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Factors Influencing Citizen Adoption of E-Government: A Review and Critical Assessment

H. Patel

D. Jacobson

FACTORS INFLUENCING CITIZEN ADOPTION OF E-GOVERNMENT: A REVIEW AND CRITICAL ASSESSMENT

Abstract

E-government is a relatively new branch of study within the Information Systems (IS) field. This paper examines the factors influencing adoption of e-government services by citizens. Factors that have been explored in the extant literature present inadequate understanding of the relationship that exists between 'adopter characteristics' and 'behavioral intention' to use e-government services. These inadequacies have been identified through a systematic and thorough review of empirical studies that have considered adoption of government to citizen (G2C) electronic services by citizens. This paper critically assesses key factors that influence e-government service adoption; reviews limitations of the research methodologies; discusses the importance of 'citizen characteristics' and 'organizational factors' in adoption of e-government services; and argues for the need to examine e-government service adoption in the developing world.

1 INTRODUCTION

E-government is a relatively new area of study in the Information Systems (IS) field that is concerned with use of ICT by the government agencies to electronically deliver its services (The World Bank Definition). According to Carter and Belanger (2005) the relationship of government with recipients of its electronic services is characterized as; government to citizen (G2C), government to business (G2B); government to employees (G2E); government to government (G2G). In a comprehensive review of the e-government studies within above mentioned relationships, Titah and Barki (2006) concluded that the most e-government studies fall under five distinct categories that explore the influence of; a) managerial practices, b) individual and organizational characteristics, c) IT characteristics, d) measurement of e-government, e) government subcultures; on e-government adoption. In a G2C context, the focus of this paper is on influence of individual and organizational characteristics on e-government adoption.

There are number of empirical studies undertaken in different countries to study e-government adoption: for example, Singapore (Fu et al. 2006); The Netherlands (Horst et al. 2007); Turkey (Akman et al. 2005); USA (Carter and Belanger 2005). Each study contributes in providing a strong theoretical understanding of the factors explored in their research model (also refer to table 2). The early adoption of ICT and higher levels of awareness regarding use of technology has aided e-government research to prosper in the developed nations (Sheridan and Riley 2006). On the other hand, citizens in developing countries are far behind in adoption of ICT (Nikam et al. 2004). In India, for instance, e-government research is in its early stages (Gupta and Jana 2003) and a country with huge population can hardly afford to be left behind in harnessing the benefits of implementing e-government (Bhatnagar 2002). Despite India's economic prosperity and emerging influence in the development of Information Technology (IT) sector in south-east Asia (Bajwa 2003), there are limited studies that have addressed adoption of e-government services in India. To the best of our knowledge, only one empirical study partially discusses the factors of e-government adoption in India (Dossani et al. 2005) and a few case studies that illustrate the merits of implementing e-government services (e.g. Bhatnagar 2002; Cecchini and Scott 2003; Rao 2004a). There are number of studies (see tables 2 and 3) that discuss the potential advantages of implementing e-government, based on a few successful regional e-government programs (e.g. Bajwa 2003; Singh 2005; Thomas 2007). These studies are conceptual, descriptive and exploratory in nature and fail to provide relevant facts regarding the current state of e-government in India. An attempt is made to identify gaps in the literature that would have implications for future research in a developing country such as India and provide better understanding of citizen beliefs and organizational characteristics of governments (local and federal) that influence adoption of ICT technologies and electronic services by citizens of India.

This paper will begin with conceptual definition of e-government; analyze the individual and organizational characteristics of adoption; and critical assessment of empirical studies in the literature. Further more, a critical assessment of the factors influencing e-government adoption by citizens will be followed by discussion on e-government adoption studies focusing India.

2 DEFINITION OF E-GOVERNMENT

Moon and Norris (2005) provides a simple definition that e-government is perceived as "means of delivering government information and service" (p.43). According to the World Bank "E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government" (The World Bank Definition). E-government is the most frequently cited term in comparison to e-governance, online government, one-stop government and digital government (Andersen and Henriksen 2006). Riley (2003) refers to 'government' as a

superstructure that deals with decisions, rules, implementation and outputs of its policies; whereas 'governance' refers to functioning based on processes, goals, performance, coordination and outcomes. The extant literature on public administration offers various conceptual definitions of both the terms, however Sheridan and Riley (2006) makes an interesting remark that e-governance and e-government are often used interchangeably and clarifies the distinction by stating that e-governance is based on four processes; namely electronic consultation, electronic controllership, electronic engagement and networked societal guidance; whereas, e-government refers to the structure that is responsible for electronic service delivery, electronic workflow, electronic voting and electronic productivity. Saxena (2005) argues that e-governance refers to the 'outcomes' as a result of 'effects produced' by public administration, whereas, e-government refers to the 'outputs' as a result of 'efforts expended' by the public administration; and mentions that e-government is perceived to be a sub-set of e-governance. In an attempt to provide a synthesized definition of e-government from extant literature, Yildiz (2007) mentions that e-government refers to the use of ICTs by public administration to create a networked structure for; interconnectivity, service delivery, efficiency, effectiveness, transparency, and accountability.

