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Factors for KMS Post Adoption: The Exploratory Study in Oil and Gas Industry in Malaysia

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ABSTRACT

This paper presents the analytical factors that influence Knowledge Management System (KMS) adoption at the individual level known as post adoption phase. Though many organizations have increasingly recognized KMS significance and started to implement it but its adoption has proved to be very difficult and many organizations are still facing with challenges. The analysis of Grounded Theory (GT) process provides results of the individual factors influence the adoption. These factors offer insights into in-depth of the case study in the real setting of oil and gas industry in Malaysia. Also, these factors provide the possibilities to prove and help in stimulating employees' adoption and assisting company to reach its KMS goals.

KEYWORDS

Knowledge Management System, Grounded Theory, Individual factors, Post Adoption, Exploratory Case Study

1 INTRODUCTION

Nowadays, all organizations are seeking for new methods to compete in a complex and challenging environment. Scientists and practitioners acknowledge that currently knowledge became more critical resource as compared to land and capital [1][2]. Therefore, organizations opt to survive and prosper by leveraging organizational knowledge assets and subsequently, their strong attention has been given to knowledge management (KM) initiative [3][4][5]. KM is the systematic approach that provides efficient disciplines and procedures to enable the knowledge to grow and create value to organization [6][7][8][9][10]. Thus, many organizations recognize it as a valuable method and have begun to support this practice to meet business needs and objectives. According to recent research findings, KM is one of the foundations for competitive advantage [11][12][13][14].

On the other hand, it is obvious that Information Technology (IT) is one of the key elements in KM and the effective deployment of KM requires its investment [15]. This is because IT provides tools and system to support various types of KM activities such as storaging, sharing, applying and creating knowledge [16]. There are diverse configurations and designs in order to make these activities possible; this is termed as knowledge management system (KMS) [7]. KMS is an IT-based system developed to support and enhance KM processes of storage, sharing, retrieval, creation and application of knowledge [17][18][19][20]. Thus, many organizations started making significant investments in KMS [21][22]. Despite the large amount of money spent for KMS implementation, this does not guarantee of its accomplishment [23][24][25][26]. Not a few and many of them had wasted organizational efforts as well as their resources [27]. It is estimated that the budget range for KMS implementation is from $25,000 to

$50,000,000 but due to its failure, the Fortune 500 companies report that they lost at least $31.5 billion annually [28].

Taking into consideration of system adoption is one of the most critical factors to KMS success [29][30], currently it is the major concern for both scientists and practitioners to investigate and understand the phenomenon [31][32]. KMS is considered as new technology therefore like any other new technology, there are many challenges that facing on adoption including its frequent use [33]. As Post adoption phase is the main area to see for technology use. Therefore, the paper seeks to explore the factors that facilitate the adoption of KMS in the organization at this level. GT method is used to analyse grounded data and conceptualise the outcome of this study.

2 BACK GROUND ON THE RESEARCH AREA

2.1 Definition of KMS Adoption

The adoption of KMS is an innovation in the field of IT and its adoption rests within the literature of IT adoption. On the other hand, the study of IT adoption in organization is related to innovation adoption which it is extremely discrepancy and contrary in its definition, conceptualizations and models. Rogers innovation diffusion theory is one of the most widely accepted regarding to innovation adoption. According to him an innovation is defined as, "An idea, practice, or object that is perceived as new by an individual or other unit of adoption" [34]. Rogers defined diffusion as, "The process by which an innovation is communicated through certain channels over time among the members of a social system" [35]. This paper is about IT adoption in the organization therefore we define the adoption as an organization or individual who makes a decision to use technology in the stage of its diffusion [36]. The above definition denotes both organizational and individual level of adoption.

