Secure Fuzzy Logic to Study the Impact of Knowledge Management Enablers on Organizational Performance through Decision Making Mediator

Omar Wassef Hijazeen 1,*, Samson Oluwaseun Fadiya 2,†, Murat Akkaya 3,† and Arif Sari 4,†

1. Researcher Management Information Systems (Girne American University)
2. Assistant Prof. Management Information Systems (Girne American University)
3. Associate Prof. Management Information Systems (Girne American University)
4. Associate Prof. Management Information Systems (Girne American University)

† These authors contributed equally to this work.

Abstract

Nowadays, organizations have realized that knowledge is considered as a key asset to achieve strategic benefits. Since, it helps to define the organization’s desired goal and future vision. For a better implementation, organizations should understand knowledge management and carefully choose the enablers (influencing factors). Therefore, this study aims to identify enablers that can affect successful implementation of knowledge management, and investigate the influence of the effective decision making (as a mediated variable) on the relationship between knowledge management enablers and organizational performance. In doing so, firstly questionnaires have been randomly distributed to Jordanian and non-Jordanian commercial banks, some by hand and others through email. Secondly, some interviews were conducted with a consultant of the central bank of Jordan, and other managers in commercial banks in Jordan. Consequently, (400) questionnaires were involved in this study, to examine the relationships between the proposed framework’s attributes and to test the suggested direct hypotheses. The collected data was analysed using an artificial intelligence approach specifically, fuzzy logic method. The result revealed that there is a significant impact of knowledge management enablers (cultural attributes, leadership style, employee skills and information technology infrastructure) on the performance of the commercial banks, using decision making as a mediator.

Keywords: knowledge management; knowledge management enablers; decision making; organizational performance; commercial banks in Jordan; fuzzy logic method.

1. INTRODUCTION

Knowledge management is considered as a driving force for organizations, which indicates success or failure of the overall performance. However, knowledge management is considered as a new tool that has complex processes, since it contains many factors to be implemented. (Bennett and Gabriel 1999) claimed that, there are no specific knowledge management enablers that can positively affect the performance. Because it dramatically depends on some vital surrounding factors such as, the structure of the organization, size, the nature of culture and the environment. (Skyrme and Amidon 1997) shed the light on some factors that affect knowledge management such as, leadership, culture, information technology… etc. Another study was done by (Mathi 2004) which highlighted some other important factors that must be taken into account when implementing knowledge management like, people, process and information technology. However, prior studies investigated the knowledge enablers, processes, and organizational performance as separate factors without studying the relationships between them (lee and choi 2003). Moreover, they did not consider the impact of knowledge management enablers and decision making on organizational output simultaneously.

In order to fill this research gap, this study is trying to investigate the relationships among the suggested knowledge management enablers, decision making and the performance of commercial banks in Jordan. Also it examines the influence of these factors on each others by answering the following research questions:

- What is the impact of knowledge management enablers on the commercial bank performance in Jordan as mediated by decision making?
- What is the impact of decision making on the commercial bank performance in Jordan?
- What is the impact of knowledge management enablers on decision making?

Many banks strive to implement the knowledge management effectively because it becomes a primary source for achieving the desired goals that they aspire to. The importance of this study lies in specifying knowledge management enablers which are: cultural attributes, leadership style, employee skills and information technology infrastructure. Then, it aims to study the relationship between these factors and performance in the banking sector with the decision making as a mediator.
In order to allow the top management of commercial banks in Jordan to discover the power of applying knowledge management, and, to create knowledge among departments and employees, which would reflect on the quality of running processes and workflow as well and, to enhance the application of some weak enablers, and to introduce the practical decision making. Thereby, this study is particularly aimed to pinpoint the following objectives:

- To determine the effect of knowledge management enablers on the commercial bank performance in Jordan considering decision making.
- To determine the effectiveness of decision making on the commercial bank performance in Jordan.
- To determine the influence of knowledge management enablers on decision making.

2. THEORETICAL BACKGROUND OF THE STUDY

This section discusses the historical development of knowledge management and its definition from different perspectives. Moreover, it sheds light on some related previous studies that examine the relation between knowledge management enablers and organizational performance. In addition to that, it explores the relation between decision making and organizational performance.

