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Impact of Organizational Culture on Technology Use in a Developing Country

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ABSTRACT

Governments all over the world are spending millions in information technology to collect and distribute valuable information to their citizens. Unified Theory of Acceptance and Use of Technology (UTAUT) is a useful model for managers to assess the likelihood of acceptance of a new technology within an organization. In this paper, we consider organizational culture as an antecedent to the UTAUT model to evaluate factors that influence users' acceptance and use of the Internet technology. We investigated the role of organizational culture in the adoption of Internet technology in a government agency in a developing country, India. We found that organizational culture influences adoption of Internet technology. We also found that the UTAUT is a valid model that can explain technology adoption in a developing country.

Keywords

Organizational Culture, Technology Use, UTAUT, India

INTRODUCTION

In recent years, growth of the Internet and the World Wide Web has had an impact on the way local, state and national governments work. Use of information electronically in government, popularly known as e-government, is on the rise. E-government is described as the use of technology to enhance the access to, and delivery of, government services to benefit citizens, business partners and employees (Turban, King, Lee, Warkentin, & Chung, 2002). Digital government or e-government, often used interchangeably, is not just putting public services on line – it is about government harnessing information technology in order to remain relevant in a more interactive and more informational era (Tapscott & Agnew, 1999). E-governance in broader perspective encompasses all the key factors to governance – better delivery of government services to citizens, improved interactions with business and industry, employee and citizen empowerment through access to information, and more efficient management, i.e., the use of Internet infrastructure to transform delivery of government services. Four perspectives are used to understand e-government initiatives: e-business perspective to understand how the information and communication technologies are used to increase government services offered; end user i.e. citizen perspective; understanding employees' contributions to facilitate e-government processes (knowledge perspective); and process perspective to understand how government service delivery can be made more efficient (Devadoss, Pan, & Huang, 2002).

Carter and Belanger (2003) identify common characteristics between e-government and e-commerce as both use the Internet to facilitate exchange of information, goods and services between parties. They also list some differences between e-government and e-commerce: access, structure and accountability. Also, while e-businesses can choose their customers, e-government organizations usually are expected to serve the entire eligible citizens. Caudle et al. (1991) also cite environmental, organization transaction related and internal structure related differences between public and private enterprises.

E-government offers several benefits including increased availability and access to services by citizens at lower costs, increased possibility of collaborations among various government entities cost-effectively and increased anonymity to the citizen while availing of the services (Song, Rao, & Braynov, 2004). Prattipati (2003) reported that there are wide differences in the adoption of e-governance and use of online government services among countries, even though 98% of the governments all over the world have web sites (World e-government rankings, 2010). Highest use of government online services in 2010 was in The Republic of Korea followed by the U.S., while India was ranked at 119 (World e-government rankings, 2010).

The National Association of Software and Services Companies (Nasscom) estimates that the e-governance market in India in 2002 was about Rs 1,400 crores or approximately USD 300 million (Giving e-Governance, 2003). Internet users in India grew from about 6 million in 2001 to 18 million by 2003 (Internet Usage, Dec 2003) to about 50 million in early 2005 (India: Internet Users, 2005), compared to 201 million Internet users in US (North America Internet, Feb 5, 2005). According to Nasscom estimates, state governments and the Central government combined spent \$890 million towards e-governance in 2001-02, a number which is expected to reach \$6 billion in 2007-08. There are some interesting experiments of e-governance undertaken at States level in India, which bear the testimony as to how IT is being conceived as an important agenda of public administration in India. However, it is long way to go. According to a recently released report by the Center for Public Policy at Brown University (West, 2002), India ranked 59th in the order of e-government ranking. According to Gartner Research, only 10 percent of the government bodies around the globe will be able to move towards e-government by 2005. India is lagging behind due to poor infrastructure and the slow response to the emerging cyber-culture (Bagga, 2004).

In this research, we examine the factors that influence adoption of Internet technology in a government organization in India. We use an integrated model, the Unified Theory of Acceptance and Use of Technology, also known as the UTAUT model, to evaluate user acceptance of Internet technology in a governmental organization.

This research paper is organized as follows. In the next section we present a review of literature on information technology adoption. Then, we propose a research model for this study. In the next section on research methodology we describe the sample used, data collection methods and analysis techniques. We present our results in the next section, followed by discussion and conclusion.

