



Factors driving the use of technology in the Algerian hospitality sector

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Abstract

The aim of this study was to examine the reliability and validity of the DAVIS (1989) technology acceptance model (TAM) in the context of up market hotels in Algeria. The results obtained partially validate the causal relationship between the different dimensions of the model and show that the perception of ease of use has a very significant impact on the use of new information and communication technologies among employees in this sector.

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- ✓ Keyword. Technology use model. Top-of-the range hotels. Structural Equation modeling.

1. INTRODUCTION

Information and communication technologies have gradually become an integral part of management practices in tourism organizations, as they offer real potential in terms of analysis, cost reduction and time spent interacting with customers (Dudézert, 2018). They are undertaking what is known as a 'digital transformation', which according to Dudézert refers to *'collaborative management and knowledge-sharing systems, which have enabled the development of work practices centre don creativity, mutual adjustment, co-construction, exchange and mobility'* (2018, p.125). These technologies have become very important in the day-to-day management of tasks for hotel businesses, especially those of a high standard, as they open up new work opportunities. Nevertheless, many Algerian hotel companies are still reluctant to change, and yet few of them are still unaware of the contribution that ICTs can make to different aspects of the organization and its performance. To this end, the introduction of technologies in the form of software or other forms is confronted with constraints relating to the acceptance of the technology, the ease of its use and its usefulness for the service in question (Baile & Louati, 2010).

Faced with these realities, our objective is to try to understand what factors are likely to influence the acceptance of new technologies among employees in the hotel sector. In other words, we are seeking to provide some answers to the following question: **what factors encourage employees of luxury hotels to use ICT in their work?**

This study has two main objectives. Firstly, to verify the extent to which the TAM model could explain the intention to use ICT among employees of up market hotels in Algeria. Secondly, to determine the degree of correlation between the dimensions of the model.

In order to address this question, we first need to define a theoretical framework that focuses essentially on a deliberately descriptive approach to the technology and paradigm of scale development, and then on the effects induced by this causality, which we want to highlight through an empirical study carried out in 10 5-star hotels.

Thirdly, we will briefly describe the research methodology, the choice of field and the Structural Equation Modeling (SEM) used to test the research hypotheses. Fourthly, the results of the testing of these hypotheses will be analyzed, interpreted and discussed. Finally, as a general conclusion, we will compare the results and verify the hypotheses of our research.

2. Paradigm Churchill

Choosing a measurement scale remains a crucial stage in management science and marketing research. It is more obvious when the concept has already been discussed in the literature, and under the same conditions of application by the researcher. Otherwise, the researcher is obliged to construct a scale specific to the concept and the field of study.

To do this, we adopted an approach based on the steps recommended by the Churchill paradigm (1979). This paradigm is a methodological approach aimed at *"the construction of multiple scales a posteriori"* (MansouriI, M'Zali, & Peretti, 2008, p. 2). It is based on the principle of psychometrics and the principle of legal value (Churchill, 1979). It is now recommended (Roussel, 1996; Sabadie, 2001; Rossiter, 2002; Baile & Louati, 2010) because it provides clear, precise and simple rules for constructing or adapting reliable measurement scales (Evrard, Pras, & Roux, 1996; Roussel, 1996; Sabadie, 2001).

The principle of measurement developed by this paradigm is to make a so-called latent variable (acceptance of ICT) quantifiable by means of real elements called items. As far as the format of the scale for rating responses is concerned, we

used the LIKERT 5-point scale. We chose this type of scale because it offers many advantages: ease of measurement and equality of intervals.

The first part of the Churchill (1979) paradigm consists of defining the construct domain, generating the items and then testing the tool by consulting experts. The scales are then refined in order to assess their reliability and validity.

To this end, we first looked at the scales borrowed from the literature and the qualitative study, and then carried out exploratory and confirmatory factor analyses of two studies carried out under the same conditions (Churchill, 1979). The aim of the first study (called the test) was to purify the measurement scale using principal component analysis. The next step will be to confirm and validate the structure of the scale we identified in the first study in a second study conducted under the same conditions as the first. The psychometric quality of the different scales was analyzed using reliability and validity tests (Sabadie, 2001).

