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Subhasish Dasgupta
George Washington University, dasgupta@gwu.edu

Babita Gupta
California State University Monterey Bay, babita_gupta@csumb.edu

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Espoused Organizational Culture Traits and Internet Technology Adoption

Subhasish Dasgupta
George Washington University
dasgupta@gwu.edu

Babita Gupta
California State University Monterey Bay
babita_gupta@csumb.edu

ABSTRACT

The Technology Acceptance Model, popularly known as the TAM, has been widely used in the information systems literature to explain individual adoption of information technology. In the late 1990's, and the early part of this century, a number of studies either extended the model by identifying antecedents to technology acceptance or have replicated and validated the model. An aspect that has captured the interest of information systems researchers is the role of culture in the acceptance, adoption, and diffusion. We examine the role of espoused organizational culture traits in technology acceptance, adoption and diffusion, that is, we consider organizational cultural values to be antecedents of TAM. We empirically test this model in an e-government setting in a developing country and report on our findings.

Keywords

Information Technology acceptance, Organizational culture, Internet, Information technology adoption

INTRODUCTION

With the Internet now accepted widely as a new medium of communication, public sector organizations are also impacted by it. E-government is described variously as the use of technology to enhance the access to and delivery of government services to benefit citizens, business partners and employees (Turban et al. 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 et al. 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 et al. 2002).

In this paper, we explore the role of organization culture traits in the acceptance of Internet technology by individuals in an e-government setting in a government agency in India. 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 (approx US $300 million). 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).

The role of organization culture, also referred to as corporate culture, in the acceptance of information technology is important. 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 et al. 1993). Therefore, depending on the unit, culture can be categorized into different types: national culture, organizational culture, professional culture, functional culture and team culture. In recent years, information systems researchers have started exploring this role of culture in the adoption and diffusion of information systems. Other studies have investigated the role of organizational culture on information systems planning. In short, culture,

both organizational and national, is a variable of interest in information system studies. In this paper we focus on organizational culture traits and its impact on Internet technology adoption and diffusion.

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 conclusion.

LITERATURE REVIEW

The Technology Acceptance Model (Davis et al. 1989; Venkatesh et al. 1996; Venkatesh et al. 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. In the following paragraphs we present a review of the TAM literature in three parts. First, we present the original TAM as proposed by Davis. Second, we examine how TAM has been extended by the addition of variables.

Davis (1986) adapted 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 rage 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.

A number of studies have tested the Technology Acceptance Model. Adams et al (1992) validated TAM using two studies. First they examined users' acceptance of two messaging technologies: voice mail and electronic mail. In a second study, Adams et al (1992) explored the use of three software packages. Their results validated the original scales for the measurement of perceived usefulness and perceived ease of use, and they found support for the original TAM. Szajna (1996) validated TAM using a longitudinal examination of e-mail use by graduate students. Using a pre-implementation and post-implementation approach they found support for the TAM. They also reported high reliability for all the constructs in the model.

Studies have extended the TAM by identifying some external variables that influence perceived ease of use and perceived usefulness in the model. As mentioned earlier, the original TAM was designed to explain voluntary use of technology. Venkatesh and Davis (2000) extended the original TAM to include mandatory uses of information systems as well. This model is referred to as the TAM2 model. Venkatesh and Davis added independent variables such as subjective norm, image, job relevance, output quality, and result demonstrability as independent variables that influence perceived usefulness to the original TAM. Subjective norm was defined as a person's perception that most people who are important to her think she should or should not perform the behavior in question. The relation between subjective norm and perceived usefulness of the system was moderated by experience and voluntary nature of use.

Other external variables that have been studied include intrinsic motivation (Venkatesh 1999), computer self-efficacy, objective usability and experience (Venkatesh et al. 1996). In a combined study that examined all these external factors together, Venkatesh (2000) evaluated determinants of perceived ease of use by using anchors and adjustment-based factors that influence perceived ease of use. Anchors are general beliefs about computers and computer usage, whereas, adjustments are beliefs that are shaped based on direct experience with the target system. This study found that anchors such as control, intrinsic motivation, and emotion are early determinants of the ease of use. Here control was operationalized as computer self-efficacy and facilitating conditions, intrinsic motivation as computer playfulness, and emotion as computer anxiety. All these external variables were found to influence perceived ease of use. This supported an earlier study that concluded, "…an individual's perception of a particular system's ease of use is anchored to her or his general computer self-efficacy at all times, and objective usability has an impact on ease of use perceptions about a specific system only after direct experience with the system" (Venkatesh and Davis, 1996, page 451).