2.1 What is Knowledge Management?

The term “knowledge management” was used before (2) decades ago. In addition, the evaluation of knowledge management was traced by many researchers (Wiig 1996; Ponzi and Koenig 2002). (Ponzi and Koenig 2002) stated that knowledge management was born in the early 1990s and has grown slowly till 1995. After that, knowledge management was growing rapidly from the year 1996 to 1999. Because knowledge is an invisible and intangible asset, it makes the process of measuring or managing it via traditional parameter very difficult (Al-Adaileh and Al-Atawi 2011). However, managing the knowledge is much more complex than managing the information, because knowledge consists of information along with ideas, obligations, inspirations, human talent, capabilities and perceptions (Grey 1996). Thus, it is difficult to find a specific definition of knowledge management. However, some of the definitions found in the literature are shown in the following:

(Bassi 1997) defined the knowledge management as a process of creating, capturing and using knowledge to improve the organizational performance. Whereas, (Liebowitz and Wilcox 1997) said that knowledge management is the ability of organizations to manage, store, value, and distribute knowledge. (Bayyavarapu 2005) “Knowledge management is a set of practices and processes to acquire and apply knowledge to facilitate organizational operations”. (Debowski 2006) defines knowledge management as the process of identifying, capturing, organizing and disseminating the intellectual assets that affect the performance of any organization for a long term. (Zaim 2006) knowledge management is the systematic management of all activities and processes referred to generation and development, codification and storage, transferring and sharing and utilization of knowledge for an organization’s competitive edge.

2.2 Literature Review and Previous Studies in the Same Field

(Adan 2013) the main objective of this research was to identify the key knowledge management enablers that affect the performance of Kenya Revenue Authority. Therefore, the study considered the organizational culture (collaboration, mutual trust, learning, and leadership), structural issues (centralization and formalization), people, and IT infrastructure as significant factors of knowledge management. Moreover, the results emphasized that these enablers had moderate to high effect on the performance of organization. . In addition, this provides a clue for academia and the business field to consider knowledge management to improve the overall performance.

(Majin et al. 2015) studied the role of knowledge management enablers, and how it can affect the performance in MASKAN banks of IRAN as the study’s sample. Therefore, the goal was trying to determine which important factors are enabling in order to share their knowledge on the effectiveness of knowledge management and database performance. Therefore, culture, structure, information technology and employee skills were studied, because they had been considered as the most important factors.

Thereby, the result revealed that all independent variables have a positive effect on the effectiveness of knowledge management. Moreover, employee skills and culture have a significant impact on performance, whereas structures and information technology had the lowest impact.

(Theriou et al. 2011) identified the critical success factors or enablers that determine the knowledge management effectiveness, which in turn influence the total performance of the small, medium and large manufacturing companies in Greece. Based on that, this study outlines five important factors which are: leadership, culture, technology, knowledge management strategy and people. Thereby, this study will help organizations to understand the impact that different enablers have on knowledge management successful implementation and, how the effectiveness of knowledge management affects the performance.

In conclusion, the empirical evidence presented here suggests that organizational culture and leadership are the most important enabler factors. The identification of these core sets of factors will facilitate the evaluation, by organizations, of the statues of knowledge management implementation and identification of areas for improvements. Consequently, organization that adopts effective knowledge management today will achieve competitive advantage tomorrow.

(Scott and Bruce 1995) defined decision making as “the learned habitual response pattern exhibited by an individual when confronted with a decision situation.” Another study,
carried out by (Rehman et al. 2012), created a model, in order to investigate the impact of decision making on the organization's performance using emotional intelligence as a moderator.

Therefore, the population of this study contains (151) branch (public and private) banks in Pakistan. The sample was chosen randomly to collect data. Finally, the result of the study described that rational and dependent decision making impact strongly and positively the organization's performance, while avoidant decision making has negative impact on it.

3. THE THEORETICAL FRAMEWORK OF THE STUDY

Figure 1, below shows the proposed framework of this study. The model was built on prior studies in the same field and the interviews conducted with some experts in commercial banks in Jordan. In order to determine the enablers that can profoundly affect the entire performance of the banks. Moreover, this framework contains independent variables (knowledge management enablers), dependent variables (organizational performance) and mediated variable (decision making). For more clarification, each one of the chosen enablers, decision making and organizational performance will be explained separately.

- Cultural Attributes

Many researchers were unanimous in that cultural attributes play a crucial role in knowledge creation and knowledge management. “Set of values, beliefs, customs, traditions and practices of sustainable knowledge that the organizational members will exchange, share and divide between each other” (Watson 2008). Also, culture can be defined as a set of shared values and beliefs among organizational members, expectations, unwritten rules and habits that affect attitudes and personality. In other words, it is the fundamental beliefs that allow employees to understand each other and communicate (Delong and Fahey 2010). Moreover, (De Long 1997) said that culture is not only the value of knowledge but also what knowledge should be kept in the organization for creation and innovation.