LITERATURE REVIEW

The Technology Acceptance Model (Davis, Bagozzi, & Warshaw, 1989; Venkatesh & Davis, 1996; Venkatesh & Davis, 2000), popularly known as the TAM, has been widely used in the information systems literature to explain individual adoption of information technology. In the 1990's, a number of studies either extended the model by identifying antecedents to technology acceptance or have replicated and validated the model. The TAM was the basis for a newer integrated model, UTAUT. In the following paragraphs we present an overview of the TAM and then the UTAUT model. Then we review literature that has investigated the role of organizational culture in information systems research.

TAM was adapted from Azjen and Fishbein's (1980) Theory of Reasoned Action (TRA), a theory in the field of social psychology, to model user acceptance of information systems. "The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end-user computing technologies and user populations..." (Davis 1989, p 985). The TAM uses variables from the TRA to explain an individual's voluntary use of information technology. Davis proposed that perceived ease of use and perceived usefulness are the two factors that affect an individual's attitude towards using technology. Attitude towards using technology affects an individual's intention to use information technology, and this, in turn, influences actual use. After finding limited support in his original model, Davis (1989) dropped the attitude variable, revised the original TAM to include the constructs: perceived ease of use, perceived usefulness, behavioral intention to use, and actual system use (Szajna, 1996). Perceived usefulness (PU) is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context. Perceived ease of use (PEOU) is defined as the degree to which a prospective user expects the target system to be free of effort (Davis et al., 1989). In short, TAM states that PU and PEOU affect behavioral intention to use a system, which in turn affects actual use.

One of the latest technology acceptance models, the Unified Theory of Acceptance and Use of Technology (UTAUT), synthesized elements across eight well known technology acceptance models: the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model (MM), the theory of planned behavior (TPB), the combined TAM and TPB, the model of PC utilization (MPTU), the innovation diffusion theory (IDT) and the social cognitive theory (SCT). The objective of the UTAUT was to achieve a unified view of user acceptance (Venkatesh, Morris, Davis, & Davis, 2003; Stafford, Stafford, & Schkade, 2004; Taylor, 2004). The resulting unified model consists of four core components or determinants of intention and usage (these are described later). The model is claimed to be a useful tool for managers to assess the likelihood of acceptance of a new technology within an organization. It also helps in understanding factors that drive acceptance of a new technology, so that appropriate features can be designed to facilitate acceptance of a new technology by users.

Organizational Culture and Information Systems

Culture refers to values and beliefs of individuals within a unit. It is also considered to be the totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thought characteristic of a community or population (Ein-Dor, Segev, & Orgad, 1993). There are a number of definitions of culture. Hofstede et al (1990) state, "There is no consensus about its definition, but most authors will probably agree on the following characteristics of the organizational/corporate culture construct: it is (1) holistic (2) historically determined, (3) related to anthropological concepts, (4) socially constructed, (5) soft, and (6) difficult to change."

Culture is based on the unit of analysis; the unit could be a nation, organization, profession, functional area or a team. Therefore, depending on the unit, culture can be categorized into different types: national culture, organizational culture, professional culture, functional culture and team culture. A number of studies in the information systems literature have examined the role of national culture. Culture plays a unique role in technologies such as the Internet and trans-national or global information systems, systems that provide information and services to individuals and organizations in different countries, with different cultures. Studies have explored the effect of cultural differences on the motivation of analysts and programmers Couger (1986), design of information systems (Choe, 2004; Ein-Dor et al., 1993) and technology acceptance (Straub, Keil, & Brenner, 1997).

