage their employees to share their knowledge with their members. The availability of needed knowledge (explicit and tacit) for each member of the organization helps them to perform their jobs better because knowledge sharing improves the knowledge of the employee who owns it and the receiver of this activity (Halal, 2008). Moreover, it supports the organization in its decision-making process, competitiveness, and capability and improves innovation performance. However, the challenge resides in sharing tacit knowledge because it is difficult to transform it into explicit knowledge, which constitutes the majority of knowledge exchange (Lee, 2003; Becerra-Fernandez & Sabherwal, 2015). Furthermore, Lee (2003) stated that tacit-to-tacit knowledge sharing contributes to 90% of total knowledge sharing, further emphasizing the importance of tacit knowledge sharing. Effective knowledge sharing contributes to the transformation of an organization into a learning organization (Scarbrough, 2003; Lin, 2007); therefore: "For many companies, getting employees to share knowledge and to contribute knowledge to organizational repositories is the focus of their knowledge management programs" (Small & Sage, 2005, p. 162). Knowledge sharing exists at two levels: organizational and individual. This study will focus on the individual level—specifically, the KSB of employees. Nevertheless, knowledge sharing is a fundamental factor for an organization to accomplish continuous innovation at both levels (Small & Sage, 2005).

Researchers proposed different definitions for the concept of KSB, but most of them are similar in meaning. Bartol and Srivastava (2002) described KSB as activities that convey or distribute organizationally related information, ideas, and expertise with one another. Lin (2007) defined KSB as social communication culture, which encompasses the exchange of employee knowledge, experiences, and skills among individuals within an organization. Schwartz (2006) introduced a broader definition by explaining KSB as an exchange of knowledge among and within individuals, groups, or organizations.

2.3 Organizational Ambidexterity

Organizational ambidexterity was introduced by Duncan (1976), and it refers to the organizational ability to manage contradicting demands and multiple strains in working with exploration and exploitation (Popadiuk et al., 2018). Some authors describe it as the organizational capacity to explore and exploit simultaneously (Carter, 2015), while others define it as a method of identifying the challenges that organizations face while managing two competing targets simultaneously (Gibson & Birkinshaw, 2004). It is a complicated and multidimensional notion (Junni et al., 2013). Exploration is the organization's quest for experimentation, new directions, flexibility, and innovation. In contrast, exploitation is the organization's optimization and improvement of available resources, capabilities, knowledge, and technologies to gain efficiency and speed up implementation (Popadiuk et al., 2018). An organization needs ambidexterity capability to balance its strength and learning between the outcomes of exploration and exploitation to become effective (O'Reilly & Tushman, 2004). Organizational ambidexterity is a relatively new field of research. However, because of its importance, it has become the focus of several studies from diverse areas, such as organizational adaptation and change, organizational learning, innovation, and strategic management (Severgnini et al., 2019). If an organization focuses on exploring its resources, it might be challenging to adapt to environmental changes. However, if the organization did the opposite and focused on the exploitation of its resources, then it would not be able to utilize new ideas and innovate new processes and products (Junni et al., 2013). Resource constraints due to conflicting demands are the main cause of this situation, which leads to trade-offs (Stadler et al., 2014). According to Lavie et al. (2010), organizations can pursue contradicting demands and goals, but they need strong organizational structures and team integration.

Three separate literature streams have identified different approaches in which firms can become ambidextrous: structural, cyclical, and contextual. Tushman and O'Reilly introduced the structural stream in 1996. They defined ambidexterity as "the ability to simultaneously pursue both incremental and discontinuous innovation and change results from hosting multiple contradictory structures, processes, and cultures within the same firm" (Tushman & O'Reilly 1996, p. 24). They claimed that structural separation could help an organization develop ambidexterity ability. The second stream is cyclical ambidexterity, in which an organization moves through periods of exploitation and exploration and adjusts its structures and processes accordingly (Chen & Katilla, 2008). The contextual stream is the focus of this study. Contextual ambidexterity includes organizational

