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Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT

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Abstract

The unified theory of acceptance and use of technology (UTAUT), a model of the user acceptance of IT, synthesizes elements from several prevailing user acceptance models. It has been credited with explaining a larger proportion of the variance of 'intention to use' and 'usage behavior' than do preceding models. However, it has not been validated in non-Western cultures. Using a survey sample collected from 722 knowledge workers using desktop computer applications on a voluntary basis in Saudi Arabia, we examined the relative power of a modified version of UTAUT in determining 'intention to use' and 'usage behavior'. We found that the model explained 39.1% of intention to use variance, and 42.1% of usage variance. In addition, drawing on the theory of cultural dimensions, we hypothesized and tested the similarities and differences between the North American and Saudi validations of UTAUT in terms of cultural differences that affected the organizational acceptance of IT in the two societies.

Keywords: Unified theory of acceptance and use of technology (UTAUT); Technology acceptance; IT adoption; Cultural differences; Technology social factors; Saudi Arabia

1. Introduction

In mainstream MIS research, there are many studies that have investigated user acceptance and usage of new IT. Of these many have used TAM [9,10] or made changes to it [4,13]. Other models, such as the theory of planned behavior (TPB) [1,18], and social cognitive theory (SCT) [8] are also well known.

Venkatesh and Davis [26] introduced an extension to TAM, TAM2, which examined the influences of select antecedent *social influence* and *cognitive instrumental* constructs on perceived usefulness and usage intentions. Subsequently, they [27] synthesized the various models into the unified theory of acceptance and use of technology (UTAUT).

However, it has been exclusively validated in the North American contexts. Clearly, in contexts removed from Western nations, the impact of subjective norms on the individual and organizational acceptance of IT could vary markedly. Accordingly, the objectives of our research was to: (1) empirically validate a modified UTAUT model in a non-Western cultural context, specifically Saudi Arabia and (2) explain anomalies between these validations in terms of cultural differences that affect the organizational acceptance of IT. To achieve this second objective, we draw from research on cultural dimensions [14,15] that explain international differences in work-related values.

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2. Theory and background

2.1. Technology acceptance

TAM postulated that two belief constructs, *perceived usefulness* and *perceived ease of use*, accounted for a large proportion of the variance in behavioral intentions and voluntary usage behaviors of new ITs. Empirical validations of TAM have typically accounted for between 15% and 45% of the variance in the 'intention to use' and self-reported 'usage'.

An extension examined the impact of *social influence* and *cognitive instrumental* processes as predictors of the *perceived usefulness* and *behavioral intention to use*. The *subjective norm*, originally developed from the theory of reasoned action (TRA) predicts general behavioral intentions in strictly voluntary contexts; it assumes that people's perception that others important to them think a behavior should or should not be followed has an impact on their actions. Additional models, including the theory of planned behavior (TPB) [11] and the decomposed theory of planned behavior (DTPB) [24], lead to the combined model as illustrated in the UTAUT model of Fig. 1.

UTAUT postulates that four constructs act as determinants of behavioral intentions and usage behavior:

1. *Performance expectancy*: "The degree to which an individual believes that using the system will help him or her attain gains in job performance."
2. *Effort expectancy*: "The degree of ease associated with the use of the system."
3. *Social influence*: "The degree to which an individual perceives that important others believe he or she should use the new system. *Social influence* is system- or application-specific, whereas *subjective norm* relates to non-system-specific behavior."
4. *Facilitating conditions*: "The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system."

In addition, UTAUT also posits the role of four key *moderator* variables: *gender*, *age*, *experience*, and *voluntariness of use*.

2.2. Technology acceptance and culture

The globalization of business has highlighted the need to understand the effectiveness of IS that span different cultures. Multinational and trans-cultural organizations use IT to achieve economies of scale, coordinate operations, and facilitate collaborative work across locations and cultures. Cultural differences have become an important issue in the evaluation of computer applications.

To make valid comparisons, models should be robust across cultures. Therefore, determining whether similar models are comparable across cultures is a first step needed to: (1) enhance understanding of cultural effects of IT acceptance and (2) improve the organizational management of IT globally.

Rose and Straub [20] conducted a study of IT adoption and use in the Arab world. Using a cross-sectional survey of 274 knowledge workers in five Arab nations (Egypt, Jordan, Saudi Arabia, Lebanon, and the Sudan), they applied a modified TAM to assess the diffusion of personal computing. Their model explained 40% of the variance of PC use in these nations. Subsequently, Straub et al. [23] developed a *cultural influence model* and suggested that Arab cultural beliefs were a strong predictor of resistance to IT transfer. Loch et al. [17] applied this model to examine culture-specific enablers and impediments to the adoption and use of the Internet in the Arab world. They showed that both *social norms* and the degree of *technological culturation* can impact the individual and organizational acceptance and use of the Internet.