3. Literature review: specifying the field of construction

The use of new information and communication technologies in the workplace is largely due to the need for hotel businesses to adapt to the socio-economic changes and competition they face (Yombia, Kalakamdjoug, & Wamnba, 2016). However, while in some companies, their acceptance is a success factor, in many others, this is not always the case. In this respect, the failure to adopt technologies is due, first and foremost, to the resistance of individuals and organizations to change (Nguyen, 2014).

In the literature, various models and concepts are used to understand and study the behavior of ICT users. To explain this, authors often refer to the notion of practical acceptability, which relates to the functionalities and ease of use of a given technology, and social acceptability, which reflects users' impressions and attitudes, as well as the social and normative constraints that lead to the choice and use of a

given technology (Bobillier-Chaumon & Dubois, 2009). DAVIS (1989) has proposed a *Technology Acceptance Model*, which aims to explain the way in which individuals accept or refuse to adapt a new technology, while referring to the cognitive theory of reasoned action of Fishbein and Ajzen (1975). According to Fishbein and Ajzen, two basic factors explain ICT user behavior: motivation and user capacity.

However, the theory of expectations, initiated by Vroom (1964), seeks to explain how individuals are motivated. The basic idea is that an individual will only make an effort if that effort enables him to obtain advantages and if the latter are rewarding in his eyes (Dupont, 2002).

According to Davis' ICT acceptance model, the likelihood of individuals adopting a new technology depends on their perception of its usefulness and ease of use. The more useful and easy to use the technology is perceived to be, the more likely the user is to adopt it.

In this case, Davis' TAM model gives a predominant role to user attitudes and consequently defines the following factors (Davis, 1989; Venkatesh & Bala, 2008; Nguyen, 2014; Yombia, Kalakamdjoug, & Wamnba, 2016).

- **Perceived usefulness:** This can be defined as the degree to which an individual believes that the use of a technology will help them to improve their capabilities and achieve gains in performance at work (Yombia, Kalakamdjoug, & Wamnba, 2016, p. 14);
- **Perceived ease of use:** This refers to the degree to which a person believes that using a technology does not require any effort (Bobillier-Chaumon & Dubois, 2009). It is presented by ease of learning, ease of use, perceived complexity and compatibility with the user's existing values;
- **Intention to use ICT:** This intention triggers behavior that translates into actual use, which can be measured in terms of satisfaction, time, quality of decisions and

confidence (Nguyen, 2014);

- **Attitudes towards the use of ICT:** This represents the degree of importance that the user attaches to technology for their work (Venkatesh & Bala, 2008).

Using the TAM model developed by Davis (1989), the work set itself the task of testing the following hypotheses:

H1: Perceived ease of use has a positive effect on the perceived usefulness of ICTs among employees of luxury hotels in Algeria;

H2: Perceived ease of use has a positive effect on attitudes towards ICT among employees of luxury hotels in Algeria;

H3: Perceived use fullness has a positive effect on attitudes towards ICT;

H4: Perceived usefulness has a positive effect on employees' intention to use ICT;

H5: Attitudes towards ICT have a positive effect on employees' intention to use ICT;

H6: Perceived ease of use has a positive effect on intention to use ICT.

These assumptions are made in accordance with the work established by Nguyen (2014) and the premises established by Davis (1989), Venkatesh (1989) and Geyskens (1999). The assumptions so four model are summarized in the figure below.

4. Research methodology

To verify the above assumptions, we used the mixed approach, which we divided into two phases.

-Research methodology for the qualitative study

The qualitative study was carried out with a number of players and managers in the hotel sector, through direct interviews using an interview guide. The study was

carried out on a sample of 33 employees. The sampling method was non-probabilistic, i.e. a convenience sample. The data was processed using lexical and frequency analysis. The aim of this study was to refine the hypotheses and identify a

battery of items compatible with the study context.