2.2 IT Adoption Theories

Fichman conducted the first review of IT adoption studies. Fichman examined 18 studies conducted between 1981-1991, which asked questions related to improving technology assessment, adoption and implementation. The most widely accepted theory for IT adoption was the innovation diffusion theory of Rogers (1983). Strongest results were noted when researchers examined: "(1) individual adoption, and/or (2) independent use technologies that impose a comparatively small knowledge burden on would-be adopters." These were instances in which the assumptions of innovation diffusion theory held [37] Jeyaraj et al evaluated 99 studies on IT adoption. Forty-eight of the studies examined IT adoption by individuals, and the best predictors of individual IT adoption were: perceived usefulness, top management support, computer experience, behavioral intention, and user support. Fifty-one studies examined organizational IT adoption, and the best predictors of IT adoption were: top management support, external pressure, professionalism of the IS unit, and external information sources. The variable of top management support stands as the strongest factor linking individual and organizational IT adoption [38].

In the literature on IT adoption from 1992-2003, 11 theories are noted as described in Table 1. Some of the studies examined individual adoption of IT, and others examined organizational adoption of IT. These studies ranged from the adoption of Decision Support Systems (DSS) to Group Support Systems, also known as, Computer Supported Cooperative Work (CSCW).

Table 1: Theories Used in Individual and Organizational IT Adoption Research [38]

Theory	Main Author(s)	Used in Individual Adoption Studies	Used in Organizational Adoption Studies
Innovation Diffusion Theory	Rogers (1983, 1995)	x	x
Perceived Characteristics of Innovation	Moor & Benbasat (1991)	x	
Social Cognitive Theory	Bandura (1986)	x	
Technology Acceptance Model	Davis (1989)	x	
Technology Acceptance Model II	Venkatesh et al (2003)	x	
Theory of Planned Behavior	Ajzen (1991)	x	
Theory of Reasoned Action	Fishbein & Ajzen (1975)	x	
Unified Theory of Acceptance and Use of Technology	Venkatesh et al (2003)	x	
Diffusion/Implementation Model	Kwon & Zmud (1987)		x
Tri-Core Model	Swanson (1994)		x
Critical Social Theory	Green (2005)	x	

However, these classical theories provide assumptions that are quite linear while KMS adoption is a multifaceted phenomenon which occurs in different manner over time [39]. Mostly, their assumptions do not go well with innovation adoption in organization [40] because the different types of innovation do not illustrate the same response to similar factors [41]. Moreover, when context differs the factors are produced differently [42]

3 METHODOLOGY

Methodologically, this study employed GT. GT is a qualitative research method increasingly common in use in various disciplines. This method is recommended for hard sciences as well as social sciences [43]. Its application to information systems is very helpful for explaining phenomenon, developing context-based and process-oriented descriptions [44] [45] [46].

GT is a suitable approach for situations where researchers are trying to reveal participants' experiences, perceptions, and build a theoretical framework based on reality [47]. In this regard, the researchers would like to explore the employees' experiences and perceptions in real situations thus the data is revealed by the employees. As the research interest herein is to generate new insights for the existing literature and to understand in depth about the factors for KMS adoption, the researchers employs an inductive approach of qualitative research by adapting the process and design of a GT approach instead of applying a deductive, hypothesis testing approach. This study is exploratory and interpretive in nature. It looks into the concepts that build the meaning of factors that affecting KMS post adoption. Therefore, a GT approach is most suitable to employ in this study for the following reasons.

The GT approach offers a set of procedures for coding and analyzing data, which keeps the analysis close to the data and presents the inductive discovery about the phenomena of the study. These procedures are structured and organized which leads the researchers to theory development [48]. As a result, the researchers are confident in the area of conceptualizing because it includes the resources of developing theory from the data itself. This study contributed to the research literature on GT by determining two new methodological process sequences as noted in Table 2 which innovatively combines the approaches of both Strauss and Glaser.

Table 2. Grounded theory methodology [49][50]

No.	GT Approach for This Study	Author
1	Start with having a general idea of where to begin.	(Strauss & Corbin, 2008)
2	Theoretical sensitivity comes from immersion in the data.	(Glaser, 1992)
3	Conceptual descriptions of situations.	(Strauss & Corbin, 2008)
4	The theory is grounded in the data.	(Glaser, 1992)
5	The credibility of the theory is from the rigor of the method.	(Strauss & Corbin, 2008)
6	The researcher is vigorous.	(Strauss & Corbin, 2008)
7	The data reveals the story.	(Glaser, 1992)
8	More rigorous coding and technique is defined. The nature of making comparisons diverges with the coding technique. Labels are carefully crafted at the time. Codes are derived from micro-analysis which analyzes data word by word.	(Strauss & Corbin, 2008)