3 FOUNDATION OF STUDIES EXAMINING INFLUENCE OF INDIVIDUAL AND ORGANIZATIONAL CHARACTERISTICS

The foundation of some G2C e-government studies is based on the theoretical frameworks derived from Rogers' (1983) diffusion of innovation (DOI) theory; Fishbein and Ajzen's (1975) theory of Reasoned action (TRA); Ajzen's (1985) theory of planned behavior (TPB), Davis' (1989) technology acceptance model (TAM) (Carter and Belanger 2005; Dimitrova and Chen 2006; Gilbert et al. 2004; Horst et al. 2007). Table 1 provides a categorical overview of studies that have considered models based on these established theories to provide a better theoretical understanding of the influence of individual's beliefs on 'intention to use' the technology.

Theoretical Frameworks	**Studies that have considered these frameworks for investigation**
Rogers' (1983) Diffusion of Innovations Theory (DOI)	Carter and Belanger (2005); Fu et al. (2006); Schaupp and Carter (2005)
Ajzen's (1985) Theory of Planned Behavior (TPB)	Horst et al. (2007); Warkentin et al. (2002)
Davis' (1989) Technology Acceptance Model (TAM)	Carter and Belanger (2005); Dimitrova and Chen (2006); Gilbert et al. (2004); Horst et al. (2007)
Individual factors	**Studies that have considered these factors for investigation**
Perceived Risks	Fu et al. (2006)
Perceived Barriers	Gilbert et al. (2004); Pilling and Boeltzig (2007)
Perceived Uncertainty and Civic Mindedness	Dimitrova and Chen (2006)
Trust in e-government	Carter and Belanger (2005); Schaupp and Carter (2005)
Gender and Education	Akman et al. (2005)
Experience and Skill	Choudrie et al. (2005); Dossani et al. (2005); Pilling and Boeltzig (2007)
Organizational Factors	**Studies that have considered these factors for investigation**
Size and Bureaucracy of Government	Moon (2002); Moon and Norris (2005); Titah and Barki (2006)

Table 1. Studies examining influence of individual beliefs and organizational characteristics

Other than these theories, the literature on barriers to adoption of technology also contributes in developing a thorough understanding of the factors that inhibit the use of e-government by citizens (Choudrie et al. 2005; Dossani et al. 2005; Pilling and Boeltzig 2007).

In their literature review, Titah and Barki (2006) identified five main research streams in the e-government studies; one of which is concerned with the influence of 'organizational characteristics' and 'individual beliefs' on e-government use and acceptance. Their research suggests that organizational size and bureaucracy in an organization, strongly affects adoption. Moon (2002) addressed this issue by proposing a theoretical framework for understanding the organizational factors responsible for adoption of e-government services by municipalities in the US and "the survey result show that municipality size and type of government are significant institutional factors in the implementation and development of e-government" (p. 431). This theoretical framework was empirically justified in a longitudinal study conducted by Norris and Moon (2005), which asserted that adoption is related to "local government demographic characteristics, including type and form of government, metropolitan status, and region (p.72). The findings of these study are encouraging as the longitudinal study involved a time frame of two years and the authors have suggested that a time frame of longer duration could provide a greater insight into the organizational factors (such as professionalism, slack resources, and administrative performance etc.). The results of these studies are important, but whether the results can be replicated for other governments remains to be seen.

Titah and Barki (2006) suggest that apart from organizational factors, individual beliefs of citizens significantly influence adoption of e-government services. In a business to consumer (B2C) e-commerce environment, individual beliefs such as perceived usefulness (PU) and perceived ease of use (PEOU) have been considered as the dominant beliefs that affect the intention to adopt or use the technology in question (Warkentin et al. 2002) . These beliefs are the major constructs of technology acceptance model (TAM) proposed by Davis (1989). In G2C e-government studies, other beliefs that have been tested along with PU and PEOU are perceived risks, perceived barriers, perceived uncertainty, civic mindedness, and trust in e-government (see Table 1). Few studies have also analyzed the demographic factors such as gender and education (Akman et al. 2005); and experience and skill to use Internet and computer (Pilling and Boeltzig 2007).