- Leadership Style

A managerial influence is considered as a part of organizational participants who are responsible for the management of knowledge. “Leadership is an important factor in the organization, to convert their culture into knowledge-supporting culture”. (Ribière and Sitar 2003). Also, (Asoh and Belardo 2007) defined the leadership as “the support of top management for achieving knowledge management activities”. Several studies were conducted to investigate and emphasize the role of leadership in knowledge management implementation, and the role of leader to guide a continuous learning for others, how a leader should have an unusual manner to achieve the highest level of organizational performance (Stephen 2000). In addition, (Singh 2008) affirmed that leadership plays a key role in knowledge management to acquire competitive advantages as one of the organizations’ goals. Moreover, he suggested (4) leadership styles (directive, supportive, consulting and delegating) that can affect knowledge management positively, while others do not.

- Employee Skills

Creation knowledge in an organization depends entirely on human resource (Berraies et al. 2014). Moreover, (Eppler and Sukowski 2000; Gottschalk 2000; Scott 2000), deemed that people forms the center of creation knowledge within organizations. (Scott 1998) studied this variable and left a vital adage: knowledge management consists of (10%) technology and (90%) people. Also, employees are considered the heart of organizational creation knowledge (Wai Tat and Hase 2007). (Nonaka and Takeuchi 1995) claimed that a new employee with new skills will add to the organization a new knowledge. Successful knowledge management is directly related to people because learning new knowledge and sharing knowledge depend on the social activities of people (Susanty et al. 2012).

- Information Technology Infrastructure

Information technology infrastructure should be widely applied and invested within organizations, since it supports different scientific activities (Gold et al. 2001). Researchers highlighted the role of information technology infrastructure in supporting creation knowledge process (Prax 2003; Mallet et al. 2006; Lopez-cabroles et al. 2009). In the context, information technology provides many tools such as the internet, groupware, workflow, data mining, and video conferencing that help organization to manage the knowledge. Practically, “connecting the employees via some arranged reusable knowledge, is considered as a channel between the newly created knowledge” (Jeng and Dunk 2013). The hierarchy existence of information technology infrastructure, in the organization, provides many benefits for the organization such as, reduce the effort and time to make employees achieve the tasks more efficiently and timely, so it is indisputable that information technology infrastructure plays a principal role in the implementation of knowledge management (Sadri McCamphel et al. 1999).

- Decision Making

None of the organizations wish to lose, burst or get a low growth in future. Thus, managers are always trying to find new business operations to enhance the performance. Therefore, introducing decision making mechanisms will assist to reach perfect organizational performance, and to achieve the desired or needed goals. The sustainable information allows managers to make effective and efficient business decisions (Rehman and Scholair 2011). While (Astley and Van de Ven 1983) proved that decision makers affect positively the organizational performance. Moreover, (March and Olsen 2010) defined decision making as “the process of making choices from some alternatives”. Furthermore, (Scott and Bruce 1995) categorised the decision making style into
(5) major sections, which are:

- Rational decision making “looking for a logical evaluation of alternatives”.
- Intuitive decision making “depending upon hunches and feelings”.
- Dependent decision making “advice and direction from others”.
- Avoidant decision making “attempts to avoid decision making or postpone it”.
- Spontaneous decision making “taking a sudden and impulsive decision”.

(Simon 1997; Mintzberg 2008; Drucker 2010) emphasised that decision makers consider the most robust processes of all management activities. Also, (McGregor 2001) noted that the quality and speed of decision making can be measured by the success and failure of an organization. While (Flüeler and Blowers 2007) studied the quality of decision making process, and how to make this process more critical and crucial by identifying the goals, providing alternatives, then weighing and balancing the values.

Organizational Performance

Nowadays, organizations or companies focus on the measure of performance as one of its essential activities “what you measure is what you get”. Generally, performance is a key phase of strategy establishment and achievement, because it can provide the organization's vision and strategic target to all organizations’ members and top management (Zaied 2012). As well as, (Moullin 2007) argued that organizational performance has been considered as important factor to investigate the organizational success. (Ngah and Ibrahim 2010) defined organizational performance as “comparing the expected results with the actual ones, investigating deviations from plans, assessing individual performance and examining progress made towards meeting the targeted objectives”. Thereby, based on the organisational performance definition, the indicators of organizational performance may assist managers to assess the organizational activities and keep the competitive position or superiority over competitors (Liao et al. 2009; Visser and Sluiter 2007). Actually, (Sinotte 2004) explained that performance could be measured or identified by the quality of functions. So, the whole performance in organizations refers to how organizational operations are by:

- Describing how to use the resources in the production process or how to provide services and what is the relation between the real and the ideal, used as inputs to achieve specific outputs.
- Describing the desired goals of the organization.