Different approaches have been used to study the organizational effects of culture; one is to apply a quantitative methodology to identify and measure national cultural dimensions. Such studies include Tiandis's [25] and Hofstede's national cultural dimensions, and social identity theory [21]. Of these, Hofstede's are most commonly used. These facilitate national-level analyses and allow multiple country comparisons. Furthermore, Hofstede's cultural dimensions have been used to explore the impact of cultural differences on technology acceptance [22]. We also drew on Hofstede's dimensions to describe select cultural differences between Saudi Arabia and North American Nations and to discuss cultural implications of IT user acceptance. Hofstede's dimensions are shown in Table 1, which briefly describes his five cultural dimensions.

Table 2 shows country scores of these dimensions for the United States and Saudi Arabia. Thus, Saudi Arabia ranks much higher than the US in *uncertainty avoidance* and *power distance*; approximately the same in *masculinity*; and much lower in *individualism*.

High *uncertainty avoidance* deals with tolerance for uncertainty and ambiguity. It indicates to what extent a person feels uncomfortable in unstructured situations.

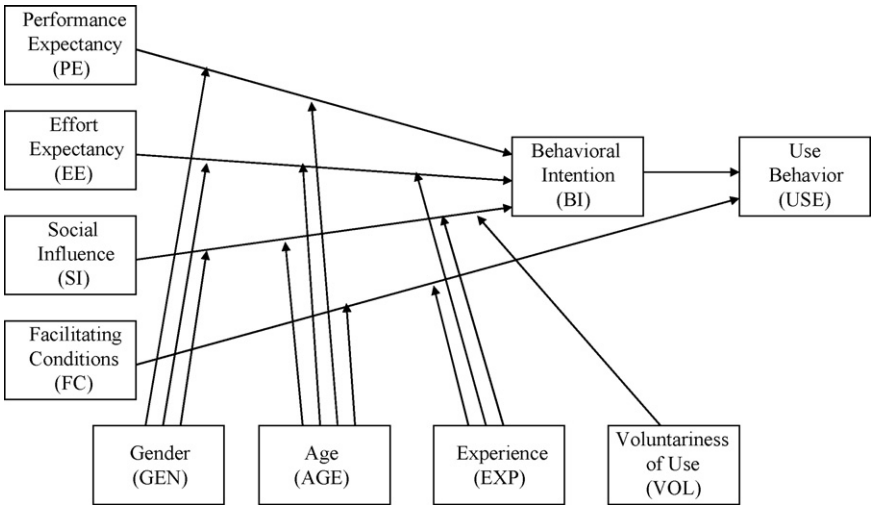

Fig. 1. Unified theory of acceptance and use of technology.

High *power distance* refers to the propensity to defer to authority, and conform to the expectations of others in superior social roles. *Masculinity* focuses on the extent to which a society stresses achievement versus caring and nurturing behaviors, and low *individualism* refers to the extent to which individuals are integrated into cohesive in-groups and value the protection it provides.

2.3. Research model and hypotheses

The model for our study is presented as Fig. 2. It was derived from UTAUT, but was modified. First, as we examined the factors that promoted the use of computers only *on a voluntary basis*, we eliminated *voluntary use* as a moderating construct. And second, we substituted *subjective norm* for *social influence*; our target behavior related to the use of desktop computers in general, and not to any application or system. Two of our four usage measures explicitly related to computer usage in many different computer applications and with respect to performing a variety of tasks. Thus, we used the more general subjective norm construct.

We analyzed all of the path linkages in our research model (Fig. 2), including all direct and moderating (or interacting) effects, forming specific hypotheses for every path *except* for that from behavioral intention to use behavior. The theoretical basis for the research model is UTAUT, which is assumed to justify the indicated path linkages. However, we assumed a number of specific effects inherent that we expected to arise from cultural differences. Since the score for long-term orientation dimension (sometimes termed a

