CUSTOMER KNOWLEDGE MANAGEMENT: DEVELOPMENT STAGES AND CHALLENGES

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ABSTRACT

Customer knowledge management (CKM) is necessary for firms in order to benefit from customer engagement which is referred as active involvement in innovative product or service development. Providing customized product and enhancing quality of service and product without successful CKM is not possible. However, organizations face major challenges concerning CKM. In this study, organizational, human and technological challenges of CKM were investigated. Then, the CKM development phases in the organizations are discussed. Finally, the organizational, human and technological challenges of each phase and the main CKM process of each phase are identified. Scholars and practitioners can use this research to estimate the current CKM phase of each organization and the challenges that the firms might face during the current and upcoming phases.

Keywords: *Customer Engagement, Customer Knowledge Management (CKM), CKM Challenges, CKM Process, CKM stages, Customer Relationship Management, Knowledge Management*

1. INTRODUCTION

Acquiring knowledge from external sources such as customers is more challenging compared to gaining knowledge from internal sources like employees. Because of this fact, implementing technologies for customer knowledge management (CKM) is considered as a challenging issue. In addition, barriers to implementation of customer relationship management (CRM) systems in companies highlight the necessity of addressing this issue. In fact, establishing mechanisms and technologies to acquire customer knowledge (CK) is found to be difficult in organizations. CKM is considered to add value to organizations, as CK is the most valuable knowledge for customer-knowledge focused organizations [1].

It is believed that developing CKM in organizations leads to enhancing the quality of products and services. In fact, CKM contributes to improving business processes resulting in high quality and innovative service or products. Thus CKM can enhance customer satisfaction and organizational performance, which leads to more net benefit and increasing competitive advantages; however CKM development in companies can involve certain challenges [2-4]. Organizations are faced with technological and organizational and human challenges during CKM development phases [5].

Lack of comprehensive research regarding the CKM challenges in companies is the motivation of this study. Thus, the first aim of this study is to review the literature to investigate the CKM challenges , and categorizing them based on Orlikowski [6] theory. Having reviewed the literature based on the fact that developing CKM consists of different phases [5], CKM is found to be composed of six phases in this study. Therefore, the next purpose of this research is to propose a phase based CKM development model in which the main CKM process of each phase are also highlighted. This research can be useful for companies since they can coordinate their strategy and visions based on this model to achieve CKM development. They can also identify the current status of CKM in their companies and the forthcoming challenges to be tackled, with which they can proceed in phases.

This research constitutes a literature review of 31 primary studies, with the goal of investigating the field of customer knowledge management. The review focuses on a CKM development challenges and barriers in the firms.

In this paper, the definition of CKM is reviewed and the CKM processes are summarized in section 2. Subsequently, in Section 3, the key technological, human and organizational challenges of CKM are identified. The proposed CKM model

is presented and discussed in section 4, and finally, the conclusion is made in Section 5

2. CKM PROCESSES

Organizational knowledge can be acquired from both internal and external sources [7]. One of the valuable external sources of knowledge is customer. Customers create and accumulate knowledge about the company through their personal experience with the company, its markets and its products and services. CK is considered as one of the most important resources to achieve competitive advantage, and one of the most dominant types of knowledge management (KM) activity. Gebert, et al. [8] classified CK into three main categories. The first type called "knowledge for customers" refers to knowledge about products, markets and suppliers applied to satisfy customers' knowledge needs. The second type is referred as "knowledge about customers," which is created based on the analysis of historical customers' data and information. The third type which is known as "knowledge from customers," refers to the customers' feedbacks.