4. RESEARCH HYPOTHESIS

Many experts and researchers have proposed several suggestions of knowledge management enablers. Since organizations are interested in implementing knowledge management practices to achieve their desired goals, this paper focuses on the common suggested knowledge management key enablers which are: Organizational culture, leadership, personnel, information technology (e.g., Cepeda-Carrión 2006; Debowski 2006; Fernandez and Sabherwal 2006; Girard 2005; Stankosky 2005; Lee and Choi 2003). (Almadallal et al. 2016) claimed that "Generally, these four key enablers of KM can be compared to the legs of a four-legged table; if one leg is missing then the table will collapse". (Rehman 2012) conducted a research to investigate the relation between decision making and organizational performance. Generally, the findings of this study emphasized that decision making has a high positive impact on the organizational performance. While as, (Nicolas 2004) stated that there is a deep relation between knowledge management and decision making. This study found out that knowledge management has a significant role on decision making processes.

After considering the aforementioned researches, this paper has identified (4) knowledge management enablers: Organizational culture, leadership, personnel, information technology. Also, it investigated the relations between knowledge management enablers (as independent variables), decision making (as mediated variable) and organizational performance (as dependent variable). Based on these variables classification, we developed the framework of this study and the suggested hypotheses.

H1: Cultural attributes have a significant statistical impact on organizational performance as mediated by decision making.

H2: Leadership style has a significant statistical impact on organizational performance as mediated by decision making.

H3: Employee skills have a significant statistical impact on organizational performance as mediated by decision making.

H4: Information technology infrastructure has a significant statistical impact on organizational performance as mediated by decision making.

H5: Effectiveness of decision making has a significant statistical impact on organizational performance.

H6: Cultural attributes have a significant statistical impact on decision making.

H7: Leadership style has a significant statistical impact on decision making.

H8: Employee skills have a significant statistical impact on decision making.

H9: Information technology infrastructure has a significant statistical impact on decision making.
5. RESEARCH METHODOLOGY

This section explains in details the methodological approach that is applied in this study. Generally, it provides the readers with a wide vision about the analytical approaches used such as, questionnaire development, sample and data collection, then historical sequences of the analysis tool used.

5.1 Questionnaire Development

After identifying the knowledge management enablers with the mediated variable decision making factor, the researchers supposed that there is a relationship between these considered variables. Moreover, some interviews have been conducted with a consultant of the central bank of Jordan, operational manager of Housing Bank for Trade and Finance, operational manager of Cairo Amman Bank and Chief Risk Officer (CRO) of the Societe General _Jordan bank. And, in order to achieve mindstorming with these interviewees, the conducted interviews can be described as free interviews or discussions to gain more information in details. Consequently, a questionnaire was designed to gather primary data from the employees of the commercial banking sector in Jordan. The questionnaire was developed based on the conducted interviews and some previous studies in the same field (Lee and Choi 2003; Zaied 2012; Mahdavi Mazdeh and Hesamamiri 2014; Adan 2013). The questions taken from other studies have been rewritten to serve the goal of this study. Before adopting the designed questionnaire, (5) academics (4) of them in Mutah University, and (1) in applied science university) pre-tested it for the conformity and validity, in order to investigate the suggested framework and test the proposed hypotheses. In doing so, questionnaires were distributed randomly some by hand through visiting the branches, others distributed by submitting the questionnaires via email. Hence, all banks (Jordanian and non-Jordanian commercial banks) were involved in this study.

The respondents have chosen their answer regarding the 5-point Likert scale ((1) = strongly disagree, (2) = disagree, (3) = neutral, (4) = agree, (5) = strongly agree) (Likert 1932). The questionnaire composed of (4) pages with (3) main parts and with (42) questions arrangement as follows. However, the questionnaire was translated into Arabic then back to English to make it easier for employees. Appendix (A) includes English version of the used questionnaire.

- The first part, regarding the personal information includes (4) questions (Gender, Age category, Education level and Experience).
- The second part of the questionnaire consisted of (3) questions regarding the organizational information.
- The third part includes the rest of this questionnaire with (35) questions containing (3) main items: knowledge management enablers, decision making and organizational performance.

After structuring the questionnaire and asserting that the questions used were sufficient to gather the primary data which needed to achieve the intended goals of this study. A pilot study was done represented in the distribution of (15) copies of this instrument to (15) employees in different banks in Amman- Jordan. In order to find out from the feedback if there are any problems such as, question ambiguity, technical jargon, mistakes in wording and context...etc. In order to prevent the participants in the future to fill in mistakes or feel bored during answering the questions. Then, after collecting the pilot test questionnaires, a feedback was considered to make some minor corrections before distributing the final questionnaire.
This study is designed as a case study. Since it is considered a flexible design type for researchers, it provides opportunity to researchers to keep the entire properties of real life events during exploring the empirical events. (Yin 2009) emphasized that using or implementing case study method is more suitable, where the main goal of the study is exploratory. Moreover, using case study method allows the researchers to collect the needed information in a systematic way by gathering data in different techniques (Cavanaugh et al. 2001).