Table 1
Measures of cultural dimensions

Hofstede's dimension	Definition
Uncertainty avoidance (UA)	Focuses on the level of tolerance for uncertainty and ambiguity within the society. High UA indicates a structured, rule-oriented society that institutes rules, regulations, and controls in order to reduce the amount of uncertainty
Power distance (PD)	Focuses on the degree of equality, or inequality, between people in the country's society. High PD indicates that inequalities of power and wealth are accepted practices and have been allowed to grow
Masculinity (MAS)	Masculinity measures the degree to which "masculine" values like assertiveness, performance, success and competition prevail over "feminine" values like the quality of life, maintaining warm personal relationships, service, caring, and solidarity
Individualism (IDV)	Focuses on the degree the society reinforces individual or collective achievement and interpersonal relationships. Low IDV typifies societies of a more collectivist nature with close ties between individuals. These cultures reinforce collectives where everyone takes responsibility for fellow members of their group
Long-term orientation or confucian dynamism (LTO)	Cultures typified by a long-term orientation are oriented towards future rewards, in particular perseverance and thrift, while a short-term orientation is characterized by values relating to both the past and present, in particular, the respect for tradition, preservation of "face" and the fulfillment of social obligations

Table 2
Hofstede country scores for the USA and Saudi Arabia

Cultural dimension	United States	Saudi Arabia
Uncertainty avoidance	46	68
Power distance	40	80
Masculinity	62	52
Individualism	91	38
Long-term orientation	29	N/A

Confucian effect) is not available for Saudi Arabia, we only drew on the remaining four dimensions.

There are rigid boundaries in social roles and expectations for women compared to men in Saudi Arabia and thus there are far fewer women in professional knowledge worker roles. Accordingly, we expected that women in Saudi Arabia would be less inclined than men to expect that the use of computers would enhance their job performances and thus advance their professional careers. Additionally, the majority of the Saudi workforce is young, under the age of 40 [2], and well educated. Consequently, we hypothesized:

- ***H1***: *Performance expectancy will have a positive influence on behavioral intentions to use computers.*
- ***H1a***: *Gender will positively moderate the influence of performance expectancy on behavioral intentions to use computers for men.*
- ***H1b***: *Age will not moderate the influence of performance expectancy on behavioral intentions to use computers.*

Again, we expected a positive influence of *effort expectancy* on *behavioral intentions* to use computers. There is no reason to suspect that the effect of the "degree of ease associated with the use of the system" should be influenced by Hofstede's cultural measures. In Saudi Arabia, increased levels of ease of using computers should be associated with increased behavioral intentions to use them. Furthermore, we hypothesized that men would be more inclined than women to associate an increased ease of use with increased intentions to use computers. Furthermore, we expected no interaction of age with this relationship. However, more experienced users would tend to be less influenced by the ease of using computers. Thus we hypothesized:

- ***H2***: *Effort expectancy will have a positive influence on behavioral intentions to use computers.*
- ***H2a***: *Gender will positively moderate the influence of effort expectancy on behavioral intentions to use computers for men.*
- ***H2b***: *Age will not moderate the influence of effort expectancy on behavioral intentions to use computers.*
- ***H2c***: *Experience will negatively moderate the influence of effort expectancy on behavioral intentions to use computers for men.*

In cultures characterized by high *power distance*, individuals will acquiesce to the expectations of others who are seen as important or influential. Consequently, in an Arabic culture, employees should exhibit a stronger association between social influence variables and *behavioral intention*, than, for example, in the US. Furthermore, the low individualism score for Saudi Arabia is characteristic of a culture that values collective achievements and interpersonal relationships. A high regard for groups suggests that the opinions of others would impact an individual's behavioral inten-

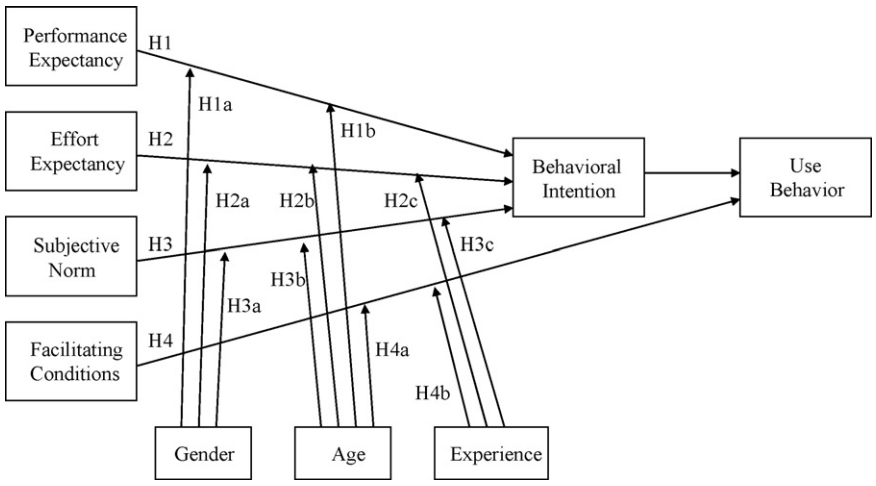

Fig. 2. Research model.

tions. Consequently, the collective opinions of others would strongly influence individual behavioral intentions and result in a positive relationship between subjective norm and behavioral influence.

