



# Internet banking acceptance model: Cross-market examination

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## ABSTRACT

This article proposes a revised technology acceptance model to measure consumers' acceptance of Internet banking, the Internet banking acceptance model (IBAM). Data was collected from 618 university students in the United Kingdom and Saudi Arabia. The results suggest the importance of attitude, such that attitude and behavioral intentions emerge as a single factor, denoted as "attitudinal intentions" (AI). Structural equation modeling confirms the fit of the model, in which perceived usefulness and trust fully mediate the impact of subjective norms and perceived manageability on AI. The invariance analysis demonstrates the psychometric equivalence of the IBAM measurements between the two country groups. At the structural level, the influence of trust and system usefulness on AI varies between the two countries, emphasizing the potential role of cultures in IS adoption. The IBAM is robust and parsimonious, explaining over 80% of AI.

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## 1. Introduction

The importance of loyal customers to business survival represents a well-known truism. The Internet has expanded horizons for businesses worldwide, especially e-services. Because of the intangible, informative nature of banking, banks are efficient users of online technology. Banks strive to understand customers' e-behaviors worldwide, though much research focuses on industrialized countries, such as the United Kingdom (UK) and United States. The behaviors of consumers in many other countries, even those with massive economies, such as Saudi Arabia, the world's top oil exporter with the 25th ranking in terms of gross domestic product, remain uncertain, especially online.

According to APACS – the UK payment association – online banking in the UK has increased by 174% from 6.2 million customers in 2001 to 17.0 million in 2006. Similarly, the number of adults shopping online has more than increased by 157% in the same period, from 11 million in 2001 to over 28 million in 2006. This rapid increase in e-shopping generally and e-banking specifically emphasizes the need for research into models of e-customer behavior. Moreover, increasing globalization demands more insight into customers' technology acceptance behaviors in other, particularly less-developed, cultures (Straub et al., 1997).

Attempts to model e-commerce adoption often utilize behavioral models, such as the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), but few studies consider customer acceptance of

Internet banking (e.g., Yiu et al., 2007) and even fewer assess models cross-market (e.g., Pavlou and Chai, 2002). Proponents of Fishbein and Ajzen's (1975) theory of reasoned action (TRA) and its derivatives (e.g. Sutton, 1998), TAM and the theory of planned behavior (TPB) (Ajzen 1991), acknowledge limitations, resulting in proliferation of explanatory variables (e.g., Richard, 2005; Moon and Kim, 2001; Lai and Li, 2005). This paper introduces a parsimonious behavioral model aimed at predicting and explaining Internet banking behaviors in global settings: the Internet banking acceptance model (IBAM).

The paper is structured as follows. The next section provides an overview of TAM, TPB, and trust, and reasons for integrating them to produce IBAM. After proposing the research framework, the article describes the methods employed. The next section includes research results, analysis and discussion. The final section contains the conclusions, limitations and recommendations for further research and managerial implications.

## 2. Literature review

### 2.1. Technology acceptance model

User acceptance remains a barrier to the success of new information technologies (IT). In an attempt to explain this, Davis (1989) introduced TAM as an extension of TRA (Fishbein and Ajzen, 1975), based on the attitude-behavior paradigm from cognitive psychology. Davis (1989) argues that people adopt an application primarily because of the functions it performs and secondarily because of the ease or difficulty associated with making the system perform these functions. The model provides a basis for tracking the impact of external factors on internal beliefs, attitude, and behavior (Davis et al., 1989).

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TAM assumes that behavior – “the manifest, observable response in a given situation” (Ajzen, 2006) – is volitional. Behavioral intention indicates a person’s readiness to perform the given behavior (Ajzen, 2006), which makes it the main predictor of the actual behavior. In TAM, intention is a function of attitude and perceived usefulness (PU). Attitude is “the degree of evaluative affect that an individual associates with using the target system” (Davis, 1993, p. 476). It represents what a person feels about a concept, which may be any entity about which persons can think and attach feeling (East, 1997). Thus, attitude plays an important role in the decision to adopt a new computer technology (e.g., Davis et al., 1989; O’Cass and Fenech, 2003). Ajzen and Fishbein (1980) define attitude as (1) attitude toward objects, i.e. evaluation of a specified object, and (2) attitude toward action (behavior), or evaluation of a specified behavior. Little evidence supports the idea that attitude toward objects stimulates action (Bagozzi et al., 1992). Previous IS research tends to treat attitude as a fragile and vague variable, although psychology research consistently recognizes its importance for individual behavior and social influence (e.g., Olson and Zanna, 1993).