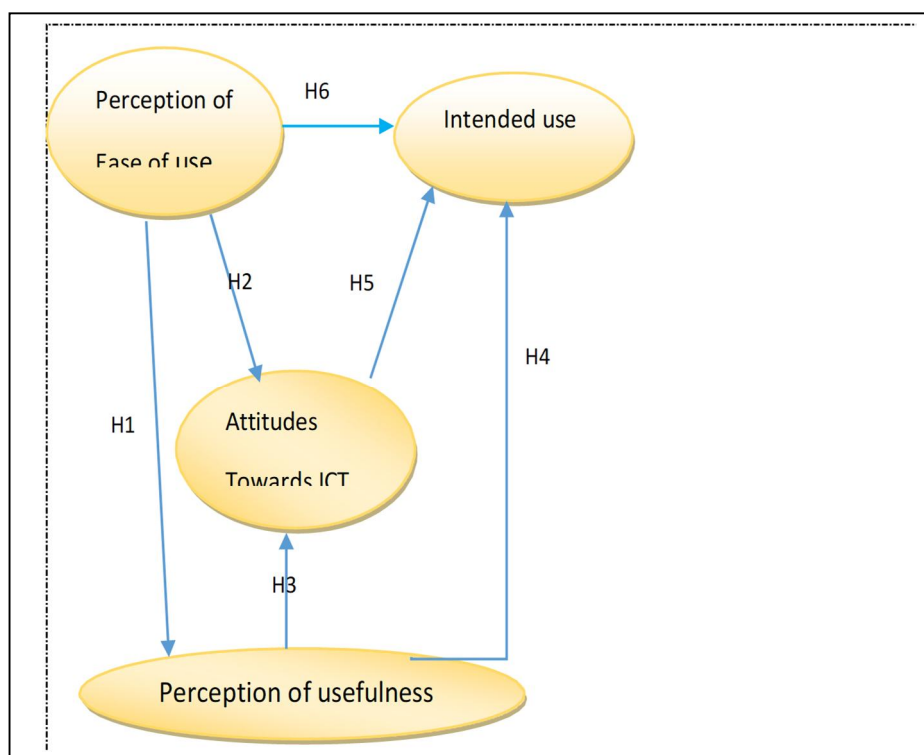
-Research methodology for the quantitative study

In the second phase, the qualitative approach was supplemented by a quantitative one, through a field survey using questionnaires. The research is part of the positivist paradigm, which follows a hypothetic-deductive approach.

The final version of an evaluation questionnaire was drawn up after months of participant observation. This questionnaire was validated with 15 people of different status in the various five-star hotels. To process the data collected, we used SPSS 24 and AMOS 21 respectively for database entry, reliability analysis and the development of our research model.

The target population corresponds to all the individuals targeted by a study and on whom we wish to gather information (Dubois & Jolibert, 1989). In this case, the accuracy of the results obtained depends on the representativeness of the study sample. The population of the 'TAM' model is made up of employees of 10 five-star hotels (out of a total of 11 top-of-the-range hotels in Algeria by the end of 2022). (ONS, 2022). These were estimated in 2022 to be 3750 current staff, belonging to different hierarchical levels. The sampling technique used to calculate the sample size was probabilistic. The sample is stratified because the number of employees varies from one hotel to another. To calculate the sample size, we opted for the Krejcie and Morgan (1970) method, which is very similar to that proposed by Jolibert and Jourdan (the results obtained were calculated using the "Simple Size Calculator" application available on the website: <http://www.surveysystem.com/sscalc.htm>).

Fig.1. Research model



Source : adapted from Davis (1989)

Perception of use has long held a special place in the social psychology literature (Minzberg, 1982; Dodier, 1995; Alter, 1996; Iunius & Fraenkel, 2009). It has had a major influence on research into the management of information systems and *end-user* behavior. The widespread use of online booking platforms (Boocking.com, Expedia, etc.) and e-commerce is forcing top-of-the-range hotels in Algeria to adapt to them (Fernane & Terkmani, 2021).

Table1. Sample size

Hotel	NBR of employees	%	Sample size
El Aurassi	350	9%	31,50
Sofitel	400	11%	39
Meridian of Oran	350	9%	31,50
Sheraton Club des Pins	500	13%	45
Sheraton of Oran	500	13%	45

Saint George	300	8%	28
Mariott of Oran	250	7%	24
Mariott Algiers	250	7%	24
Mariott of Constantine	400	11%	39
Sheraton of Annaba	450	12%	42
Parent population	3750	100%	349

Source: Based on qualitative survey data.

The number of questionnaires accepted and the response rates for each survey are shown in the table below.

Table 2. Questionnaires distributed and retained by study

Study	Number of questionnaires distributed	Number of questionnaires received	Number of questionnaires accepted	Response rate
Study1	360	240	216	60%
Study2	360	343	340	76%

Source: Compiled by us.

