

The Use of KMS in Organizations: A Conceptual Framework and Preliminary Tests of Instruments

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Abstract— The importance attributed towards the utilization of knowledge management systems (KMS) is contingent on the recognition of knowledge as an indispensable asset to be managed. While KM has gained much attention from different research perspectives, studies on its tools called KMS appear scanty and at infant stage. An important area demanding attention is the need to explore the factors contributing to effective utilization of KMS, as the success of KMS implementations depends on utilization. This paper provides a conceptual understanding aiming at an effective KMS utilization through a proposed conceptual model. The framework built on previous research frameworks and models to propose the socio-technical antecedents that can be categorized into organizational, individual and technical factors; influencing KMS utilization in organizations. Items to be used in measuring the constructs in the framework were adapted or developed based earlier studies found in literature. A reliability test based on a study of 306 individuals across different organization in Malaysia confirmed that the constructs are of good reliability as most of the constructs alpha values are above 0.8 and none of the value falls below the 0.7 threshold point.

Keywords- *Antecedents, Knowledge Management, Knowledge Management Systems, Intermediate-outcome Organization Performance*

I. INTRODUCTION

The recognition of knowledge as an organizational resource that guarantees the sustainability of competitiveness is gaining momentum; consequently, the task of managing it has become a crucial aspect of organizational management. Conceptualizations on Knowledge Management (KM) could be observed to have followed a number of stages, the early conceptualization of KM according to [1], focused on guiding the adoption of KM in organization as well as empowering of knowledge workers. As research trend on KM matures, research focus shifted to different activities that could be managed or facilitated by Information Technology (IT) [1]. According to [2] four popular process of KM in literature are creation, storage/retrieval, transfer and application. As studies on KM evolves into different conceptualizations, so does research on Knowledge Management Systems (KMS), which are a class of Information Systems or Technologies dedicated

for the management of knowledge activities. Two widely acknowledge classification of knowledge is that knowledge is either explicit or tacit [3]; as such the early application of KMS is guided by the use of information technology as databases or data warehouses and tends mostly on the storage of explicit (codified) knowledge.

Knowledge is explicit when it is viewed as an object which can be codified, stored, expressed and communicated, whereas tacit knowledge represents the skill or crafts as well as technical expertise which reside in individual experiences and actions [1]. Organizations quest for competitiveness via innovation have been emphasized of proper leveraging of tacit knowledge, because it is difficult if not impossible to imitate. Researchers have also mentioned that, what guarantees organizations innovative capability for competitiveness lies beyond the sole application of tacit knowledge but an interaction between both tacit and explicit knowledge [3]. Further, the increasing emphasis on the complementary role of both explicit and tacit knowledge exposes the limitation of early KMSs which are more designed for explicit knowledge management. In view of the above, technologies which facilitate synchronous collaboration where tacit knowledge can be shared and integrated have been mentioned as necessary inputs to be integrated to early KMS technologies. Therefore, this study conceptualizes KMS as integrative and interactive systems or technologies which facilitate the management of both explicit and tacit knowledge in organizations.

Based on the discussion above, KMSs which leverage both integrative and interactive knowledge activities is believed to be a means through which organization's learning and intellectual capability increases by facilitating the sharing, accessibility to and utilization or application of knowledge. However, the adoption of KMS is not always successful despite the huge financial resources necessary for its implementation [4]. One major reason is that technology can only thrive when it is supplemented by other "soft" factors such as leadership and culture [5]. Prior studies have shown that the influence of technology on organizations performance comes through its complementary relationship with other organizational capabilities. Therefore, this paper anticipates to conceptualizing the socio-technical factors serving as

antecedents of KMS utilization as well as testing the reliability of measure used in the framework proposed.

II. THE STUDY FRAMEWORK

The framework as shown in Figure 1 below attempts to investigate the socio-technical conditions that nurture the effective utilization of KMS. Based on previous research finding, these socio-technical factors comprising of organizational, individual and technological attributes are believed to be important in organizations use of technologies particularly for managing knowledge [5]. Therefore, at the organization factor level; the framework will empirically examine the effects of organizational culture and structure in terms of cultural values and job design respectively. Knowledge self efficacy as well as autonomous motivation to KMS use are found as important factors to be considered as user factors. Lastly on the antecedents, system quality and knowledge and linkage quality of the systems are adopted as the technological factors. In addition, the impacts of KMS utilization on knowledge process such as sharing of knowledge; intellectual capital development among employees and organizational innovative capability are proposed to measure KMS utilization effectiveness. Table provides the lists of

III. KMS USE

The importance of technology in facilitating KM practices, particularly in large and widely distributed organizations [5] has gained tremendous attention in literature. Technology may provide the platform through which organization can flatten and decentralize its operations when utilized under the right condition. KMS is a class of IS developed to facilitate and enhance the process through which organizations create, store/retrieve, transfer and apply knowledge [6]. Three modes as mentioned in literature through which KMS facilitate knowledge activities are: storage of lessons learned, access to expertise and enabling of knowledge network. Based on these, KMS facilitates active communication and intense collaboration which prior research works have found to be important for organizational agility, innovativeness and competitiveness.