Knowledge Management (CKM) is referred as an strategic practice in progressive companies for gaining capability to change their customers from passive recipients of products and services to active knowledge oriented partners Sofianti, et al. [9]. CKM is about acquiring, sharing, and enlarging the knowledge residing in customers contributing to both customer and corporate welfare. CKM is described as an ongoing process of generating, disseminating and using customer knowledge within an organization, and between an organization and its customers [10].
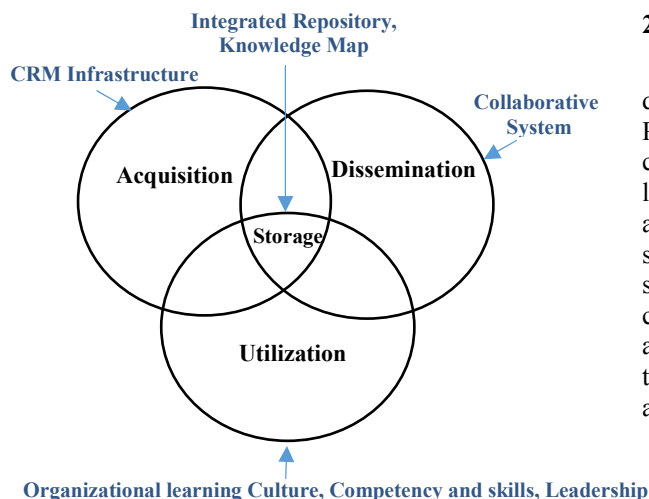
There are four processes involved in the CKM, with which the knowledge is employed into the organization (see Figure 1). The process begins with the phases of acquiring and storing the knowledge into the CKM system, and is followed by the phases of disseminating and using of knowledge among the communities [11] [12].

2.1 Customer Knowledge Acquisition

Knowledge acquisition is the starting process of CKM. Knowledge capture and acquisition is essential for the establishment of organizational memory [7]. CK can be used to support customer services, sales and marketing. The CK acquisition process is the process of obtaining or creating CK: from customers, about customers and for customers. The Customers' knowledge is created based on accumulated experience of the products and services, marketing, sales and support of companies and competitors. According to Xu and Walton [13], CK acquisition should be a dynamic and continuous process that acquires knowledge not only about existing customers, but also defecting customers, new customers, prospective customers and customers that are loyal to competitors.

2.2 Customer Knowledge Storage

This is a process where the knowledge will be kept in repositories. This process indexes the knowledge dynamically, and maps the knowledge into specific requirements. Repositories and knowledge map technology is useful for organizing and categorizing knowledge. It is evident that once knowledge is stored and updated periodically, knowledge can be shared smoothly. Thus, knowledge storage facilitates knowledge sharing within organization [14].

2.3 Customer Knowledge Dissemination

Knowledge sharing is a prerequisite for developing new technologies and products. Performance can be enhanced, when people communicate information, best practices, lessons learned, experiences, insights, as well as common and uncommon sense. Accordingly, the ability to share knowledge between units contributes significantly to the project success [14]. The collaboration system can disseminate knowledge in a collaborative environment, depending on whether the communication method is synchronous or asynchronous or combination of both.

Figure 1: CKM processes

2.4 Customer Knowledge Utilization

Knowledge utilization is the most crucial aspect of CKM. This is due to the fact that all the advantages of the other phases of acquisition and dissemination are required to be accumulated in this stage resulting in tangible profit for the organization. CK utilization is implied as the capability of the organization to use existing knowledge about and from the customer, with which the customer relationship, product or service innovation and quality will be enhanced. More precisely, according to Jayachandran, et al. [15], Knowledge utilization conjures up as utilizing the knowledge both for learning about customer needs and behaviour ,which is called "knowledge-enhancing utilization", and for the development of customer-specific products and services, which is referred as action-oriented utilization. Thus, knowledge-enhancing utilization results in changes in the existing knowledge base and in the understanding of the customers, whereas action-oriented utilization leads to more concrete changes in activities [11]. Product development is considered as a knowledge intensive process that requires both knowledge creation and application to produce highly successful new products [14, 16].

3. KEY CHALLENGES OF CKM

Developing a reliable customer knowledge management system could involve certain challenges such as knowledge retrieval, transfer and assessment, as well as establishing trust among different sides of the equation. As discussed earlier, Knowledge management comprises four distinct processes, namely "knowledge acquisition, knowledge storage, knowledge dissemination and the use or responsiveness to knowledge" [11, 12]. In each process, there are some technological, organizational and human challenges.

