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Examining the Moderating Role of Gender in Arabian Workers' Acceptance of Computer Technology

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Abstract:

Even as information technology becomes globally ubiquitous, the pace of its dissemination varies across regions. For example, technology acceptance by ordinary workers in the Arabian region is generally slow, though its diffusion has recently exhibited substantial improvements. The research model proposed herein, based in the theory of planned behavior and the technology acceptance model, focuses on the effects of gender, because long-standing Saudi Arabian culture traditions and entrenched social norms define distinct gender roles. The test of the model and its associated hypotheses involves voluntary responses from 1,088 Arabian workers of fifty-six firms. The results show that the model can explain a significant portion of variance in workers' intentions to use computer technology. Perceived usefulness seems to have the strongest impact on intention, followed by perceived behavioral control and subjective norms. In addition, gender moderates the effect of subjective norms on intentions and the influence of perceived usefulness on attitude, more prominently among male than among female workers. Overall, the findings imply relative differences in the explanatory power of prevalent theoretical models across different socio-cultural contexts and point to the important role of gender in technology acceptance. They also offer implications for research and practice.

Keywords: technology acceptance by Arabian workers; gender effects in technology acceptance; technology diffusion in the middle east; theory of planned behavior; technology acceptance model

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I. INTRODUCTION

In the mature research stream focused on user technology acceptance [Venkatesh and Bala, 2008], several theoretical models prevail, such as the theory of reasoned action (TRA) [Ajzen and Fishbein, 1980], the theory of planned behavior (TPB) [Ajzen, 1985], innovation diffusion theory (IDT) [Rogers, 1983], technology acceptance model (TAM) [Davis, 1989], and the unifying theory of acceptance and use of technology (UTAUT) [Venkatesh, Morris, Davis and Davis, 2003]. These models can explain people's acceptance of different information technologies reasonably well [Chau and Hu, 2002; Davis, Bagozzi, and Warshaw, 1989; Taylor and Todd, 1995a; Venkatesh and Davis, 2000]. However, most models have been conceived by researchers immersed in Western cultures, then tested with targeted users in developed countries. Empirical evidence pertaining to people with dissimilar cultural backgrounds is lacking—including technology acceptance by workers in developing regions. These areas traditionally have exhibited slow information technology diffusion, but also have displayed rapid growth in technology investment and deployment more recently. It is essential to reexamine salient theoretical models with common users in such regions, which usually represent varied cultural contexts, to advance understanding of people's technology acceptance across heterogeneous socio-cultural backgrounds while also increasing the validity and applicability of extant models [Venkatesh, Davis, and Morris, 2007].

Socio-cultural backgrounds affect people's acceptance of a technology. In particular, users' attitudes toward and perceptions of a technology depend on their backgrounds, which encapsulate cultural traditions and social norms that shape their beliefs about how a technology should work or be used [Hill, Loch, Straub, and El-Sheshai, 1998]. A theoretical model thus might not offer equal explanatory utilities across disparate socio-cultural contexts. As Venkatesh et al. [2007] note, "Identifying boundary conditions and situational contingencies related to technology adoption models presents an important step on the road to scientific progress and maturity within a stream" (p. 270). Reexamining prevalent models is also vital for technology management practices, because growing globalization demands that firms better understand which factors affect technology acceptance by people in various regions [Al-Maghrabi and Dennis, 2009].

The socio-cultural background of the Arabian region is distinct from those common to Western or other developed countries [Hill et al., 1998]. The region also plays an increasing role in the global economy and is progressively experiencing technology-enabled modernization. Internet usage in this region increased by 1,176.8 percent between 2000 and 2008; global growth averaged only 305.5 percent over the same period [Griffith, Myers, and Harvey, 2006]. Strong growth rates also mark technology investments [Al Sukkar and Hasan, 2005; Shirazi, Gholami, and Higón, 2009], Internet infrastructures such as network bandwidth and speed [Shirazi et al., 2009], technology deployments in work environments [Basahel and Irani, 2009], and Web-based electronic commerce [Al-Maghrabi and Dennis, 2009]. Yet, overall, the Arabian region is generally considered slow in technology adoption and diffusion, and it tends to be unfamiliar to researchers who instead emphasize technology adoption and utilization in developed countries. Therefore, for both research and practice, understanding technology acceptance by Arabian workers is essential, because information technology has become a central driving force of the region's business landscape and modernization. Some subtle differences of technology acceptance in various work environments already have been identified [Chau and Hu, 2002], but our review reveals limited examinations of information technology acceptance by Arabian workers.

To address this gap, we study technology acceptance by Arabian workers, in which context we emphasize the role of gender, an intriguing aspect of the region's culture [Gefen and Straub, 1997] that has important implications for technology management research and practice. Gender differences in the work environment reflect the distinctiveness of Arab culture [Al-Kahtani, Ryan, and Jefferson, 2005; Hill et al., 1998] and social norms [Gefen and Straub, 1997]. Despite the changing and complex nature of Arab culture, some cultural traits and social characteristics are commonly shared by people in this region [Hill et al., 1998], such as a close-knit family system that stresses guarding and elevating the family reputation [Arab American and Chaldean Council, 2006], predominance of primary group relations [Barakat, 2003], and gender roles that generally define the division of labor and social segregation [Hill et al., 1998].

These cultural characteristics might affect the applicability of salient, theoretical models immersed in Western cultures. For example, the TPB suggests that behavioral intentions derive jointly from attitude, subjective norms, and perceived behavioral control [Ajzen, 1985]; however, the weights of these determinants greatly depend on individuals' beliefs and values. Instead of being driven by personal experiences and attitudes, Arabian people's

behavioral intentions may be largely influenced by important others in the family or intended compliance with group norms, societal benefits, or religious values. Furthermore, perceived ease of use and perceived usefulness, according to the TAM, represent the personal costs and benefits of using a technology [Chau and Hu, 2002]; the estimation of costs versus benefits would be affected by individuals' cultural values. Although Arabian workers' acceptance of a technology may rely on their judgments of the technology's usefulness and ease of use, external factors pertaining to the group-oriented culture may exert important influences as well. In addition, the gender gap in the Arabian region is significant [Hausmann, Tyson, and Zahidi, 2009], a unique distinction from Western countries. Previous studies show that gender is an essential contingency for scientific inquiries in various domains, including technology acceptance [Gefen and Straub, 1997; Venkatesh, Morris, and Ackerman, 2000; Venkatesh and Morris, 2000]. Therefore, we anticipate that the applicability of the TPB and TAM may be affected by the unique Arabian cultural context.

In turn, we propose a model built on the TPB and TAM and empirically test it with a large-scale survey that includes 1,088 Arabian workers from different organizations. Our model is able to explain individual workers' intentions to use information technology in work environments; specifically, we find that perceived usefulness affects attitude and intention; perceived ease of use influences perceived usefulness and attitude. Both subjective norms and perceived behavioral controls appear to affect intentions as well. However, the mediating effects of attitude are not significant statistically. Furthermore, gender appears to have a significant moderating effect in the relationships between perceived usefulness and attitude, as well as between subjective norms and intention, though not on the other relationships: perceived ease of use and attitude, perceived usefulness and intention, and perceived behavioral control and intention.

In Section II, we provide an overview of technology development in the Arabian region, an analysis of technology acceptance by workers in this region, and a review of previous technology acceptance research that highlights the research gap that has motivated our study. Section III describes our research model and associated hypotheses, followed by the details of our study design and data collection in Section IV. We describe our data analyses and highlight important results in Section V and then discuss their implications for research and practice in Section VI. We conclude in Section VII with a summary, discussions of our study's contributions and limitations, and future research directions.