4 CRITICAL ASSESSMENT OF EMPIRICAL STUDIES ON E-GOVERNMENT ADOPTION

Empirical suggestions of some e-government studies often differ with findings in the literature. Consequently, lack of generalizability is frequently cited as one of the limitations in some empirical studies (Horst et al. 2007; Fu et al. 2006). Deursen et al. (2006) makes an interesting observation; despite similarities in Dutch and Scandinavian culture, welfare state, and political system; the usage of e-government vastly differs in these countries. The time span to undertake comparative empirical research is considerably long and in this regard, Moon and Norris (2005) suggests that longitudinal studies of more than two years could provide more clarity in the results. Critical assessment of studies serve multitude of purposes. It highlights shortcomings of theoretical framework for research; provides opportunity to compare studies, methodologies, research findings from the literature; and helps identify gap in the literature for future research. In the following sub-sections this paper does critical assessment with a focus on: selection criterion of studies; research methodology; individual, demographic and non-demographic characteristics of citizens. Following this section, the emphasis of critical assessment would be on studies related to adoption of e-government services by citizens in India.

4.1 Selection Criterion of studies for assessment

The basic premise of considering the selection criterion is to include arguments from empirical research and conceptual studies for a balanced assessment. Occasionally empirical research results have contradicted with the established findings in the extant literature, for example, in relation to the influence of the following factors on adoption of e-government service; 'perceived ease of use' (Gilbert et al. 2004); 'perceived usefulness' (Horst et al. 2007); gender (Akman et al. 2005). This paper

considers a selection criterion to include a mix of theoretical, conceptual and empirical studies that enhances the need for sound arguments for assessment. Based on the selection criterion outlined by Grabner-Krauter and Kaluscha (2002) this paper considers modifying few conditions to include those studies that provide valuable insight into the usage intention of e-government services. The criterion for selection of research studies is subjective in nature and includes those studies that have considered: 1) focus on government-to-citizen electronic services adoption; 2) primary data collection techniques directly from citizens; 3) case study approach; 4) quantitative analysis; 5) qualitative analysis; 6) qualitative and quantitative analysis; 7) theory guided research leading to empirical results; 8) conceptual framework based on established theories in the literature; 9) conceptual models of e-government development.

4.2 Assessment of research methodology

Some empirical studies have considered quantitative analysis (Dimitrova and Chen 2006; Dossani et al. 2005; etc.) and suggest that smaller sample size is considered as a major limitation in the research (Carter and Belanger 2005; Horst et al. 2007). Some studies have considered case studies based on qualitative analysis (Chouderie et al. 2005; Pilling and Boeltzig 2007; etc). Some case studies consider comparison between two or more e-government initiatives for citizen (Choudrie et al. 2005; Pilling et al. 2007) and some considered non-comparative approach to highlight the success of individual e-government initiatives (Bhatnagar 2003a; Cecchini and Scott 2003; Saxena 2005). Only one study identified by this paper has considered quantitative and qualitative analysis for their research and realized that "data triangulation …integrated new ideas for quantifying qualitative data for use in quality assessment" (Barnes and Vidgen 2006, p. 776).

This paper found that quantitative studies encounter limitations in their research with respect to the size of sample (Carter and Belanger 2005); selection of appropriate statistical tool (Horst et al. 2007); lack of internal validity (Barnes and Vidgen 2006); lack of external validity (Fu et al. 2006); and lack of representative sample (Akman et al. 2005). Also found were the limitations of qualitative studies, such as; subjective nature of analysis (Gupta and Jana 2003); credibility of analytical techniques (Barnes and Vidgen 2006); generalizability of results (Fu et al. 2006); and lack of proportionate representative sample (Choudrie et al. 2005). The limitations of these studies improve our understanding of the complexities involved in the selection of research methodology and collection of primary data.