Orlikowski [6] proposed a theoretical model to consider impact and interaction between organization, people and technology. In her theory, Orlikowski [6] stated the relation between organization, people and technology. Van den Brink [17] expressed that we shape technology, and then it shapes us through our use of technology in special ways. Thus, the social systems are independent of us, but they are created every day through our thinking and through our actions. Therefore, according to Orlikowski theory, to manage customer knowledge successfully, technological, human and organizational challenges

should be taken into account. In order to benefit from CKM, organizations need to have a strategy. In addition to having an appropriate strategy, firms are also required to motivate their customer for sharing knowledge and motivate their employees to absorb and manage knowledge effectively. Appropriate training can enhance organizational culture and provide an organizational learning culture, which can be implied as learning by doing. This culture facilitates the process of learning from customer and applying customer knowledge to achieve product quality and innovation.

3.1 Organizational Challenges

3.1.1 Structural challenges

One of the challenges of CKM in an organization is the structure of the organization that can support CKM [18] [10]. According to Al-Shammari and Global [5], successful CKM requires transformation of organizations from product–centric to customer centric, from vertical to a network structure, from individualistic to collective work. Attafar, et al. [19] noted that one of the important barriers of CKM is interdepartmental conflicts.

Cross functional cooperation is very important for CKM. So, an organization should develop channels that enable two-way communication with customers and between departments, and they should foster cross-functional knowledge-sharing among employees [20]. In case internal departments operate independently, then collaboration among departments is limited. Consequently, many potential benefits of the CKM is not being utilized [21]. Organizational Inter-functional cooperation needs to manage individual customer relationships. Customer information and knowledge should be available to everyone in an organization dealing with customers, and everyone who uses customer knowledge in decision making. Yet, customer information and knowledge can be available for functions that are not directly dealing with customers ; such as finance and accounting [22].

3.1.2 Cultural challenges

One of the cultural challenges related to CKM is that organizations are not looking at their clients, but are internally oriented [19, 23]. Companies affected by this challenge typically perceive customer as a source of revenue, rather than considering it as a source of knowledge. In that respect, there are three cultural reactions to implement CKM. The first reaction is called

'corporate narcissism' and is characterized by statements such as 'we know our own business better than our customers do'. This was compounded by well-known business aphorisms such as Sony's proclaiming that 'no customer ever asked us to develop the Walkman.' The second reaction is the exact opposite of corporate narcissism, namely, lack of a critical perspective when it comes to customer knowledge. For example, Harley Davidson's chair- man and CEO Jeffrey L. Bleustein said at the Fortune Leadership Conference in Chicago on April 2002 that Harley customers asked the company to produce cigarettes with the Harley Davidson Brand, a venture that was soon discontinued, even though market research showed that 80 per cent of the company's customers are smokers. The third reaction, which might be dubbed 'corporate shyness' was colourfully illustrated by a senior manager at Siemens' headquarters in Munich. This concept addresses the increase in transparency of internal processes and the sharpened scrutiny from the perspective of the customer, and is highlighted by referring to the sentence 'walking around naked on a crowded Marienplatz at noon'. With regard to the first two recessions, companies interested in CKM need to appreciate that customer knowledge should be taken with a grain of salt. Customer knowledge constitutes an important ingredient in innovation processes, but it is not a panacea, and certainly does not replace the R&D department. With regard to the third reaction, just as CKM does not mean accepting all customer knowledge at face value, companies need to realize that CKM does not mean disclosing all knowledge of the company to all customers. This calls for appropriate network security processes ('Chinese Walls'), as well as trust-building processes that enable companies to purposefully encourage the flow of knowledge in certain areas, while controlling or limiting it in others [23].

3.2 Human Challenges

3.2.1 Competency challenges

CKM competence refers to the ability to integrate customer information and knowledge into an organization's every day processes and operations [22]. Organizations need to develop competencies in all aspects of CKM, which ranges from understanding who their customers really are and what they want to designing platforms specifically for customers. Skills and competencies for CKM are different from those designed for internal use [18, 23]. Al-Shammari and Global [5] argue that Skills and competencies for CKM must

be used in the collection, creation, dissemination, and usage of CK. However, companies do not often take full advantage of the knowledge sources they have, e.g. communities of practice, alumni, retirees, and front line workers.