In addition, younger people tend to occupy subordinate roles and thus are likely to be influenced by the subjective norm in a culture characterized by high power distance. Consequently, we hypothesized:

- ***H3***: *Subjective norm will have a positive influence on behavioral intentions to use computers.*
- ***H3a***: *Gender will positively moderate the influence of subjective norm on behavioral intentions to use computers for men.*
- ***H3b***: *Age will negatively moderate the influence of subjective norm on behavioral intentions to use computers.*
- ***H3c***: *Experience will negatively moderate the influence of subjective norm on behavioral intentions to use computers.*

In terms of UTAUT, we argued that the relationships between *facilitating conditions* and *use behavior* should be strong for cultures that score high on *uncertainty avoidance*. We reasoned that increasing levels of *facilitating conditions* should serve to reduce uncomforting levels of uncertainty or ambiguity with computers. Therefore, we expected that a direct relationship between *facilitating conditions* and *use behavior* would hold true in Saudi Arabia. Additionally, we reasoned that age and experience should negatively interact with the influence of facilitating conditions on computer usage. Specifically, we speculated that increasing levels of age and experience would mute the dependence on a facilitating infrastructure to utilize computers. Consequently, we hypothesized:

- ***H4***: *Facilitating conditions will have a positive influence on computer usage behavior.*
- ***H4a***: *Age will negatively moderate the influence of facilitating conditions on computer usage behavior.*
- ***H4b***: *Experience will negatively moderate the influence of facilitating conditions on computer usage behavior.*

3. Method

The data used in our study were part of the material collected in a project financed by the Saudi government to build a comprehensive model of the antecedents and of the mediating, moderating, and outcome factors, that affect the acceptance and use of computers by knowledge workers in Saudi Arabia. A list of the major companies in the four main provinces of Saudi Arabia was compiled with the assistance of the chambers of commerce in each region. The general managers of these organizations were asked to allow participation of knowledge workers from their organization. Those that agreed to participate were asked to nominate a contact person to help the researchers distribute and collect the survey instruments. The organizations participating included banking, merchandising, manufacturing, and petroleum industries.

A total of 1190 usable survey responses were collected. Of these, 468 responders indicated that their use of computers was mandatory. The remaining 722 survey responders indicated volitional use of computers. These responses constituted our survey sample.

All survey items, originally published in English, as discussed later, were converted into Arabic using Brislin's [3] back translation method. The items were translated between English and Arabic by several bilingual professors and repeated until both versions converged.

Table 3 shows the items used to estimate the Saudi predictor latent constructs. A seven point Likert scale with anchors of *strongly disagree* to *strongly agree* was

Table 3
Saudi predictor latent construct items

Performance expectancy (PE)
PE1: I find computers useful in my job
PE2: Using computers in my job enables me to accomplish tasks more quickly
PE3: Using computers in my job increases my productivity
PE4: Using computers enhances my effectiveness on the job
Effort expectancy (EE)
EE1: My interactions with computers are clear and understandable
EE2: It is easy for me to become skillful using computers
EE3: I find computers easy to use
EE4: Learning to use computers is easy for me
Subjective norm (SN)
SN1: Most people who are important to me think I should use computers
SN2: Most people who are important to me would want me to use computers
SN3: People whose opinions I value would prefer me to use computers
Facilitating conditions (FC)
FC1: I have the resources and the knowledge and the ability to make use of the computer
FC2: A central support was available to help with computer problems
FC3: Management provided most of the necessary help and resources for computing

used to measure each item. The *performance expectancy* and *effort expectancy* constructs were items used by Venkatesh et al. with the references to ''the system'' changed to ''computers.'' The *subjective norm* items originated from TRA/TPB. *Facilitating conditions*, defined by Venkatesh et al. as: ''the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system,'' included references to having resources, knowledge, and technical and management support to use computers.

Table 4 gives the Saudi items used to measure the moderator variables. Similar to Venkatesh et al., we used a binary dummy variable, 0 for female, and 1 for male, to indicate *gender*. There was an imbalance of male gender representation (82% of responses), but this was inevitable due to the cultural preponderance of working males in Saudi Arabia. As indicated, we measured *age* using five ordinal categories in response to the question: ''For how many years have you been using computers?''