In the technology acceptance domain, some researchers emphasize the relationship between attitude and intentions (e.g., Hausman and Siekpe, 2008), whereas others argue its unimportance (e.g., Venkatesh et al., 2003), suggesting that IS usage decisions might be dominated by cognitive beliefs, such as perceived usefulness, rather than affect, such as attitude. Yang and Yoo (2004) argue that researchers fail to distinguish between the two types of attitudes, where the potentially significant influence of cognition attitude gets offset by the insignificant influence of affect attitude.

The originality of the TAM derives from two related beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), which generalize across different settings. TAM assumes that users engage in behaviors because they have evaluated the benefits and expect certain results (Dishaw and Strong, 1999). Snij et al. (2004) find that users do not use a system for its own sake but instead use it because of its attributes that drive value, according to the utility provided by the combination of attributes, less the disutility represented by any sacrifices required to use the system.

As the ability of Internet users to find their way around a site and keep track of where they are (Richard and Chandra, 2005), PEOU affects attitude either directly or indirectly through its effect on PU: “even if potential users believe that a given application is useful, they may at the same time believe that the systems are too hard to use and that performance benefits of usage are outweighed by the effort of using the application” (Davis 1989, p. 320). Both PEOU and PU are influenced by external stimuli, such as information richness, web quality, and experience.

## 2.2. Theory of planned behavior

Theory of reasoned actions is ill-equipped to predict situations where people possess low volitional control. In the TPB, Ajzen (1991) incorporates perceived behavioral control (PBC) as an antecedent of behavioral intentions to overcome this limitation. Therefore, in the TPB, a person’s performance of certain behavior depends on his or her intention toward that behavior; intention in turn relies on attitudes, subjective norms (SN), and PBC. Ajzen (2006) defines PBC as “people’s perceptions of their ability to perform a given behavior”, and empirical evidence suggests that it improves predictions of intentions (Ajzen, 1991). Subjective norms (SN) refer to perceived pressures to perform a behavior, according to what others say or do is important (Fishbein and Ajzen, 1975). E-commerce acceptance research suggests mixed results regarding this variable; some researchers find that SN has no significant influence on intentions (e.g., Shim et al., 2001; Shih and Fang, 2004), whereas others reveal a significant relationship (Taylor and Todd, 1995). Vijayasarathy (2000) suggests that perceptions of relevant others may differ according to the type of behavior,

and similarly, Hartwick and Barki (1994) show that SN has a significant effect on intentions for mandatory system usage but not when usage is voluntary. Davis et al. (1989) fail to find a significant relationship between SN and intentions. Scholars tackle the confusion from different angles: Venkatesh and Davis (2000) discuss compliance; Moore and Benbasat (1991) raise issues of image and social influence; Hartwick and Barki (1994) and Taylor and Todd (1995) argue that system experience decreases the direct effect of SN on intentions; and Courneya et al. (2000) propose substituting SN with social support. Despite these efforts, ambiguity still surrounds the SN construct.

## 2.3. Trust

Trust is at the heart of all kinds of relationships (Morgan and Hunt, 1994). Definitions and conceptualization vary with disciplines, such that psychologists view trust as a personal trait, sociologists consider it a social construct, and economists see it as an economic choice mechanism (McKnight and Chervany, 2002). In the social psychology realm, Rousseau et al. (1998, p. 394) define trust as “perceptions about others’ attributes and a related willingness to become vulnerable to others.” In this sense, consumers might not use e-commerce because they lack trust in Internet businesses (Grewal et al., 2004). With greater trust, people can resolve their uncertainty regarding the motives, intentions, and prospective actions of others on whom they depend (Kramer, 1999), as well as save money and effort, because trust reduces monitoring and legal contract costs (Fortin et al., 2002). The lack of trust in online transactions and Web vendors thus represents an important obstacle to the market penetration of e-channels (Liu et al., 2004). Moreover, recent research indicates that trust has a critical influence on users’ willingness to engage in online exchanges of money and sensitive personal information (Friedman et al., 2000).