To collect the data, we used both face-to-face interviews and online questionnaires (Google From).

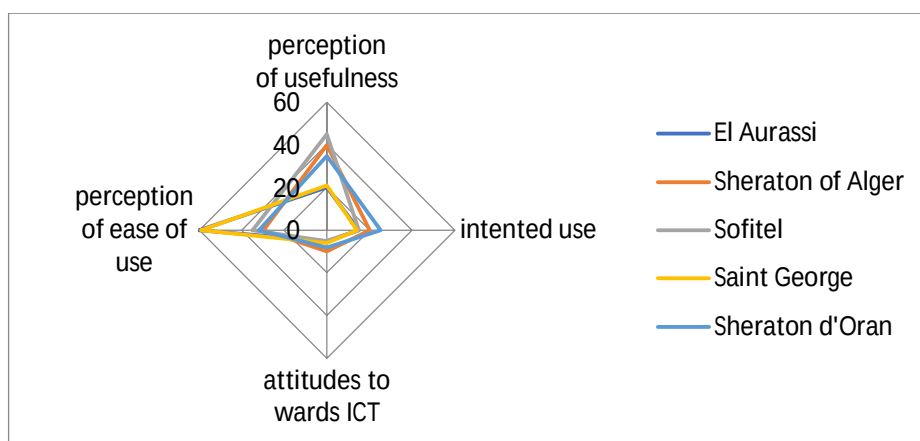
5. EXPERIMENTAL

-Results of the qualitative study

ICT users consider that culture, training and experience are determining factors in the acceptance of ICTs within high-end hotels. However, the users we interviewed consider that need determines whether or not a new technology is accepted. And when need prevails, the acceptance variable gives way.

Content analysis enabled us to create a perception measurement scale comprising 4 dimensions with 34 items. Frequency analysis gave us the importance of each dimension per hotel.

Figure2. Frequency of appearance of dimensions by hotel



Source: Based on data from the qualitative study.

89% of those surveyed were aware of the importance of ICT for the smooth running of their work, and saw it as a tool to help them manage their tasks. It should also be pointed out that access to technology tools is only available to five-star hotels, given the high costs involved. The technology consists of acquiring software for reservations (OPERA), security (MM800), management (EZRMS) and catering (MICROS), and equipping the establishment with an intranet and management information system, subscriptions to international platforms and databases that are beyond the reach of small hotel businesses. Using the qualitative method and the theoretical model, we were able to create a measurement scale consisting of 4 dimensions with 35 items. This scale was the subject of an exploratory and confirmatory analysis based on the methodological approach of Churchill (1979). However, in order to ensure that the items were appropriate for the chosen construct domain, we consulted three experts in accordance with Zaichkowsky's (1985) approach. The experts helped us to categorize our items using qualitative criteria (objectivity and exhaustiveness) and an analysis grid (codification).

-Results of the quantitative study

First, we will assess the dimensionality, reliability and validity of the constructs, in particular through Cronbach's alpha coefficient and exploratory and confirmatory factor analysis. We will then carry out an analysis using the structural equation method, the aim of which is to test the relationships between the dimensions recommended by the research model.

-Reliability and exploratory factor analysis

Exploratory factor analysis reveals 22 items (out of 35 items) of a multidimensional scale composed of four factors that explain 89.69% of the variance. We performed a rotation according to the Varimax principle and the equal value principle ≥ 1 . Factor analysis was conducted for each of the factors in order to comply with the recommendations of Rochrich (1993) and those of Gerbing and Anderson (1988), Steenkamp and van Trijp (1991): *"a multidimensional construct must therefore be considered as a set of unidimensional sub-constructs; its validation requires verification of the psychometric quality of each of the dimensions"* (SABADIE, 2001, p. 223). We retained only those items with a loading ≥ 0.5 . The aim of rotation is obviously to freeze item saturation in the factor space. The table below gives the loading value for each item.

Table 3. Factor structure of the 22 items of the TAM model after oblique rotation

Code	Perception of usefulness	Perception of ease of use	Attitude to software use	Intention to use the software
PU2	,980			
PU3	,890			
PU7	,601			
PU8	,654			
PU9	,666			

PU10	,689			
PFU1		,614		
PFU4		,632		
PFU5		,987		
PFU6		,914		
PFU8		,798		
AUL1			,671	
AUL2			,693	
AUL3			,911	
AUL4			,999	
AUL5			,610	
AUL8			,708	
IUL3				,655
IUL4				,681
IUL5				,879
IUL6				,947
IUL7				,722

Source: Calculated from Survey data using SPSS software.

