THE ADOPTION DETERMINANTS OF MOBILE TECHNOLOGIES IN THE ACCOUNTING PROFESSION

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ABSTRACT

Given that mobile technology has become a disruptive innovation, with new service solutions for both users and customers, it remains yet underexplored in managerial and in operational issues. This study explains the adoption of accountants' mobile technology usage behavior by moving beyond the Technology Acceptance Model (TAM) and building on the modified and extended Unified Theory of Technology Acceptance and Use of Technology (UTAUT) model.

The proposals in this research are based on the TAM model and the UTAUT model. This research adopts a hypothetical-deductive approach supported by a questionnaire for which one hundred Tunisian accountants responded. The results of this study highlight the influence of performance expectancy, facilitating conditions, and task variety on the current use of mobile technologies in the accounting profession. Overall, the extended model was able to explain 49,5% of the variance in behavioral intention to adopt and use mobile technology.

Keywords: Mobile Technology, Adoption, Use behavior, UTAUT, TAM, Accountants

INTRODUCTION

Whether it is a question of goods, people, capital, services, ideas, images, or information, mobility is now firmly anchored in our contemporary society. Mobility is expressed in many ways in this 'society on the move', both in its social values and in its cultural and economic dimensions (Han et al., 2021). As a sign of these transformations, technological innovations in the field of communication networks and Information And Communication Technologies (ICT) have led to the development of so-called 'mobile' technologies. Mobile technologies include different types of terminals such as mobile phones, laptops, Personal Digital Assistants (PDAs), and tablet PCs. The specificity of these tools lies in the possibility of communicating, transmitting information, and having access to various services, anywhere and at any time (Lew et al., 2020). Indeed, these technologies hold a lot of promise for organizations in terms of responsiveness, flexibility, and increased productivity. So, in an accountancy firm, the organization of interest in this research, the accountant can be reached at any time of the day and the service of his clients 24 hours a day. Therefore, while the benefits of integrating mobile technologies are undeniable within accountancy firms, these tools must be accepted, adopted, and used by accountants.

During the last decade, Mobile applications are taking a great interest in the field of MIS researchers due to their popularity and universality. Several studies have investigated the adoption of mobile technologies using the Technology Acceptance Model (TAM) (Chhonker et al., 2017, Alalwan et al., 2018, Patil et al., 2020, Lew et al., 2020). However, this model has several shortcomings. Thus, this research has gone beyond this model and taken the unified theory of technology acceptance and use it as the basic model to study the behavior of accountants.

The present research is part of this framework and attempts to provide some answers to the following question: How can we explain the behavior of accountants about mobile technology? The objective of this research is to criticize the TAM model and go beyond it to propose a modified and extended UTAUT model. The aim is to study the introduction of the notion of mobility in the accounting profession. This study allows us to explain first the adoption of mobile technologies by accountants of Tunisian companies and the model used to

explain this adoption and second the methodology adopted to illustrate the adoption of mobile technologies by the accountants in this country.

LITERATURE REVIEW

The use of information technology by individuals, groups, or organizations is one of the issues addressed by information systems research (Fishbein & Ajzen, 1975; Davis et al., 1989; Taylor & Todd, 1995; Venkatesh et al., 2003). It is of particular importance since it is subject to factors relating to the behavior and judgments of individuals. Several studies use the Technology Acceptance Model (TAM) to study user behavior. Indeed, this model is general, simple, and easy to use (Igbaria et al., 1997; Mathieson, 1991). The Technology Acceptance Model (TAM) developed by Davis (1989) is considered to be the founding model of information system research on technology adoption. Acceptance of an information system is measured by the use of an information system, which depends on two variables: perceived usefulness and perceived ease of use. Research has been conducted to complement the TAM model. Thus, this model has not maintained its original form but has progressed from 1989 to 2020. Indeed, given certain limitations, the TAM model has been subject to certain extensions (Alalwan et al., 2018).

The first period, the introductory period, is marked by the introduction of information systems within organizations and user adoption of technology becomes a major focus of most research. In the second period, the validation period, several studies have investigated the validity and reliability of TAM instruments (perceived usefulness and perceived ease of use) (Hendrickson et al., 1993; Davis & Venkatesh, 1996; Chhonker et al., 2017; Alalwan et al., 2018; Lew et al., 2020). The third period, the extension period, is characterized by the introduction of new variables into the TAM model. Indeed, several researchers have confirmed that the addition of external variables as antecedents to the TAM constructs (perceived usefulness and perceived ease of use) contributes marginally to explaining system use (Legris et al., 2003). Finally, the development period is marked by the development of a new version of the original TAM that is more valid than the latter: TAM 2 (Venkatesh et al., (n.d.); Davis, 2000; Chhonker et al., 2017; Patil et al., 2020).