3.1 Data Collection

We use theoretical sampling and both unstructured and semi-structured techniques to interview informants regarding their perceptions and experiences to accept KMS for their daily work. At the very beginning we interviewed them with open ended questions unstructuredly. This is because at this stage we would like to discover the real issues occurred in this particular organizational setting. During the interview session, we probed informants to explore and discover what factors that really concern in their organization. Indeed, the in depth interviews allow us to have a flexible and dynamic style of asking the question and discuss directly to understand the significance of informants perceptions and their experiences from their perspective as also recommended by [51]. Since the informants' description is the principle for this kind of study therefore we rely to some degree of their testimony to obtain what the informants denote. In fact, this could help the researcher to get rid of the drawbacks on distortion, exaggeration, fabrication, and deception [52].

The data collection process was constant and it is ceased when further data was no longer adding to the insights already gained. This indicator is called theoretical saturation. At this point, it was not necessary for further analysis because the analytical framework was saturated [49][53]. The further data of this study had not added new things therefore the theoretical model has been discovered at respondent number 8.

In terms of a process model of the analytic sequence of GT in this study (see Figure 1), the researchers explored in depth open, axial, and selective coding, and discovered conceptual process constructs of: bubbling, exploring, and arising.

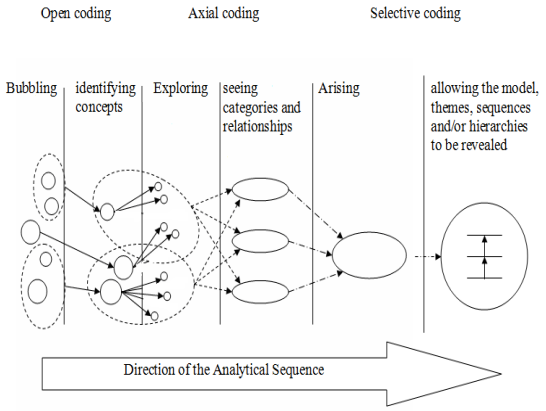

Figure 1: The GT analytical process in the data analysis
(Adapted from Warburton, 2005)[54]

Next, the researchers will describe and discuss the results of this study.

4 RESULTS AND DISCUSSIONS

4.1 Demographic Findings

The demographic findings of this study are the participants' gender of 75% female and 25% male (see Figure 2). Participants job positions were 50% executives, 25% senior managers, and 25% managers (see Figure 3).