## 2.4. Proposed model and hypotheses development

One criticism notes the relatively few investigations that target factors that affect PU and PEOU (Gefen and Keil, 1998). Previous empirical research suggests that PU and PEOU might not be the only beliefs that mediate the impact of the external environment on attitude and intentions. For example, Davis (1993) finds a small but significant direct influence of system characteristics on attitude toward the use of a system. Additionally, recent research has established that PEOU has no direct effect on attitude (Gefen and Straub, 2000; Ha and Stoel, 2008). Accordingly, it seems illogical to assume that PU is the only determinant and ultimate mediator of all external environmental effects on attitude and intentions. Friedman et al. (2000) argue that beliefs about an e-vendor, in addition to technology perceptions, represent a determinant of e-commerce usage. Several studies also propose integrated models based on TAM that are partially modified to fit the study context and therefore demonstrate better predictive power regarding customers’ acceptance of e-commerce (e.g. Lin, 2007). As an extension of previous research, this study introduces the Internet banking acceptance model (IBAM) (Fig. 1).

Attitudinal intentions (AI): Several studies drop attitude because of its partial mediation of the relationship between beliefs and intentions, whereas it is assumed that beliefs are better predictors of intentions. Ironically, attitude serves as a predictor of actual behavior in many other studies (e.g. Bajaj and Nidumolu, 1998; O’Cass and Fenech, 2003) and an extensive body of literature demonstrates the importance of attitude on behaviors (e.g., Ajzen and Fishbein, 1980; Dick and Basu, 1994). Cao and Mokhtarian (2005) consider that the collective empirical evidence highlights the importance of customers’ attitude, because attitudinal factors explain most of the variation in e-behavior. On the other hand, in previous literature, behavioral

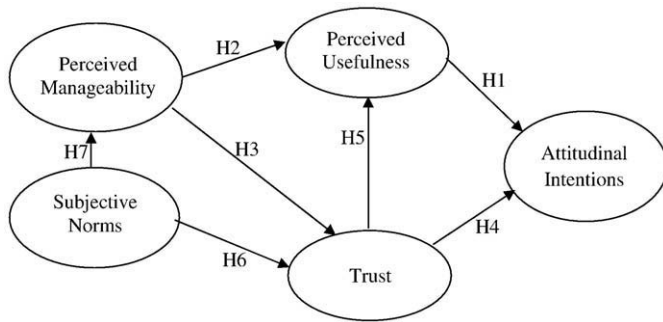


Fig. 1. Internet banking acceptance model – IBAM.

intentions do not always correlate well with actual behavior, often due to a lack of control, such as insufficient resources or knowledge. Moreover, stated intentions may contrast with true intentions as a result of social desirability bias or consistency bias (Cao and Mokhtarian 2005).

Attitude resides in the mind, precedes and produces behavior and thus can be used to predict behavior (Yang and Yoo, 2004). Also it reflects people's predisposition to respond either favorably or unfavorably to a particular behavior, which may minimize social desirability bias. And because Internet banking increases banking customers' choice set, the impact of relative attitude should become more important in predicting consumer behavior. Cao and Mokhtarian (2005) suggest that there are several dimensions related to e-behavior intentions and attitude, which they measure individually and then integrate into a scalar attitudinal or intention measure, generally through exploratory factor analysis.