While almost all studies in the information systems literature report support for the TAM, a few studies did not find support for part of the model. In a study of broker workstations, Lucas and Spitler (1999) added system-based variables such as perceived system quality and norms to the TAM. They also identified two control variables, workload and prior performance. They found that the main variables of TAM were not significant determinants of adoption of Windows-based broker workstations. Variables not in the original TAM such as social norms and prior performance influenced adoption and performance. Geffen and Struab (2000) examined the TAM literature and concluded that the relationship between perceived ease of use and usefulness is tenuous at best. Some studies in the literature reported that perceived ease of use has a significant positive impact on perceived usefulness, whereas, others failed to identify the relationship.

Organizational Culture, Cultural Values 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 et al. 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, members of a 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 (1986), design of information systems (Choe 2004; Ein-Dor et al. 1993) and technology acceptance (Straub et al. 1997).

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 et al. 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 et al. 2005), information technology adoption and diffusion (Dasgupta et al. 1999), information technology implementation (Fedrick 2001; Harper et al. 2001), information technology infrastructure flexibility (Syler 2003) and user computer efficacy (Sheng et al. 2003). Other studies have looked at impact of organizational culture on specific technologies such as knowledge management (Gold et al. 2001) and implementation of data warehouses (Doherty et al. 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.

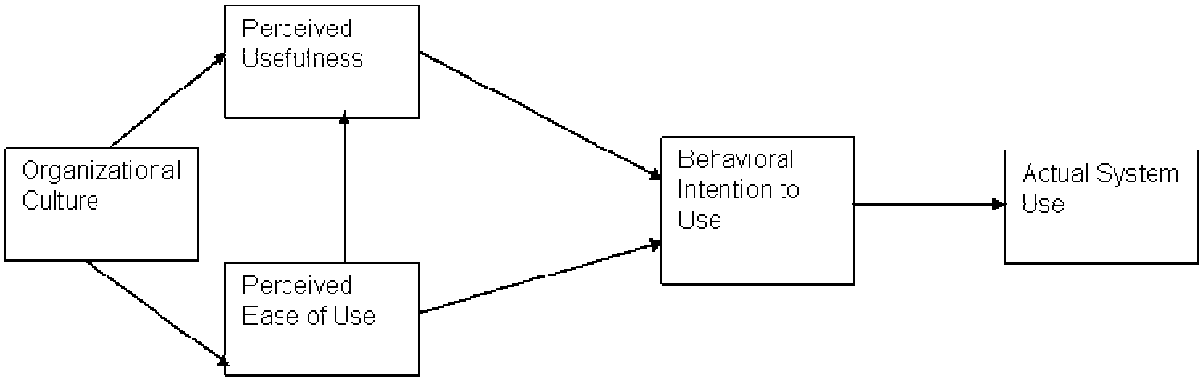
Denison and Mishra (1995) identified four traits of organizational culture: involvement, consistency, adaptability, and mission. Involvement refers to the extent of participation in the organization. More the involvement of an individual within an organization, greater is the sense of ownership and responsibility. 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. We examine espoused cultural values in this study and our unit of analysis is the individual.

In this study, we contribute to literature in the area by exploring the impact of organizational culture traits on adoption of information technology in a developing country. We use the Technology Acceptance Model (TAM) as the theoretical basis for our research model. Details of our research model and hypotheses are provided in the next section.

RESEARCH MODEL AND HYPOTHESES

The Technology Acceptance Model proposes that a number of factors influence an individual's acceptance of an information system. It states that external variables influence perceived ease of use and perceived usefulness of an information system. Perceived usefulness and ease of use, in turn, impact an individual's intention to use and actual use of the system. In this study we propose that organizational culture is an important antecedent to the original TAM. Figure 1 below represents the research model for our study.