context, culture, and managers supporting employees via environmental management and development (Gibson & Birkinshaw, 2004). It can be defined as "the invisible set of stimuli and pressures that motivate a company's professionals to develop their activities to achieve ambidexterity" (Popadiuk et al., 2018, p. 644). Several studies emphasized the vital elements of the organizational environment that influence ambidexterity; for instance, cultures, structures, processes, and systems (Popadiuk et al., 2018). To acquire ambidextrous ability, organizations need to have processes and systems that promote, support, and inspire employees to embrace ambidextrous behavior while they make decisions regarding the ideal approach to allocate time and resources to contradictory demands. This competence penetrates all organizational levels and functions to accomplish alignment and flexibility, which means that "the more the context is characterized by an interaction between discipline, elasticity, support and trust, the greater the ambidexterity level" (Popadiuk et. al., 2018, p. 644; Gibson & Birkinshaw, 2004).

2.4 Organizational Ambidexterity and KSB

Filippini et al. (2012) believed that KM simultaneously facilitates exploration and exploitation. Organizations need to have two distinct learning modes of exploitation and exploration to balance and maintain efficiency and innovation (Kang & Snell, 2009). Nevertheless, discovering the appropriate balance between exploration and exploitation is a challenging task: "The basic problem confronting an organization is to engage in sufficient exploitation to ensure its current viability and, at the same time, to devote enough energy to exploration to ensure its future viability" (Levinthal & March, 1993, p. 105). In other words, combining the two learning modes is essential for short-term efficiency and long-term survival, but it is difficult to achieve.

The availability of an effective KMS can help an organization find an appropriate balance between exploration and exploitation. In a study conducted by Yang et al. (2016) on Chinese manufacturing companies to examine the influence of an electronic, human resource management system (EHRMS) on organizational ambidexterity through the mediation role of the top management team (TMT) and the moderating role of knowledge-sharing intensity. The findings showed that EHRMS could affect organizational ambidexterity through the mediating roles of other resources or capabilities. As a capability, a high level of TMT effectiveness may be achieved when firms successfully establish an excellent executive Strategic Human Resource Management (SHRM) system. Because of the SHRM system's availability, the executives could instantaneously enhance

the efficiency of current innovation approaches and obtain new technology. The results also showed that the degree of knowledge sharing from middle managers to TMT members moderated the connection between TMT effectiveness and organizational ambidexterity (Yang et al., 2016). Therefore, firms need to balance the learning modes of exploitation and exploration to maintain efficiency in the short term and innovation in the long term (Kang & Snell, 2009; Filippini et al., 2012).

3. Research Model and Propositions

By drawing upon the arguments of the literature review and recent studies in the previous section, Figure 2 illustrates the proposed conceptual model of this study., TTF and KMS characteristics are the independent variables (IVs) that positively affect KSB, which positively mediates the relationship between these two IVs and organizational ambidexterity. The conceptualization for each variable is demonstrated in Table 1. Two theories are applied to justify the relationships among the variables in the demonstrated model.

First, the TTF theory by Goodhue (1995) argues that the usability and effectiveness of a system depend on the suitability and fit between task and system characteristics. According to the TTF theory, the perceived TTF and technology characteristics will positively influence the system's usability (Goodhue & Thompson, 1995). In this study, the author focuses on the KSB construct instead of the usability construct and argues that the theory applies to this construct and that the perceived TTF and technology characteristics will similarly influence KSB. Several studies have revealed that the availability of adequate technology systems enhances KSB. Aside from that, effective technology systems encourage users to participate and share knowledge among organization members. Therefore, a suitable KMS positively impacts KSB, which then increases organizational ambidexterity capability (Filippini et al., 2012; Yang et al., 2016). Thus, the following propositions are presented:

H1: For the KMS users, the system’s perceived TTF will positively influence their willingness to share knowledge.