4.3 Assessment of individual characteristics of citizens

In a G2C context, various studies have investigated individual characteristics that affect attributes of e-government, such as; quality of website (Barnes and Vidgen 2006), access to e-government (Choudrie et al. 2005; Gilbert et al. 2004; Pilling and Boeltzig 2007), measurement and assessment of benefits (Gupta and Jana 2003), infrastructure (Dossani et al. 2005); intention to use e-government (Carter and Belanger 2005; Horst et al. 2007; Schaupp and Carter 2005; Warkentin et al. 2002). The results from these studies are overwhelming and confusing to an extent that conceptual clarity is required to investigate holistic view of e-government adoption. In the extant literature of technology adoption, perceived usefulness (PU) and perceived ease of use (PEOU) have been accepted as the dominant beliefs that affect intention/usage of technology and e-government (Warkentin et al. 2002). Horst et al. (2007) examined the determinant factors of adoption of e-government services in The Netherlands and found that perceived usefulness of e-government services has no direct influence on intention to adopt e-government. Similarly, they also found that 'perceived behavioral control' (PBC) did not influence intention to adopt e-government, which is one of the major constructs of a model based on Theory of Planned behavior (TPB). Horst et al. (2007) suggest that smaller size of sample may have influenced the results and conclude that there is a need to substantiate their findings in another research.

Gilbert et al. (2004) supports the findings of Horst et al. (2007) and indicates that perceived usefulness and perceived ease of use are insignificant in their ability to influence adoption of e-government services, which is in contrast to the findings commonly accepted in the literature. Their research emphasizes on identifying the factors important in evaluating the use of e-government service rather than measuring the perceptions regarding the use of service. Drawing on Higgins and Ferguson's (1991) study, Gilbert et al. (2004) suggests that the functional aspects of the service should be clearly distinguished from the technical aspect of the service. Their implicit assumption is that the "consumers find it difficult to separate how the service is being delivered (functional) from what is delivered (technical)" (p.288). They conclude that trust and financial security are important barriers to adoption in comparison to four other barriers such as experience, information quality, low stress and visual appeal. Out of nine factors identified concerning barriers of adoption, this study doesn't specify 'most' significant and 'least' significant factors in their analysis.

Two studies in our review (Barnes and Vidgen 2006; and Gilbert et al. 2004) have differing opinions regarding the measurement of user's perception. In a study that measures users perception regarding quality of Inland Revenue website of the UK government, Barnes and Vidgen (2006) used e-Qual 4.0 instrument to distinguish the interactive users from the non-interactive users on dimensions of information, usability, design, trust and empathy respectively. Information was rated with the highest score and empathy received the least score by both the type of users. This study suggests that usability and inability to communicate with the organization (empathy factor) affected the perceptions of interactive users. Barnes and Vidgen (2007) indicate that perception of interactive and non-interactive users concerning factors (e.g. information and empathy) are important to both of them, whereas the significance of factors (design, usability and trust) is subjective in nature for both the type of users. Emphasis of this study is on perception of both types of users towards the quality of Inland Revenue website of the UK government. In contrast, Gilbert et al. (2004) stresses on identifying the factors without measuring the perception. They argue that it is important to investigate the service quality attributes (e.g. reliability, control, enjoyment) in a comparative sense (for example; between traditional service and online service) rather than focusing only on technology (e.g. online service).

4.4 Assessment of demographic and non-demographic characteristics of citizens

The moderating role of demographic characteristics of individuals such as age, experience, gender, education and voluntariness of use of technology has been explored in the B2C e-commerce (Venkatesh et al. 2003). The effectiveness of these characteristics in e-government adoption is yet to be substantiated theoretically and empirically. In an attempt to explore the possibility of gender difference in adoption of e-government services, a study in Turkey found that gender differences were huge in terms of "perceived acceptance of Internet and e-government" (Akman et al. 2005, p. 251) and concluded that gender gap existed in accessing the Internet and e-government. According to Akman et al. (2005) these findings are in contrast to the study of Levy (2002) in the US that suggested "disparity in Internet usage between men and women has largely disappeared" (Akman et al. 2005, p.251). Drawing inference from the study of Cakir and Cagiltay (2002), their study suggested one possible reason for this difference could be due to 'cultural tendencies' that lead to adoption of different online communication styles by men and women.

The research of Pilling and Boeltzig (2007), takes a different approach towards significance of individual characteristics of adopters and suggests that proponents of diffusion of innovation theory focus more on the "individual characteristics of the adopters (socioeconomic characteristics, personality traits, and communication behavior), holding the individual responsible for his her problems" (p.36). They argue that focus should be on 'systematic barriers' to the Internet and e-government, such as; unequal Internet access; unequal access to e-government; problems with website accessibility and usability; that "prevent people from accessing and eventually adopting technology such as the Internet and e-government" (p.36). In a comprehensive review and comparison of e-government initiatives in the US and UK, their study suggests; creating learning environment,

improving usability of the Internet and e-government service, and dealing with accessibility issues are more important than focusing on individual characteristics of adopters. As a future course of action, their research suggests collaboration between researchers from different countries, can help identifying the need to overcome 'digital barriers' for making e-government accessible.