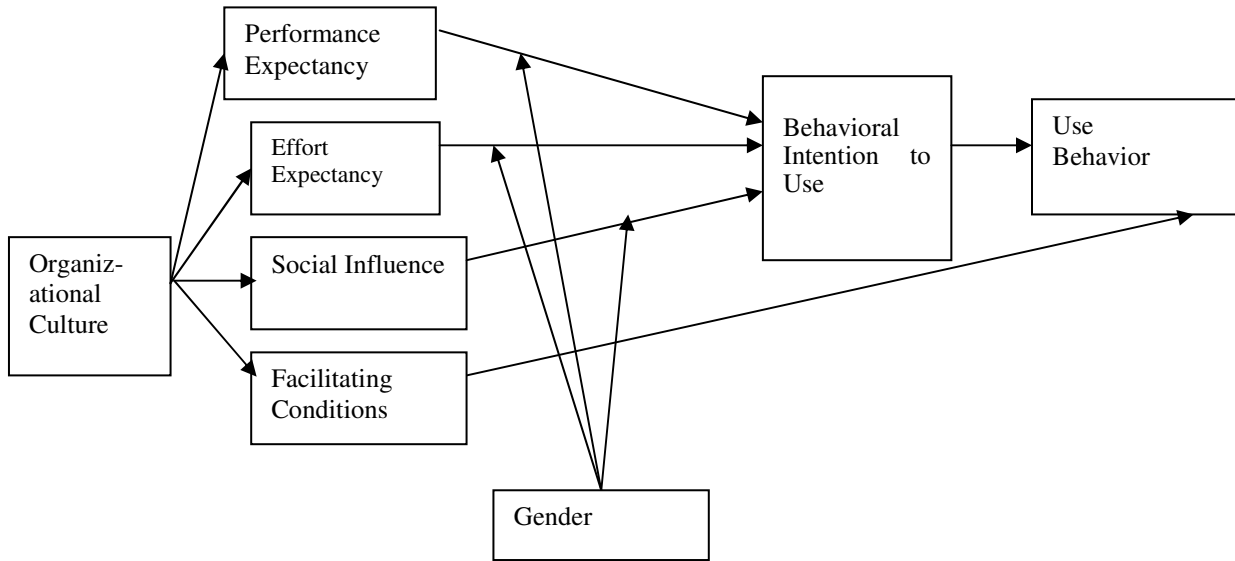
An individual's work behavior is influenced by a various cultural norms, ranging from supranational, national, organizational to professional cultures. Each of these cultures levels, though, is not equally predominant for various task behaviors at work place. Relative influence of organizational and professional culture may be stronger for work behaviors that are task focused and require strong competency and practices of individual in an organization (Karahanna, Evaristo and Srite, 2005). Recent studies in the area have looked at culture at the organizational level, the focus of this research. Organizational culture refers to common values and beliefs shared by individuals within an organization (Punnett & Ricks, 1990). Boynton and Zmud (1987) recommended that organizations should evaluate the importance of organizational culture and its impact on information technology planning. Researchers have investigated the role of organizational culture on absorptive capacity and information technology success (Harrington & Guimaraes, 2005), information technology adoption and diffusion (Dasgupta, Agarwal, Ioannidis, & Gopalakrishnan, 1999), information technology implementation (Fedrick, 2001; Harper & Utley, 2001), information technology infrastructure flexibility (Syler, 2003) and user computer efficacy (Sheng, Pearson, & Crosby, 2003). Other studies have looked at impact of organizational culture on specific technologies such as knowledge management (Gold, Malhotra, & Segars, 2001) and implementation of data warehouses (Doherty & Doig, 2003).

It is important to note here that organizational culture has been operationalized in a number of different ways in the research literature. Most have operationalized culture as a second order construct. Etzioni (1975) explained organizational culture using two dimensions: involvement and participation. Organizations can be classified into three types - coercive, utilitarian and normative organizations based on these two dimensions. Cameron and Quinn (1999) used the dimensions of flexibility/stability and internal/external focus to classify organizations into four types: clan which has flexibility and internal focus, adhocracy with flexibility and external focus, hierarchy with stability and internal focus, and market which is characterized by stability and external focus. Denison and Mishra (1995) identified four traits of organizational culture: involvement, consistency, adaptability, and mission. We use these four traits as second order constructs for organizational culture. Detailed descriptions of these constructs are provided in the research model section.

RESEARCH MODEL AND HYPOTHESES

In the previous sections we have provided a justification for research into adoption of Internet technology in a governmental organization in a developing country, and reviewed literature on models that are used to understand user acceptance and use of information technology. In this section we present the model we use for modeling Internet use, the UTAUT model. The UTAUT identified seven factors that influence use of information technology. They are: performance expectancy, effort expectancy, and attitude toward using technology, social influence, facilitating conditions, self-efficacy, and anxiety. We list the definitions provided by Venkatesh et al (2003). Performance expectancy is the degree to which an individual believes that using the system will help her to attain gains in job performance. Effort expectancy is the degree of ease associated with the use of the system. Social influence is the degree to which an individual perceives that important others believe she should use the new system. Facilitating conditions refer to the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Recent studies also suggest that the adoption and use of a new technology in an organization might be influenced by organizational culture (Karahanna, Evaristo & Srite, 2005).