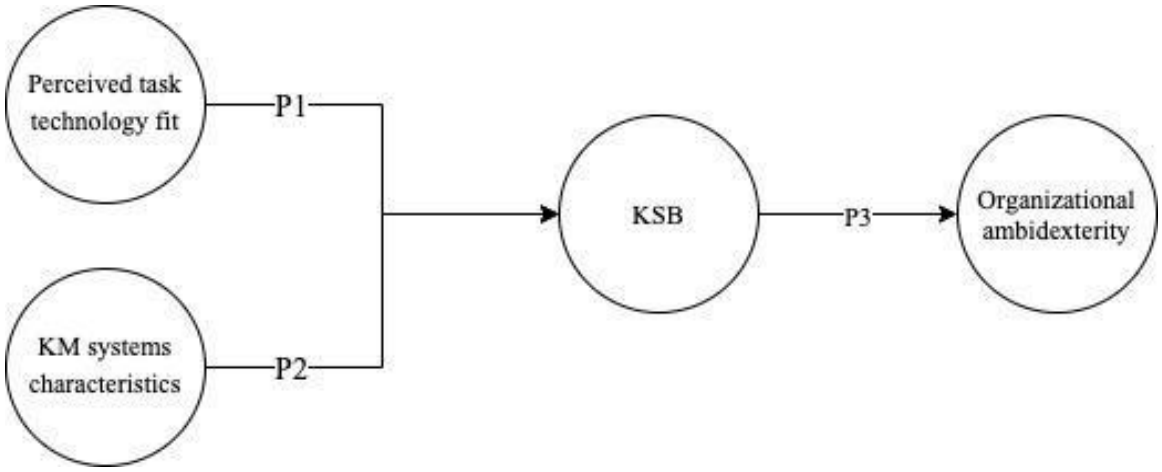
H2: For the KMS users, the system's technological characteristics will positively influence their willingness to share knowledge.

Second, the social cognitive theory (SCT) was developed by Bandura around the mid-1970s. SCT "views human behavior as an interactive, dynamic, and reciprocal network of personal factors, behavior, and the environment" (Huan, 2015, p. 1). The central assumption of SCT is that human action is triggered by three interacting factors: behavior, cognition, and the person's external environment. It emphasizes the learning processes and the interaction between multiple aspects (Bandura, 1988). From a knowledge-sharing perspective, SCT implies that individuals will not share their knowledge with others if they are not confident of their capabilities and the outcome of the knowledge they share. The author argues that the perceived TTF of KMS will increase knowledge sharing because it enhances the individual's confidence in the shared knowledge output. Pálsdóttir (2013) claimed that SCT had proven its significance in surveying motivations to share knowledge and to learn. Therefore, individuals are essential actors in KMS because an organization cannot create knowledge without individuals (Nonaka & Tekeuchi, 1995) who are motivated by an effective KMS to participate and share their knowledge and innovate. According to the TTF theory and the knowledge-based theory, if the users use the system and trust others to share their knowledge within the system (as they perceive the KMS as an essential means to develop, disseminate, and utilize knowledge). The organizational ability to exploit resources and explore new opportunities will also increase organizational ambidexterity. Eventually, the organization will gain a competitive advantage over its rivals through its knowledge and the intellectual capital created by the employees. Therefore, the following propositions are presented:

H3a: For the KMS users, the users' willingness to share knowledge will positively influence the organization's ability for exploitation.

H3b: For the KMS users, the users' willingness to share knowledge will positively influence the organization's ability for exploration.

Figure 2 *Research Model*



4. Methodology

The proposed method for empirically testing the theoretical model is the quantitative method, and the questionnaire is the primary tool for data collection. The population of the study will be organizations that have implemented KMS, and the managers and employees would be the appropriate respondents. The study questionnaire is divided into two groups. The first group encompasses 20 items for employees, and the second group contains six items for managers. According to Podsakoff et al. (2003), using two samples to participate in the questionnaire can help minimize the issue of common method bias of self-reported information. Table 1 shows the adopted measures for each construct. All the measures are established scales that have been previously tested and validated. The internal reliability test for the constructs' scales ranges from 0.9 to 0.5.