Research of Dimitrova and Chen (2006) takes a step further in the direction of exploring 'non-demographic characteristics on adoption of e-government services. Their research suggests that "there is consensus in the e-government literature that those with higher education and higher income are more likely to use e-government information and services" (p. 175). They argue that apart from demographic characteristics such as; race, income, and education; non-demographic characteristics of an individual such as 'civic mindedness' play an equally important role in adoption of e-government services. Their research suggests that the "three aspects (of civic mindedness, namely); social contact, prior interest in e-government, and media use of public affairs" (p. 177) enhances civic engagement and increases the likelihood of "use of electronic means by citizens to interact with government" (p. 177).

5 CRITICAL ASSESSMENT OF STUDIES ON E-GOVERNMENT ADOPTION BY CITIZENS IN INDIA

The National Government of India has given high priority to implementation of ICT for providing e-services to its citizens (Nikam et al. 2004). However, the size of the population (Fors and Moreno 2002) and the massive government structure (Sheriden and Riley 2006) pose enormous challenge in implementation of e-government services and their adoption by citizens. There is limited statistical reference in the academic literature regarding the e-government usage by citizens in India. A research undertaken by Taylor, Nelson and Sofres (2003) suggests that government online usage has gone up from 22% in 2001 to 40% in 2003 with government online users belonging to a high penetration group of 36% to 50%. There is a growing need to consider further research in the e-government service ‘adoption’ and ‘usage’ behavior of Indian citizens.

India has twenty eight states and seven Union Territories and there are three levels of government: the national government (equivalent to a federal government); state (regional) governments; and local (district/block/village/town) governments (DIT Govt. of India 2005). According to Chandrasekar (2006), in October 2005 the Department of Information Technology (DIT) of Government of India “initiated an integrated approach called the National e-Governance Plan (NeGP) for developing e-Governance uniformly across India” (p.1) and suggests if NeGP goes ahead as planned "government services such as issuance of birth and death certificates, payment of various bills and taxes, online submission of applications, and land and revenue records can be accessed...by 2008" (p. 2). DIT has an ambitious plan to fulfill a target of establishing 100,000 Common Service Center (CSC) by the year 2007, which is defined as "an ICT enabled service delivery outlet providing a range of services to the people in the village/town in which it is located" (DIT Govt. of India 2005, p.3). Approximately eighty services (e-commerce and e-government services) in 15 different categories have been identified to be served by CSC's. The utility of these services will be available to citizens for a small fee charged to by the CSC operator (DIT Govt. of India, 2005).

There is a dearth of quantitative research undertaken to study the impact of the e-government initiatives taken by the state governments. The reasons could be attributed to the fact that these initiatives have been implemented in recent past; some e-government efforts are carried as pilot project, and some on a larger scale at state level; for example, Bhoomi (Karnataka); e-Seva (Andhra Pradesh); Computer Aided Registration Deed-CARD (Andhra Pradesh); and FRIENDS (Kerala). The project 'Gyandoot' of Madhya Pradesh state government is much discussed in the literature, and has been considered a good model for replication by other states, due to its successful implementation (see table 3 and 4 for more details) but there is no conclusive evidence to suggest that it's 'usage' or 'intention to use' has increased considerably in the state since its inception. Some studies have

presented an exploratory analysis of the e-government initiative taken by Karnataka, Andhra Pradesh and Madhya Pradesh governments (Bhatnagar 2003; CDT 2002; Nikam et al. 2004; Saxena 2005; Singh 2005; Thomas 2007). The Bhoomi project undertaken by the state government of Karnataka provides electronic services to citizens regarding registration of the land. This e-government project is viewed favorably for its successful implementation across the state and considered suitable for replication by other states (Bhatnagar 2003b). Dossani et al. (2005) investigated the factors impeding growth of e-government services in rural India. Their study considers the impact of various projects sponsored by state governments, private organizations, multinationals, and not-for-profit organizations; on rural citizens of India.