II. BACKGROUND AND LITERATURE REVIEW

In this section, we provide an overview of technology development in the Arabian region, analyze Arabian workers' acceptance of information technology with consideration of probable gender effects, review salient theoretical models and their empirical support, and then highlight the research gap that motivates our study.

Information Technology Adoption and Diffusion in the Arabian Region

The overall development of information technology in the Arabian region has been relatively slow [El Louadi, 2008]; for example, Internet connections were not established until 1997; Internet access by the general public was available only in 1999 [Al-Kahtani et al., 2005]; and Internet users accounted for only 5.41 percent of the population in 2003 [Al-Kahtani et al., 2005]. Recent statistics show that Internet penetration in the Arabian region has reached 23.9 percent of the population, whereas such penetration rates are 53.9 percent in the United States and 61.3 percent in Europe [Internet World Stats, 2012].

The incompatibility between this imported Western technology and the unique and deeply entrenched socio-cultural background of the area seems to have been a major barrier to technology dissemination [El Louadi, 2008]. To some extent, people might consider technology developed in Western countries (i.e., North American or European) culturally biased and socially invasive [Hill et al., 1998]. In turn, socio-cultural obstacles minimize technology acceptance by people in this region and prevent them from making good use of the technology in their work environments [Hill et al., 1998].

Despite the relatively slow pace of technology adoption and diffusion in the Arabian region [Al Sukkar and Hasan, 2005], growth in technology-enabled services and products has been notably stronger in recent years [Al Sukkar and Hasan, 2005]. Take Internet-based e-commerce as an example: Online transactions increased from \$278 million in 2002 to \$556 million in 2005 [Al-Maghrabi and Dennis, 2009]. In Jordan, the information technology market grew between 15 percent and 30 percent annually [Khreisat, 2009]. Demand for hardware and services, both conventional and Web-based, is also growing [Loch, Straub, and Kamel, 2003]. Yet the coexistence of such technologies and long-standing socio-cultural traditions remains challenging and continues to constrain technology diffusion and penetration across all aspects of people's lives [Griffith et al., 2006]. Several studies suggest insights about how firms might provide technology products or services in this region [Al Sukkar and Hasan, 2005], but it also

is essential to understand which factors determine the technology acceptance of Arabian workers, which has great potential for technological empowerment and tremendous business opportunities [Al Sukkar and Hasan, 2005].

Previous Information Technology Acceptance Research in the Arabian Region

Prior research has considered different facets of information technology in the Arabian region, such as technology-mediated communications [Fandy, 2000], Internet banking [Al Sukkar and Hasan, 2005], e-commerce [Al-Maghrabi and Dennis, 2009], information system management [Daghfous and Barkhi, 2009], and e-government [Chatfield and Alhujran, 2009]. Although these studies address different focal phenomena [Al-Maghrabi and Dennis, 2009], consumer contexts represent a common focus. Discussions of technology acceptance in work environments have been limited, and only a handful of studies investigate knowledge workers. For example, Loch et al. [2003] examine Internet adoption by knowledge workers and report that social norms and technological cultivation can influence their technology acceptance. Few, if any, studies examine technology acceptance by ordinary workers or use established theoretical premises to analyze individual perceptions of a focal technology while incorporating potential gender effects.

We argue that gender represents an important contingency in technology acceptance [Venkatesh et al., 2000]. Studies that have examined gender differences [Gefen and Straub, 1997; Venkatesh et al., 2000; Venkatesh and Morris, 2000] usually target users in Western or developed countries, with different socio-cultural backgrounds compared to the Arabian region. To some extent, Arabian women are expected to comply with long-standing cultural traditions and persistent social norms that favor women taking subordinate roles to men by limiting their professional career pursuits and choices, accepting marginal roles in social organizations or political systems, or not expressing their opinions freely in public [Barakat, 2003]. These distinct gender roles constitute an important characteristic of Arabian culture and thus offer a fundamental lens through which to observe the sharp division of labor between genders and their segregation in society [Hill et al., 1998]. Women have historically been underrepresented in the work force [Al-Gahtani, Hubona, and Wang, 2007] and might be less likely to accept and use information technology than their male counterparts. Women account for nearly two-thirds of the population but only 4 percent of its Internet users [El Louadi, 2008]. In recent years, interest in technology among women also has grown continually, in contrast with the seemingly declining participation by women in Western countries [Khreisat, 2009]. Yet female participation in technology still reflects a serious underrepresentation in light of the composition of the Arabian region's population [Khreisat, 2009]. Thus, our literature review suggests the need to investigate technology acceptance by ordinary Arabian workers, as affected by their gender.

Previous Technology Acceptance Research

Among the theoretical models that attempt to explain technology acceptance, the TPB and TAM are generic and commonly employed to study various technology acceptance phenomena across technologies, target users, and contexts [Pavlou and Fygenson, 2006; Venkatesh et al. 2000]. Drawn from the TRA, they offer parsimonious frameworks for analyzing individual acceptance of a technology [Hu, Chau, Sheng, and Tam, 1999; Kiriakidis, 2008].

According to the TPB, a person's acceptance of a technology can be explained by his or her intention, which is jointly determined by attitude, subjective norms, and perceived behavioral control. Attitude refers to a person's positive or negative evaluative affect about performing a behavior; subjective norms denote the person's perception of relevant others' opinions about whether he or she should perform the focal behavior [Ajzen, 1991]. In general, perceived behavioral control refers to a person's perception of the presence or absence of required resources for performing a behavior [Ajzen and Madden, 1986]. The TPB focuses on cognitive effort and social desirability related to a behavior, but not on its monetary costs [Bhattacharjee, 2000]; therefore, the TPB is applicable to contexts in which adopters do not face significant monetary costs [Bhattacharjee, 2000]. The generic TPB can explain a person's behavior in a social (organizational) setting [Schifter and Ajzen, 1985] and has been tested as a means to explain various behaviors (e.g., Bhattacharjee, 2000; Chau and Hu, 2001; Pavlou and Fygenson, 2006; Schifter and Ajzen, 1985; Venkatesh et al. 2000). Accumulated evidence suggests that this theory exhibits satisfactory explanatory and predictive power [Venkatesh et al., 2007].

The TAM is developed specifically to explain (or predict) a person's acceptance of information technology [Davis, 1989; Davis et al., 1989]. This model posits that perceived usefulness and perceived ease of use are critical determinants of technology acceptance [Davis, 1989]. Perceived usefulness refers to the degree to which a person believes that using the focal technology will enhance his or her performance, and perceived ease of use denotes the extent to which a person believes his or her use of the technology will be free of effort [Davis, 1989]. The cognitive criteria (i.e., perceived usefulness and perceived ease of use) can be mapped to the design criteria of functionality and usability [Whitworth, Banuls, Sylla, and Mahinda, 2008]. This parsimonious model has been examined empirically across a wide range of technology acceptance scenarios [Whitworth et al., 2008]. The collective findings suggest satisfactory utilities for explaining (predicting) user acceptance across different technologies, user

populations, and organizational contexts [Davis et al., 1989; Venkatesh and Bala, 2008; Venkatesh and Davis, 2000].

Although both the TPB and the TAM represent prevalent theoretical models for technology acceptance, their validity and applicability might be enhanced through testing with different user populations and contexts. For example, Straub, Keil, and Brenner [1997] test the TAM with people from Japan, Switzerland, and the United States and show that it offers reasonable explanatory power for users in the latter countries, but not for those in Japan. Bandyopadhyay and Fraccastoro [2007] examine the TAM in the context of workers' technology acceptance by focusing on the role of culture; they report that this generic model is not equally predictive across different cultures. The comparative results from prior research thus reveal the importance of reexamining prevalent models across different socio-cultural contexts.

