



## The effect of using collaborative technology on the banking knowledge management: case of Tunisian banks with mixed capital

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### Abstract

This study examines the influence of using collaborative technology (Groupware) on knowledge management (KM) process (capture, storage, dissemination and reuse of knowledge). Based on a survey of 272 front office Tunisian agents working in Tunisian banks with mixed capital, this study uses a structural equation modeling (SEM) approach to investigate the research model. The results showed that the adoption of Groupware in Tunisian banks with mixed capital is influenced by the facilitating conditions, the social influence and the expected performance. In addition, results revealed that the usage of this technology, by the front office agents, was significantly associated with capture, storage and the reuse of knowledge. However, the Groupware use did not significantly influence the knowledge dissemination.

Given the importance of Groupware implementation as a knowledge management system, the findings of this study are designed to help bank managers or policy-makers in formulating appropriate organizational policies enabling them to enhance knowledge management implementation.

**Keywords:** Groupware, Usage, UTAUT, Tunisian banks, Knowledge Management Process, Transversality.

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## 1. INTRODUCTION

Today, we are in an era characterized by constant change and complex processes, where knowledge centric activities or knowledge-based activities are becoming the primary source of sustainable competitive advantage. Thus, knowledge is considered as a key resource that must be managed to help the business improve, succeed and stay ahead of highly competitive enterprises.

In this view, Tunisian banks with mixed capital, are obliged to develop practical knowledge management in order to avoid the loss of tacit and/ explicit knowledge, due to the rotation or retirement of their employees. Knowledge management helps banks to gain insights and further understanding from their own experience [1]; [2] and [3]. Thus, Knowledge management activities can assist banks acquire, store, disseminate and reuse knowledge for problem solving, dynamic learning, strategic planning and decision making. As for many organizations, from commercial enterprises to government agencies, Tunisian banks with mixed capital are focusing on knowledge management by implementing a Groupware technology to improve the research and develop of knowledge, reduce travel expenses, support informed, up-to-the-minute business decision making, improve decision making, and increase innovation to maintain their competitive edge. However, the adoption of Groupware by the staff of an organization seems to be a complex process [4]. The history of Groupware adoption was subject to much resistance from both the employees and the organizational factors [5]. Nonetheless, the history of Groupware was not known only for the failure of its adoption, but also for its being accepted by the users. Indeed, [6]and[7] showed that the availability of technical assistance and the implementation of training circles can influence the users to adopt Groupware. The conditions of using Groupware seem very limited in literature. Indeed, despite the frequent use of this concept, we are struck by the lack of studies (especially in the Tunisian case) which focus, in detail, on the factors that lead the banking staff to adopt Groupware technology for the development of knowledge management process.

This study proposes a theoretical model whose basic contention is that the relation between Groupware technology and knowledge management process is significative: The use of Groupware technology can influence the knowledge management processes.

The following sections discuss the concepts of knowledge management and Groupware technology. Then, the hypotheses representing the relations between Groupware use, and knowledge management processes are formulated. The hypotheses are tested with the structural modeling technique, using data collected from 272 banking agents. This paper concludes with a discussion of the results and their implications.

## 2. LITERATURE REVIEW

Knowledge management (KM) can be viewed as the development and leveraging of organizational knowledge to increase an organization's value[8]. This management is essential in order to maintain competitive advantages.

This, in turn, helps organizations to achieve success in the dynamic business environment [9].

Knowledge management involves human resource, enterprise organization and culture, as well as the information technology, methods and tools that support and enable it [10].

Knowledge management combines tools and technologies to support the capture, storage, dissemination and reuse of knowledge, generating benefits for the organization and their members. In this context, collaboration technologies play a central role. In cases where knowledge can be explicitly encoded and recorded, or where the context is well-shared, collaborative technologies are useful in knowledge acquisition, combination, interpretation, and dissemination. Where knowledge is primarily tacit, these technologies can be used to support the personal interaction required for knowledge sharing, creating, and explaining [8]

[11], argues that Groupware offers advantages for its users as it facilitates communication, brings together multiple perspectives and expertise, saves time and cost in coordinating group work, facilitates group problem-solving, and enables new modes of communication, such as anonymous interchanges or structured interactions.

Groupware tools help workers to work together through communication, collaboration and coordination in order to help them to improve their knowledge and their expertise[12].

In fact, the knowledge management process cannot succeed without effectively supporting collaborative technology. However, the information system cannot improve the performance of organizations if it isn't sufficiently accepted by the users.