However, all these recognized advantages of the TAM in the perspective of predicting the acceptance and use of technology did not prevent Davis himself and other authors from reproaching it with certain shortcomings. Indeed, many criticisms have been made of the acceptance model. They are of three kinds: they relate to the conditions of development of the model, the level of analysis, and the mobile technology context in which it is studied.

The first limitation is that most adoption studies based on the TAM model are based on student samples or a university environment (Davis, 1989). Thus, the TAM model becomes inappropriate to reflect the work environment. Secondly, this model is usually developed in the context of the introduction of relatively simple technology. Indeed, it tends to examine a single technology, in a homogeneous group, on a single task, at a specific time (Legris et al., 2003). Since user perception and intention change over time, it is important to measure these quantities at several points in time. Finally, Venkatesh, et al., (2003) argue that gender, age, experience, and willingness are significant moderators of acceptance that TAM did not take into account. Concerning the limitations related to the level of analysis, the Technology Acceptance Model (TAM), seeking to isolate the determinants of acceptance by the individual, focuses exclusively on the micro-level of analysis (Lew et al., 2020). However, this model neglects the macro level which concerns organizations and societies.

The first criticisms concern the two constructs of the technology acceptance model: perceived ease of use and perceived usefulness (Rafique et al., 2020). Indeed, Lew, et al., (2020) argue that these two constructs are less important in mobile services. Other motivations influence the behavior of mobile technology users such as flexibility, accessibility, and security. The second criticism presented by Chhonker, et al., (2017) is that the TAM model ignores the potential existence of benefits and barriers to technology use. Finally, another limitation, presented by Shiau, et al., (2018) in the context of mobile internet adoption, is that the TAM

model is inappropriate for new technologies (mobile technologies) given the change in the notion of the user: from a mere employee to a consumer. As these various criticisms show, the explanatory power of the Technology Acceptance Model (TAM) is limited (40%).

These limitations have been largely resolved in the model proposed by Venkatesh, et al., (2003), the Unified Theory of Acceptance and Use of Technology (UTAUT). The latter is the basic model for this research. Indeed, Venkatesh, et al., (2003) synthesize twenty years of research into IT adoption and test 32 constructs from 8 adoption models to identify the variables that most influence IT use. They theorize four determinants of intention to use and usage behavior. Three constructs emerge as determinants of intention to use, performance expectancy of use effort expectancy, and social influence. Intention and facilitating conditions appear as determinants of user behavior. Four variables also play a moderating role: age, gender, experience, and voluntariness.

This UTAUT model has several advantages that make it more robust and interesting than the Technology Acceptance Model (TAM), especially in the context of mobile technology adoption by accountants (Patil et al., 2020). First, Venkatesh, et al., (2003) in their studies consider sophisticated and complex technologies. Secondly, these researchers did not focus their research on the student sample (like the TAM sample) but collected data from employees in organizations. Then, Venkatesh, et al., (2003) analyze a plurality of technologies, organizations, industries, functions in a longitudinal study at several points in time. Furthermore, the model proposed by Venkatesh, et al., (2003) distinguishes between voluntary and compulsory acceptance, which is not the case for the TAM model. Furthermore, the UTAUT model has the advantage of unifying different theoretical perspectives from almost twenty years of research on technology adoption. Finally, the UTAUT model, explaining 70% of the variance in intentions to use, allows for much finer-grained analysis of adoption behavior.

But the problem is the UTAUT model valid for mobile technology? To answer this question, it is worth presenting some work that has studied the adoption of mobile technologies while applying the UTAUT model. Patil, et al., (2020) try to predict the factors that influence consumer adoption of mobile services. Ayaz & Yanartas (2020) studied the adoption of Electronic Document Management Systems (EDMS) in small and medium-sized enterprises. Ultimately, it appears that UTAUT is a robust model to explain accountants' behavior towards mobile technologies. The theoretical framework reviewed underpins the conceptual model of this research.