To test the psychometric quality of the scale measuring the different dimensions of our model, we first checked the correlation between the different items making up the scales, in particular using the KMO and Bartlett test. We found that the correlation was significant with KMO >0.7 (Aouidad, 2021).

Table 4. KMO, Bartlett test and reliability of the TAM measurement scale

Dimensions	KMO	Sig	Items	Cronbach's Alpha
Perception of usefulness	,901	,000	6	,879
Perception of ease of use	,854	,000	5	,903
Attitude towards the software	,813	,000	6	,799

Intention to use the software	,710	,000	5	,847
TAM			22	,899

Source: Calculated from survey data using SPSS software.

The Cronbach's Alpha obtained per item (0.879; 0.903; 0.799; 0.847) and for the scale as a whole (0.899) was sufficiently high, exceeding the most stringent threshold of (0.7). The results of the exploratory analysis were subjected to confirmatory analysis, and the goodness of fit of the data was assessed using validity indices.

-Confirmatory factor analysis

Confirmatory factor analysis is used to test the fit of the measurement scale (ability of the scale to reproduce the data). We used AMOS software to carry out our various analyses.

The following table presents the different dimensions and items of our model, as well as its codification after cleaning. Its structure corresponds to the questionnaire we distributed to employees using a five-point Likert scale.

Table 5. Items, dimensions and coding of the TAM model of the confirmatory study

Dimensions	Items	Code	Dimensions	Items	Code
Perception of usefulness (adapted from Kemayou and al, 2016)	-Using ICT will improve my customer relations	PU2	Intention to use the software (adapted from Davis, 1989; Nguyen, 2014)	-I will use ICT in the future	IUL
	-ICT helps me a lot in my work	PU3		-I draw up a plan for using ICT	3
	-Using ICT will improve my efficiency	PU7		- I am satisfied with the results of my work	IUL
	-Using ICT will increase my productivity	PU8		-With the introduction of ICT, my work has improved a lot	4
	-Using ICT will increase my capabilities	PU9		-I plan to computerise all my tasks	IUL
	-I find ICT a useful tool in my work	PU10			5
					IUL6
					IUL7

Perception of ease of use (adapted from Davis, 1989; Nguyen, 2014)	-My interaction with ICT is clear and understandable	PFU1	Attitudes towards software use (adapted from Compeau and Higgins, 1995, cited by Nguyen, 2014)	-ICT makes work more interesting	AUL1
	-I find it easy to ask software to do what I want	PFU4		-Working with ICT is fun	AUL2
	-Interacting with ICT does not require much mental effort	PFU5		-Working with ICT has enabled me to progress in my work	AUL3
	-I find ICT compatible with the demands of my job	PFU6		-Working with ICT has enabled me to be promoted and develop my career.	AUL4
	-I find ICT easy to use	PFU8		-I like working with ICT	AUL 5
				-I'm looking for aspects of my job that require the use of ICT	AUL 8

Source: Compiled by us.

We received 340 completed questionnaires from a population with the following characteristics:

-The proportion of women and men is 56.4% and 43.4% respectively;

6.2% of respondents were top managers, 21.8% middle managers and 72% in-line managers;

-35.3% of those questioned have more than 20 years' experience, 34% have a university degree and 30% are graduates of hotel management schools.

-78.3% of respondents said they had received training in the use of ICTs before joining the hotel, while 22.7% had not.

The confirmatory analysis enabled us to test our conceptual model and we obtained the following results:

Table 6. TAM model fit indicator

<i>Adjustment index</i>	<i>Results</i>	<i>Recommended value</i>
X^2	21,83($p < 0,00$)	
X^2/dl	2,45	≤ 3
CMA	0,034	≤ 1
RMSEA	0,035	$\leq 0,08$
CFI	0,901	$\geq 0,9$
GFI	0,908	$\geq 0,9$

Source: Calculated from survey data using AMOS software.

As shown in the table above, the results indicate a good quality of fit, allowing us to carry out our CFA.