## 3. HYPOTHESIS DEVELOPMENT

This section develops the critical hypotheses related to the determinants of Groupware usage then those related to the impact of the Groupware use on the different step of the knowledge management process in the context of Tunisian banks with mixt capital.

A number of researchers used several technology adoption theories to deal with such phenomenon; however, these studies were fragmented. Thus, the Unified Theory of acceptance and Use of Technology (UTAUT) [13]combined eight of those numerous theories and models of technology adoption to have a unified view. Four variables define the model of [13],performance expectancy, social influence, perceived ease of use, and facilitating conditions.



### **3.1 Perceived usefulness**

Researches on the adoption of technology showed that the concept of perceived usefulness had a very strong predictive power that had proven its robustness in the explanation of the behavioral use across several studies.

According to [14], the elderly showed more resistance to changes and a negative attitude toward using mobile banking services.

This idea helped us develop our first research hypothesis:

**H1:** Perceived usefulness significantly affects the front office staff's intention to use Groupware.

**H1a:** The influence of performance expectancy on the front office staff intention will be moderated by age.

### **3.2 Social Influence**

According to [13], Social Influence is defined as the impact of the opinions of the social group in the formation of the intention to use a new system.

In addition, since this has been often verified in literature [15] and [16], we expect a positive influence on the intention of the behavior of beliefs among the banking staff.

[17] revealed that voluntariness of an individual to try a new technology has a significant impact on the decision to accept this technology.

Based on the above arguments, we suggest that:

**H2:** Social influence significantly affects the front office staff's intention to use Groupware.

**H2.1:** The influence of supervisors has a positive effect on the intention to use Groupware.

**H2.2:** The expectation valorization positively influences the intention of using Groupware.

### **3.3 Perceived Ease of Use**

Perceived ease of use was defined by [18] as the degree at which a person believes that using a system would be free of effort.

According to [13], the influence of the perceived ease of use on the intention to behave will be moderated by the employees' age and experience

Hence we set the following hypothesis:

**H3:** Perceived ease of use significantly affects the front office staff's intention to use Groupware.

### **3.4 Facilitating conditions**

Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system [13]. Several previous studies on the UTAUT model [19] and [20] indicated that the facilitating conditions did have a direct influence on the usage beyond the one explained by the behavioral intention alone.

Moreover, the influence on the facilitating conditions of the Groupware use was moderated by age and experience [13].

According to the above information, we propose:

**H4:** Facilitating conditions have a positive effect on the expected behavior.

**H4-1:** Computer knowledge has a positive effect on the adoption intention of Groupware by the banking agents.

**H4-2:** Technical assistance has a positive effect on the adoption intention of Groupware.

**H4-3:** Previous experiences of younger front office staff in the use of information systems positively influence their perceived ease of the Groupware use.

### **3.5 Behavioral Intention**

Consistent with all the models drawn from psychological theories, which argue that individual behavior is predictable and influenced by individual intention, the UTAUT contended and proved the behavioral intention to have a significant influence on technology usage [21].

Accordingly, this study hypothesizes:

**H5:** Intention of use has a positive effect on the expected behavior of using Groupware.

**H6:** Intention of use has a positive effect on the use of Groupware.

**H7:** The individual behavior has a positive effect on the use of Groupware.

### 3.6 Groupware and knowledge capture

Groupware is a process of identifying, capturing and mobilizing collective knowledge in an organization, in order to improve its competitiveness [22]

**H8:** Groupware facilitates the capture of knowledge.

### 3.7 Groupware and knowledge storage

Groupware can help increase organizational memory because of its accuracy in storing organizational knowledge. It can provide common support to review similar cases and solutions, and analyze their contexts for problems and solutions. [23]

**H9:** Groupware provides the capitalization of knowledge.

### 3.8 Groupware and Knowledge distribution

Integrated Groupware, which is framed around an information system infrastructure, can bring together employees of diverse skills from around the globe to share knowledge while working on a project. Internet, intranet, and other Groupware technologies, such as Lotus-Notes and e-mail, can be used to distribute and share individual experience and innovation throughout organizations [24 ] and [25] .

**H10:** Groupware participation in the dissemination of knowledge.

[26], assert that the reuse of knowledge is an important criterion for companies of which major tasks require similar knowledge. Software development is an example. Reusing knowledge saves time and efforts. For routine problems and tasks, the reuse of existing knowledge can often provide quick and easy solutions.