In summary, attitude should predict actual behavior, just as intentions do, but attitude avoids the bias that often marks measures of intentions. In a voluntary utilitarian context such as Internet banking, it seems almost impossible that attitude would contrast with intentions. Moreover, if attitude were dropped because of its partial mediation, then intentions also should be dropped from behavioral models, because previous research demonstrates that some beliefs affect behavior directly, beyond intentions, such as facilitating conditions (Venkatesh et al., 2003). Ajzen and Fishbein (1980) also argue that intentions are similar to behavior, consisting of action, target, context, and time elements; researchers often fail to include all these criteria in their intention measurements. Eliminating attitude from behavioral models thus neglects an entire body of research and represents a step backward. Based on these arguments, this article proposes an aggregate construct, attitudinal intentions (AI) as the dependent variable, which is analogous to attitudinal loyalty, or repeat purchasing behavior that reflects a conscious decision to continue purchasing a service or product (Beerli et al., 2004). It contrasts with behavioral loyalty, which results from using a service or brand merely because of habit.

Perceived usefulness: beliefs are meaningful variables in their own right and function as behavioral variables, not surrogate measures of objective phenomena (Davis, 1989). Thus, people form intentions about behaviors that they believe will increase their performance, beyond any positive or negative feelings that they may sense toward the behavior per se (Davis et al., 1989). Previous literature demonstrated PU to have large effects on attitude and intentions of technology use (e.g. Davis, 1989; Davis et al., 1989; Lin and Lu, 2000; Gefen et al., 2003; Fusilier and Durlabhji, 2005). Thus:

**H1.** Perceived usefulness has a positive effect on users' attitudinal intentions toward Internet banking adoption.

Despite the distinction in previous studies between PEOU and PBC for predicting customers' e-behavior (e.g., Venkatesh et al., 2003; Lin,

2007), conceptually they measure the same phenomenon – in different domains. TPB views PBC as a means of control over behaviors that are difficult to execute and may limit the volitional control. Ajzen (2002) points out that PBC is not original to TPB but reflects Bandura's (1977; 1982) concept of self-efficacy that was adopted by Davis (1989) as PEOU.

The vexing problems of the nature and measurement of control over behavior remain ambiguous, not only because of the difficulty in measuring PBC but also the lack of impact of PEOU on behavior reported in many studies. Therefore, IBAM proposes PBC (measured by self-efficacy and controllability; Ajzen, 2002) and PEOU as a single aggregate factor measuring users' perceptions of the internal and external barriers to using the Internet banking system.

Recent IS acceptance studies reveal that the influence of PEOU on attitude and intentions remains speculative and suggest that PEOU operates mainly through PU (e.g. Gefen and Straub, 2000; Ha and Stoel, 2008). Accordingly, PMNG should operate through PU in IBAM. In addition, Gefen et al. (2003) find that PEOU affects trust significantly. Therefore:

**H2.** Perceived manageability has a positive effect on users' perceived usefulness.

**H3.** Perceived manageability has a positive effect on users' trust.

Many scholars emphasize the importance of trust in e-commerce acceptance. Gefen et al. (2003) argue that a model of technology acceptance that features more social dimensions must include trust, especially when the relations involve social uncertainty and risk, as in Internet banking. Page and Luding (2003) consider that trust issues are crucial drivers of Internet banking adoption, and McKnight et al. (1998) integrate trust into TRA as a belief that influences intention to engage in behavior related to a specific e-vendor. Trust is implicit to customer intentions (Stewart 2003), and because it reduces social complexity, trust enables customers to rule out undesirable yet possible behaviors by the bank. Stewart (2003) also argues that at higher levels of trust, customers perceive a Web site as more useful. Usefulness refers to both technical and non-technical characteristics, though trust predominantly relates to the latter. Finally, Pavlou (2003) reports that trust influences intentions through positive attitudes. Therefore:

**H4.** Trust has a positive effect on users' attitudinal intentions toward Internet banking adoption.

**H5.** Trust has a positive effect on users' perceived usefulness.

In the technology acceptance context, Davis et al. (1989) acknowledge the need for additional research to investigate the impact of social influences on usage. Some studies find no direct influence of SN on intentions (e.g. Shih and Fang, 2004). Fishbein and Ajzen (1975) argue that attitude and SN are mostly consistent but sometimes may not be in agreement. Ajzen and Fishbein (1980) suggest two approaches to treating the inconsistent influence of intentions' determinants: the "other variables approach" and the "moderating approach". The other variables approach views SN – or attitude – as only one of a number of factors that influences behavior, such that others must also be taken into account, for instance personality and social abilities. However, this suggestion lacks a systematic procedure for deciding which of many possible variables might be relevant to a given behavior (Wicker, 1969 cited by Ajzen and Fishbein, 1980). On the other hand, the moderating approach would suggest that the relationship between SN and behavior is moderated by other variables such as experience, although empirical evidence to support this contention is lacking in the technology acceptance context. Rather, Venkatesh and Davis (2000) provide empirical support for a "mediating approach", concluding that the



influence of SN will be fully mediated by other beliefs such as PU. In the Internet banking acceptance context, usage is voluntary and we argue that, because SN is a social force, it is more likely to act through a social belief: trust, rather than techno belief: PU. Finally, we argue that important others influence customers' perceptions about the targeted systems manageability ("I will give it a try if my significant other says that it is easy to do"). This leads to:

**H6.** Subjective norms have a positive effect on users' trust.

**H7.** Subjective norms have a positive effect on users' perceived manageability.

### 3. Method

The overwhelming majority of technology use research focuses on users in industrialized countries. Less industrialized countries have much to gain from the Internet and IS research, but they have received little research attention (Fusilier and Durlabhji, 2005). This represents a serious research gap as consumer responses have been demonstrated to vary between cultures (Davis et al., 2008). Veiga et al. (2001) identify the important influence of culture on technology use and acceptance, and Moon and Kim (2001) suggest the need for more research pertaining to the application of TAMs in non-Western and less developed countries. Moreover, integrated models rarely appear in cross-market studies related to non-western cultures.

The profile of students is closer to that of the online customer population than is the profile of the population generally. Additionally, King and He (2006) confirmed by meta-analysis the value of using students as surrogates for professionals in TAM studies. Accordingly, paper questionnaires were distributed to students in two academic institutions in capital cities, one in the United Kingdom (UK) and one in the Kingdom of Saudi Arabia (KSA). The 955 questionnaires distributed almost equally across both countries produced 618 returned completed questionnaires, including 232 valid questionnaires and a response rate of 49% from the UK; and 386 valid questionnaires and a response rate of 82% from the KSA (non-response in this collection method taking the form of questionnaires returned incomplete). The KSA sample consisted of 42.5% females and 57.5% males; 13.5% were under 20 years old, 83.2% between 20 and 30, and 3.4% more than 30 years old with a mean Internet experience of 3.25 years. The UK sample included 43.9% females and 56.1% males; 44.5% were under 20 years old, 53% between 20 and 30 years, and 2.5% were above 30 years old with an average of 4.3 years of Internet experience. Notwithstanding that both groups had high response rates, because of the lower response rate for the UK sample, thirty-six incomplete UK questionnaires were compared to the valid ones. The demographics of the incomplete questionnaires respondents were: 4.23 average years of Internet experience; 58% males and 42% females; 44% less than 20 years old and 52.7% between 20 and 30. These percentages are very similar to the UK respondents' group demographics, suggesting that the UK non-responders and responders may be considered as a homogeneous group, allaying concerns of non-response bias.

The IBAM measures, mainly adapted from prior research, contained modifications where needed to fit the Internet banking context and utilized seven-point Likert scale measurements, ranging from "strongly disagree" to "strongly agree" and "completely unimportant" to "completely important." Intention was adopted from Venkatesh and Davis (2000), attitude from Suh and Han (2002), PU and PEOU from Wang et al. (2003), SN from Shih and Fang (2004), SE and CTRL from Pavlou and Fygenonson (2006) and Trust beliefs from McKnight et al. (2002). Space limitations preclude listing the questionnaire items here but they are available on request from the authors. The Arabic questionnaire employed Brislin's (1986) back translation

method, iterated twice. Before the actual data collection, pilot studies were conducted in both countries, leading to minor modifications.