Table 5 indicates the items used to estimate the Saudi predicted latent constructs, *behavioral intention* and *use behavior*. For *behavioral intention*, we chose items that reflected an individual's self-assessment of his (or her) likelihood to continue to use computers for an indefinite period. Our measure differs from other measures in the literature that have used time-specific measures. We wanted to capture a self-assessment of likely continuing computer usage.

We used a multi-item, self-reported latent usage construct to provide four dimensions of computer usage: (1) amount of time spent using computers per day; (2) frequency of using computers; (3) number of different software applications used; and (4) number of different business tasks supported through computer use. These four items had been used in a study [16] investigating the acceptance of desktop computing by 358 users in small private firms in New Zealand.

Table 4
Saudi moderating (interacting) variables

Gender	Male (82%) or female (18%)
Age	(1) Less than 20 years (1%); (2) 20–30 years (35%); (3) 31–40 years (43%); (4) 41–50 years (19%); and (5) above 50 years (2%)
Experience	For how many years have you been using computers? (1) Less than a year (8%); (2) 1–3 years (25%); (3) 4–7 years (30%); (4) 8–10 years (13%); (5) more than 10 years (24%)

Table 5
Saudi predicted latent construct items

Behavioral intention (BI)
- BI1: I predict I will continue to use computers on a regular basis (seven-point Likert scale anchored with strongly disagree to strongly agree)
- BI2: What are the chances in 100 that you will continue as a computer user? (1) Zero; (2) 1–10%; (3) 11–30%; (4) 31–50%; (5) 51–70%; (6) 71–90%; or (7) more than 90%
- BI3: To do my work, I would use computers rather than any other means available (seven-point Likert scale anchored with strongly disagree to strongly agree)

Use behavior (USE)
- USE1: On an average working day, how much time do you spend using computers? (1) Almost never; (2) less than 30 min; (3) from 30 min to 1 h; (4) from 1 to 2 h; (5) from 2 to 3 h; and (6) more than 3 h
- USE2: On average, how frequently do you use computers? (1) Less than once a month; (2) once a month; (3) a few times a month; (4) a few times a week; (5) about once a day; and (6) several times a day
- USE3: How many different computer applications have you worked with or used in your job? (1) None; (2) one; (3) two; (4) three to five applications; (5) six to ten applications; and (6) more than 10 applications
- USE4: According to your job requirements, please indicate each task you use computers to perform (count of all that apply)? (1) Letters and memos; (2) producing reports; (3) data storage and retrieval; (4) making decisions; (5) analyzing trends; (6) planning and forecasting; (7) analyzing problems and alternatives; (8) budgeting; (9) controlling and guiding activities; (10) electronic communications with others; and (11) others (please indicate)

4. Results

The research model of Fig. 2 was analyzed using PLS-Graph (build 1126), a PLS structural equation modeling tool [5]. It assesses the psychometric properties of the *measurement model*, and estimates the parameters of the *structural model*. This tool enables the simultaneous analysis of up to 200 indicator variables, allowing the examination of extensive interactions among moderator and latent predictor variable indicators.

4.1. The measurement model

Reliability results are given in Table 6. The data indicates that the measures are robust in terms of their internal consistency reliability as indexed by the composite reliability. The composite reliabilities of the different measures range from 0.76 to 0.95, which exceed the recommended threshold value of 0.70 [19]. In addition, consistent with the guidelines of Fornell and

Table 6
Assessment of the measurement model

Variable constructs	The composite reliability (internal consistency reliability)	Average variance extracted/explained
Performance expectancy	0.90	0.70
Effort expectancy	0.90	0.70
Subjective norm	0.95	0.87
Facilitating conditions	0.77	0.53
Behavioral intention	0.76	0.52
Use behavior	0.85	0.58

Larcker [12], the average variance extracted (AVE) for each measure exceeded 0.50. Table 7 reports the results of testing the discriminant validity of the measure scales. The elements in the matrix diagonals, representing the square roots of the AVEs, are greater in all cases than the off-diagonal elements in their corresponding row and column, supporting the discriminant validity of our scales.