MODEL DEVELOPMENT

Three conceptual levels make up the model in this research, technology characteristics, environmental characteristics, and task characteristics. For this research, the determinants of adoption are classified into three dimensions: technology characteristics, environmental characteristics (or implementation context), and the third type of characteristics is added which are task characteristics.

Technology Characteristics

Technology characteristics are important to be evaluated in terms of adoption and are the focus of many information systems research. Mobile communication services are considered portable ubiquitous technologies, and the users have a close personal relationship with the devices involved. The cell phone, especially the smartphone, is the centerpiece in this context and the target of the convergence of communication and entertainment functions (Chhonker et al., 2017; Patil et al., 2020). This dimension brings together the two determinants of intention to use technologies in the UTAUT model: performance expectancy and effort expectancy.

Performance Expectancy

Performance expectancy is defined as the degree to which an individual believes that using the system will help him or her to achieve gains in work performance (Ayaz & Yanartaş, 2020). It refers to the degree of believing that the individual using the system will perform higher. The influence of performance expectancy has been confirmed in both voluntary and compulsory settings and situations with less experience Thus, taking into account the perception of this performance expectancy of mobile technologies by accountants leads to the retention of a variable named PEREX. Concerning the effect of performance expectancy on current use, Ayaz & Yanartaş (2020) affirm the significant and positive effect on technology use. Based on this, the following hypothesis has been put forward:

H11: The influence of the performance expectancy on mobile technology use behavior is positive and significant.

Effort Expectancy

It expresses the degree of convenience regarding the use of the system. The effort expectancy factor influences behavioral intention in both voluntary and compulsory use environments. The effort expectancy provides the measurement of a system's interface design, ease of use, flexibility, and ease of learning. Therefore, it is expected that the usage intention of mobile technology will be easy to use without effort. In many studies using the UTAUT model, the effort expectancy factor has been shown to have a significant impact on intention to use (Chen & Hwang, 2019). This expected effort when using mobile technologies gives rise to a research variable called EFEX. Regarding the effect of expected effort on current usage, Based on this, the following hypothesis has been put forward:

H12: The influence of the Expected Effort on mobile technology use behavior is positive and significant.

Environmental Characteristics

Understanding the impacts caused by technological innovations in people's lives is something that stimulates the interest of many social science researchers over time. When these innovations are linked to individual mobility, they bring benefits to social and professional life (Chhonker et al., 2017; Han et al., 2021). Environmental characteristics refer to the user's working environment and this dimension combines the social influence variable and the facilitating conditions variable of the UTAUT model.

Social Influence

Ayaz & Yanartaş (2020) define social influence as the degree to which an individual perceives the beliefs of others that he or she should use the new system (what do my colleagues think about whether I use the new system. It refers to the degree to which the person who is deemed to be important to the individual believes that he/she should use the new system. In cases where the social influence factor has no effect in the case of voluntary use. The social influence factor reflects the influence of influencing factors on the behavior of users, such as opinions of friends or hierarchical superiors. Thus, this concept of social influence leads to a research variable called SOIN. Based on this, the following hypothesis has been put forward:

H21: The influence of social influence on mobile technology use behavior is positive and significant.

Facilitating Conditions

Facilitating conditions are defined as the degree to which an individual believes that the technical and organizational infrastructures exist to support the use of the system (Venkatesh et al., 2003); Triandis (1980), mentions that a behavior cannot be implemented if the objective conditions of the environment prevent it. This construct of facilitating conditions gives rise to a research variable called FACON. Venkatesh et al., (2003) state that the effect of facilitating conditions on user behavior is significant and positive. Based on this, the following hypothesis has been put forward:

H22: The influence of facilitating conditions on mobile technology use behavior is positive and significant.

Task Characteristics

To understand how task characteristics, such as type, complexity, and difficulty, affect user interaction with mobile technology, this concept investigates if and how various types of task and information systems lead to different user experiences, and, how tasks affect users' evaluation of the interaction design of specific mobile systems. This research takes into consideration two characteristics, namely the mobility and variety of the task.

Mobility of Task

Mobility would be one of the characteristics of the current environment. Mobility can therefore be considered as one of the characteristics of tasks (Lew et al., 2020). This concept of mobility leads to the selection of a variable called MOB. For the effect of MOB on current usage. Based on this, the following hypothesis has been put forward:

H31: The influence of mobility on mobile technology use behavior is positive and significant.