### 4. Analysis

Cronbach's alphas (Table 1) are above 0.6 (Bagozzi and Yi 1988). From principle component analysis (PCA), (SPSS 15.0), KMOs exceed 0.84 (Kaiser 1974). The average communality for KSA is 0.63 vs. 0.65 for UK, suggesting retaining factors with eigenvalues >1 (Kaiser's criterion).

No cross-construct loadings above 0.3 indicates discriminant validity. Factor loadings exceed 0.5, demonstrating convergent validity.

#### 4.1. Structural equation modeling

The hypotheses are operationalized using structural equation modeling (SEM) (AMOS 5.0) (Table 2). The model is recursive with 107 degrees of freedom (*df*) and chi-square ( $\chi^2$ ) 181.1 for the UK and 211.7 for the KSA. Regression (structural) weight estimates testing H1–H7 are significant (Table 4). PU and trust fully mediate the impact of PMNG and SN on AI.

#### 4.2. Invariance analysis

To compare KSA and UK, factorial invariance (metric equivalence) assesses the extent to which measures have the same meaning for the two groups (Hair et al., 2006). The  $\chi^2 = 395.6$  (216*df*) provides the baseline. CFI = 0.96 and RMSEA = 0.037 indicate outstanding fit across the groups. Assuming the unconstrained model correct, comparing with constraining all factorial paths, they remain invariant across the groups, with changes in *df* ( $\Delta df$ ) = 12,  $\chi^2$  ( $\Delta \chi^2$ ) = 20.9, and *p* = 0.08, exceeding the 0.05 Byrne (2001) cut-off. Tests of each measurement invariance freely estimating the other loadings are in Table 3. Only one PU indicator reduces fit significantly, accordingly chosen as constrained path for the SEM. Since metric equivalence is established, the analysis proceeds to regression paths.

**Table 1**  
Principal component extraction and internal consistency reliability.

	UK		KSA	
	Pattern matrix	Structure matrix	Pattern matrix	Structure matrix
Perceived manageability	$\alpha = 0.87$		$\alpha = 0.8$	
PMNG1	−0.57	−0.70	0.51	0.62
PMNG2	−0.74	−0.80	0.61	0.72
PMNG3	−0.91	−0.86	0.84	0.82
PMNG4	−0.52	−0.67	0.41	0.57
PMNG5	−0.80	−0.80	0.83	0.79
PMNG6	−0.76	−0.78	0.42	0.55
Subjective norms	$\alpha = 0.84$		$\alpha = 0.83$	
SN1	0.88	0.87	−0.86	−0.84
SN2	0.89	0.87	−0.85	−0.87
SN3	0.80	0.85	−0.89	−0.89
Trust beliefs	$\alpha = 0.86$		$\alpha = 0.9$	
TB1	0.89	0.79	0.58	0.68
TB2	0.71	0.74	0.92	0.88
TB3	0.68	0.74	0.89	0.87
TB4	0.77	0.83	0.89	0.89
TB5	0.67	0.79	0.65	0.75
TB6	0.68	0.72	0.66	0.75
Perceived usefulness	$\alpha = 0.68$		$\alpha = 0.68$	
PU1	0.51	0.63	0.77	0.77
PU2	0.86	0.84	0.57	0.62
PU3	0.5	0.62	0.74	0.81

Total variance explained after rotation is 63.3% for the KSA group and 65.2% for the UK group.

Principle component analysis extraction with direct oblimin rotation.

AI Cronbach's alpha for the UK  $\alpha = 0.81$  and for the KSA  $\alpha = 0.81$ .