**H11:** Groupware is a potential tool for the knowledge reuse.

### 3.9 Groupware and transverse organization

Empirical studies of [27] and [28] showed that the introduction of classified information systems in organizations leads to a movement of decentralizing the power and decision making. Similarly, others have pointed out that the Groupware tools support both informational and / or social connectivity , by reducing the psychosocial barriers between distributed workgroups [29].The Groupware tools leads to a re-delegation of roles and responsibilities [30] between employees ,consequently they enable to promote horizontal relations in organizations.

**H12-**Groupware is a vector for a transverse organization.

Conceptual framework:

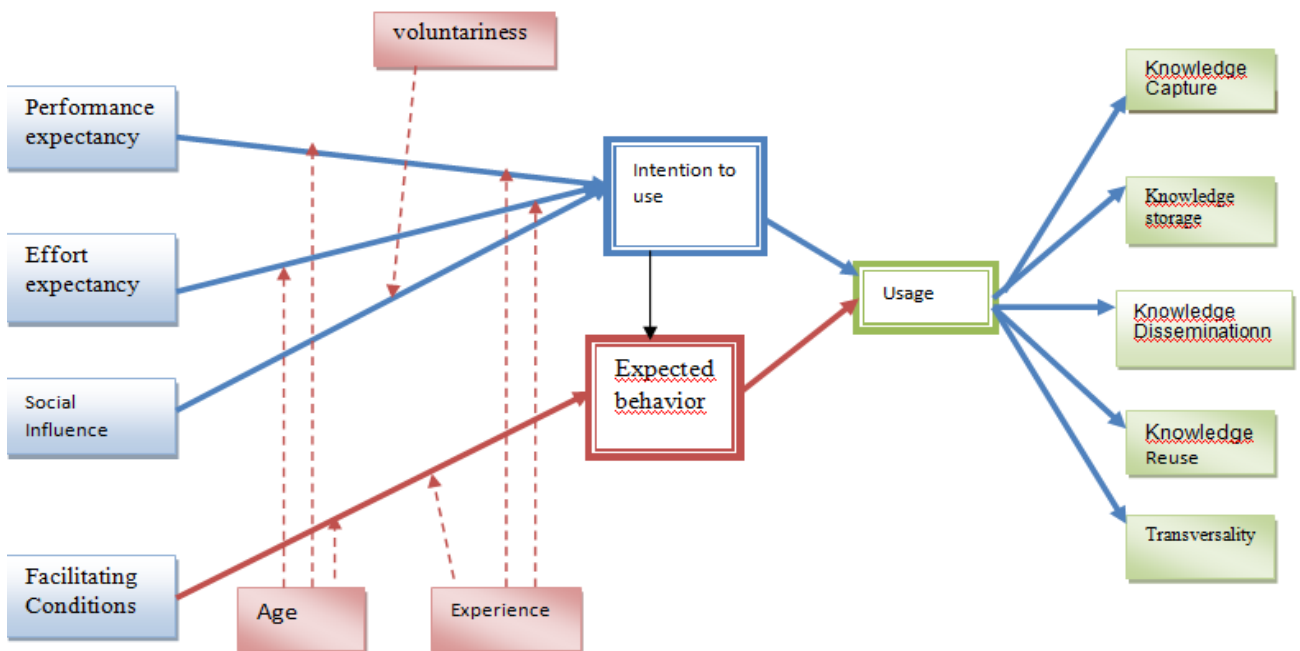


Figure 1: The Proposed Research Structure



## 4. METHODOLOGY

### 4.1 Research Method Approach

This is a descriptive research that investigates the relationship of the Groupware use by front office agents and knowledge management process in Tunisian mixed capital banks. A cross-sectional survey research had been chosen as an approach where primary data were collected by requesting the respondents to fill up a questionnaire.

### 4.2 Measurement

The questionnaire was designed in line with the aim of the research. It consists of three parts; Part 1 has a set of questions that state the respondents' agreement on whether the attributes are part of the factors that influence their adoption of Groupware. Part 2 consists in asking employees about the impact of their use of groupware tools on the process' development of their knowledge managing. These parts are measured on the Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Part 3 is about the demographic profile of the respondents. In this research, the questionnaire is purely based on the previous instrument developed by various researchers, such as [31] and [17].