Figure 1: Organizational Culture and The Unified Theory of Acceptance and Use of Technology Model



In this study we propose organizational culture is an important antecedent to the UTAUT. Figure 1 graphically represents our research model, the UTAUT model. It is important to note the only four of the seven factors listed above are represented in the model. The reason is that some of the factors identified above are not expected to impact the intention to use the system. In our study, the intention to use refers to the extent to which individuals would like to use Internet technology in a governmental organization. Gender, experience, age and voluntariness of use were identified as moderating variables in the original UTAUT; we have controlled for age, experience and voluntariness, and therefore, removed them from the model.

Denison and Mishra (1995) identified four traits of organizational culture: involvement, consistency, adaptability, and mission. Involvement refers to the extent of participation in the organization. More the involvement of an individual within an organization, greater is the sense of ownership and responsibility. Consistency provides an implicit control system based on internalized values within the organization. It represents the degree of normative integration. Adaptability is a reflection of the norms and beliefs in the organization and provides the capacity for internal change in response to external conditions. Mission trait provides purpose and meaning and long-term vision. We use these four traits, involvement, consistency, adaptability and mission as constructs for organizational culture. In this study, we examined the use of Internet technologies in a government agency. We believe that these individual traits will impact an individual's perception of the ease of use and usefulness of the Internet. That is, we propose that organizational culture is an antecedent to the UTAUT. We use the terms Internet technology and system interchangeably in this paper.

Therefore, we state our set of hypotheses regarding organizational culture and hypotheses from the traditional UTAUT model, as follows:

- H1: Organizational culture will have a significant impact on performance expectancy.
- H2: Organizational culture will have a significant impact on effort expectancy.
- H2: Organizational culture will have a significant impact on social influence.
- H4: Organizational culture will have a significant impact on the facilitating conditions.

We now propose another set of hypotheses based on the original UTAUT model.

- H5: The influence of performance expectancy on behavioral intention will be moderated by gender.
- H6: The influence of effort expectancy on behavioral intention will be moderated by gender.
- H7: The influence of social influence on behavioral intention will be moderated by gender.
- H8: Facilitating conditions will have an impact on usage of the system.
- H9: Behavioral intention will have a significant positive effect on usage of the system.

As mentioned earlier, systems here refer to Internet-based technologies available to individuals in government organization. In this section we have described our proposed model and hypotheses. In the next section we present our research methodology including details of our sample, data collection and analysis.

METHODOLOGY

Sample

This study is aimed at understanding how employees in a government organization, Wildlife Institute of India (WII) use Internet technologies, and how can the acceptance and use of these technologies be enhanced equitably across government organizations. Wildlife Institute of India (WII) was established in 1986 as a non-profit autonomous Institute of the Ministry of Environment and Forests, Government of India. WII’s mandate is to provide research, training and advisory services in wildlife management and nature conservation to officers in various Indian government services including Indian Administrative Services, Indian Army, Customs and to sensitize people at various strata for nature conservation. WII also collaborates with international organizations such as the UNESCO, Food and Agricultural Organization and US Fish and Asian countries like Nepal, Bhutan, China, Sri Lanka, Afghanistan, Cambodia, Laos and Vietnam. WII is supported by the Central Ministry of India (equivalent to federal government in US) in its technology investment to facilitate WII objectives.

For this study, authors designed the survey and then conducted a pilot study with 5 employees in a department at another government organization in India to test the design efficacy of the survey. Pilot study did not suggest any major changes to the survey research questions except for some minor changes to language in a few questions. After finalizing the research questions, a survey was conducted at WII in India by distributing paper-based surveys to employees over several days. Out of the 110 surveys that were distributed, a total of 102 completed surveys were returned with a return rate of almost 93%. One of the reasons for these high surveys return rate was that one of the authors was able to spend several weeks at the government agency.