**Table 2**  
IBAM fit statistics and variance explained.

Fit statistics	UK	KSA
$R^2$	0.81	0.83
Chi-square	181.076	211.715
df	107	107
$\chi^2/df$	1.69	1.98
CFI	>0.95	0.97
GFI	>0.9	0.94
RMSEA	<0.08	0.050
NFI	>0.9	0.93
AGFI	>0.9	0.91
RMR	<0.1	0.08

Comparing IBAM across the two groups with all regression paths constrained indicates that the model is significantly different ( $\Delta\chi^2 = 16$ ,  $\Delta df = 7$ ,  $p = 0.02$ ). To detect which regression path(s) are non-invariant, each regression path is constrained equal across the two groups in turn and the others unconstrained (Table 4). There are significant differences in the regression paths between: PU and AI; and between trust and AI. Saudi customers perceive system usefulness to be more influential compared to their counterparts in the UK in determining their AI. On the other hand, UK customers perceive bank's trustworthiness as more influential compared to their counterparts in the KSA in determining their AI.

## 5. Discussion

Results confirm that intentions toward Internet banking adoption are attitudinal. Moreover, the analysis confirms that PEOU, SE and CTRL form one aggregate construct; PMNG, which represents users' perceptions of control upon their behavior. The IBAM explains 81–83% of AI variance for Saudis and Britons. Nevertheless, whereas PU was more influential to Saudi respondents' attitudinal intentions (regression weight ( $rw$ ) = 0.74; critical ratio ( $cr$ ) = 7) compared to trust ( $rw$  = 0.18;  $cr$  = 2.17), trust was very similar in deciding UK customers attitudinal intentions ( $rw$  = 0.61;  $cr$  = 4.38) to PU ( $rw$  = 0.57;  $cr$  = 5).

IBAM factorial paths remain invariant for the two groups. Testing for regression paths invariance; PMNG influences PU similarly across the two groups. Relationships between trust and PU; PMNG and trust; SN and PMNG; and SN and trust remain similar across groups. On the other hand, PU and trust regression paths to AI do not hold invariant, consistent with previous cross-cultural studies (e.g. Straub et al., 1997; Pavlou and Chai, 2002), which attributed such variation to cultural dimensions (Hofstede, 1980). Variation of trust weight has been attributed to collectivism/individualism (the basic culture dimension of behavior regulation). People in collective cultures, such as KSA, are unlikely to trust someone who is not part of their in-group (Yamagishi and Yamagishi, 1994) but derive trust from relationships and first-hand knowledge. More individualistic cultures, such as UK, which are self-reliant and focused on utilitarian views of exchange and competence, tend to rely on the environment to determine whether it is in another's (in this context, the bank's) best interest to behave well (Bhawuk and Brislin, 1992).

**Table 4**  
IBAM regression analysis and invariance analysis results.

Hypothesis	United Kingdom			Kingdom of Saudi Arabia			Invariance		
	RW	CR	p	RW	CR	p	$\Delta\chi^2$	$\Delta df$	p
H1: PU → AI (hypothesis accepted)	0.5	5	0.01	0.74	7	0.01	5.89	1	0.02*
H2: PMNG → PU (hypothesis accepted)	0.7	5.17	0.01	0.47	3.71	0.01	2.32	1	0.13
H3: PMNG → TB (hypothesis accepted)	0.4	4.72	0.01	0.6	4.76	0.01	1.78	1	0.18
H4: TB → AI (hypothesis accepted)	0.61	4.38	0.01	0.18	2.17	0.03	6.45	1	0.01**
H5: TB → PU (hypothesis accepted)	0.33	2.6	0.01	0.31	3.35	0.01	0.44	1	0.51
H6: SN → TB (hypothesis accepted)	0.14	2.75	0.01	0.18	2.13	0.03	0.17	1	0.68
H7: SN → PMNG (hypothesis accepted)	0.33	5.1	0.01	0.33	7.12	0.01	0.01	1	0.93

\* significant at 0.05 level.

\*\* significant at 0.01 level.

On the other hand, variation in PU regression paths toward AI may be attributed to culture assertiveness differences. Internet banking, a low social presence medium, may be less favored in more masculine cultures (focusing on assertiveness, performance, success, and competition) such as UK. In more feminine cultures (values related to gentler dimensions like quality of life, relationships, service, and care), such as KSA, face-to-face and rich media are not as necessary (Straub et al., 1997). However, other factors may also contribute, such as the limited number of banks in Saudi Arabia (only 16), which all offer similar services and charges and have equivalent reputations. This scenario reduces the role of trust and raises the importance of usefulness. The difference in the product life cycle stages between the two countries also may have an effect, as could higher techno-literacy rates among UK users.