Variety of Task

Chang, et al., (2003) define task variety as the number of exceptions encountered in the work. Thus, task variety gives rise to a variable called VAR. Regarding the effect of task variety on usage, the latter studied this relationship. Thus, there is a clear relationship between task variety and user behavior of technology. Based on this, the following hypothesis has been put forward:

H32: The influence of task variety on mobile technology use behavior is positive and significant.

Mobile Technology Use Behavior

In research related to technology adoption, usage is approached at the technology adoption phase. This concept of current usage is measured in this research by the frequency of use. It gives rise to the dependent variable called USACT.

Figure 1 illustrates the conceptual model based on a set of variables that are assumed to influence the use of mobile technologies. These variables are divided into three main axes: technology characteristics, environmental characteristics, and task characteristics.

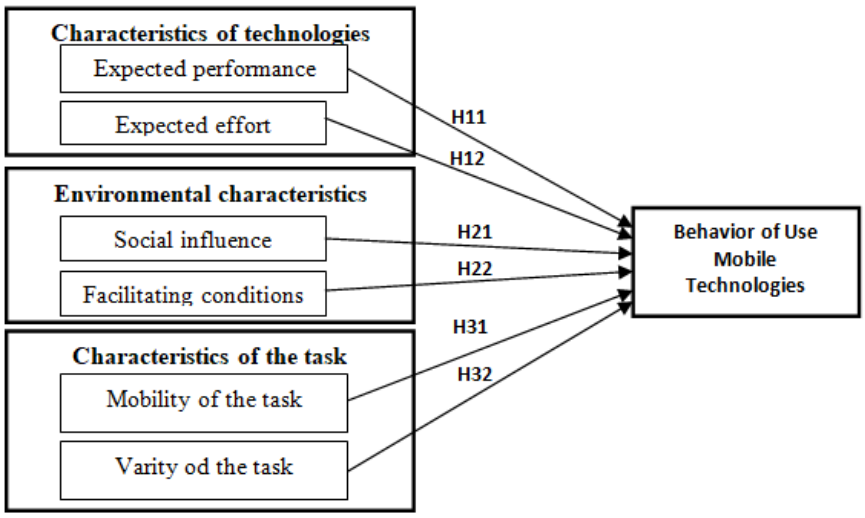

FIGURE 1
THE CONCEPTUAL MODEL

Before proceeding with the analysis of the data collected, it is necessary to present the data collection tool, the research field and to study the characteristics of the sample obtained.

METHOD

The Questionnaire

Data collection was carried out using a questionnaire with quantitative, closed-ended responses of the five-point Likert scale type. This is an attitude and opinion scale that consists of respondents ticking the appropriate box for a series of statements. The construction of the questionnaire consists of assigning to each variable a well-defined item from previous research. These scales are designed to assess accountants' perceptions and judgments about the use of mobile technologies. Only the variable of current use of mobile technologies is measured on a six-point scale. To ensure that the questionnaire is properly understood, a pre-test was carried out with ten accountants. The latter made it possible to make some modifications and improvements to the semantics of the items proposed in the questionnaire. Once the questionnaire had been drawn up, the research field was chosen and the questionnaire was administered.

Research Field

The population targeted in this research includes Tunisian accountants. The population studied is not limited to accountants with their own offices but also to accountants hired in companies. This choice of the population helps to explain the behavior of accountants in general about mobile technologies. Data collection for this research began on 8 February and ended on 10 April 2017. During the first contact, 200 accountants were contacted directly or *via* telephone, to find out if they were willing to give up 15 minutes of their time to answer the questionnaire. Due to the time pressure (period of preparation of the balance sheets), 120 accountants agreed to arrange a meeting. From 10 February to 28 February, 60 accountants responded favorably and 60 postponed the meeting. After telephone reminders and mailings, 40 accountants responded. Thus, 100 responses are valid for analysis.

Sample Characteristics

The structure of the sample is described through the set of respondents taking into consideration certain characteristics of the respondents. The distribution of the respondents in the sample is based on the following criteria: the respondent's function, age, gender, type of mobile technology used, and experience of using the technologies. The majority of respondents are accountants (82.5%), under 39 years of age, men (75.4%), all of whom use mobile phones, and 65.4% of them use laptops, and who have had an experience of using mobile technologies for between 3 and 5 years (94.4%).

THE RESULTS

The results of this research are tested using the multiple linear regression method.