A new factorial analysis was then conducted using SPSS on the 22 items retained following the exploratory analysis. This analysis resulted in a scale structure comprising 4 dimensions and 19 items.

The construct validity of the technology acceptance factors share 96%, 76%, 78% and 86% variance respectively with their measures.

Table 7. KMO, Bartlett test and reliability of the TAM measurement scale

Dimensions	KMO	Sig	Items	Cronbach's Alpha
Perception of usefulness	,911	,000	4	,894
Perception of ease of use	,876	,000	5	,903
Attitude towards the software	,879	,000	5	,865
Attitude to use the software	,822	,000	5	,847
TAM			19	,917

Source: Calculated from survey data using SPSS software.

This analysis enables us to move on to testing the various research hypotheses.

-Testing research hypotheses

A structural equation analysis was conducted to estimate the causal links between the model's dimensions and items. The results of the standardized regression coefficients and their significance are shown in the table below.

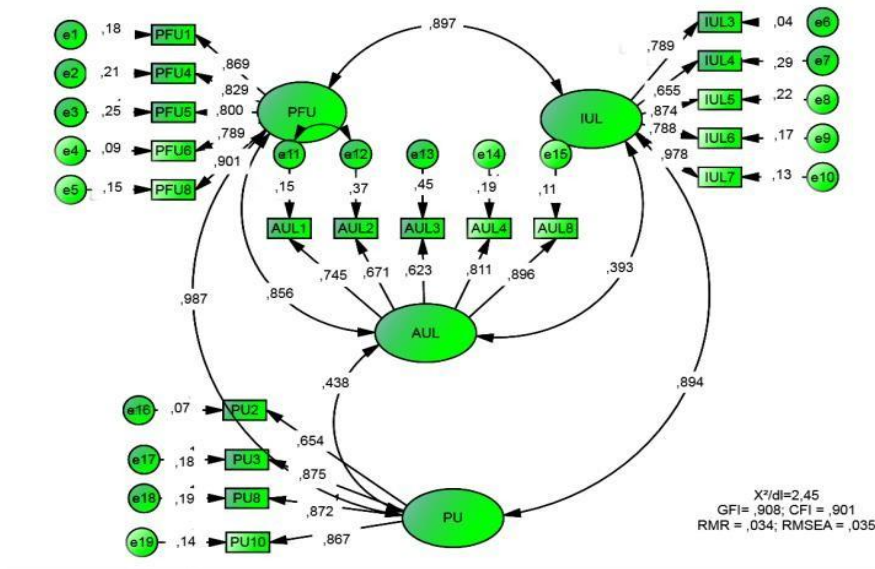
Table 8. Hypothesis testing

Assumptions	Relations	Beta	Sig
H1	PFU PU 	,744	,000
H2	PFU AUL 	,856	,000
H3	PUAUL 	,438	,072
H4	PUIUL 	,894	,000
H5	AULIUL 	,393	,119
H6	PFU IUL 	,798	,000

Source: Calculated from survey data using AMOS software.

These results show that hypotheses H1, H2, H4 and H6 are confirmed. Hypotheses H3 and H5, on the other hand, are not validated. Hypothesis H1 states that the perceived ease of use of ICTs has a positive effect on the perceived use of ICTs ($\beta = 0.744$ with $\text{Sig} < 0.01$). A system that does not require too much effort increases the degree to which users can improve their efficiency. In hypothesis H2, this dimension has a positive effect on attitude towards ICT use ($\beta = 0.856$ with $\text{Sig} < 0.01$). Perception of use in hypothesis H3, on the other hand, does not help determine attitude towards the use of ICTs ($\beta = 0.483$ with $\text{Sig} > 0.01$), but very significantly determines intention to use ICTs in hypothesis H4 ($\beta = 0.894$ with $\text{Sig} < 0.01$). Finally, in hypothesis 5, attitude has no effect on intention to use ICT ($\beta = 0.393$ with $\text{Sig} > 0.01$). In hypothesis H6, perceived ease of use has a positive impact on intention to use, which allows us to suggest that ease of use is the determining factor in employees' acceptance of a new technology.