Peng, et al. [24] noted that lack of the expertise to guide through problem solving is one of the barriers of CKM. Triki and Zouaoui [25] mentioned that organizations need Three types of competencies for successful CKM, which include; customer knowledge acquisition skills, customer knowledge sharing skills and finally customer knowledge use skills.

3.2.2 Privacy concerns

It is believed that much of CKM is based on developing a trusting relationship with each customer [20]. Organizations should take privacy dimension into consideration. Companies must understand not only the legal guidelines around how customer data is protected, but also how customers feel about how a firm uses their information. For example, too much customization is likely to make some customers feel uncomfortable with what a company knows about them.

Importance of privacy concern is highlighted by Mukherji [26] as he believes that why customers would spend the time to provide information to the organization while customers deem solicitation of such information as invasion of privacy. However, organizations need to train their employees such that they can elicit information from customers through meaningful interaction. Socialization is the predominant vehicle for sharing tacit and complex knowledge is premised on depth of relationships between individuals [27]. The challenge would be to develop such relationships with the customers within a time period that is long enough to create meaningful interaction and yet not so long as to make a customer uncomfortable. Organizations also need to act on the information collected and show visible impact of such interactions to the customers in order to motivate the customers to share information multiple times.

3.2.3 Trust concerns

One of the key challenges in retrieving knowledge from customer is lack of trust. The CKM system needs more social interactions between the project teams and customers. Since trust can enhance social interaction between the customer and development team , lack of social interactions in fact, could be viewed as the main

origin of issues [28]. Lin, et al. [29] argue that to improve the effectiveness and efficiency of CKM, trust between customer and company is important. Skotis, et al. [30] argue that lack of trust and lack of motivation are barriers of CKM. In fact, Trust refers to the avoidance of opportunistic behaviours to gain customer knowledge in order to improve the firm`s reputation and image.

Wu, et al. [31] expressed that Knowledge for customer can also be the knowledge sharing among customers. Knowledge sharing can lead to an added value in that it enables customers to know the product/service better with the help of knowledge from other customers. More importantly, the knowledge sharing among customers is perceived as more neutral and trustworthy, and thereby helps to reduce customers perceived risk [32].

Developing a trustworthy environment in which project team members can actually share appropriate knowledge to external parties such as customers and vice versa is certainly a challenge. As studies show, one of the biggest challenges that a project manager might face would be encouraging individuals to share their knowledge, particularly tacit knowledge in favour of an organization's overall success [33].

3.2.4 Motivation challenges

lack of motivation is considered as another important barriers against CKM [30]. This is due to the fact that knowledge management is a human based activity, so individual motivation plays an important role in sharing explicit and tacit knowledge between customers and employees and between employees. Motivation includes the identification of incentives and customer rights. From the company`s point of view, firms must develop the capacities to identify, absorb, share and deploy valuable customer knowledge. Peng, et al. [24] argue that lack of motivation in the service employees is one of the barriers of absorbing customer knowledge. Lorenzo-Romero, et al. [34] mentioned four benefits that motivate individual for customer knowledge creation and sharing. The first benefit called learning benefits are related to the acquisition of knowledge and gaining an understanding of the environment. The second advantage known as social integrative benefits are related to intensifying consumer ties with relevant others. The third benefit referred as personal integrative benefits are associated with strengthening the customers' own status and self-confidence, and finally the fourth benefit called

hedonic benefits deal with enhancing aesthetic or pleasurable experiences [34].

Aho and Uden [10] found that in the software development context, creating possibilities to participate and express personal opinions are key elements in successful development processes. Thus, motivating customers and project team members to share their knowledge is important in order to gain customer knowledge. Therefore, the system should encourage customers to complain, which is intended to provide the company with a better feedback. In fact, Complaint management is an important marketing variable and a key element in relationship marketing and CKM by extension. accordingly, in applying a CKM system within the firm, the customer data profile needs to be expanded in order to include non-transactional data such as general inquiries, suggestions and complaints [35].