Research Gap and Motivation

Our literature review suggests limited investigations of technology acceptance by ordinary Arabian workers, and particularly limited considerations of gender effects, though a handful of studies have analyzed technology implementation by different user groups qualitatively [Al-Kahtani et al., 2005; Hill et al., 1998; Khreisat, 2009]. To provide a broader view of how computer technology is perceived by general users in the Arabian region, we target ordinary workers rather than knowledge workers. That is, we survey ordinary employees in organizations, regardless of their job context; knowledge workers instead include only those who work extensively with knowledge and information [Finch, 2007]. Because we do not limit our sample to specific occupations or professional job contexts, we reduce the probable biases resulting from the professional nature of knowledge work, which often demands specialized knowledge, professional requirements, and specific training. For example, several previous studies suggest that perceived ease of use does not affect knowledge workers' decisions about whether to accept a technology; perceived usefulness is the most important determinant of their technology acceptance; and subjective norms appear to have limited influences on decision making [Chau and Hu, 2001; Yi, Jackson, Park, and Probst, 2006]. Knowledge workers also may possess unique professional values and beliefs, such that their technology acceptance decisions would not generalize to a broader workforce. Because the increasingly prevalent use of computer technology is not limited to knowledge workers, we expand our sample, so our results can provide insights for managers and policy makers who strive to foster the use of computer technology in various work environments.

Investigations in this field are important for several reasons. First, the Arabian region is developing, with increasing technology investments and implementations. Although it is exhibiting fast technology growth, the region continues to struggle with the coexistence of its cultural norms and the technology developed by Western or other developed countries [Griffith et al., 2006]. Second, Arabian culture is marked by relatively large power distance and strong collectivism [Hofstede, 2001], as well as a significant gender gap¹ [Hausmann et al., 2009]; the social expectations for men and women differ from those common to Western cultures [Al-Kahtani et al., 2005]. The socio-cultural environment in this region also is unique [Fandy, 2000; Loch et al., 2003] and influences people's beliefs and perceptions about a technology. For increased model validity and applicability, we examine salient theoretical models, which should shed light on probable boundary conditions or situational contingencies. Third, examining technology acceptance in work environments acknowledges the more expansive penetration of technology to an expanding array of work settings. Compared with general users, workers might adopt different considerations when they decide whether to use a technology at work and perceive peer influences differently [Chau and Hu, 2002]. Therefore, we propose a model, built on the TPB and the TAM, that emphasizes probable gender effects in technology acceptance by Arabian workers. Our study specifically targets the following research questions:

1. Can the proposed model, based in the TPB and TAM, offer satisfactory explanatory power for the acceptance of computer technology by Arabian workers?
2. How does gender influence the proposed determinants of technology acceptance by Arabian workers?

III. RESEARCH MODEL AND HYPOTHESES

Although the TAM is advantageous for identifying salient beliefs that affect technology acceptance [Taylor and Todd, 1995a], this focus on salient beliefs constrains its practical value, because it does not consider other important factors, such as the influence of significant others or perceived control [Ajzen, 1991; Taylor and Todd, 1995a]. The TPB, by stressing some essential determinants of intention, may mitigate these limitations of the TAM, though it seems to offer less explanatory power [Mathieson, 1991]. By integrating the TPB with the TAM, we may better explain technology acceptance. Taylor and Todd [1995b] combine the TPB and TAM by consolidating the predictors of the TPB with perceived usefulness and ease of use, thus creating an augmented, hybrid model. The inclusion of

¹ Gender equality in Saudi Arabia is ranked 130 out of 134 countries [Hausmann et al., 2009].

social and control factors with key determinants of technology acceptance [Taylor and Todd, 1995a] creates a combined model that exhibits increased explanatory and predictive utilities. Taylor and Todd [1995b] describe this approach: "... because of their wide-spread application in social psychology, subjective norm and perceived behavioral control are added to TAM to provide a more complete test of the important determinants of IT usage" (p. 562); Chau and Hu [2002] also suggest the importance of factors pertinent to the technology (e.g., perceived usefulness, perceived ease of use), users (attitudes, perceived behavioral control), and social or organizational contexts (social influence).

In Figure 1, we depict our proposed model, in which we suggest that attitude is an important mediator that shapes workers' intentions to accept computer technology in their work environment [Fishbein and Ajzen, 1975]. Furthermore, usefulness and perceived ease of use determine attitude, which affects technology acceptance [Chau and Hu, 2002; Mathieson, 1991; Taylor and Todd, 1995a, 1995b]. A worker's intention to accept computer technology is also influenced by subjective norms and perceived behavioral control. Beyond the influences of key antecedents of intention and attitude, we examine the moderating effects of gender, which allows us to explore gender differences in technology acceptance.