### 4.3 Sampling Procedure

The population in this research consists of the users of Groupware in Tunisian mixed capital banks. Due to the difficulty of obtaining a survey frame of all the front office staff working in Tunisian mixed capital banks, such as the Tunisian Central Bank (BCT), we selected a sample by the convenience method. With the help of some managers working in the (BCT) and their contacts made for the general managers of the Tunisian mixed capital banks, only four banks from different parts of the country agreed to collaborate.

### 4.4 Data Collection

Three hundred and eight copies of the questionnaire were distributed to eighty Tunisian bank agencies with mixed capital. A total of 308 answers were collected from the front office agents, 272 of which were completed and analyzed.

### 4.5 Data Analysis

The software used in analyzing the data was AMOSS16. The statistical analysis includes Principal Component Analysis (PCA) and the structural equation model (SEM).

## 5. RESULTS AND DISCUSSION

### 5.1 Descriptive Analysis

Variables	Percent (%)
<b>Age</b>	
[25-30 years [	47,5%
[31-40 years [	33,7%
[41-50 years [	18,8%
<b>Bank</b>	
Attijari Bank	29,4%
UBCI	22,8%
UIB	29,4%
BTK	18,4%
<b>Training Groupware</b>	
Yes	90,4%
No	9,6%



<b>Computer knowledge</b>	
Yes	62,5%
No	37,5 %
<b>Training followed</b>	
An internal training organized by the bank	59,6%
A simulation by your colleague	40,4 %
<b>Education Level</b>	
Certificate	15,1%
Diploma	24,3%
Degree	52,6%
Master	8,1 %
<b>Seniority in the banking sector</b>	
<10 years	65,4%
11-20 years	19,5 %
21-30 years	14,3 %
>40 years	0,7%
<b>Seniority in the current bank</b>	
<10 years	62,1%
11-20 years	22,4%
21-30 years	14,7%
>40 years	0,7 %

Table 1 shows that the majority of the respondents are between 25-30 years of age, (47.5%).(52.6%) possess a License degree, (62.5%) have Computer knowledge and performed training on Groupware organized by their banks.

**Exploratory factor analysis:**

The exploratory analysis was conducted using SPSS18 from which the items with low factor contributions were deleted.

The exploratory analysis shows that AFCP returns a single factor for all the variables with positive factor contributions and above 0.5, thus confirming the dimensionality of this construct. The reliability analysis shows that alpha values are greater than 0.6 for all the variables. Moreover, there presentation of the items, is also satisfactory (>0.5).

**5.2 Confirmatory factor analysis**

All the fit indices are acceptable:  $X^2/dl$  ( $1.273 \leq 2$ ), GFI ( $0.876 \leq 0.9$ ), AGFI ( $0.825 < 0.9$ ), CFI ( $0.910 > 0.9$ ), TLI ( $0.845 < 0.9$ ), NFI ( $0.880 < 0.9$ ), RMSEA ( $0.060 < 0.08$ ). The fit of the measurement model is therefore considered satisfactory.

**The SME results with moderators:**

This study employs the partial least squares (SME) regression to examine the presented research structure. This study demonstrates firstly the applicability of UTAUT to the Groupware system. The empirical results strongly support the extended UTAUT in predicting individual intentions and behaviors of Groupware adoption. Table 2 shows that the front office staff's intention to adopt Groupware is significantly impacted by social influence and perceived usefulness. The expected behavior is significantly impacted by the facilitating conditions. However, the front office staffs intention has no effect on the expected behavior.

Secondly the SME results show that the capture, the storage and the reuse of knowledge by the front office staff, are significantly impacted by the use of Groupware. However, the front office staffs usage of Groupware has no effect on the transfer of knowledge. This result differs from the one of [32] where Groupware is considered as an application to establish a relationship between the employees to help them exchange, share and deepen their expertise.