We tested convergent validity using PLS-Graph by extracting the factor and cross loadings of all indicator items to their respective latent constructs. These results, presented in Table 8, indicated that all items loaded: on their respective construct from a lower bound of 0.70 to an upper bound of 0.95; and more highly on their respective construct than on any other. Furthermore, each item's factor loading on its respective construct was highly significant ($p < 0.0001$) as indicated by the *T*-statistics of the outer model loadings in the PLS-Graph output. These values ranged from a low of 16 to a high value of 121. The constructs' items' loadings and cross loadings presented in Table 8, and the highly significant *T*-statistic for each individual item loading

Table 7
Discriminant validity (intercorrelations) of variable constructs

Latent variables	1	2	3	4	5	6
1. Performance expectancy	**0.84**					
2. Effort expectancy	0.43	**0.84**				
3. Subjective norm	0.32	0.24	**0.93**			
4. Facilitating conditions	0.32	0.48	0.24	**0.73**		
5. Behavioral intention	0.43	0.50	0.36	0.47	**0.72**	
6. Use behavior	0.20	0.29	0.04	0.38	0.47	**0.76**

Table 8
Factor loadings (bolded) and cross loadings

	Performance expectancy	Effort expectancy	Subjective norm	Facilitating conditions	Behavioral intention	Use behavior
PE1	**0.79**	0.39	0.24	0.25	0.32	0.14
PE2	**0.88**	0.32	0.28	0.25	0.37	0.15
PE3	**0.89**	0.37	0.31	0.28	0.39	0.18
PE4	**0.77**	0.36	0.25	0.28	0.37	0.20
EE1	0.34	**0.84**	0.17	0.40	0.43	0.18
EE2	0.39	**0.82**	0.22	0.44	0.47	0.34
EE3	0.33	**0.83**	0.22	0.37	0.39	0.25
EE4	0.37	**0.85**	0.19	0.39	0.39	0.21
SN1	0.30	0.26	**0.94**	0.24	0.34	0.05
SN2	0.29	0.19	**0.95**	0.24	0.32	0.05
SN3	0.31	0.22	**0.92**	0.18	0.36	0.01
FC1	0.29	0.44	0.19	**0.74**	0.45	0.34
FC2	0.20	0.19	0.13	**0.72**	0.27	0.21
FC3	0.19	0.20	0.19	**0.72**	0.24	0.23
BI1	0.32	0.34	0.34	0.34	**0.73**	0.23
BI2	0.17	0.28	0.12	0.31	**0.70**	0.45
BI3	0.45	0.46	0.34	0.37	**0.72**	0.22
USE1	0.13	0.23	0.07	0.27	0.41	**0.79**
USE2	0.15	0.22	0.06	0.26	0.35	**0.76**
USE3	0.15	0.26	0.00	0.31	0.36	**0.80**
USE4	0.19	0.20	−0.02	0.31	0.32	**0.71**

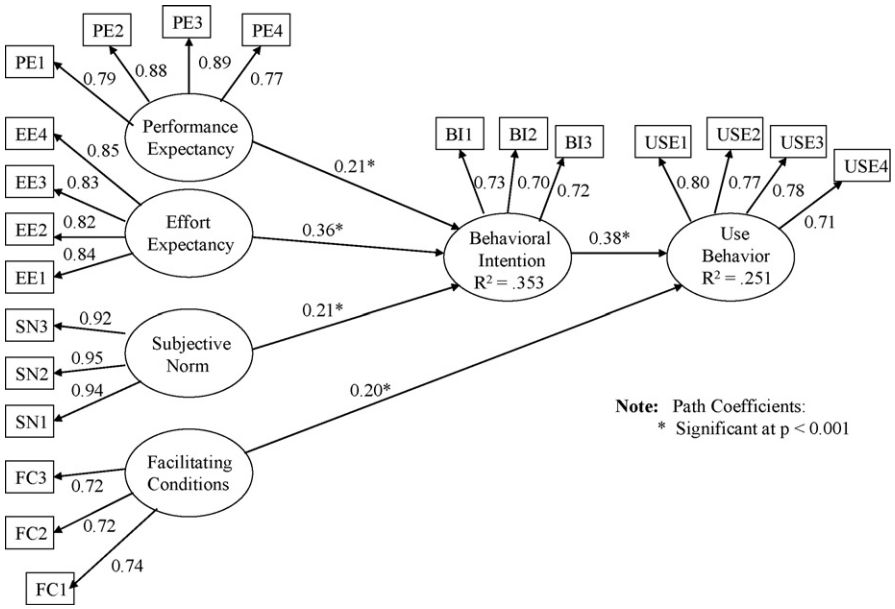

Fig. 3. Structural model results (without interacting variables).

both confirm the convergent validity of these indicators as representing distinct latent constructs.