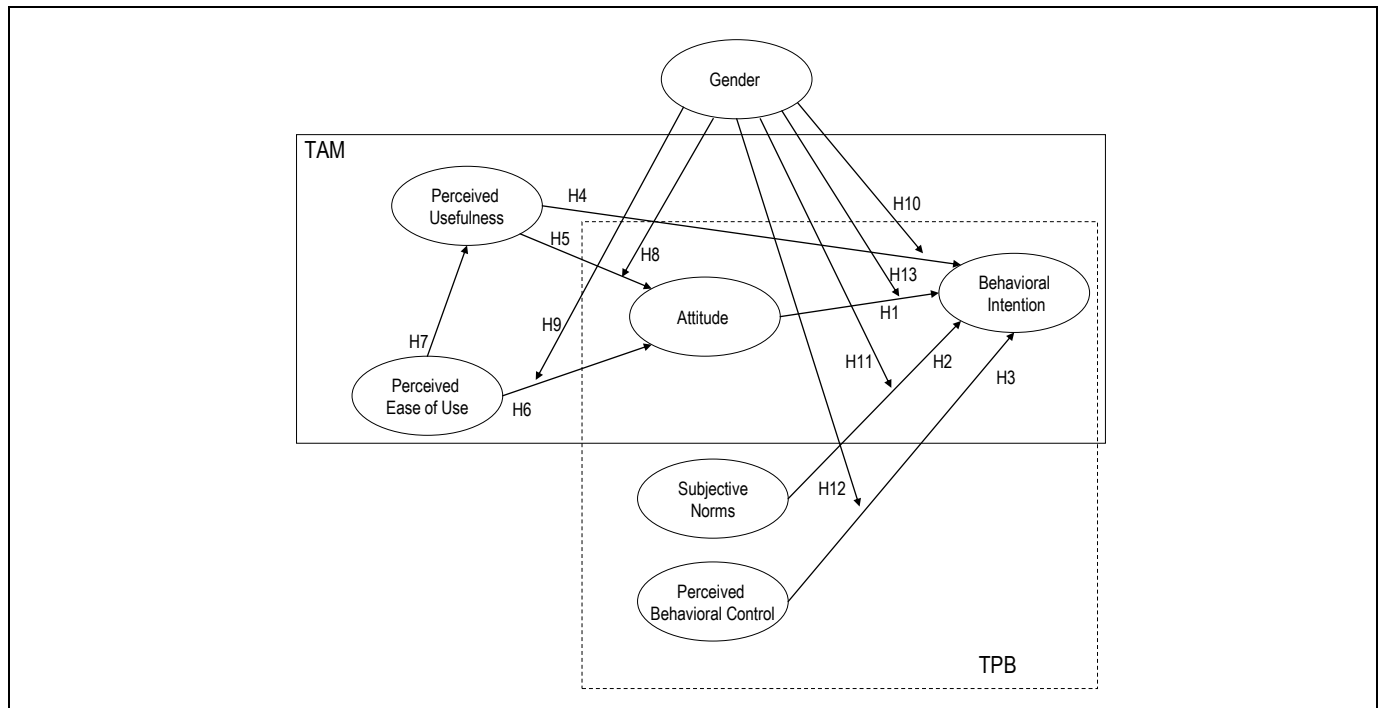


Figure 1. Research Model

An important difference between our model and the unifying theory (i.e., UTAUT) is the role of attitude. According to the TPB and TAM, attitude has a direct effect on behavioral intention and mediates the effect of behavioral beliefs (e.g., perceived usefulness and perceived ease of use) [Ajzen, 1985; Davis et al., 1989]. In contrast, the UTAUT suggests that the effect of attitude on intention can be captured by effort expectancy and performance expectancy [Venkatesh et al., 2003]. More recent studies validate the effects of attitude on behavioral intention [Venkatesh, Thong, Chan, Hu, and Brown, 2011]. Consistent with the theoretical logic of TPB and TAM, we include attitude in our model and test its effect. Although the UTAUT suggests the effect of perceived behavioral control on behavioral intention is insignificant, we expect the effect to be prominent, in line with the TPB. Also based on the TAM, we test the effect of perceived ease of use on perceived usefulness, which is omitted from the UTAUT. Finally, we consider the effects of gender, because long-standing Saudi Arabian cultural traditions and entrenched social norms define distinct gender roles. We do not test for moderating effects of age, experience, or voluntariness of use, but rather examine the moderating role of gender on relationships that are not included in UTAUT, such as those between perceived usefulness and attitude, between perceived ease of use and attitude, between attitude and behavioral intention, and between perceived behavioral control on behavioral intention. Our proposed model thereby provides a more thorough investigation of the role of gender in the Saudi Arabian context.

Furthermore, we measure the respondents' voluntary, intended use of computer technology to assess technology acceptance for several reasons. First, technology acceptance represents an individual user's psychological state, that is, a willingness or intention to use the focal technology [Chau and Hu, 2001]. The person's decision to accept a

technology instead is a conscious act that can be explained or predicted by his or her intentions [Chau and Hu, 2002]. Thus, intention is a reasonable proxy for technology acceptance. Second, previous research offers abundant empirical evidence of a strong, significant link between intention and actual technology use [Mathieson, 1991; Taylor and Todd, 1995a; Venkatesh and Morris, 2000], so our approach is consistent with previous studies (e.g., Bandyopadhyay and Fraccastoro, 2007; Fu, Farn, and Chao, 2006; Mathieson, 1991; Sun, Bhattacharjee, and Ma, 2009; Vatanparast and Qadim, 2009; Venkatesh and Morris, 2000; Teo, 2011), which demonstrate that using intention to approximate technology acceptance is both theoretically justifiable and empirically supported [Mathieson, 1991]. Third, measuring usage would require longitudinal studies to assess people's beliefs and attitudes in the preceding period. Instead, we avoid the influence of probable intervening events in the temporal gap between an initial and follow-up survey by using (cross-sectional) data. Furthermore, our use of intentions to gauge user acceptance enables us to avoid the potential complications of a retrospective analysis in a survey study [Yi et al., 2006], which usually is measured contemporaneously with beliefs. The choice to measure acceptance with intention accordingly is appropriate for our research purpose [Agarwal and Prasad, 1999].

According to the TRA, a person's intention to perform a behavior can be determined by his or her attitude and subjective norms about that behavior [Ajzen and Fishbein, 1980]. A person's attitude is a function of his or her beliefs about the outcome of performing the behavior and evaluation of the value of those outcomes [Fishbein and Ajzen, 1975]. If the assessment indicates a positive value, the person is likely to perform the behavior. The positive relationship between attitude and behavioral intention is central to salient theoretical models of technology acceptance and has garnered substantial empirical support [Davis et al., 1989; Venkatesh et al., 2003]. In our study context, an Arabian worker would evaluate the value of using computer technology at work, using his or her personal beliefs. When workers believe the use of computer technology at work will produce desirable outcomes, they should form strong intentions to use it. Thus, we test the following hypothesis:

H1: An Arabian worker's attitude toward computer technology positively affects his or her intention to use that technology.

Similar to attitude, subjective norms can affect a person's behavioral intentions [Fishbein and Ajzen, 1975]. A reference group's opinions or expectations influence an individual user's technology acceptance decision [Venkatesh and Davis, 2000]. Furthermore, because Arabian culture is associated with relatively high power distance and collectivism scores [Hofstede, 2001], this closely knit social structure likely will increase conformance pressures on people. Therefore, Arabian workers should tend to accept leaders' opinions and comply with referent others' expectations. In work settings, Arabian workers perceive social influences from both organizational and socio-cultural sources; they also likely exhibit a strong desire to comply with the expectations of their supervisors or colleagues. Accordingly, we propose:

H2: Subjective norms positively affect an Arabian worker's intention to use computer technology.

According to the TPB, perceived behavioral control can directly affect intention; by including this construct, we account for conditions in which people lack complete control over the focal behavior. In our study context, perceived behavioral control represents the technological or organizational environments that might reduce the barriers to technology acceptance [Venkatesh et al., 2003], which can be fostered directly by resources and opportunities and, therefore, is essential to continued technology use [Venkatesh et al., 2003]. When an organization provides adequate resources (e.g., training, assistance) in the work environment, it reduces workers' costs to use computer technology. As a result, Arabian workers who perceive their use of computer technology as well-supported by the organization should exhibit a stronger intention to use it at work. We test the following hypothesis:

H3: Perceived behavioral control positively affects an Arabian worker's intention to use computer technology.

Intention also can be determined by perceived usefulness [Davis et al., 1989]. In an organizational setting, people form intentions to use a technology according to their beliefs that doing so will enhance their job performance, beyond any positive or negative feelings that may be evoked by that behavior [Davis et al., 1989]. From a utilitarian perspective, people tend to accept a technology when they consider their use of it beneficial to the achievement of their work tasks and performance. In a work setting, people must fulfill job requirements by completing the tasks assigned to them; they are more likely to use computer technology if they believe it helps them accomplish that goal through increased performance or efficiency. Thus, we test the following hypothesis:

H4: Perceived usefulness positively affects an Arabian worker's intention to use computer technology.

We consider perceived usefulness, which refers to a person's beliefs about the outcome of using a technology. Learning and affective-cognitive consistency mechanisms provide the theoretical premises underlying this relationship [Bagozzi, 1982], such that positively valued outcomes increase a person's affect toward the behavior that generates such outcomes [Davis et al., 1989]. The posited link between perceived usefulness and attitude is

congruent with extant behavioral decision-making literature, which shows that people attempt to minimize their efforts and adopt those tools that benefit them [Thompson, Higgins, and Howell, 1991]. In our case, Arabian workers value their enhanced job performance and, therefore, assess tools available in the work environment according to their task usefulness. Workers form positive attitudes toward a technology if they perceive it is useful for their job performance. We hypothesize:

H5: Perceived usefulness positively affects an Arabian worker's attitude toward computer technology.

The effect of perceived ease of use on attitude can be explained according to the concepts of self-efficacy and instrumentality [Davis et al., 1989]. A technology that is easy to use helps people realize considerable time or effort savings when completing a task. Compared with their counterparts in developed countries, Arabian workers tend to be less savvy with regard to computer technology because of the limited diffusion of such technologies [Al Sukkar and Hasan, 2005]. Thus, their attitudes toward computer technology might be dampened if their use of it requires substantial learning and cognitive effort. However, workers should form positive attitudes if they believe this use requires little effort on their part. Accordingly, we hypothesize:

H6: Perceived ease of use positively affects an Arabian worker's attitude toward computer technology.

An easy-to-use technology allows people to accomplish work tasks with little effort and enhances their performance from a cost-effectiveness or cost-efficiency sense. Yet computer technology is not extensively used by Arabian workers, and some of these novice users may consider the technology complex and difficult to use. When attempting to use computer technology at work, Arabian workers need to learn the fundamentals and apply the technology to their work tasks through trial and error. If a technology is easy to use, though, people might experiment with it to perform their tasks and thus gain first-hand observations about its capabilities. We test the following hypothesis:

H7: Perceived ease of use positively affects an Arabian worker's perception of computer technology's usefulness.