The suggested assessment of the measurement model has four main steps. In the first step, Cronbach's alpha will be used to test the internal reliability of the scales. In the second step, confirmatory factor analysis (CFA) will be conducted to examine the measurement of model fit to a data set. CFA is important in the analysis procedure because it allows researchers to identify and test the significance of factor loadings for each indicator (Dimitrov, 2012). Moreover, CFA will be applied to address construct validation with three criteria: reliability, convergent validity, and discriminant validity (Hamann et al., 2013). Structural equation modeling (SEM) will be run in the fourth step. SEM is a suitable approach for the proposed conceptual model because its multivariate method permits simultaneous analysis of all hypotheses in the model instead of testing them separately. It enables the researcher to test for direct and indirect paths in a model in one step (Hayes et al., 2017). The SEM

method is recommended over other analysis methods because it produces model-fit information regarding the reliability of the hypothesized mediational model and indications for the credibility of the proposed mediation model (Imai & Tingley, 2010).

Table 1 *The formal definitions of constructs and adopted measures*

CONSTRUCTS	DEFINITION	MEASURES
Technology characteristics	"The technological dimensions that are part of effective knowledge management include business intelligence, collaboration, distributed learning, knowledge discovery, knowledge mapping, and opportunity generation in carrying out their tasks." (Lin & Huang, 2008, p. 414)	9 items, (Gold et al., 2001)
Perceived tasktechnology fit	"The perception that the KMS capabilities match with the user's task requirements." (Lin & Huang, 2008, p. 414)	8 items, (Jarupathirun & Zahedi, 2007)
Knowledge-sharing behavior	"A social interaction culture involving the exchange of employee knowledge, experiences, and skills through the whole department or organization." (Sihombing, 2011, p. 26)	3 items, (Lin, 2007)
Organizational ambidexterity: exploration	"The tendency of a firm to invest resources to refine and extend its existing product innovation knowledge, skills, and processes." (Athuahene-Gima, 2005, p. 62)	3 items, (Athuahene-Gima, 2005)
Organizational ambidexterity: exploitation	"The tendency of a firm to invest resources to acquire entirely new knowledge, skills, and processes." (Athuahene-Gima, 2005, p. 62)	3 items, (Athuahene-Gima, 2005)

5. Limitation and Future Studies

This is a conceptual study; thus, the key limitation is that it is theoretical and provides no empirical evidence to support the findings. Future research can test the propositions within an organizational setting. Furthermore, the proposed model only considers two factors of KMS (KMS characteristics and TTF). Additional analysis can be performed to examine other factors of KMS, such as KMS capabilities and KMS self-efficacy (Lin & Huang, 2008). This study does not differentiate between different types of KMS, which could influence the perceived TTF of KMS. In the future, scholars can consider the influence of different types of KMS and their functionalities on organizational ambidexterity. Further research may also consider other dimensions of organizational

ambidexterity, such as agility and discipline (Boehm & Turner, 2004), alignment and adaptability (Napier et al., 2011).

6. **Conclusion**

Knowledge is the new fuel for organizations because it sustains their competitiveness and innovativeness. This study proposed a theoretical model to attempt to answer how KMS influences organizational ambidexterity through the mediation roles of KSB. In addition, it investigated the issue of the lack of knowledge contributions from KMS users that could cause a system failure, which prevents employees and organizations from fully utilizing the system to maximize their learning and innovation (Lin & Huang, 2008; Wang et al., El Said, 2015; Becerra-Fernandez & Sabherwal, 2015).

This study contributes to the theoretical discussion in the fields of KM and organizational performance. It proposed a model that combined KMS, KSB, and organizational ambidexterity and illustrated the association among them via two theories: TTF and SCT. This study sheds new light on the link between KMS and organizational ambidexterity since the literature lacks studies in this field.

From a practical perspective, the study underlines the importance of selecting a suitable KMS, and managers should consider it to stimulate knowledge sharing among their employees, which can enhance their innovativeness. This study also provides implications that will inspire managers to adopt strategies to improve KMS implementation and boost organizational ambidexterity. The theoretical model offers insights into the organization’s need to assess its capabilities and make better decisions regarding the direction of KM initiatives.

7. References

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