3.3 Technical challenges

3.3.1 IT infrastructure challenges

CRM systems, collaboration systems, knowledge map technology and social media are fundamental infrastructure for CKM. Lack of these infrastructures is an important challenge for CKM. Technology has the capability to provide access to large amounts of data, and to enable long distance collaboration between business functions and teams. Technology is firmly believed to perform as a facilitator to support and encourage CKM by making CKM more effective and easier. However, the key issue is to choose an appropriate technology capable of developing a close fit between people and organizations. This issue is highlighted by referring to fact that a technology that operates effectively in some organizations may fail in others [36].

This infrastructure includes three related dimensions. One dimension deals with having explicit online, indexed and mapped knowledge by providing easy access and accurate retrieval for all users. In fact, storing, categorizing and organizing customer knowledge by using the repository and knowledge map technology is essential for effective CKM. It should be stated that in this condition, the emphasis is put on explicit knowledge. Next dimension is related to improving communication, collaboration and coordination between individuals, teams, or groups to share the knowledge [17]. Here, the emphasis is on tacit knowledge, and providing the collaboration system is necessary. The third dimension is about presenting pointers to individuals with a special

expertise or documents that describe knowledge. In this dimension, the emphasis is on both tacit and explicit knowledge. Knowledge map technology is useful for mapping and addressing both tacit and explicit knowledge.

In spite of importance of IT systems, it must be stated that they are only tools and not solutions .In fact, individuals are still responsible for sharing information and knowledge [37]. A key aspect of an organization's resources is its intellectual capital and knowledge base. This includes the skills and experience of its employees, its policies, processes and information repositories.

3.3.2 CKM assessment concerns

In order to get a better understanding about the current conditions of CKM in an organization, CK audits could be considered as the first essential step. By conducting regular audits, key success and failure aspects of implementing appropriate CKM systems in knowledge-based projects could be identified and monitored. Having such a system within the organization might be achievable as a result of certain efforts. Engaging customers for similar strategies might not be very easy ,and certainly will require a fundamentally well-established environment which enables healthy communication and collaboration with customers [38].

Moreover, assessing CKM efforts is not an easy endeavour and could be measured in few certain special ways. Indicators such as resource growth, knowledge content development, project survival and financial return are the key attributed factors which have been identified as key aspects for such purpose. Yet, a number of aspects are not easy to be measured. Tacit knowledge, for instance could not be measured by quantitative procedures [38] .In case of customers, developing Key Performance Indicators (KPI) has been the most commonly used approach to measure various aspects of customer engagement and collaboration strategies [39]. Therefore, it is fair to identify CKM assessment as one of the key challenges in such environments to be addressed both among the project teams and customers.

Wilde [40] found that the Poor customer data quality and lack of customer orientation strategy are considered as the major challenges in effective CKM. Mukherji [26] mentioned that not all information provided by the customer is valid. Therefore, Organizations need to have powerful analytical and triangulation processes to ensure the validity of the information that they collect from

the customers before they can act on such information. Necessity of conducting such analytical oriented assessment is highlighted by referring to point that capturing interactive data from customers would be both difficult and expensive, and Organizations need to be conscious of the returns that they get from such investments. The importance of assessment is emphasized by Talet [16] as he states that Measures need to be established to assess the impacts of the CKM and use of knowledge as well as verifying that the right knowledge is being captured.

4. ANALYZING OF CHALLENGES AND DISCUSSION

In this research, the challenges regarding to CKM process are reviewed according to Orlikowski [6] theory. In all processes, there are organizational, human and technological challenges required to be considered by researchers (see Figure 2).
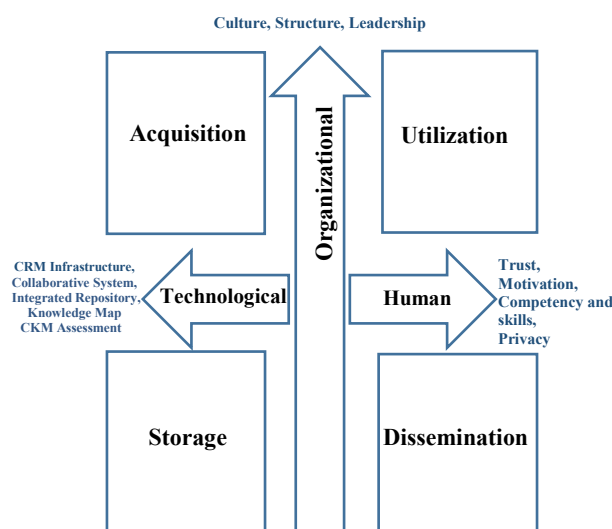