In the following hypotheses, we include the potential influence of gender on people's perceptions and behaviors [Gefen and Straub, 1997]. In general, men receive encouragement to be assertive and competitive, whereas women are expected to be nurturing and cooperative. Gender thus is likely to determine a person's frame of reference for evaluating a technology [Venkatesh and Morris, 2000]. Moreover, social roles and expectations for women are relatively rigid in Arabian culture [Al-Gahtani et al., 2007], and usually women are expected to suppress their opinions and judgments and bow to social influences. Therefore, even if all Arabian workers are encouraged to use technology, women might be less assertive in its use, due to the relatively strict social norms they encounter. Following this reasoning, female workers may rely less on their own judgments when forming attitudes about the perceived usefulness of computer technology, whereas male workers likely depend more on their own beliefs to develop attitudes toward computer technology. Thus,

H8: Gender moderates the effect of perceived usefulness on an Arabian worker's attitude toward computer technology.

Prior research has shown that the influence of perceived ease of use on technology acceptance is more salient for women than for men [Venkatesh et al., 2003]. Several previous studies report that male students generally seem more comfortable learning and experimenting with information technology than female students [Venkatesh and Morris, 2000]. Hofstede [2001] notes that women tend to place more importance on service aspects and the physical environment than do men. In this light, female workers may appreciate the ease of use of computer technology more than their male counterparts. Women also seem more anxious than men about the use of computer technology, which can affect their attitudes toward the technology. As a result, the influence of perceived ease of use on women's attitudes toward a technology may be more prominent than that on men, and we propose:

H9: Gender moderates the effect of perceived ease of use on an Arabian worker's attitude toward computer technology.

Men and women may vary in their orientation and frame of reference toward a focal (social) phenomenon [Eagly, 1987]; for example, men are more task-oriented, whereas women exhibit a communal orientation [Eagly, 1987]. Male workers are more likely than female workers to pay attention to how a technology can improve their job performance, so the effect of perceived usefulness on intentions to use the computer technology may be more salient for men than for women. These differential orientations and frames of reference reflect gender schema theory [Venkatesh et al., 2003]. The gender schema is especially prominent in social norms encouraging such a schema and, therefore, has greater influences on people's behaviors. Social norms regarding different gender roles are particularly distinct in Arabian culture, and we anticipate a differential influence of perceived usefulness on the

intention to use computer technology between male and female Arabian workers. Therefore, we test the following hypothesis:

H10: Gender moderates the effect of perceived usefulness on an Arabian worker's intention to use computer technology.

In general, women are more aware of and sensitive to others' feelings than are men; they often prefer not to upset others [Miller, 1986]. Thus, women tend to be compliant [Crawford, 1995] and more likely to conform to majority opinions [Eagly, 1987]. In a social system or an organization, women place more value on harmonious relationships and smooth communications than do men, who instead emphasize getting the job done in an effective or efficient way. Accordingly, we expect greater influence by peers and social norms on female Arabian workers, who tend to accept the opinions of their supervisors and significant others and also align with social norms when deciding whether to use computer technology. Therefore, we hypothesize:

H11: Gender moderates the effect of subjective norms on an Arabian worker's intention to use computer technology.

From the perspective of instrumentality, men tend to emphasize outcomes rather than the process [Venkatesh et al., 2000] and thus may be likely to pay less attention to facilitating conditions than women do. In contrast, women usually stress the importance of service aspects and the physical environment [Venkatesh and Morris, 2000]. In this light, female Arabian workers may appreciate resources and support for the use of computer technology more than their male counterparts. Furthermore, the organization's efforts to facilitate technology use might represent a manifestation of the organization's expectation about technology usage, with which female workers are more likely to comply than male workers. Therefore, we anticipate the effect of perceived behavioral control on intention to be stronger for female than for male workers:

H12: Gender moderates the effect of perceived behavioral control on an Arabian worker's intention to use computer technology.

Finally, men usually place greater importance on advancement and power, whereas women rate interpersonal aspects, service, and the physical environment as more important [Hofstede, 2001; Venkatesh and Morris, 2000]. To make their decisions, men tend to depend on self-judgments; women rely on peers' opinions and other environmental factors. If women depend more on subjective norms, they likely pay more attention to resource-related issues when making their technology adoption decision and less to their own attitudes. Male workers, on the other hand, form behavioral intentions on the basis of their assessments and attitudes, because the Arabian culture respects independent decision making by men. We anticipate that the effect of attitude on intention is stronger for male workers than for female workers, and we test the following hypothesis:

H13: Gender moderates the effect of attitude on an Arabian worker's intention to use computer technology.

IV. STUDY DESIGN AND DATA COLLECTION

In this section, we detail our study design (measurements and participants) and data collection.

Measurements. Each construct was operationalized with previously validated question items, with minor wording changes to fit our context. The subjective norms, perceived behavioral control, and attitude items were adapted from Taylor and Todd [1995a]; items for perceived usefulness and perceived ease of use came from Davis [1989]; and items for behavioral intention were taken from Mathieson [1991]. All items employed seven-point Likert-type scales, anchored by "strongly disagree" and "strongly agree," except the semantic differential scale of attitude anchored by pairs of opposite words on a seven-point scale, such as bad versus good, foolish versus wise, or negative versus positive. We used a binary dummy variable to represent gender (0 = female, 1 = male). All survey items, originally written in English, were translated into Arabic. We employed the back-translation method [Brislin, 1986], such that each item was translated back and forth between English and Arabic by a panel of six Arabic-English bilingual professors, who repeated the process until both versions perfectly converged in semantic meaning and clarity. The question items are listed in the Appendix.

Targeted participants. We recruited voluntary participants among the employees of fifty-six private and public organizations in Saudi Arabia. These organizations are located throughout the country and span different industries and sectors, including finance and banking, merchandising, manufacturing, petroleum, education, health care, and government. In particular, we targeted workers who need to use computer technology provided by their organization at work. In this study, *computer technology* refers to computers and related technologies available to ordinary workers in the organization. We provided an explicit definition in our survey, together with common examples of

computer technology in various work environments. We did not screen those who actually used or did not use the computer technology, because of our goal to examine technology acceptance among workers.

Data collection. This study is part of a project funded by the Saudi government and enacted by King Abdul-Aziz City for Science and Technology (KACST), the Saudi government's reputable science and technology research agency. In general, research projects funded by KACST are well-regarded by the general public; therefore, many organizations and individuals were willing to participate. The assistance of the chambers of commerce in four provinces was helpful as well; we solicited voluntary participation by the targeted organizations through a letter, cosigned by a top administrator of a major university. Each organization that agreed to take part in the study identified a central liaison who distributed the questionnaire survey to individual workers in the organization and then collected the completed surveys. In the fifty-six organizations that participated, we distributed surveys to 1,900 workers and received 1,088 completed surveys. The sample reflected the preponderance of male workers in Saudi Arabia [Hausmann et al., 2009] in the imbalance between male (78 percent) and female (22 percent) respondents. This gender ratio is representative of the labor division throughout the area; for example, the Global Gender Gap Report 2009 [Hausmann et al., 2009] reveals a female-to-male ratio of labor participation in Saudi Arabia of 20:80, very close to the ratio we find. Similarly, in other Middle Eastern countries, reported female-to-male labor participation ratios are consistent with our sample, such as in Egypt (25:75), Syria (20:80), Tunisia (27:73), Yemen (25:75), and Jordan (17:83).

Each worker had two weeks to complete the survey; we provided an additional two-week period to those failed to complete it during the initial response period. From every company, we received surveys from both male and female respondents. No evidence suggested that either gender clustered in specific industries or companies.