Figure 1: Organizational Culture Traits and Technology Acceptance



In our literature review we have found that prior studies in the field have found that organizational culture has an impact on information technology adoption, implementation and success (Dasgupta et al. 1999; Doherty et al. 2003; Harper et al. 2001; Harrington et al. 2005). In this study we examine the use of Internet technologies in a government agency in a developing country, India. We believe that individual cultural traits such as mission, involvement, consistency and adaptability will impact an individual's perception of the ease of use and usefulness of the Internet. That is, we propose that culture is an antecedent to the traditional TAM. We use the terms Internet technology and system interchangeably in this paper. Therefore, we state our first set of hypotheses as follows.

H1a: Organizational culture will have a significant influence on perceived ease of use of the system.

H1b: Organizational culture will have a significant impact on the perceived usefulness of the system.

In addition to our hypotheses regarding culture, we have hypotheses from the traditional TAM model. They are as follows.

H2: Perceived ease of use will have a significant effect on perceived usefulness of the system.

H3: Perceived ease of use will have a significant effect on behavioral intention to use the system.

H4: Perceived usefulness will have a significant effect on behavioral intention to use the system.

H5: Behavioral intention to use will have a significant impact on actual use of the system.

As mentioned earlier, systems here refer to Internet-based technologies available to individuals in government. 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 use Internet technologies, and how can the acceptance and use of these technologies be enhanced equitably across government organizations. For this study, authors designed the survey and then conducted a pilot study with 5 employees in a department at another government organization 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 the government organization 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 this high survey return rate was that one of the authors was able to spend several weeks at the government agency and therefore, was able to individually meet and administer the survey to each employee, and was able to remind them several times in person to complete the survey.

This study surveyed a sample of 102 employees in government organization to gather quantitative data. The sample consisted overwhelmingly of males (82%). Sample had about 66% of employees between the ages of 30-49 years of age with about 10% above the age of 50. 44% of employees have been with the organization for more than 10 years. About 12% of employees in the sample belong in senior management, 25% in middle management, 15% in the IT department, 21% as researcher/post graduate students and the rest 27% are in staff positions, as described their job functions.

Most employees have been using the computers and the Internet for more than one year (95% and 90% respectively). Also, twenty-five percent of employees use Internet regularly for four to eight hours per day, while seventy-two percent indicated that they use the Internet daily for one to three hours. There are employees who are not using the Internet at all (3%). Of the ninety-seven percent employees who do use Internet, seventy percent use it to communicate with other employees within the organization.

Data Collection

A survey questionnaire was used to collect data regarding use of Internet technologies in a government organization 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, perceived ease of use (PEOU), perceived usefulness (PU), 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 et al. 1995). This research had validated measures for each of the constructs and we decided to include those validated items in our questionnaire. We used the questionnaire to collect data from 102 individuals in a government agency in India.

Analysis

In our analysis of the data, we first created a correlation matrix (see Table 1). Results from the correlations matrix showed that there are a few correlations that were high. We found that the correlation between perceived ease of use and perceived usefulness, and between the mission trait and consistency trait of organization culture were over the 0.70 threshold. To avoid multicollinearity, we ran separate regression models for perceived ease of use and usefulness. Results of our analysis are presented in the results section.

	Mean	S.D.	Reliability	1	2	3	4	5	6	7
1. Involvement	4.69	1.46	0.73	1.000						
2. Consistency	4.89	1.55	0.71	0.607***	1.000					
3. Adaptability	4.50	1.42	0.75	0.548***	0.600***	1.000				
4. Mission	5.62	1.48	0.72	0.616***	0.718***	0.591***	1.000			
5. PEOU	5.62	1.14	0.73	0.271**	0.283**	0.197*	0.316**	1.000		
6. PU	5.24	1.18	0.75	0.231*	0.263**	0.023	0.318**	0.726***	1.000	
7.Intention to Use	5.10	1.62	0.78	0.237*	0.174	-0.041	0.106	0.322**	0.285**	1.000