Figure 2: CKM Challenges (Organizational, Human and Technological)

Acquisition is the first process, in which firms define and collect knowledge form and about customers. CRM infrastructure including operational, collaborative, social and analytical CRM is the fundamental technology to absorb knowledge. Thus, lack of these infrastructures is an important challenge for CKM. Besides, it is found that IT systems are only tools and not solutions, and people are still responsible for sharing information and knowledge. Human challenges such as lack of

motivation of customers to share knowledge, lack of motivation of employees to communicate with customers for absorbing more knowledge, lack of competency and skills to absorb knowledge and lack of trust and privacy concern are critical barriers for knowledge acquisition.

Storage knowledge is the next process. Firms need to store and organize CK after CK absorption, and IT infrastructure is vital in this process. Companies need to integrate the repository to store explicit knowledge and they need knowledge map technology to map and organize explicit and tacit knowledge. A knowledge map is a navigation aid in discovering the sources of explicit and tacit knowledge by illustrating how knowledge flows through the Organization. Thus, it can be implied that customer knowledge map is useful not only for organizing customer knowledge, but also for deriving new knowledge from the organized knowledge and map this knowledge to the firm's problem for innovation and quality improvement.

One of the challenges of the companies is lack of CK integration and organizing. Some companies use data mining and text mining tools for classification and clustering customer knowledge; however, the main problem is organizing tacit knowledge and proving links to experts. Knowledge maps are found likely to be capable of helping organizations to manage tacit knowledge. Third process is knowledge sharing. In this process, customer knowledge needs to be shared across the organization and all the members of the organization in need for this knowledge can access to this knowledge. Collaboration system is responsible for providing the flow of CK in the organization. In fact, employees can discuss and collaborate with each other to solve the problem of the customers and improve the quality of product and service based on customer knowledge. Lack of collaboration system and lack of motivation and skill to share knowledge are the main challenges of this process. Last process is customer knowledge utilization. Knowledge utilization is the most crucial process since all the advantages of the earlier processes should be accumulated in the utilization process to provide the firm with tangible advantages.

Customer knowledge utilization refers to the capability of utilizing the knowledge both to learn about customer needs and behaviour (knowledge-enhancing utilization), and in the development of customer-specific products and services (action-oriented utilization). Thus, knowledge-enhancing utilization results in changes in the existing knowledge base and in the understanding of the knowledge users, whereas action-oriented use leads to more concrete changes in activities [11].

It is found that among all the CK process, technology is the most fundamental factor, while human and organizational factors are necessary. However, for the last two processes called dissemination and utilization, human and organizational factors are more vital. Lack of organizational strategy, lack of learning culture and lack of organizational commitment for CKM are important organizational barriers which are likely to influence technological and human factors. Providing trust environment and motivation and skills are human factors that are essential in all processes.

Based on Van Den Brink [41] model and CKM process, we proposed CKM stage based model (Table 1). In this model, each phase reflects a particular stage in the development of CKM in an organization. In the proposed model, some enabling conditions are more relevant to certain phases than to others.

We propose the following CKM phases:

1. Unawareness phase: An organization in the unawareness phase does not realize the possible contribution of CKM to its competitiveness. CKM is not addressed in the organizational vision or strategy.

2. Knowledge repository phase: The knowledge repository phase is applicable to organizations that have become aware of the potential value of CK. In its strategy, the organization pays attention to CKM and it is willing to invest in CRM infrastructure and integrated repository. In this phase, organization lays emphasis on acquisition and storage of CK.

3. Knowledge route map phase: An organization in the knowledge route map phase realizes the benefits of CK and undertakes increasing effort in CKM. This phase focuses not only on sharing of explicit knowledge, but also for sharing of 'indirect' knowledge by means of knowledge route maps. Organizing CK is the important challenges of this phase.