5.2 Sample and Data Collection

This study was applied to the commercial banks of Jordan. The population of this study involved all employees in these banks. In this research, the required data was collected by (2) primary ways: firstly, interviews that have been conducted with a consultant of the central bank of Jordan, operational manager of Housing Bank for Trade and Finance, operational manager of Cairo Amman Bank and Chief Risk Officer (CRO) of Societe General _ Jordan, to determine which of the most enablers that can impact effectively the banking sector with the surrounding circumstance and environment. Secondly, a questionnaire was built to measure the impact of these proposed enablers and to what extent they can affect the performance.

Total number of (450) questionnaires were distributed to cover the chosen sample. However, (437) questionnaires were returned successfully while (13) questionnaires were dismissed or not returned. Out of the (437) questionnaires returned, (37) questionnaires were eliminated from the study because they were incomplete or not correct. This has yielded the response rate of (97.1%), based on the conducted pilot study. The collected questionnaires will be analysed using an artificial intelligence approach specifically fuzzy logic method (MATLAB® R2017b).

5.3 Fuzzy logic (Fuzzy Inference Systems (FISs))


In general, FISs occupied a significant place in fuzzy logic and fuzzy set theory as well. FISs were defined by (Yager et al. 1994), as an intelligence mechanism using computational operations to determine the output perfectly using fuzzy inference rules, which go hand in hand with the input.

Technically, there are many reasons that tempted the researchers to use FISs approach to analyze the collected data of their studies. First, FISs are assigned to measure the impact of independent variables on dependent variables. Second, they use very simple mathematical equations. Third, this method will provide very accurate decisions. Fourth, all possibilities can be found but no IF-THEN statement can do that. Fifth, in case of error, FISs give the ability to modify by adding or even deleting some rules in order not to re-create new FISs from the beginning. Finally, they are working in parallel with very high speed. Therefore, it was the best mechanism that can be used for analysis in this study, in order to make use of its aforementioned benefits. Also, the researchers did not find another study that adopted this mechanism for analysis (Sari, A., Qayyum, Z.A, Onursal, O. (2017), Sari, A. (2017), Sari, A., Akkaya, M., Fadiya, S., (2016), Alzubi, A. and Sari, A. (2016), Sari., Akkaya, M. (2016).


6. ANALYSIS AND FINDINGS

This section discusses the research’s model outcomes formulated from data analysis which are: demographic outcome, independent variables phase, mediation variable, the final result for the overall framework (3 Outputs), Decision Making (DM) on Organizational Performance (OP). Finally, the researcher will present the results for each phase using FISs model.

6.1 Demographics Variables Profile

Table 1, below shows the personal information about the employees who are involved in this study. (238) out of (400) participants were males, which represents (59.5%) and the rest, (162) were females that forms (40.5%). Moreover, (219) employees who are involved in this study. (238) out of (400) participants were males, which represents (59.5%) and the others were divided between diploma, master and other. Based on the level of experience, the participants had been classified into (4) categories: (176) employees with a ratio (44%) had (5) years or less of job experience, (106) employees had 6 to10 years, (70) employees had (11-15) years of job experience, (44%) had (5) years or less of job experience, (106) employees had 6 to10 years, (70) employees had (11-15) years of job experience.
participants had (16) years or more which forms (12%).

<table>
<thead>
<tr>
<th>Table 1. Demographic Frequency Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>30 years or less</td>
</tr>
<tr>
<td>31-40 years</td>
</tr>
<tr>
<td>41-50 years</td>
</tr>
<tr>
<td>50 years or more</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Diploma</td>
</tr>
<tr>
<td>Bachelor</td>
</tr>
<tr>
<td>Master</td>
</tr>
<tr>
<td>other</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
</tr>
<tr>
<td>5 years or less</td>
</tr>
<tr>
<td>6 to 10 years</td>
</tr>
<tr>
<td>11 to 15 years</td>
</tr>
<tr>
<td>16 years or more</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Practically, the analysis includes (4) main stages: independent variables phase (knowledge management enablers), mediation variable (decision making), the final result for the overall framework (3 outputs) and Decision Making on Organizational Performance. Each one of these stages required (4) steps to be performed. Note that, each step has particular specifications: 5-point likert scale to indicate the number of input's membership functions. Input and output membership function type was “gaussmf”, the range of input's membership functions was [400 2000] and, the range of output’s membership functions was [0 100]. The section below explains that in details.