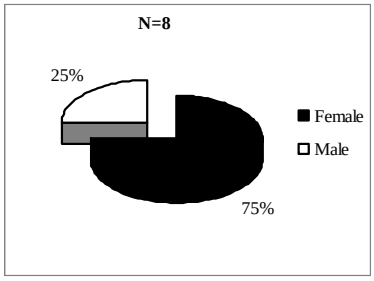

Figure 2: Participants' Gender

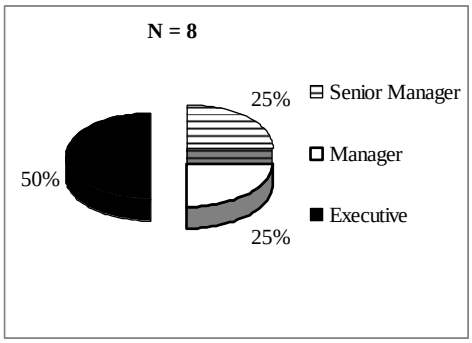

Figure 3: Participants' Job Positions

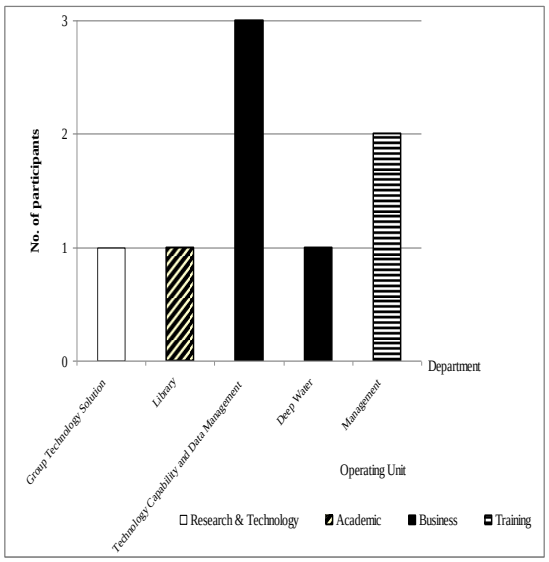

Figure 4: Participants' Departments and Operating Units

The various management teams contributed very meaningful data to this study because of their knowledge and experiences with IT adoption, particularly the KMS. Figure 4 illustrates the distribution of the departments in which the participants worked and their operating units. The highest numbers of participants in this study were from the technology capability and data management department, which is under the business-operating unit.

4.2 Factors for Post KMS Adoption

Now, the researchers present the three components of the factors that influence the post adoption of KMS. The result derived from the analysis process of GT which integrated into model (see figure 5). This model is a synthesis of the 8 models derived from the respondents and consists of three themes: Technology, Individual, and Process (See Table 3).The three components of the model arose during the selective coding stage of the research and the researchers considered them as research themes. They arose easily and clearly from the respondents transcripts. It is to be noted that throughout this process the researcher used the Atlas.TI program to store the transcripts and for the grounded theory coding process. Within each component of the model there are terms which arose from the data to describe the respondents' experiences with the adoption of the KMS innovation. These terms describe experiences, qualities, or characteristics of the technology, individual, process of innovation adoption.

The first, the technology component, discussed herein. The technology component has: service quality, system quality and knowledge quality which are grounded in the data. The dimensions of service quality are adaptive advantage, efficiency and fulfilling. Customization, integration, ease of use and sophistication are dimensions of system quality. In addition, the timeliness and knowledge contents are appeared to knowledge quality dimension.

Second, the individual component contains psychological traits/states, age and roles and responsibility. The experience of flow state and the personality traits such as openness and conscientiousness provide positive influence to KMS post adoption while introversion, neuroticsm and resistance to change characteristics tend to hold individual from adoption.

Third, the process component reveals management intervention and KM processes. The management intervention includes management support, training and motivation while KM processes refers to knowledge sharing and knowledge creation.

Table 3: Factors Findings

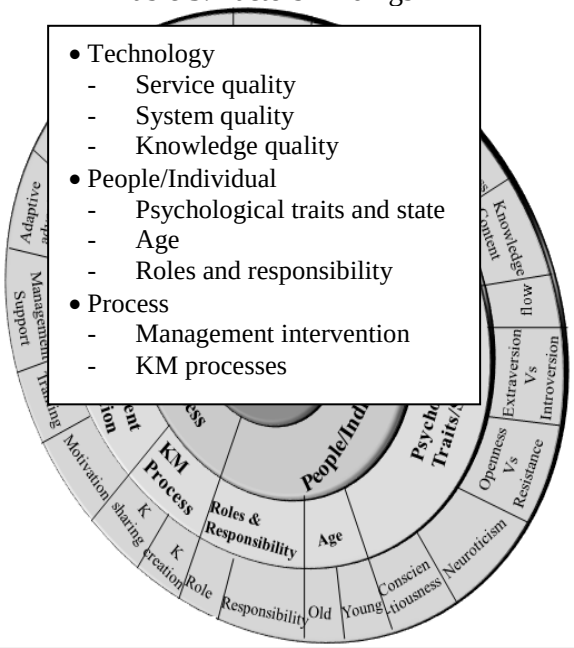

Figure 5: Model of KMS Adoption: The Grounded Process

5 CONCLUSION

Though there are various models exist related to the study of technology adoption. However, those models are drawn from preconceptualization instead of generated the concepts grounded from data. The result of this study derived from the actual process of KMS post adoption from organization in the case study. Therefore, the exploration process and result of the phenomenon enabled the researcher to understand the situation within a real life context so that the boundary between the phenomenon and its context could then become clear. The finding of this study could facilitate the top management to increase the rate of adoption and acceptance to use the system for daily activities.

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