4. Collaborative platform phase: Organizations in the collaborative platform phase use knowledge to compete and to address their business drivers. The way of working is focused on participative decision-making,

collaboration, and learning together, for instance in communities of practice. Organization need to use Collaboration system to facilitate communication and collaboration of CK between employees.

5. Organizational learning phase: Learning by trial and error is sided by explicit, systematic (double loop) learning. Competitive advantages are attained through collective learning in the organization, through combination and coordination of skills, competencies and technologies. In this phase organization reach to the CK culture that organization tries to learn from customers.

6. Organizational Innovation and quality phase: Organizations in the Innovation and quality phase use customer knowledge for product and service innovation and enhance their quality. The aim of all CKM process is utilization of customer knowledge for product and service innovation and enhances the existing product and service quality, however, providing innovative culture and improving the quality of business process and product and services is not easy. Firms need to reach an appropriate culture. All the members should consider customer

knowledge as an important source of organizational innovation. Customer knowledge needs to be embedded in all related business processes (BP). In fact, it plays an enabling role for them. According to Gibbert, et al. [23], CK which is embedded in BP should have four goals including knowledge transparency, knowledge dissemination, knowledge development and knowledge efficiency. In this phase, the customer is seen as a knowledgeable entity rather than being perceived as a passive recipient of products and services. He is an active co-creator of value. Corporate efforts to deal with acquiring, sharing and expanding knowledge residing in customers, which is beneficial to both company and consumer [30].

Table 1 shows CKM phases and highlights that organizations need to focus on certain special CKM process in any of these phases. This table also shows the main challenges of each phase that should be addressed by organizations. In this table, challenges are categorized into technological, organizational and human challenges.

Table 1: CKM Phases

No	CKM phases	Focus processes	Main challenges		
			Technological	Organizational	Human
1	*Knowledge repository*	Acquisition, storage	IT infrastructure challenges, Integrated knowledge repository	CKM strategy challenges, Top management support	Motivation challenges, Competency Challenges, Lack of Customer involvement, Trust Concerns
2	*Knowledge route map*	Storage, Organizing	IT infrastructure challenges, Knowledge Map, Knowledge organizing,	Top management support,	Competency Challenges
3	*Collaborative platform*	sharing	Collaboration system Concerns, Social Media Concerns	Structural Challenges	Motivation challenges, Competency Challenges, Trust Concerns, Privacy Concerns
4	*Organizational learning*	Knowledge-Enhancing Utilization	Social media Concerns, CKM Assessment Concerns	Cultural Challenges, Embedded CK in BP	Trust Concerns, Competency Challenges
5	Organizational Innovation and quality	Action-Oriented Utilization	CKM Assessment Concerns	Cultural Challenges. Embedded CK in BP	Competency Challenges, Motivation challenges

5. CONCLUSION

In this research, CKM challenges are reviewed in literatures, then, according to Orlikowski theory, challenges are categorized into three categories called technological, human and organizational challenges. Lack of senior management commitment to CKM, poor communication, Lack of cultural readiness and lack of customer management skills are the barriers to the design and implementation of CKM. It is found that the most significant challenges in an effective implementation of CKM are organizational, not technical. It is clear that the challenges are not limited to the ones proposed here. In fact, based on the environment, complexity of projects and other variables, different difficulties might arise. However, realizing the key characteristics of challenges would help to identify some of the key elements which could facilitate developing reliable and sustainable CKM systems. Then, the challenges of each CKM process are mentioned. In this study, it is identified that human challenges are more important challenges in the acquisition process. In the storage process, technological challenges are more serious. In the dissemination and utilization process, human and organizational challenges are more highlighted. However, organizational challenges such as strategy and top management commitment can stimulate other challenges; for example, if the top manager of the organization doesn't support the CKM program, then expert human resource and high technology infrastructure is not useful for successful CKM. In this research, the development phases of CKM and challenges of each phase are mentioned. Then, CKM process which should be considered more seriously in each phase is identified and discussed. The proposed model can be useful for firms. Taking advantage of this model, firms will know about the status of CKM in their companies and the current phase of their companies. However, more research is needed to provide the organizations with solution for challenges in each phase, and reach to the utilization phase through which firms can achieve the innovative culture.

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