There are clear implications for researchers. First, this study demonstrates the efficacy of developing questionnaires free of misconceptions for subgroups across cultures where an effective translation method is used and double-checked. Second, behavioral models may vary at the regression weights level across cultures. Third, before concluding that a proposed theory is adequate, researchers should validate models across different groups. There is a pressing need to validate integrated TAM models that include universal variables, such as trust, across cultures to assess the robustness. Fourth, trust has never failed to be a significant predictor in e-commerce research and therefore should always be included in behavioral models in this context. Fifth, researchers should consider all of the control variables – PEOU, PBC, self-efficacy, and controllability – as measuring a single construct. Sixth, more research should address the relative neglect of attitude and SN. Finally, future research in Internet banking acceptance should employ IBAM to predict users' behaviors, because of its parsimonious form capturing techno and social beliefs. In addition, IBAM has a high prediction power ( $R^2 = 81–83\%$ ) compared with other models (i.e. Wang et al., 2003  $R^2 = 62\%$ ; Shih and Fang, 2004  $R^2 = 66\%$ ; Suh and Han, 2002  $R^2 = 75\%$ ).

**Table 3**  
Metric invariance results.

	AI1	AI2	AI3	SN1	SN2	SN3	PU1	PU2	PU3	TB1	TB2	TB3	TB4	MG1	MG2	MG3	MG4
$\Delta\chi^2$	0.16	0.66	0.16	2.3	0.27	0.17	0.32	8.1	0.32	0.82	0.15	0.09	0.82	0.96	0.55	1.5	0.96
$\Delta df$	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
p	0.7	0.42	0.7	0.13	0.6	0.69	0.57	0.01**	0.56	0.37	0.7	0.77	0.37	0.33	0.46	0.22	0.33

\*\* significant at 0.01 level.

## 6. Conclusion

This research demonstrates conceptually and empirically that PEOU and PBC measure the same phenomenon, the perception of control over certain behaviors in the face of internal and external barriers. Furthermore, in the Internet banking domain, attitude is implicit to behavioral intentions and an aggregate variable (AI) offers an important predictor of adoption behavior. Moreover, SN influences e-behavior indirectly through other salient beliefs. Few studies have used a cross-market approach especially in the Gulf area, and even fewer employ invariance analysis to verify behavioral differences in an e-commerce context. This research addresses this knowledge gap. The invariance analysis deployed herein confirms that the importance of trust and PU varies, demonstrating that cultures may play a significant role in the technology perceptions of users. Accordingly, IBAM as a hybrid model (techno and social centric) with high fit and explanatory power has the quality of capturing e-commerce behaviors.

### 6.1. Research limitations and further research

It would be appealing to conclude that cultural differences alone explain the differences between the results for the two countries. Nevertheless, as with prior research, this study does not measure cultural dimensions directly and cannot claim with confidence a link between culture and technology acceptance variation. A future study including these measures could bridge this knowledge gap. Finally, future research with a larger sample is necessary to investigate the extent to which gender or other demographics affect Internet banking adoption behavior, especially in Saudi Arabia, where such issues have not been addressed previously.

### 6.2. Managerial implications

Managers should be aware of the importance of different beliefs on users' attitudes and adjust their marketing mix accordingly. Users' perceptions that e-transactions are easy and controllable is essential for Internet banking adoption, because ease and controllability create trust and usefulness perceptions. Moreover, Internet banking behavior is influenced indirectly by important others, and therefore managers cannot ignore non-users and family members in marketing campaigns. Banks should work to build an innovative reputation and obtain endorsements and positive word of mouth that will enhance the perceptions of family members, friends, potential customers, and customers about the Web site's usefulness and ease of use; such endorsements should also improve perceptions of banks' trustworthiness. To this end, promoting a contemporary service such as Internet banking requires contemporary marketing communications, such as e-mails, blogs and social networks.

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