Data Collection

A survey questionnaire was used to collect data regarding use of Internet technologies in an e-government setting in India. The questionnaire consisted of 57 items. In addition to demographic information, this paper-based questionnaire collected data from individual users of Internet-based technologies on a number of constructs identified in the research model. These constructs included: organizational culture, performance expectancy, effort expectancy, facilitating conditions, social influence, behavioral intention to use, and actual use. Organizational culture was operationalized as a second order construct that consisted of four traits adaptability, mission, involvement and consistency (Denison & Mishra, 1995). Earlier research had validated measures for each of the constructs and we decided to include those validated items in our questionnaire. We used this questionnaire to collect data from 102 individuals in a government agency.

RESULTS AND DISCUSSION

We used regression models to analyze the data. We ran separate regressions to test the effect of organization culture on performance expectancy, effort expectancy, social influence and facilitating conditions. We did the same when we considered the effect of performance expectancy, effort expectancy, social influence and facilitating conditions on the dependent variables: intention to use and actual use.

Hypothesis	Dependent Variable	R ²	F-value	Independent Variable	Coefficient
H1	Performance Expectancy	0.129	3.58***	Involvement	0.078
				Consistency	0.070
				Adaptability	-0.240**
				Mission	0.279**
H2	Effort Expectancy	0.107	2.92**	Involvement	0.064
				Consistency	0.068
				Adaptability	-0.101
				Mission	0.205*

H3	Social Influence	0.190	5.70****	Involvement	0.227**
				Consistency	-0.044
				Adaptability	-0.112
				Mission	0.231**
H4	Facilitating Conditions	0.272	9.05****	Involvement	0.131
				Consistency	0.301**
				Adaptability	-0.071
				Mission	0.005

*p-value < 0.1 **p-value < 0.05, ***p < 0.01, ****p < 0.001; N.S. = Not significant

Table 1: Results of Regression Analysis – Organization Culture Variables

Table 1 provides results from regression analysis. In short, our results show that organizational culture influences information technology adoption. We found support for Hypothesis 1. The adaptability and mission cultural traits have a significant impact on performance expectancy. While mission has a positive influence on performance expectancy, adaptability has a negative impact. Only mission has a positive impact on effort expectancy. Involvement and mission cultural traits influence social influence. The only cultural trait that has an effect on facilitating conditions is consistency. In short, our results show that organizational culture affects Internet technology adoption. This also supports existing literature in the area of culture and information systems (Dasgupta et al., 1999; Doherty & Doig, 2003; Harper & Utley, 2001; Harrington & Guimaraes, 2005).

Hypothesis	Dependent Variable	R ²	F-value	Independent Variable	Coefficient
H5	Behavioral Intention	0.054	2.64*	Performance Expectancy	0.317**
				Gender	0.192
H6	Behavioral Intention	0.109	5.71**	Effort Expectancy	0.487**
				Gender	0.124
H7	Behavioral Intention	0.078	3.96**	Social Influence	0.443**
				Gender	0.262
H8	Usage	0.034	3.44*	Facilitating Conditions	0.154*
H9	Usage	0.006	0.54	Behavioral Intention	0.071

*p-value < 0.1, **p-value < 0.05, ***p < 0.01, ****p < 0.001; N.S. = Not significant

Table 2: Results of Regression Analysis – UTAUT Variables

We also found support for the traditional UTAUT. Our results show that Hypotheses 5, 6, and 7 are supported. That is, performance expectancy, effort expectancy and social influence impact the behavioral intention to use the system. Facilitating conditions also positively influence usage (Hypothesis 8). But, we did not find a relationship between intention to use and actual use (Hypothesis 9). One of the reasons for this could be the fact that Internet technology was already implemented in the organization when we conducted this study. Intention to use is relevant in situations where the technology is very new and the users have not used it, which was not the case here. We also did not find that gender had any significant effect in the model, i.e., there is no difference in the acceptance and use of the Internet technologies among men and women in the

organization. Considering all the results, we can say that the UTAUT, which was primarily proposed and tested in a developed country, can also explain information technology acceptance in a developing country such as India.

CONCLUSION

Our results show that organizational culture has an impact on individual acceptance and use of Internet technology in a government agency in developing country. This implies that organizational culture should be carefully managed for the successful adoption and diffusion of Internet and other technologies. Moreover, greater emphasis should be placed on increasing the capacity for change if the organizational culture promotes stability. Change management techniques may be used to help organizations handle change better.

We believe that we have made a valuable contribution to the literature in the area of cultural research in information systems. We recommend additional research in governmental and non-governmental organizations in different countries for further inquiry into the acceptance and use of Internet technologies.

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