4.2. The structural model

Fig. 3 shows the structural model results *omitting the influence of the interacting moderator variables*. All beta path coefficients are positive (i.e. in the expected direction) and statistically significant (at $p < 0.05$).

To model the interaction effects, we conformed to Chin et al. [6,7]. Interaction terms were formulated by multiplying the corresponding indicators of the predictor and moderator constructs. Furthermore, we followed the hierarchical process that they recommended to construct and compare models *with* and *without* the respective interacting constructs. Fig. 4 shows the results of the structural model with interaction effects. It presents the results of the structural model with moderator variables.

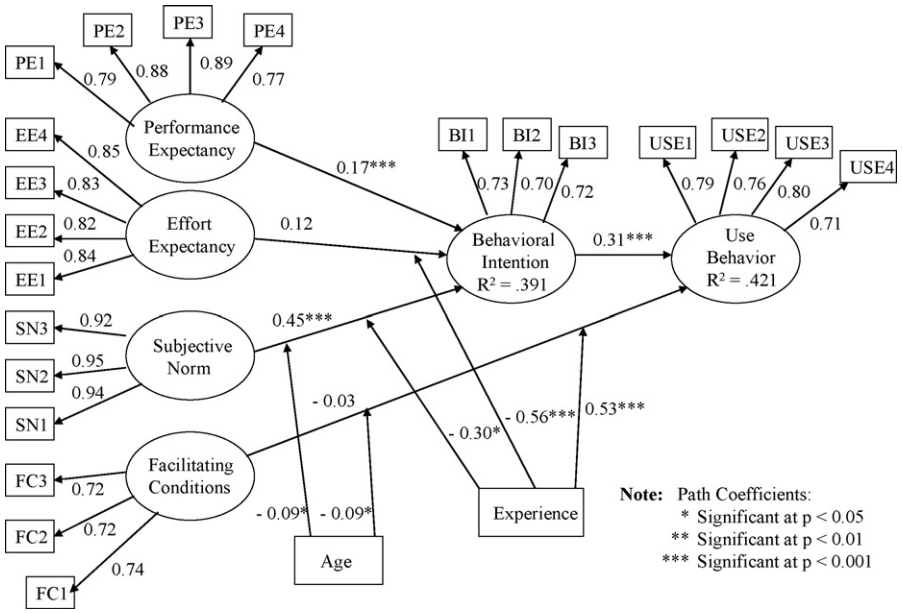

Fig. 4. Structural model results.

For purposes of clarity, only statistically significant moderator variables (e.g. age and experience) were included. The beta values of all path coefficients are also shown. *Performance expectancy* had a positive influence (beta = 0.17, $p < 0.001$) on *intention*. *Effort expectancy* had a non-significant (beta = 0.12) influence on *intention*. *Subjective norm* had a positive influence (beta = 0.45, $p < 0.001$) on *intention*. The weak influence of *facilitating conditions* on *use* (beta = −0.03) was not statistically significant. *Behavioral intention* had a positive influence (beta = 0.31, $p < 0.001$) on *use*.

For the moderator (interacting) variables, statistically significant beta path coefficients were indicated. Surprisingly, *gender* did not exhibit significant interactions with any predictor latent variables. *Age* had a negative (beta = −0.09, $p < 0.05$) interacting effect with *subjective norm* upon *behavioral intention*. *Age* also exhibited a negative (beta = −0.09, $p < 0.05$) interacting effect with *facilitating conditions* on *use*. *Experience* exhibited three interacting effects: a negative (beta = −0.56, $p < 0.001$) interacting effect with *effort expectancy* on *behavioral intention*; a negative (beta = −0.30, $p < 0.05$) interacting effect with *subjective norm* on *behavioral intention*; and a strongly *positive* (beta = 0.53, $p < 0.001$) interacting effect with *facilitating conditions* on *use*.

It is important to note that the strength and direction (i.e. positive or negative) of main path coefficients cannot be adequately interpreted without also considering the influences of interacting variables. However, as a basis of comparison, the (direct only) model explains 35.3% of the variance in *behavioral intention* and 25.1% of the variance in *use behavior*. In contrast, by including the effects of the interacting variables, a larger proportion of the respective variances in *behavioral intention* ($R^2 = 0.391$) and *use* ($R^2 = 0.421$) are accounted for.