Testing Hypothesis H1

Hypothesis H1 is designed to establish the relationship between technology characteristics and mobile technology usage behavior. The results of the linear regression are presented in Table 1.

Table 1
LINEAR REGRESSION RESULTS FOR H1

Explanatory variables	USACT
PEREX	0.325*
EFEX	-0.084ns
Coefficient de détermination	6.4%
Coefficient F de Fisher	2.912
Signification du F : (α)	0.063
Coefficient de Durby-Watson **p<0.05 *p<0.1 ns : non significatif	1.309

This model explains 6.4% of the variance of USACT at the risk threshold (p=0.063<0.1). When examining the partial coefficients, only the coefficient of PEREX corresponding to (0.325) is positive and statistically significant and the associated risk (p=0.019). However, the EFEX variable does not have a significant influence on the dependent variable. In other words, the expected performance of mobile technology use positively and significantly influences its actual use by accountants. Thus, these results verify sub-hypothesis H11 and reject hypothesis H12.

Testing Hypothesis H2

Hypothesis H2 is designed to establish the relationship between environmental characteristics and current usage. The results of the linear regression are presented in Table 2.

The variance of the variable to be explained USACT by the variables SOIN and FACON is insignificant and statistically insignificant. The partial regression coefficients are practically small. In other words, social influence and facilitating conditions do not affect accountants' use of mobile technologies. Thus, these results reject hypothesis H2.

Table 2 LINEAR REGRESSION RESULTS FOR H2	
Explanatory variables	**USACT**
SOIN	-0.041ns
FACON	0.110ns
Coefficient de détermination	2.5%
Coefficient F de Fisher	0.318
Signification du F : (α)	0.729
Coefficient de Durby-Watson **p<0.05 *p<0.1 ns : non significatif	1.330

Testing Hypothesis H3

Hypothesis H3 is designed to establish the relationship between task characteristics and usage behavior. The results of the linear regression are presented in Table 3. The multiple linear regression method verified the significant effect of only one variable, namely task variety, on accountants' mobile technology use behavior.

This model explains 7% of the variance of USACT at the risk threshold (p=0.028<0.1). When examining the partial coefficients, only the coefficient of VAR corresponding to (0.259) is positive and statistically significant and the associated risk (p=0.09).

Table 3 LINEAR REGRESSION RESULTS FOR H3	
Explanatory variables	**USACT**
MOB	0.102ns
VAR	0.259**
Determination Coefficient	7%
Fisher's F coefficient	1.293
Signification du F : (α)	0.028
Coefficient de Durby-Watson **p<0.05 *p<0.1 ns : non significatif	1.412

However, the MOB variable does not have a significant influence on the dependent variable. In other words, the Variety Of Tasks (VAR) influence the mobile technology use by accountants positively and significantly. Thus, these results verify sub-hypothesis H32 and reject hypothesis H31.

Test of the Overall Structure of the Model

This test concerns the study of the direct relationship between all the explanatory variables (the first level) of the model with the variable explaining the use behavior (the second level). This regression analysis gives the following results in table 4.

This model explains 49.5% of the variance of USACT at the risk threshold (p=0.034<0.05). Examination of the partial regression coefficients shows that three sub-hypotheses are verified. Thus, the results of the test of the overall structure of the model confirm H11, H22, and H32.

Table 4 LINEAR REGRESSION RESULTS FOR THE OVERALL STRUCTURE OF THE MODEL	
Explanatory variables	**USACT**
PEREX	0.377**
EFEX	-0.061ns
SOIN	0.073ns
FACON	0.259*
MOB	-0.141ns
VAR	0.377**
Determination Coefficient	49.5%
Fisher's F coefficient	2.505
Signification F : (α)	0.034
Coefficient de Durby-Watson **p<0.05 *p<0.1 ns : non significatif	1.412

DISCUSSION

At the end of this research, an explanatory analysis of the research hypotheses was conducted by testing these hypotheses. The results indicated the importance of three variables on the level of adoption of mobile technologies. These variables are expected performance, facilitating conditions, and task variety. The effect of expected performance on mobile technology use behavior is positive and significant. In other words, the accountant adopts mobile technologies mainly because it generates gains to his or her work in terms of time management, flexibility, responsiveness, and client satisfaction. These accountants need to save time in their missions, be present with their clients, and have more availability and autonomy. So they saw mobile technologies as a solution to all these issues.