Thus, KMS as thought of in this study; is a combination of both integrative and interactive technologies that can facilitating the exchange and integration of tacit knowledge, distribution of explicit knowledge and giving richer meaning to codified knowledge by providing linkages between knowledge donor and receiver. An intensive review of literature shows that a lot of gap still exists in the area of KMS utilization, and the following section provides the discussion on the identified areas.

IV. ORGANIZATIONAL FACTORS

The cultural disposition as well as the structure of job execution in organizations has been identified as either a facilitator or hindrance to knowledge management as well as

knowledge management systems acceptability. With the increasing role of knowledge in decision making, organizational dynamic capability and competitiveness [2], organizations are becoming more interested in using technological tools to leverage their knowledge practices [7]. As mentioned by [8], “while it is widely recognized that information technologies have the potential to facilitate knowledge management, the management of knowledge-based system is an intricate process that involves a complex interplay of technical and social factors”. According to [8], KMS implementation is one of those efforts geared towards facilitating knowledge sharing via technology utilization. Despite the importance and the level of consideration given to organization culture in management studies, studies exploring the relationship between cultural values and KMS use are very scanty both in IS and KM studies [8]. For knowledge processes including the use of technology to thrive, the existence of culture of openness and trust have been mentioned, and the cultural values for collaboration and innovation have been identified as underlying values promoting openness, trust and motivation [9].

Furthermore, organization structure which has been categorized along the formalization, centralization and integration dimensions [10] plays important roles in eliciting the needs for communication and collaboration among employees. While these constructs have been measure separately in previous studies, researchers have demonstrated that job design in organization is the major factor determining these dimensions [9, 11, 12]. Job design that allows for less formalization and centralization and provide for strong integration is believed to be important to effective use of KMS in organizations.

V. USER FACTORS

At the individual level of KMS utilization, user factors are important factors which when combined with good organizational and technological factors will create a synergy that can foster purposeful utilization of KMS for knowledge processes. Individual/user factors in this study refer to personal attributes of an employee or group of employees in an organization which predisposes them to the use of technology particularly for knowledge sharing. According to [4], different interpretations of KMS suggest some common attributes inherent in such systems. One of these attributes is that KMS depends extensively on knowledge workers or organization employee’s transformation of KMS input into organization performance. Of Importance in this study are the user’s sense of knowledge self worth and autonomous motivation. While the former represents an individual’s belief of personal capability to perform knowledge tasks [13, 14], the latter indicates a self-valued desire to engage in certain behavior [15]