	Hypotheses	Coefficient of regression standardized	CR	P
<b>H1</b>	Perceived usefulness → Intention to use	0,585	2,064	0,001
<b>H1a</b>	Age → H1	0,433	2,440	0,001
<b>H2</b>	Social influence → Intention to use	0,491	1,082	0,003
<b>H2a</b>	Age and Experience → H2	0,532	1,060	0,002
<b>H3</b>	Social influence → Intention to use.	0,343	2,210	0,004
<b>H3.1</b>	The influence of supervisors → The intention to use	0,510	2,126	0,001
<b>H3.2</b>	The expectation valorization → The intention to use	0,479	2,146	0,001
<b>H3.3</b>	The voluntariness → H3	0,557	2,234	0,000
<b>H4</b>	Facilitating conditions → Expected behavior.	0,393	2,435	0,000
<b>H4.1</b>	The mastery of computers → The intention to use	0,366	2,135	0,001
<b>H4.2</b>	Technical assistance → Intention to use.	0,597	2,279	0,002
<b>H4.3</b>	Age and Experience → H4	0,597	2,190	0,002
<b>H5</b>	The intention of use → The expected behavior.	0,245	1,004	0,176
<b>H6</b>	The intention of use → The use of Groupware	0,765	3,590	0,000
<b>H7</b>	The expected behavior → The use of Groupware	0,459	2,990	0,001
<b>H8</b>	The use of Groupware → The knowledge capture.	0,585	2,064	0,001
<b>H9</b>	The use of Groupware → The knowledge storage.	0,433	2,440	0,001
<b>H10</b>	The uses of Groupware → The knowledge transfer.	0,191	1,082	0,093
<b>H11</b>	The use of Groupware → The knowledge reuse.	0,510	2,126	0,001
<b>H12</b>	The use of Groupware → Transversal organization	0,376	1,398	0,234

The empirical evidence of this study indicates that the facilitating conditions are the most powerful factor in affecting the front office staff's intention to use Groupware. This seems to be consistent with the finding of [33] and [34]. Besides; this study found that the respondents were significantly influenced by social factors, the thing which seems to be consistent with the finding of [35].

This result shows that supervisors have some influence on the adoption of Groupware by the reception staff, through their use of collaborative tools over looked by their staff.

Regarding the effort expectance, the empirical evidence in this study isn't consistent with that of [36] and [37], who showed the significant effect between the effort expectancy and behavioral intention. This result maybe due to the fact



that the front office staff has a high level of computer knowledge and web culture. This can also be explained by the fact that these banks organize a regular training to support their staff in using Groupware applications.

Regarding the performance expectancy, the empirical evidence in this study is consistent with that of [33]. The significant effect of this variable can also be explained by the front office staff's association made between the use of Groupware and the work improvement.

Regarding the moderating effects of age, the results reveal that age considerably moderates the effect of performance expectancy on behavioral intention and the effect of the facilitating conditions on behavior adoption.

The detailed statistics reveal that younger staff has a higher voluntariness to adopt new technology products, the thing which matches the results of [13].

As for the moderating effects of experience, the results show that the experience in the information systems considerably moderated the effect of the facilitating conditions on adoption behavior.

Consequently our results show that younger banking staff can easily enjoy their experiences with the information systems, which seems to be consistent with the findings of [19].

Regarding the moderating effects of voluntariness on social behavior intention, this empirical result indicates that voluntariness considerably moderates the effect of social influence on the adoption behavior, which is consistent with the finding of [17].

Concerning the effect of Groupware on the Knowledge management process stages, the empirical study indicates that the knowledge storage is the most influenced phase by using the Groupware system. This seems to be consistent with the finding of [38] and [39].

Regarding the dissemination knowledge, the empirical evidence in this study isn't consistent with that of [36] [40] and [41] who showed significant effect between the Groupware use and knowledge sharing.

This empirical study concluded that using Groupware tools did not play a determinant role in influencing bank's agents to share their knowledge. This result may be due to the fact that the front office staff considers groupware as a control system by the stockholders. The mistrust can be a significant barrier for the exchange of information.

Moreover, this study shows that the Groupware use did not have a significant effect on transversality. This result isn't consistent with that of [42] and [43] for whom the implementation of collaborative technologies in company reduces psychosocial barriers between the distributed working groups, promotes more decentralized decision making and helps employees to be more and more autonomous and polyvalent in their work.

## 6. THEORETICAL CONTRIBUTIONS

The result of this research provides a new validation of the UTAUT and confirms its contributions to the identification of the factors favoring the adoption of Groupware.

However, this study does not provide a major innovation in theory but can be considered original in two respects. On the one hand, it is one of the few applications of the UTAUT in the Tunisian context. By the way, most applications of the model were carried out in an Anglo-Saxon and Asian context (China, Japan, and Taiwan). On the other hand, our study is the first conducted in the context of the Tunisian mixed-capital banks on adopting the Groupware system and its effect on the knowledge management process.

## 7. MANAGERIAL CONTRIBUTIONS

For further analysis, we found that the respondents have been strongly influenced by the facilitating conditions. They estimate that, through their abilities, their mastery, as well as their level of knowledge of the information systems, they can become familiar with the Groupware system.