V. DATA ANALYSES AND RESULTS

We tested our model and hypotheses using partial least squares (PLS), which allows for simultaneous examinations of the measurement and structural models. Compared with other data analysis techniques, such as LISREL, PLS supports factor analysis with linear regressions and has fewer stringent data distribution requirements that include multivariate normality [Gefen, Straub, and Boudreau, 2000]. Furthermore, PLS enables the simultaneous analysis of a large number of indicator variables and can support tests of extensive interactions among moderator and latent predictors. In our case, all the investigated constructs used reflective indicators. To reduce potential multicollinearity across constructs in our model, we mean-centered the variables at the indicator level before creating the interaction terms [Chin, Marcolin, and Newsted, 2003]. For improved robustness, we also adopted a bootstrapping method (250 times) that randomly selected subsamples to test different PLS models.

Measurement model testing results. We examined our instrument in terms of its reliability and convergent and discriminant validity. To assess item reliability, we analyzed the loading of each item on its corresponding construct. Items with a loading greater than 0.7 are generally reliable [Nunnally, 1978]. Judged by this threshold value, our instrument achieved adequate reliability; all item loadings exceeded 0.7 and were statistically significant at the 0.001 level (see Table 1).

We analyzed the instrument's construct reliability by examining internal consistency and composite construct reliability. We used Cronbach's alphas to evaluate internal consistency and adopted the common threshold of 0.7 [Nunnally, 1978]. Each construct attained a Cronbach's alpha value greater than or close to 0.7, suggesting appropriate internal consistency. As we summarize in Table 2, the composite reliability of each construct exceeded 0.7, a common threshold value that indicates satisfactory construct reliability [Fornell and Larcker, 1981]. Overall, our results confirm that the instrument possesses appropriate construct reliability.

For the convergent validity test, we used average variance extracted (AVE) to determine the variance captured by indicators [Fornell and Larcker, 1981]. In general, an AVE exceeding 0.5 suggests adequate convergent validity [Fornell and Larcker, 1981], and as we show in Table 2, each construct had an AVE score exceeding 0.5. Therefore, our instrument exhibited adequate convergent validity. We further determined convergent and discriminant validity by examining the cross-loadings computed from the correlation between each construct's component score and the manifest indicators of other constructs [Chin, 1998]. As the results in Table 3 show, all the items loaded substantially higher on their own construct than on other constructs.

According to Table 4, the square roots of the AVEs also were greater than the correlation among any pair of latent constructs [Chin, 1998]. Therefore, our instrument exhibits adequate convergent and discriminant validity.



	Item	Loading	t-Statistics
Subjective Norms (SN)	SN-1	0.94	147.07
	SN-2	0.94	129.25
	SN-3	0.91	88.38
Perceived Behavioral Control (PBC)	PBC-1	0.74	21.95
	PBC-2	0.76	28.58
	PBC-3	0.76	26.87
Perceived Usefulness (PU)	PU-1	0.76	26.56
	PU-2	0.83	39.41
	PU-3	0.86	49.75
	PU-4	0.86	47.76
	PU-5	0.85	54.55
	PU-6	0.72	28.82
Perceived Ease of Use (PEOU)	PEOU-1	0.79	50.34
	PEOU-2	0.81	49.36
	PEOU-3	0.84	68.06
	PEOU-4	0.80	46.98
	PEOU-5	0.81	46.76
	PEOU-6	0.79	40.21
Attitude (ATT)	ATT-1	0.90	71.31
	ATT-2	0.91	113.83
	ATT-3	0.90	96.07
	ATT-4	0.88	69.61
	ATT-5	0.88	71.51
Behavioral Intention (BI)	BI-1	0.85	68.91
	BI-2	0.84	54.85
	BI-3	0.88	85.86

Construct	Composite	Cronbach's Alpha	Variance extracted
Subjective Norms	0.95	0.92	0.87
Perceived Behavioral Control	0.80	0.63	0.57
Perceived Usefulness	0.92	0.90	0.66
Perceived Ease of Use	0.92	0.89	0.65
Attitude	0.95	0.94	0.80
Behavioral Intention	0.89	0.82	0.73

Model testing results. In Figure 2, we summarize our model testing results. The full model with moderators explains a significant portion of the variances in perceived usefulness ($R^2 = 24$ percent), attitude ($R^2 = 20.3$ percent), and intention ($R^2 = 34.2$ percent), which seem smaller than those in prior studies [Chau and Hu, 2001; Venkatesh and Morris, 2000]. Furthermore, when gender is included in the model, the R-square value of behavioral intention increases from 32.8 percent to 34.2 percent, showing a weak ($f^2 = 0.02$) [Cohen, 1988] but noteworthy impact of gender. The relatively lower R-square values may suggest the reduced applicability of the TPB and TAM in an Arabian socio-cultural context. Perceived usefulness emerges as the most important antecedent of intention, followed by perceived behavioral control and subjective norms. Perceived ease of use also affects intention indirectly through its influence on perceived usefulness. Gender moderates the effects of some, but not all, of the antecedents.

Hypothesis testing results. The data support most of the direct effects: perceived ease of use on perceived usefulness (path coefficient = 0.49, $p < 0.001$, $t = 13.26$); perceived usefulness on attitude (path coefficient = 0.28, $p < 0.001$, $t = 7.77$); perceived ease of use on intention (path coefficient = 0.23, $p < 0.001$, $t = 6.31$); perceived usefulness on intention (path coefficient = 0.32, $p < 0.001$, $t = 8.10$); subjective norms on intention (path coefficient = 0.17, $p < 0.001$, $t = 5.03$); and perceived behavioral control on intention (path coefficient = 0.20, $p < 0.001$, $t = 6.32$). However, the effect of attitude on intention is not statistically significant (path coefficient = 0.12, $p > 0.05$, $t = 0.77$).

Regarding the moderating role of gender, we observed a significant moderating effect on the influence of subjective norms on intention (path coefficient = 0.04, $p < 0.05$, $t = 1.97$). We further analyzed the effects of subjective norms among male versus female workers. The effect of subjective norms is significant for male workers (path coefficient =

Table 3: Summary of Cross-factor Loadings

	SN	PBC	PU	PEOU	ATT	BI
SN-1	0.94	0.28	0.29	0.27	0.13	0.33
SN-2	0.94	0.28	0.29	0.24	0.11	0.30
SN-3	0.91	0.27	0.30	0.24	0.13	0.33
PBC-1	0.23	0.75	0.27	0.35	0.21	0.24
PBC-2	0.18	0.76	0.31	0.52	0.27	0.34
PBC-3	0.26	0.76	0.29	0.34	0.21	0.33
PU-1	0.25	0.29	0.76	0.41	0.30	0.37
PU-2	0.25	0.34	0.83	0.38	0.32	0.37
PU-3	0.28	0.32	0.86	0.39	0.31	0.42
PU-4	0.30	0.33	0.85	0.39	0.31	0.41
PU-5	0.23	0.29	0.85	0.39	0.30	0.42
PU-6	0.24	0.31	0.72	0.40	0.35	0.39
PEOU-1	0.19	0.46	0.36	0.79	0.27	0.44
PEOU-2	0.17	0.39	0.39	0.80	0.32	0.45
PEOU-3	0.25	0.44	0.43	0.84	0.32	0.49
PEOU-4	0.25	0.38	0.43	0.80	0.29	0.48
PEOU-5	0.23	0.47	0.35	0.81	0.28	0.44
PEOU-6	0.21	0.45	0.37	0.79	0.26	0.46
ATT-1	0.15	0.28	0.35	0.34	0.90	0.30
ATT-2	0.12	0.32	0.35	0.36	0.91	0.31
ATT-3	0.13	0.28	0.35	0.34	0.90	0.30
ATT-4	0.11	0.26	0.36	0.30	0.88	0.24
ATT-5	0.08	0.24	0.32	0.27	0.88	0.23
BI-1	0.28	0.38	0.47	0.53	0.31	0.85
BI-2	0.29	0.30	0.32	0.46	0.23	0.84
BI-3	0.31	0.35	0.45	0.48	0.25	0.88