*p < 0.05; **p < 0.01; ***p < 0.001; PEOU = Perceived Ease of Use; PU = Perceived Usefulness

Table 1: Correlation Matrix

RESULTS

Table 2 below provides results from regression analysis. We found support for all our hypotheses except for H5. We now examine each of our results carefully. In hypotheses 1a and 1b, we examined the relationship between culture and perceived

ease of use and usefulness. We ran a step-wise regression with backward elimination with all the four cultural traits as the independent variables. Our results showed that the mission trait had a significant impact on perceived ease of use, and two traits: mission and adaptability had a significant influence on perceived usefulness of Internet technologies in the government agency. The mission trait refers to the purpose and meaning and long term vision. Our findings show that higher the sense of purpose and long term vision, higher the perceived ease of use and perceived usefulness of the Internet. The adaptability cultural trait is a reflection of the norms and beliefs in the organization and provides the capacity for internal change in response to external conditions. In our research we found that the adaptability trait negatively affects perceived usefulness of the technology. Government agencies are known to have stable cultures that resist change, therefore, our findings seem to suggest that due to the lack of capacity for internal change employees in the government agency found the new technology less useful. In short, our results show that organizational culture influences information technology adoption. This supports existing literature in the area of culture and information systems (Dasgupta et al. 1999; Doherty et al. 2003; Harper et al. 2001; Harrington et al. 2005).

Hypothesis	**Dependent Variable**	**R^2**	**F-value**	**Independent Variable**	**Coefficient**
H1a	PEOU	0.099	11.10**	Mission	0.244**
H1b	PU	0.143	8.26***	Adaptability Mission	-0.211** 0.373***
H2	PU	0.527	111.20***	PEOU	0.749***
H3	Intention to Use	0.104	10.86**	PEOU	0.476**
H4	Intention to Use	0.082	8.34**	PU	0.409**
H5	Use	0.006	N.S.	Intention to Use	N.S.

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

Table 2: Results of Regression Analysis

We also found support for the traditional TAM. We found that perceived ease of use influences perceived usefulness. An individual's intention to use Internet technologies is affected by both perceived ease of use and perceived usefulness of the system. But, we did not find support for hypothesis 5. This is in line with recent TAM research where the intention to use construct was removed from the model. Therefore, we can say that perceived ease of use and perceived usefulness of Internet technology have a positive impact on the intention to use the technology. TAM, which has been widely tested in developed countries with a variety of technologies (Davis et al. 1989; Szajna 1996; Venkatesh 2000; Venkatesh et al. 2000; Venkatesh et al. 2002), can also explain information technology acceptance in a developing country.

CONCLUSION

Our results show that organizational culture traits have an impact on the individual acceptance and use of Internet technologies in a developing country. It is clear that the mission trait of organizational culture is dominant during adoption of technology. This can be attributed to the public service role that most government organizations play – government agencies have mission of public service. This drives the adoption of new technologies such as the Internet. Moreover, organizations should pay more attention to the capacity for internal change. Higher the capacity for change, greater is the use of technology. In short, organizational culture should be carefully managed for the successful adoption and diffusion of Internet and other technologies. We also found that the Technology Acceptance Model can also be used to explain information technology adoption in a developing country.

Every study has its limitations, and ours is no exception. Our study considers information technology adoption in one government agency in a developing country. Although we had a relatively large sample size for our study, data from additional companies in the private and public sectors would have been valuable. Secondly, Internet use information was a

perceived measure and reported by individuals themselves. Although difficult to obtain, actual use data would have been more helpful.

We believe that we have made a valuable contribution to the literature in the area of organizational culture research in information systems. There are a number of areas where additional research is recommended. Research in the future should examine the role of other independent variables such as education, computer efficacy, and gender in information technology adoption in developing countries. We also recommend additional technology-acceptance research in governmental and non-governmental organizations. Additional models of information technology adoption such as the Theory of Planned Behavior (TPB) and the Unified Theory of Acceptance and Use of Information Technology (UTAUT) should be also used to examine information technology adoption in developing countries.

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