5. Discussion

Table 9 presents the hypotheses and outcomes. The 'CONCLUSION' column indicates whether that hypothesis was: (1) supported; (2) refuted; or (3) not

Table 9
Hypotheses conclusions

Hypotheses	Finding	Conclusion	Venkatesh finding
H1: Performance expectancy will have a positive influence on behavioral intentions to use computers	Yes: (beta = 0.17, $p < 0.001$)	Supported	Yes: (beta = 0.18, $p < 0.05$)
H1a: Gender will positively moderate the influence of performance expectancy on behavioral intentions to use computers for men	No: not significant	Not supported	No: not significant
H1b: Age will not moderate the influence of performance expectancy on behavioral intentions to use computers	Yes: not significant	Supported	Yes: not significant
H2: Effort expectancy will have a positive influence on behavioral intentions to use computers	No: (beta = 0.12, n.s.)	Not supported	No: (beta = 0.04, n.s.)
H2a: Gender will positively moderate the influence of effort expectancy on behavioral intentions to use computers for men	No: not significant	Not supported	No: not significant
H2b: Age will not moderate the influence of effort expectancy on behavioral intentions to use computers	Yes: not significant	Supported	Yes: not significant
H2c: Experience will negatively moderate the influence of effort expectancy on behavioral intentions to use computers	Yes: (beta = −0.56, $p < 0.001$)	Supported	No: (beta = 0.02, n.s.)
H3: Subjective norm will have a positive influence on behavioral intentions to use computers	Yes: (beta = 0.45, $p < 0.001$)	Supported	No: (beta = 0.02, n.s.)
H3a: Gender will positively moderate the influence of subjective norm on behavioral intentions to use computers for men	No: not significant	Not supported	No: not significant
H3b: Age will negatively moderate the influence of subjective norm on behavioral intentions to use computers	Yes: (beta = −0.09, $p < 0.05$)	Supported	No: (beta = 0.02, n.s.)
H3c: Experience will negatively moderate the influence of subjective norm on behavioral intentions to use computers	Yes: (beta = −0.30, $p < 0.05$)	Supported	No: (beta = 0.04, n.s.)
H4: Facilitating conditions will have a positive influence on computer usage behavior	No:(beta = −0.03, n.s.)	Not supported	No: (beta = 0.11, n.s.)
H4a: Age will negatively moderate the influence of facilitating conditions on computer usage behavior	Yes: (beta = −0.09, $p < 0.05$)	Supported	No: (beta = 0.02, n.s.)
H4b: Experience will negatively moderate the influence of facilitating conditions on computer usage behavior	No: (beta = 0.53, $p < 0.001$)	Refuted	No: (beta = 0.00, n.s.)

supported. The 'VENKATESH FINDING' column indicates the corresponding relationship presented in the UTAUT study.

5.1. Findings

As suggested by Venkatesh et al., we found that *performance expectancy* had a positive effect on *intention*, but we found no interacting effect *with performance expectancy* and either *gender* or *age* on *intention*.

Also we found that *effort expectancy* did not have a significant effect on *intention* in the presence of interactions with the moderating variables. The negative interaction between *effort expectancy* and *experience* on *intention* indicated that, with increased years of experience with computers, ease of use becomes less important in predicting Saudi's behavioral intentions.

In cultures characterized by a high *power distance* dimension, we argued that individuals would be more inclined to show deference to authority and conform to the expectations of others in important or superior roles. Consequently, we expected that higher *power distance* cultures would exhibit a stronger association between *subjective norm* and *behavioral intention*. We also argued that the low individualism country score for Saudi Arabia might indicate a strong relationship between *subjective norms* and *behavioral intentions* in the Arab world. In Fig. 4, *subjective norm* positively influences *intention*, but negatively interacts with increasing levels of *age* and *experience* on *intention*. These results indicate that, among Saudi users, *subjective norm* positively influences *intention*, but, as expected, this influence is diminished by both increasing *age*, and increasing years of *experience* using computers.

The weak negative effect of *facilitating conditions* on *use* was not significant in the presence of: the negative interacting effect of increasing *age* with *facilitating conditions* on *use*; and the strong positive interacting effect of increasing *experience* with *facilitating conditions* on *use*.

5.2. Limitations

Our study was not longitudinal in design, and did not target intentions and behaviors with respect to application software use. Further, we substituted *subjective norm* for *social influence*. We also hypothesized cultural affects on the basis of Hofstede's cultural dimensions. Although this approach has been proven in general, it would be more informative if measures of cultural-specific work values were collected at the individual level, commensurate with the survey data.

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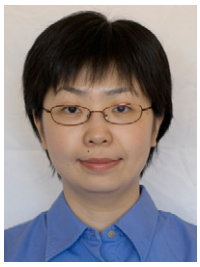

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