Table 4: Latent Variable Correlations

	Square Root of AVE	SN	PBC	PU	PEOU	ATT
Subjective Norms (SN)	0.93					
Perceived Behavioral Control (PBC)	0.76	0.29				
Perceived Usefulness (PU)	0.81	0.32	0.39			
Perceived Ease of Use (PEOU)	0.80	0.27	0.54	0.48		
Attitude (ATT)	0.89	0.13	0.31	0.39	0.36	
Behavioral Intention (BI)	0.86	0.35	0.41	0.49	0.57	0.31

0.19, $p < 0.001$, $t = 5.53$) but insignificant for female workers (path coefficient = 0.11, $p = 0.16$, $t = 1.41$). The moderation of gender also is significant in the relationship between perceived usefulness and attitude (path coefficient = 0.07, $p < 0.05$, $t = 2.03$); again, a further analysis revealed that the moderating effect seems stronger for men (path coefficient = 0.32, $p < 0.001$, $t = 7.61$) than for women (path coefficient = 0.07, $p < 0.001$, $t = 3.78$). However, the moderating effects of gender on the other relationships are not statistically significant.

To examine whether the statistically insignificant results were due to a lack of power, we conducted post hoc power analyses using G-Power 3.1 [Faul, Erdfelder, Buchner, and Lang, 2009], with an effect size f^2 set to 0.02 for small effects, as suggested by Cohen [1988], and α equal to 0.05. We achieved a power of 0.93, which suggests it is not likely that the statistically insignificant results can be attributed to a limited sample size.

Overall, our results regarding gender effects contrast with some of those reported in previous studies [Venkatesh et al., 2003; Venkatesh and Morris, 2000]. The influence of subjective norms on behavioral intentions is stronger for men than for women, in contrast with several prior studies that suggest women tend to be more sensitive to others' opinions and find social influence more salient in the process they use to form intentions to use new technology (e.g., Venkatesh et al., 2003). In addition, our results show no significant effect of gender on the relationships between perceived usefulness and behavioral intention. In contrast, previous research suggests men have higher task orientation, such that the effects of perceived usefulness seemingly should appear more salient among men than women [Venkatesh et al., 2003]. In this vein, our result reinforces the importance of reexamining salient theoretical models in different socio-cultural contexts.

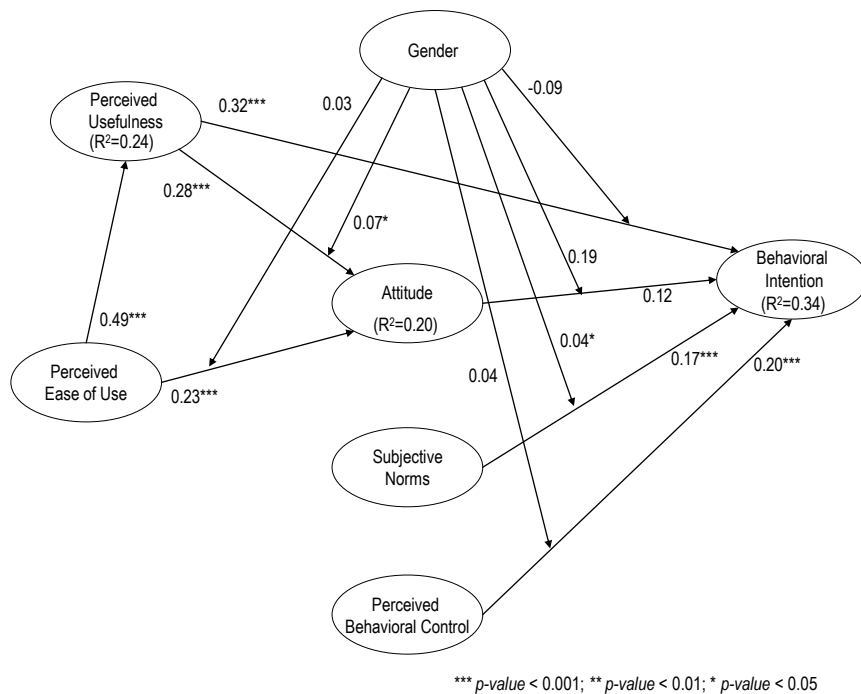


Figure 2. Model Testing Results

VI. DISCUSSION

Our results related to the direct effects of the intention antecedents are consistent with the findings of prior research [Chau and Hu, 2001; Davis, 1989; Venkatesh and Bala, 2008], with the exception of a mediating influence of attitude on the impact of perceived usefulness and perceived ease of use on intention. This finding echoes previous research results that suggest attitude is a weak mediator between beliefs and behavioral intentions in certain circumstances [Venkatesh and Davis, 2000; Venkatesh et al., 2003]. As a group, Arabian workers are not particularly savvy with computer technology, compared with their counterparts in developed countries; thus, they may place a greater emphasis on contextual factors, such as subjective norms and perceived behavioral control, when they determine whether to accept a technology in their work environment. This finding might be explained partially by the unique Arabian culture, which values group relationships and closely knit social structures, thereby increasing conformance pressures on people.

Our model, which derives from the TPB and TAM, offers reasonable utilities for explaining Arabian workers' acceptance of computer technology; it accounts for 34 percent of the variance in intentions to use it. Among the intention determinants we studied, perceived usefulness has the strongest influence on intentions, and perceived behavioral control exhibits the second strongest influence. The indirect effect of perceived ease of use also is greater than that of subjective norms, through perceived usefulness. Prior research has identified several situations in which perceived ease of use might not affect perceived usefulness or attitude; for example, healthcare professionals tend to be goal-oriented and place more emphasis on a technology's usefulness than its perceived ease of use when making technology acceptance decisions [Chau and Hu, 2001]. In our case, the tasks performed by ordinary workers may be less knowledge intensive, such that these workers need to use computer technology to perform their routine jobs. Thus, the technology's ease of use, as perceived by workers, influences their assessments of its usefulness and in turn affects their acceptance. Our results underscore the importance of creating favorable facilitating conditions in the work environment that help workers gain sufficient control over their use of computer technology. Social influences also matter; organizations should cultivate norms and atmospheres that foster technology acceptance among workers.

Gender moderates the impact of perceived usefulness on attitude, more prominently among male than female workers. Therefore, men appear to place more weight on a technology's usefulness than do women when shaping their attitudes. The importance of a technology's usefulness to male workers indicates a utility-centric view that stresses outcomes. For female Arabian workers, attitudes still depend on judgments of the technology's usefulness, but to a lesser extent and in combination with other (external) factors. Our comparative analysis shows that the most important intention determinant (i.e., perceived usefulness) is consistent between genders, but its effect magnitude is moderated by gender. Therefore, organizations should stress a technology's usefulness when introducing it to

male workers, then leverage the influences of supervisors and referent peers to foster acceptance among female workers.

Gender also moderates the influence of subjective norms on intentions, again more strongly among male than among female workers. This finding suggests, somewhat surprisingly, that male workers may be more sensitive to normative pressures and more motivated to comply. Thus, it highlights another interesting cultural difference between Arabian and Western workers; in the latter, men usually have substantial freedom and may be less affected by social pressures in their technology-acceptance decisions. Arabian men, though relatively more autonomous than Arabian women, seem more conscious of compliance with cultural traditions and the expectations of relevant others. Therefore, organizations must be mindful of the normative pressures and peer influences that exist in their environment when implementing a technology. The moderating role of gender is insignificant in the relationships between perceived usefulness and intention, between perceived ease of use and attitude, between attitude and intention, and between perceived behavioral control and intention. That is, the influences of these factors are consistent between genders; for example, ease of use has comparable importance in the attitude formation of male and female workers, and the training or resources an organization provides to facilitate the use of a technology is equally valued by all workers.