6.2 Independent Variables Phase (Knowledge Management Enablers)

- **Designing a model for chosen independent variables knowledge Management Enablers (KMEs)**

The first step of analysis is to designing a model to identify the number of input and output variables, in order to find the influence of the (4) chosen variables which are (cultural attributes, leadership style, employee skills and information technology infrastructure). In sum, this designed model consists of (19) questions that represent the input which lead to extract (4) outputs.

- **Creating membership function for independent variables (KMEs)**

After finalizing the previous step, membership function must be determined for the designed model. All the suggested independent variables are categorized by the 5-point likert scale. Hence, the questions from (1-19) in the designed questionnaire are represented in the independent variables where, the questions from (1-6) are represented in the cultural attributes. Questions from (7-10) are related to leadership style. From (11-15) returned to employee skills and (16 -19) are designed for the information technology infrastructure.

- **Creating rules for independent variables (KMEs)**

This step concerns the creation of rules. All the valid returned questionnaires were stored in an excel sheet. Then, several calculations were done such as, AVERAGE and SUM for all items. Hence, the connection between input and output is always (AND).

- **Rules viewer for independent variables**

Based on the previous steps, the obtained results can be shown by clicking on view list then select rules. The results show that each independent variable has a different influence: cultural attributes (C) had (62.9%), leadership style (L) had (63.7%), employee skills (E) had the lowest influence equals to (60.1%), and information technology infrastructure (I) had (64.6%) which is considered the highest influencer. As shown in Figure 2, below.
6.3 Mediation Variable (Decision Making)

- Designing a model for the mediation variable Decision Making (DM)

Designing a model for the next step that represents the (DM) as a mediation variable. Thereby, this step formed the stepping stone to find the result of next stage. Moreover, this step is basically depending on the obtained results from previous one, by integrating (4) inputs from KMEs with (6) inputs of the mediation variable DM, in order to extract only (1) output.

- Creating membership function for the mediation variable (DM)

Identifying the membership function for all used inputs (KMEs and 6 items of the mediation variable DM) should be done. The questions from (20-25) in the questionnaire represent the DM variables.

- Creating rules for the mediation variable (DM)

In order to get the desired result of this phase, the rules should be entered which represent all returned responses from the involved employees. As mentioned before, this phase is totally depending on the previous stage. So the result of C, L, E and I intersected with the membership function at (2) points mf3 and mf4, which led the researcher to enter the rules twice on the mentioned membership function. Therefore, (800) rules were introduced in this stage to obtain a clear result and assert that the outcome is more accurate.

- Rules viewer for the mediation variable (DM)

After doing all the needed calculations on the excel sheet such as, average and sum. The result will be used as an input for the next stage. All in all, the result comes as the following: KMEs and DM as a mediation variable is (60.7%). Figure 3, shows the result of this stage.

Figure 2. Rules viewer for independent variables knowledge management enablers (Source: self-generated)
6.4 The Final Result for the Overall Framework (3 Outputs)

- Designing a model for the overall framework (Organizational Performance (OP) with (3) Outputs)
  
In this step, the researcher has to enter the result (Output) of phase (6.3) as an input, in order to find the influences on the organizational performance (overall model). Hence, the performance has been divided into (3) outputs, which are the competitive position (CP), Market share (M) and Quality of services (Q), to discover the influence of each one of them alone on the designed model. This stage contains (11) inputs distributed as: (1) input returned to (KMEs_DM), (10) inputs belonged to OP, whereas, (3) outputs for CP, M and Q as named in the FISs.

- Creating membership function for the overall framework (Organizational Performance (OP) with (3) Outputs)

Creating membership function is the next step in this phase as done before. (1) Input (KMEs_DM) and (10) inputs regarding the OP. The related questions for this stage are distributed as: (26-29) for the competitive position (CP), (30-32) for the market share (M) and the questions (33-35) for the quality of services (Q).

- Creating rules for the overall framework (Organizational Performance (OP) with 3 Outputs)

The responses of the employees will be entered as rules. As mentioned before, this phase depends on the outcomes of the stage (6.3). The result also intersected with the membership function at (2) points mf3 and mf4 that led to enter the rules twice again.