The effect of facilitating conditions on mobile technology use behavior is positive and significant. In other words, the accountant believes in the effect of facilitating conditions on his or her mobile technology use behavior. Indeed, if accountants have the resources, knowledge, and support, they can use mobile technologies without any problems. Of course, the adoption of mobile technologies depends on the environment and the conditions available that encourage or discourage adoption. This analysis thus supports the initial findings of Venkatesh, et al., (2003); Chang, et al., (2006); Ayaz & Yanartaş (2020); Lew, et al., (2020).

The effect of task variety on accountants' mobile technology use behavior is positive and significant. The accounting function has several aspects whether it is accounting, legal, and tax, so the accountant's tasks are quite varied and they require more face-to-face communication than using mobile technologies. They use technology for simple day-to-day tasks (simple communications, see emails) and not for all their work. This result corroborates previous work (Chen & Hwang, 2019; Patil et al., 2020) which asserts a positive relationship between task variety and the use of new technologies. In sum, the final results show the importance of expected performance, facilitating conditions, and task variety.

Nevertheless, the level of adoption of mobile technologies by accountants is not dependent on social influence and expected effort. This can be attributed to the fact that most of the respondents in this research are young people who have sufficient knowledge to use mobile technologies, and they are mostly heads of firms who are not influenced by a superior.

In addition, the variable of mobility also doesn’t have any positive influence on the use of mobile technologies; this is also attributed to the fact that the accounting profession in Tunisia is still linked to the office, record keeping, and papers.

CONCLUSION

This work aims to explain the adoption of mobile technology use by accountants and it tends to criticize the TAM model while proposing a modified and extended UTAUT model as the basic model of this research. This literature is the set of reviews that clarify the shortcomings of the TAM model, propose UTAUT, and add other variables to the model that complement it. It shows an influence of technology characteristics, environmental characteristics, and task characteristics on mobile technology use behavior.

The empirical validation of this study was carried out on a population of one hundred accountants overall in the 24 cities in Tunisia. The results obtained complement the theoretical contributions of the research and highlight the variables that influence the adoption of mobile technologies by accountants. To this end, the empirical research led to the following findings:

- The use of mobile technologies by accountants depends mainly on the expected performance.
- Similarly, the facilitating conditions influence the use of mobile technologies.
- In addition, the variety of the task influences the use of mobile technologies.

On the other hand, the expected effort, social influence, and mobility do not influence the use of mobile technologies by accountants. This work is primarily aimed at information systems researchers who are interested in explaining the behavior of mobile technology users and the factors that influence the emergence of this type of technology. Thus, the model of this research attempts to provide persuasive evidence to better understand accountants' perceptions of mobile technologies and how they can enhance their adoption and improve the accounting profession, and to introduce the notion of the nomadic firm. In addition, this research criticizes the TAM model and moves it to the UTAUT model, and applies it to mobile technologies (the latest innovations) and the sample of Tunisian accountants

The methodological contributions of this research lie mainly in the implementation of a quantitative approach to deal with the use of mobile technologies by accountants. Regarding the professional contributions, this work can be useful for designers and vendors of mobile technologies. They may realize that this type of technology may be perceived differently for different accountants and different functions. In addition, this focus is of paramount importance to accountants and the accounting profession in general. Indeed, accountants need to be aware of the factors that drive the adoption of mobile technologies within the accounting profession and encourage this adoption while fostering the environment for its development.

Beyond these findings, this research has some theoretical and methodological limitations. Theoretically, the UTAUT model does not fully address the problems encountered in TAM and even the adoption of mobile technologies, especially since it focuses on the micro-level and neglects the effect of the organization. Even the number of variables tested in this research remains somewhat small to all the possible determinants. Methodologically, we limited ourselves to a sample of 100 accountants from Tunisia. Although the sample is representative for this research, a more extensive study could generate more significant results and the results cannot be generalized to all accountants and chartered accountants. In addition, the data collected is at a very specific point in time and in a very sensitive period for accountants and finally, the linear regression method did not give good results in expressing the behavior of accountants.

Taking these limitations into consideration leads to the suggestion of future research which consists of studying the moderating effect of "age", "gender", "experience" and "voluntariness" on the causal links between the different characteristics and the dependent variable. Another future research can be by studying the adoption of mobile technologies by using Venkatesh & Ramesh's (2006) model and applying the structural equation method.

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