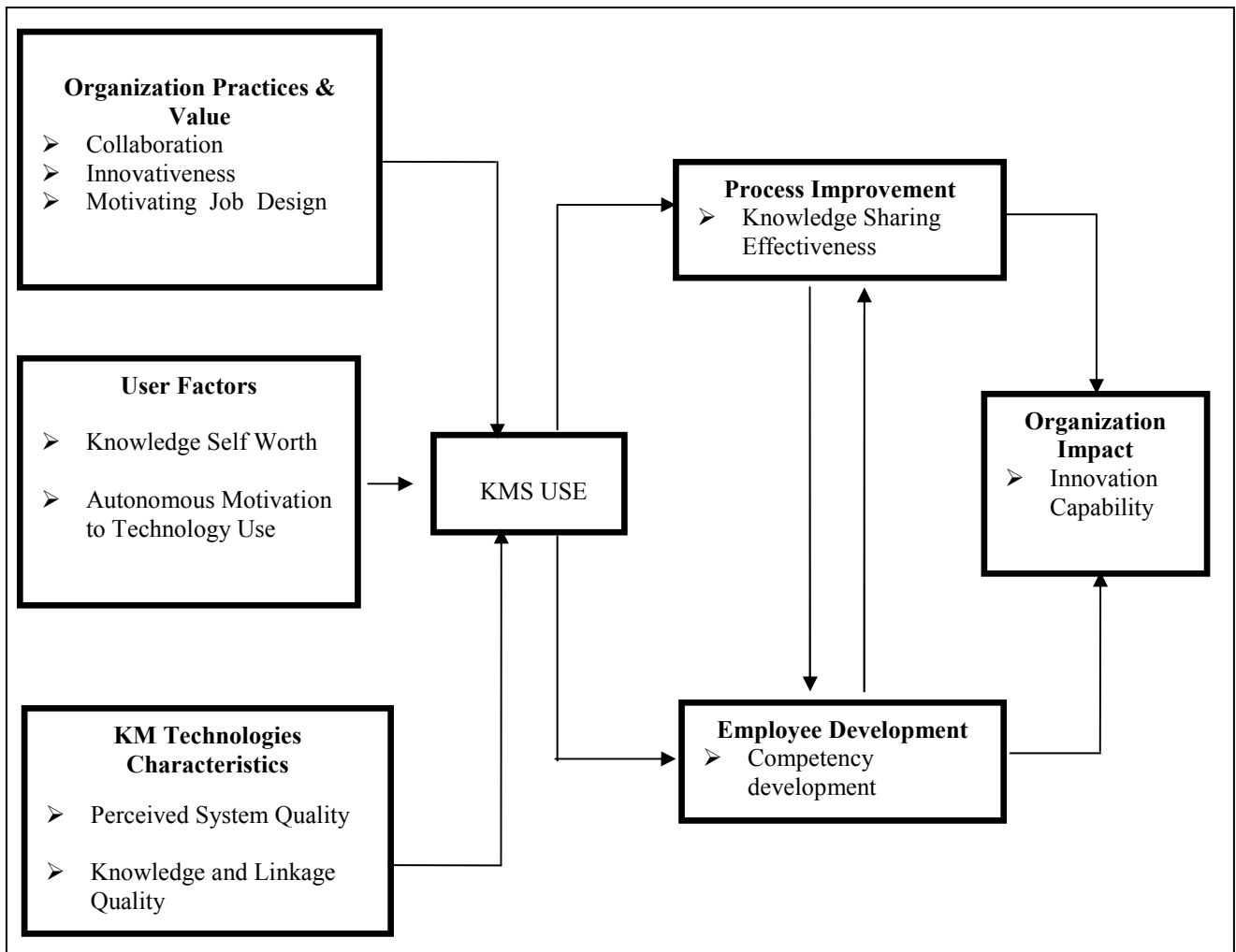


Figure 1

VI. TECHNOLOGICAL CHARACTERISTICS

Technological characteristics of technology innovation are the attributes of any technological innovation that can influence its usage. Delone and McLean [16] categorized the characteristics into two: System quality and Information quality. In adopting these measures for KMS success, [11] investigated the joint influence of system quality and knowledge and linkage quality on user satisfaction and perceived KMS benefits to determine KMS use. Therefore, this study also adopts system quality and knowledge/information quality as determinants of technological characteristics. System quality implies the ease, speed of completeness and effectiveness in the performance of knowledge functions using the KMS. KMS will aid knowledge sharing when it enables faster and ease in the codification of knowledge [2] and when it provides easy and fast access to experts or allows for collaboration, it facilitates the visualization and development of relational base of

organizations social [17]. In addition, because KMS involves repository and networked systems, [18] mentioned that “knowledge or information quality is a multi-dimensional construct having two components”: content quality as in the well known IS environment, and context as well as linkage quality which highlights the degree of KMS usability for leveraging tacit knowledge. As there is no a priori justification to decide otherwise, this study also adopts system quality and knowledge and linkage quality as technological factors of KMS that will contribute to its effective utilization.

VII. KNOWLEDGE SHARING EFFECTIVENESS

Knowledge sharing among employees has been described as a competitive necessity [19] in the present knowledge era. According to [20], sharing of knowledge is not limited to ordinary transfer of knowledge between donor and receiver but also involve the creation of new knowledge via interaction

which exists in a rich social network. Therefore, knowledge sharing contributes a great deal to the competency of organizational human capital. According to [19], “organizational knowledge sharing helps pass down idiosyncratic, competency-enhancing knowledge from the organization to individual or from one individual to another”. Thus, this study conceptualizes that effective knowledge sharing practices contribute a great deal to the development of competency among employees and consequently on the innovative capability of organizations.