- Rules viewer for the overall framework (Organizational Performance (OP) with 3 Outputs)

Finally, the rules viewer shows the final result of the KMEs influence on the performance using the DM as mediation. As before, the needed calculations (Average, Sum) are done on the excel sheet. The results were the same for all outputs, (60.7%) for Competitive Position (CP), Market share (M) and Quality of services (Q) as well. Figure 4, shows the result.
6.5 Decision Making (DM) on Organizational Performance (OP)

- Designing a model for DM on OP
  This phase is trying to find out the influence of DM on the overall performance. Therefore, the designed model will use the questions for both DM and OP. This step contains (16) inputs that are divided between DM and OP, with only (1) output.

- Creating membership function for DM on OP
  Identifying the types of membership function and ranges. This phase has (16) inputs, where the first (6) inputs return to DM (the questions from (20-25)), and (10) questions refer to OP (the questions from (26-35)).

- Creating Rules for DM on OP
  Entering (400) rules that are related to DM and OP, in order to find out the influences of DM on the entire performance.

- Rules viewer for DM on OP
  After performing the required calculations on excel sheet, the result of this phase equals to (63.6%), and that would represent the influence of DM on OP. Figure 5, below shows the Rules Viewer result.
Figure 6, below shows the positive relationships between the variables of this research which have emerged from the study conducted on commercial banks. Whereas, the knowledge management enablers affect positively the performance through decision making variable as the following: cultural attributes (62.9%), leadership style (63.7%), employee skills (60.1%) and information technology infrastructure (64.6%). Then these enablers, by decision making, influence the overall performance with a rate of (60.7%); in details, this relation affects the mentioned outputs of the organizational performance which are (competitive position, market share and quality of service) in the same ratio (60.7%). On the other hand, decision making has impact on performance by a rate of (63.6%).
The result of this study confirmed the hypotheses which are: cultural attributes have a positive impact on the commercial banks performance in Jordan with a decision making as the mediator, which support hypothesis (1), leadership style has a positive impact on the commercial banks performance in Jordan with a decision making as the mediator, which supports hypothesis (2), employee skills have a positive impact on the commercial banks performance in Jordan with a decision making as the mediator, which supports hypothesis (3), information technology infrastructure has a positive impact on the commercial banks performance in Jordan with a decision making as the mediator, which supports hypothesis (4), effectiveness of decision making has a positive impact on the commercial banks performance in Jordan, which supports hypothesis (5), cultural attributes have a positive impact on the decision making, which support hypothesis (6), leadership style has a positive impact on the decision making, which supports hypothesis (7), employee skills have a positive impact on the decision making, which supports hypothesis (8) and information technology infrastructure has a positive impact on the decision making, which supports hypothesis (9).

7. DISCUSSION AND CONCLUSION

This study is considered as the first research that is trying to examine the impact of knowledge management enablers on the organizational performance using decision making as a mediating variable in commercial banks of Jordan. Based on the conducted interviews, it concluded that the most important knowledge management enablers: cultural attributes, leadership style, employee skills and information technology infrastructure, in order to guarantee the best implementation of knowledge management in these banks.

Accordingly, (400) questionnaires were distributed to Jordanian and non-Jordanian commercial banks in Amman-Jordan. Then, the collected data was analysed using the fuzzy logic method. Finally, these findings can be used to enhance better implementation of knowledge management in commercial banks, and in order to reach higher level of organizational performance. Moreover, it helps these types of organizations to take advantage of knowledge management by identifying the most important enablers.

Since a lot of crises happened, this study is recommended to conduct more researches about applying knowledge management in banking sector of Jordan. In sum, the organization must understand knowledge management and identify the influencing enablers for better performance. This can help decision makers to avoid the consequences of upcoming crises in future. Moreover, this study has found that information technology infrastructure has a significant impact on the effectiveness of applying knowledge management to commercial banks. This leads to developing the deployed information technology infrastructure and providing training courses for employees to increase their skills in this side.

Both leaders and top management play a significant role in implementing knowledge management, by enhancing communication channels, trust and collaboration between employees, this leads to improved internal environment where creation, sharing, and transfer of knowledge could flourish. However, employee skills factor had the lowest impact in this study. But it is considered the heart of creation knowledge and knowledge management implementation. Therefore, top management must pay more attention by involving the employees in some courses, symposia, conferences and workshops. Moreover, human resources department must employ new employees who have multiple skills. Researchers would advise managers to encourage the employees to be involved in decision making process, by expanding their authorities or permissions and taking their perspectives into account.