This implies that users can resist the technological changes as they may reject the new system if they do not believe they can control it. In a banking environment characterized by a high speed of technological change, banks must pay attention to the availability of the technological resources (Internet, Intranet, hardware, applications) as well as to the continuous technical assistance.

Moreover, this empirical study shows that the social influence is an important factor in determining the intention to use Groupware. The front office staff is strongly influenced by the opinions of their superiors.

This result is consistent with those made by [44]. Therefore, banks are invited to improve the interpersonal interaction and deepen the relationships with the superiors.

However, no significant effect of the 'valorization' variable indicates that the front office agents do not care about improving their image after using Groupware. This paradoxical relationship may also be explained by the absence of consistency between the Groupware use and the practices of professional advancement [45]. To reverse this effect, it would be interesting for the human resource managers to promote collaborative work and show its advantages, particularly through sensitization and training.

This study also shows that the use of Groupware as a knowledge management system in banks is still marginal. Indeed, the front office staffs use the Groupware tools only for acquisition, capitalization and reuse of knowledge.





Nevertheless, the respondents did not have recourse to the use of Groupware tools in the sharing of professional knowledge. They believe that Groupware tools are designed to control digital information by their stakeholders. Consequently, their lack of confidence and feeling mistrustful can be an important obstacle for breaking their exchange of information [46]. This can be also explained by the fact that the front office agents, essentially older ones, think that the use of traditional tools of transfer (face to face, telephone...) is easier and faster than the numerical tools.

Furthermore, the non significant effect of Groupware use on transversal organization seems to be a paradoxical result because it nearly contradicts all the previous empirical studies [47] and [48]. Various authors [49] and [50], have suggested that the implementation of collaborative technologies in companies reduces psychosocial barriers between the distributed working groups, promotes more decentralized decision making and helps employees to be more and more autonomous and polyvalent in their work.

This finding may be due to the lack of collaboration and coordination between front office agents. This strange attitude can be explained by the dominance of jealousy feeling and the competitiveness between banks' agents.

This allows us to highlight that the successful introduction of Groupware system in organizations can't be guided only by technology but needs to rely on a good understanding of how groups and organizations must function.

This result suggests the strengthening of communal orientation that encourages the group work and the creation of project group, therefore making the development of mutual trust between employees easier.

This result implies the need for human resource managers to conduct training, mostly for the older agents, to educate them about the capital gains of Groupware tools such as, the exchange and acquisition of new knowledge, skills' development, shortcuts in the execution of operations, creation of new professional relationships...

In addition, Directors of Human Resources should promote an organizational sharing culture that encourages the front office to collaborate, exchange their knowledge and their best practices, which can facilitate the knowledge management practice.

To enhance the process of knowledge management in banks, stakeholders are required to take into account these steps that are summarized as follows:

Firstly, they should improve the level of the use of collaborative technologies in the bank. Stakeholders must take into account all the factors that can influence the Groupware adoption by the front office staff.

Secondly, they must implement training aimed at the development of an organizational culture of sharing and exchange between banks agents.

Thirdly, they should implement training for older agents, in order to show them the Groupware tools' functioning and the advantages of their use, in particular for the improvement of their cognitive capital.

## **8. LIMITATION AND FUTURE RESEARCH**

This study has some limitations that should be taken into consideration:

The number of banks studied is limited. This survey did not interview all the Tunisian banks with mixed capital and hence, a large number of the Front office agents were not included.

Another important limitation is the fact that this study did not take into consideration the key factors of the Groupware adoption as it only tested the influence of the determinants of the UTAUT model. Future researches should examine other factors, such as financial motivation, complexity, anxiety...

It would be important for future researches to conduct a longitudinal study to better understand the real reasons which prevent bank's agents from sharing information and knowledge via Groupware tools, and checking their validity over time.

## **9. CONCLUSION**

The aim of this research is to explore the relationships between the Groupware use and the knowledge management process in the Tunisian mixed-capital banks through the distribution of 272 copies of a data analysis questionnaires were used for data analysis.

The results of this exploratory study show that the groupware system was significantly associated with most of the stage of the knowledge management processes we identified. However, knowledge transfer isn't significantly associated with the Groupware use.

These results can help the human resource managers develop more efficient policies and strategies to incite the front office agents to collaborate and share their knowledge via the Groupware tools in order to enjoy its benefits.

Stakeholders should pay more attention to the key factors of successful knowledge management system. The lack of motivation can be the major reason that explains why some bank agents don't share their knowledge through Groupware system.



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