VIII. COMPETENCY DEVELOPMENT

Competency development involves the broadening of employee knowledge via the exchange of knowledge with other employees. Lee and Choi, [21] used the terms T-Shaped skill to represent competency that span over the vertical and horizontal depth of knowledge domain. To improve the competency level among personnel in work places, different knowledge domains must be made visible among organizational units as well as enabling cross functional projects or tasks that help employees to gain knowledge of different sections in the organization. Technology provides the means to structure codified knowledge in such a way that knowledge seeker can easily have a structured start in an unfamiliar knowledge area. Similarly, the enablement of collaboration irrespective time or space is an advantage which technology has offered knowledge community to integrate and broaden the cognitive capital of the community in general. According to [21], people with skill whose competency is deep both in depth and breadth are valuable individuals who are capable of integrating both practical and theoretical knowledge to foresee the association between their area of expertise and other branches of knowledge. Because of their competence, they engage actively in knowledge exploration and exploitation to create new knowledge which is the essential of organization innovative capability.

IX. INNOVATIVE CAPACITY

In order to achieve a holistic comprehension of KMS effectiveness, it is imperative to link its utilization to outcomes. Therefore, this study considers non-financial outcomes of KM (Organization innovative capability) [22] as a construct of exploration based on by the availability of effective knowledge sharing practices and competent workforce aided by the use of KMS in organizations.

X. METHODOLOGY

In order operationalize the constructs entailed in the proposed model represented in Fig. 1 above, items used in previous study were adapted and reworded to suit the KMS utilization context. Multiple items were used to measure all constructs with a seven point Likert scale ranging from 1 = strongly disagree and 7 = strongly agree. A three-item scale measuring

innovativeness was adopted from Bock et al [23]. These items focused on the tolerance and practice of innovation in organization. Collaborative norm is measure based on the five items adapted from Lee and Choi [21]. These items encompass norm of inter-unit cooperation, willingness to collaborate among employees and the readiness to assume collective responsibilities in organization. In measuring motivating job design, five-item scale was developed based on earlier works in [9, 11, 12]. These items focus on job design that allows for autonomy, relatedness, learning, collaboration and access to communication facilities. The six-item questions for measuring autonomous motivation gauged both the valued extrinsic reasons and intrinsic reasons that encourage the use of KMS and were adapted from [15]. In addition, individuals sense of knowledge self efficacy/worth is measured by four items adapted from [22, 23]. Measure of KMS technological characteristics (System quality and Knowledge quality) were adapted from [16, 18]. Then, a five item measure adapted from [18] is used to measure system (KMS) use. These items focused on the use of KMS for decision making, donating and searching for explicit knowledge as well as the use of KMS for tacit knowledge exchange. Further, knowledge sharing effectiveness was measured using four items adapted from [19]. Competency development was measure based on four items adapted from [21]. These items tap into the development of employees’ competency in their core and general areas. Lastly, a six-item measure adapted from [22, 24] was used to measure organization innovative capability.

XI. RELIABILITY OF THE MEASURES

Based on a study conducted among 306 individuals working in various organizations such as in the manufacturing, service sector, government, software and IT, as well as banking and finance sectors in Malaysia and who are also undertaking MBA in Malaysia’s institutes of higher learning to test the reliability of the questionnaire items. To achieve this, a seven point Likert scales ranging from strongly disagree to strongly agree was used. As shown in table 1, the Cronbach’s alpha value for most of the measures is more than 0.8 and none of the reliability measure is below the 0.7 threshold. This signifies a high reliability of the instruments.

TABLE 1: RELIABILITY OF INSTRUMENTS

Measures	Means	Cronbach’s Alpha
Innovativeness	4.9455	0.7539
Collaboration	5.0523	0.7938
Motivating Job Design	5.2459	0.7953
Knowledge Quality	4.9461	0.9148
System Quality	4.7876	0.9030

Sense of knowledge self-worth	5.3126	0.8895
Autonomous Motivation to KMS Use	5.4641	0.9092
System Use	5.3673	0.9042
Knowledge Sharing Effectiveness	5.1046	0.9164
Competency Development	5.2026	0.8864
Innovation Capability	4.9139	0.9162

XII. CONCLUSION

Efforts aiming at empirically investigating socio-technical antecedents and impacts of KMS utilizations in organizations would be considered as a valuable contribution to literature as little of such have been done, particularly with the integration of different constructs which previous studies have treated in isolation. Practitioners can use the measures to assess the necessary inputs for KMS usage and at same time evaluate the contribution of the systems to their organization business objectives thus enabling the formulation of appropriate strategies. Despite the valuable contribution of the proposed framework, the reliability and applicability of the measure should be further tested particularly at specific organization level. The proposed framework and the relationships among the variable will empirically tested and the findings be published in the near future.

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