Based on the aforementioned findings, this research has considered some inherent limitations and future suggestions. Firstly, the vast majority of studies about knowledge management have been conducted in some developing economies. However, there is a lack in empirical findings in commercial banks. Moreover; the researcher did not find any study about applying knowledge management in Jordanian commercial banks. Thus, this sector may be a fertile environment for future studies. Secondly, researchers should adopt this idea and conduct several studies using different variables that can affect applying knowledge management (socio-technical theory must be considered (Pan and Scarbrough 1998)) in this sector to maintain the high quality of performance. Thirdly, this study was conducted in a specific sector (Jordanian and non-Jordanian commercial banks), so the result cannot be generalized to other types of banks or organizations, because the selected variables are based on the type, size, structure and surrounding environment of only these types of banks in Jordan. Fourthly, there is no particular study that examines the relationship between knowledge management, decision making and organizational performance. Therefore, this could be a future research to glean this relation in different types of organizations. Finally, internal policies in some organizations are very restricted. Since they prevent the researchers from collecting the needed information for the sake of privacy. So, the researchers may face many difficulties during the conduction of interviews and the distribution of questionnaires. Therefore, banks must create some sort of departments to support the scientific research.

REFERENCES


APPENDIX A

Personal Information
1. Gender: Male □ Female □
2. Age category: 30 years or less □ 31-40 years □ 41-50 years □ 50 years or more □
3. Education: Diploma □ Bachelor □ Master □ Other □
4. Experience: 5 years or less □ 6 to 10 years □ 11 to 15 years □ 16 years or more □

Organizational Information
1. Compared with key competitors, the company is more successful. (Lee and Choi 2003)
2. Compared with key competitors, the company has a greater market share. (Lee and Choi 2003; Zaied 2012)
3. Compared with key competitors, the level of customer satisfaction is much better. (Mahdavi Mazdeh and Hesamamiri 2014)

Survey Questions
• Cultural Attributes:
  1. Organizational helps their employees to establish a good relationship between each other. (Adan 2013)
  2. Organization provides facilities that allow collaborating between employees, via exchange information and experience. (Adan 2013)
  3. Organization seeks to provide a good environment to work within it. (Adan 2013)
  4. Organization is always interested in developing the experience and knowledge of the employees. (Adan 2013)
  5. Organization encourages its employees to continue their education and supports them to achieve this. (Adan 2013)
  6. Organization culture encourages openness for perpetual change. (Developed by interviews)

• Leadership Style:
  7. Organization is keen on applying convenient leading techniques with their employee. (Adan 2013)
  8. There is a variety of leadership techniques applied in the organization. (Adan 2013)
  9. Organization managers have leadership capabilities to cope with different work situations. (Adan 2013)
  10. Leaders within the organization encourage employees to participate in decision making. (Zaied 2012)

• Employee Skills:
  11. Employees within the organization have the required skills to accomplish their work. (Adan 2013; Zaied 2012)
  12. Organization provides a convenient environment for employee to develop their experience and skills. (Adan 2013)
  13. Organization schemes are keen on providing a various training courses that suit the employees’ needs and abilities. (Adan 2013; Zaied 2012)
  14. Organization is interested in evaluating the employees’ skills and capability and takes care of them. (Adan 2013)
  15. Organization identifies the needed training courses according to the needs and capabilities of employees. (Adan 2013)
• **Information Technology Infrastructure: (Developed by interviews)**
  
  16. Organization is always interested in developing the Information technology infrastructure.
  17. Organization provides the needed technical support to the information technology permanently.
  18. Organization is always interested in updating different technology and application.
  19. Organization always tries to keep up with the technical and technological changes within the surrounded environment.

• **Decision Making: (Developed by interviews)**
  
  20. Decision making process done within an organization in an organized manner.
  21. Organization is interested in involving employee in decision making.
  22. Organization seeks to enhance decision making process by using all available tools.
  23. Organization is keen on making decisions dependent on confirmed and appropriated information.
  24. Decision making process done according to environmental condition.
  25. Decision making process is followed to ensure that is applied perfectly.

**Organizational Performance: (Developed by interviews)**

• **Competitive Position:**
  
  26. Organization is keen on putting a set of strategies and objectives to achieve a high level of organizational performance.
  27. Organization seeks to keep up with changes, in order to maintain a high level of performance.
  28. Organization is concerned with customer satisfaction in order to achieve a high level of performance and competitiveness.
  29. Organization is concerned with what competitors provide and try to accomplish their works in better manner.

• **Market Share:**
  
  30. Organization is keen on studying the surrounded environment to identify the needs of customers and fulfill them.
  31. Organization takes into account the complaints and suggestions of the customers in order to increase the level of satisfaction.
  32. Organization provides many services in order to increase their market share.

• **Quality of Services:**
  
  33. Organization continuously assesses the level of quality for services and products.
  34. Organization is always concerned with developing the quality by applying the highest quality standards.
  35. Organization provides customers the service of suggestion and complaints for the quality, performance and other transaction within it.

*Thank You*