These findings offer several implications for research. First, our model explains a smaller portion of the variance in technology acceptance than those reported by prior studies examining the TPB or TAM in Western or developed countries, which typically account for 40 percent or more of the variance [Chau and Hu, 2002; Davis et al., 1989; Taylor and Todd, 1995a; Venkatesh and Davis, 2000]. Although the proposed model offers reasonable explanatory power for Arabian workers' acceptance of computer technology, our empirical results reveal several limitations of salient theoretical models, which in turn require investigations of additional factors that may determine unique cultural traits (e.g., religion, communication patterns, organizational citizenship behavior). Second, our results reinforce the important role of gender in technology acceptance by Arabian workers. Further investigations should scrutinize the gender differences traditionally expected in the Arabian socio-cultural system and assess their effects on individual users' technology acceptance.

For practitioners, our findings provide several important implications. First, increasing globalization requires both technology and business managers to appreciate cultural differences and understand their probable effects on technology-related issues. For example, noting the influences of subjective norms, managers might create an organizational atmosphere that cultivates positive attitudes toward the technology and provides adequate support to foster technology acceptance by targeted users. Second, the increasing role of female workers in the Arabian region [Metcalf, 2007] and the subtle differences in technology assessments by male versus female workers mean that managers need to develop strategies effective for each gender. According to our results, managers should consider ways to create positive norms in the organization to encourage technology acceptance among male workers. In addition, perceived usefulness is a critical acceptance driver, particularly for male workers, so managers should communicate the explicit benefits of a technology in relation to work tasks, as well as the costs associated with their use, such as ease of use and training requirements. To promote the use of a technology among female workers, managers may want to emphasize the organizational resources and support available to them.

VII. CONCLUSION AND FURTHER RESEARCH DIRECTIONS

We examine technology acceptance by Arabian workers and, building on the TPB and TAM, propose a model that focuses on gender effects. The results show that attitudes toward computer technology depend jointly on perceived usefulness and perceived ease of use; intentions to use a technology reflect perceived usefulness, subjective norms, and perceived behavioral control. Our findings also indicate that gender moderates the effect of social influences on workers' technology acceptance, as well as the impact of perceived usefulness on their attitudes toward the technology.

Accordingly, we contribute to existing technology acceptance research in several ways. First, we reexamine salient theoretical models (i.e., TPB and TAM) among Arabian workers whose socio-cultural background differs from those common to Western or other developed countries. Our empirical results show that the proposed model offers reasonable utilities for explaining the technology acceptance by workers in the Arabian region, though at a level lower than that observed among people in developed countries. The reduced explanatory power of the underlying theoretical models implies boundary conditions on the salient models' validity and applicability. Additional factors also influence people's attitudes, intentions, and technology use in this setting. Second, we empirically examine gender effects in Arabian workers' acceptance of computer technology. Gender seems to have a significant moderating effect on the influences of perceived usefulness on attitude, as well as the impacts of subjective norms on intention. However, the ways gender moderates the relationships are not consistent with the findings of several prior studies; our results mark an important divergence from those reported by prior research. We contribute to extant literature by pointing out the potential constraints of applying a salient, theoretical model directly to various

socio-cultural contexts without appropriate adjustments. The relationships posited by gender schema theories developed in Western cultures in particular require further reexaminations and refinements.

Third, our study contributes to extant literature by examining technology acceptance among less technologically savvy, ordinary workers in a developing country. By demonstrating an insignificant effect of attitude on intention, we confirm the importance of environmental factors (e.g., subjective norms, perceived behavioral control) in situations characterized by less technologically sophisticated users. Fourth, our study of Arabian workers reinforces the importance of the key acceptance antecedents (perceived usefulness, subjective norms, and perceived behavior control). Perceived ease of use is also important, though its influence on technology acceptance appears mediated by perceived usefulness. The exact effect magnitudes of previously tested antecedents differ across contexts; our results reveal the need to incorporate context-related factors to achieve a better understanding of the underlying process by which antecedents influence people's acceptance decisions. By combining the TPB and the TAM, we also respond to calls to include factors that pertain to individual, technology, and social-organizational contexts when examining technology acceptance [Chau and Hu, 2002].

However, several limitations of this study point to important research directions. Our results are derived from a single study that involves 1,088 individual workers from fifty-six organizations. Although this sample is reasonably representative of the overall workforce in Saudi Arabia, we cannot rule out self-selection biases. Our model test offers a reexamination of the TPB and TAM in a unique socio-cultural context, yet we consider only the antecedents suggested by these models. Further investigations should address a broader set of factors that might affect technology acceptance by Arabian workers directly or indirectly, such as management support, user training, incentives. Although our results imply reduced explanatory power of the models in various settings, we cannot generalize our results to other socio-cultural contexts. That is, the scope of our study targets computer technology and Arabian workers; for increased generalizability, additional studies should include different technologies and user groups. For example, professional individuals use specific information technologies and likely possess different characteristics than general workers using general computer technology, which should be investigated further. Moreover, we focus on gender effects because of the region's unique socio-cultural context. Continued research should consider other important cultural factors and use them to extend prevalent theoretical models, such as social normative beliefs, cultural values, level of utilitarianism, perceived cultural conflicts, power distance, collectivism, femininity versus masculinity, and uncertainty avoidance. Finally, we offer a cross-sectional snapshot of Arabian workers' technology acceptance. Other studies should consider longitudinal designs to analyze changes in attitude and technology use over time as users become more knowledgeable and experienced with computer technology.

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Editor's Note: The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the article on the Web, can gain direct access to these linked references. Readers are warned, however, that:

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APPENDIX A: QUESTION ITEMS

Subjective Norms (SN)

SN-1: Most people who are important to me think I should use computer technology.

SN-2: Most people who are important to me would want me to use computer technology.

SN-3: People whose opinions I value would prefer me to use computer technology.

Perceived Behavior Control (PBC)

PBC-1: I would be able to use computer technology.

PBC-2: I have the knowledge and ability to make use of computer technology.

PBC-3: Given the resources available for using computer technology, it would be easier for me to choose computer technology rather than any other means available.

Perceived Usefulness (PU)

PU-1: Using computer technology in my job would enable me to accomplish tasks more quickly.

PU-2: Using computer technology would improve my job performance.

PU-3: Using computer technology in my job would increase my productivity.

PU-4: Using computer technology would enhance my effectiveness on the job.

PU-5: Using computer technology would make it easier to do my job.

PU-6: I would find computer technology useful in my job.

Perceived Ease of Use (PEOU)

PEOU-1: Learning to operate computer technology would be easy for me.

PEOU-2: I would find it easy to get computer technology to do what I want it to do.

PEOU-3: My interaction with computer technology would be clear and understandable.

PEOU-4: I would find computer technology to be flexible to interact with.

PEOU-5: It would be easy for me to become skillful at using computer technology.

PEOU-6: I would find computer technology easy to use.

Attitude (ATT)

ATT-1: All things considered, my using computer technology is bad/good.

ATT-2: All things considered, my using computer technology is foolish/wise.

ATT-3: All things considered, my using computer technology is unfavorable/favorable.

ATT-4: All things considered, my using computer technology is harmful/ beneficial.

ATT-5: All things considered, my using computer technology is negative/positive.

Behavioral Intention (BI)

BI-1: I would use computer technology rather than any other means available.

BI-2: My intention would be to use computer technology rather than any other means available.

BI-3: To do my work, I would use computer technology rather than any other means available.

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