Figure 3. Covariance diagram of TAM model constructs



Source: Calculated from survey data using AMOS

6. DISCUSSION OF RESULTS

The aim of this study is to examine the reliability and validity of the TAM model in the context of the luxury hotel industry in Algeria, and to define the nature of the causal relationships between the different dimensions of the measurement scale. The study involved 340 employees at different hierarchical levels. The results of the statistical analyses indicate that the multidimensional measurement scale of the TAM model is composed of 4 factors and 19 items (3 items were eliminated because they did not saturate any factor of the scale). The scale has satisfactory psychometric qualities in terms of reliability and construct validity ($\alpha=0.917$ and $KMO > 0.7$ with $\text{sig} = 0.000$). In addition, the value of Cronbach's alphas for the various items ranged from 0.847 to 0.917, which is in line with the recommendations of statisticians that alpha is considered acceptable at 0.70 and above. As for the fit of the model to the data, we based ourselves mainly on the recommendations of Yousafzai (2007) and those of Schumacker and Lomax (2010) taken up by Nguyen Huu Binh (2014).

Table 9. Quality of TAM suitability indifferent contexts

Study	X ² /dl	GFI	CFI	RMSEA	CMA	SRMR
Shroff, Deneen and Ng (2011)	N/a	0,89	0,91	N/a	0,45	0,68
Ayadi and Fourati Kammoun (2009)	1,63	0,90	0,96	0,06	0,10	N/a
Teo, Lee, Chaiand Wong (2009)	1,78	N/a	0,98	0,04	N/a	N/a
Wong and Teo (2009)	2,10	0,94	0,97	N/a	N/a	0,04
Teo (2008)	1,11	N/a	0,98	0,03	N/a	0,06
Nguyen Huu Binh (2014)	1,94	0,94	0,97	0,07	0,03	0,04

Source: Based on various readings

We note that this validation has been justified in several works undertaken in different contexts and summarised in the table above.

The results relating to the relationships between the different dimensions and the structural equation analysis highlighted all the causal links as advocated by the TAM model. These results corroborate with those found by Nguyen Huu Binh (2014).

The rejection of hypothesis H3, which states that the perception of usefulness does not influence the attitude towards the use of ICTs, which in turn has a very modest effect on employees' intention to use ICTs, can be explained by several reasons: most employees are obliged to adapt to this new work organization, which does not facilitate the development of a positive attitude towards the system. Similarly, the unfavorable career plan and the random recruitment of employees (the hotel industry does not require highly qualified workers) are obstacles to the efficient use of the applications (Gelinier, 1993). The rejection of hypothesis H5, which states that attitude influences intention to use ICTs, is explained by the difficulty in using these tools and the lack of motivation. Companies need to step up their efforts in terms of training and incentives in order to boost behavior and intention among their employees.

Perceived ease of use has a positive influence on attitude to using ICT ($\beta=0.856$). Furthermore, the standardized regression coefficients indicate that

perceived ease of use has a significant impact on perceived usefulness (0.744), which in turn affects intensity of use (0.894). These results lead us to say that this dimension is a factor that encourages employees to use ICTs. In other words, employees would use software to perform their tasks when this use does not require a great deal of effort. The influence of attitudes on the intention to use remains modest.

7. CONCLUSION

In this article, we have adapted the scale for measuring technology acceptance in luxury hotels by applying the Churchill (1979) paradigm. To this end, the technology acceptance model proposed by Davis (1989) can be considered a valid tool for studying the factors that determine and influence the behavior of ICT users in top-of-the-range hotels in Algeria. The results obtained partially validate the hypotheses of our work and show that ease of use is an important dimension and positively influences employees' intention to use ICT.

Moreover, whenever users perceive that technology is useful for their work and easy to use, they are more likely to adopt and accept it. This confirms Davis'(1989) approach, which states that the probability of individuals adopting a new technology depends on perceived usefulness and perceived ease of use.

So, to adopt ICTs effectively and efficiently, the hotel business needs to incorporate change management into its incentive and motivation techniques. Nevertheless, acceptance is never acquired once and for all; it is a capacity for mastery that is part of a dynamic. It is constantly called into question by evolving work situations, technical devices (control) and the predispositions of the individual himself and his environment (culture). The acceptance process is a multidimensional approach, which means that its analysis in real-life situations requires the integration of various factors and components of the individual's work system.

However, this article does have some limitations, mainly due to the need to replicate this study in order to further increase the external validity of the model.

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