Researchers have suggested that governments have to exercise caution in implementing ICT to provide services to the citizens (Bhatnagar 2003a; Fors and Moreno 2002; Keniston 2002). In an interesting case study of Gujarat government's initiative to automate the process of collecting 'toll tax', CDT (2002) observed that "within one year, the system had paid for itself" (p.8), but this project turned into a massive failure in due course of time (Bhatnagar 2003b). The reasons of failure for some projects are rooted into technical, administrative, and policy related difficulties faced during the tenure of its implementation, but lends credibility to the argument that ICT implementation failure could have devastating consequences in terms of lost opportunity, wasted resources, and loss in revenue (Bhatnagar 2003a, Fors and Moreno 2002, Keniston 2002). Some e-government projects in the states of Maharashtra and Punjab run the risk of delay in implementation (Nikam et. al. 2004) and DIT (2005) suggests that the challenge however lies scalability of implementation. Rao (2004a) argues that successful pilot testing of an e-government project at district-level provides an opportunity to study the replicability on massive scale.

Studies related to e-government initiatives in India provide a distorted view of measures of success for an e-government project; whether it be transparency (Bhatnagar 2003a); time and cost savings (Rao 2004a); bridging the digital divide (Nikam et al. 2004); accessibility of e-government programs (Cecchini and Scott 2003); economic returns (CDT 2002); effectiveness (Saxena 2005); partnership with non-governmental organizations (Singh 2005); process reforms (Thomas 2007) and infrastructural framework (Dossani et al. 2005). There is a lack of emphasis on the individual characteristics that can significantly influence the adoption of e-government programs in India. Scholars have addressed concerns related to the lack of: awareness, willingness, and ability to access to technological resources. These concerns have been more anecdotal in nature rather than substantiated by empirical evidence. It is evident that the use of ICT can benefit citizens, but it is not clear how individual characteristics can affect; adoption of technology, and e-government usage by citizens of India.

6 CONCLUSION

This paper conducts a comprehensive review of the empirical studies in the context of G2C e-government adoption by citizens. There is a need to develop concise definition of e-government service for better operationalization of the concepts used for research. Future research in e-government adoption should consider sound theoretical framework research that has been tested successfully in other empirical studies. This paper draws attention to the importance of individual characteristics of adopters and lays emphasis on its significance discussed in the extant literature. The assessment of empirical studies highlight remarkable differences in observations of various studies and carefully analyses the underlying reasons presented in these studies. This paper also looks into the organizational factors that have been considered in the literature related to barriers of adoption of e-government services. These factors provide an improved understanding to address the needs of citizens. Finally, this paper takes into account the lack of e-government studies in developing countries, especially India and suggests that individual characteristics of citizens are important to study the factors that influence e-government adoption. Also, these factors can be influenced by varied cultural background of citizens. Due to lack of empirical and theoretical G2C studies examining

cultural influence, this paper acknowledges the contextual exclusion of culture and its influence on adoption of e-government usage by citizens; which is also a limitation indicating that culture can have a profound impact on e-government service adoption. A number of studies in B2C e-commerce suggest that culture plays significant role in adoption of ICT by consumers, across different countries. Drawing insight from these studies can open up further avenues for studying cultural influence on e-government usage by citizens. Finally, a review of e-government studies in India also indicates that none of the empirical studies have considered a theoretical model to examine the influence of individual characteristics of citizens on adoption of e-government services; and an assessment of empirical studies suggests that care should be taken in adopting: suitable research methodology, appropriate sampling techniques, and data collection for future empirical research.

TABLES (2, 3 AND 4)

Authors	**Findings related to e-government adoption**	**Direction for future research**
Akman et al. (2005)	Gender difference is huge in Turkey in relation to e-government adoption (Turkey)	Culture and communication styles need to be explored
Andersen and Henriksen (2006)	Benefits of digitalization of core e-government activities from end-users perspective (Denmark)	Research required to understand the driving forces for progression from one stage to another
Barnes and Vidgen (2007)	Significant differences in perception regarding; usability, design, information, trust and empathy (The UK)	Suggests the threat of internal validity can be overcome by triangulation techniques
Carter and Belanger (2005)	PEOU, compatibility and trustworthiness are significant indicators for adoption (USA)	Future studies should include a broader set of government agencies.
Choudrie et al. (2005)	Lack of accessibility and usability affect e-government adoption (The UK)	Longitudinal research is essential to understand barriers of e-government in UK
Dimitrova and Chen (2006)	Non-demographic characteristics are equally important (USA)	Research in 'civic mindedness' and differentiation of 'social networks' is essential
Dossani et al. (2005)	Strong infrastructure and partnership with non-governmental organizations required (India)	Research in strategic needs of stake holders .
Fu et al. (2006)	PU and PEOU significantly affect adoption (Singapore)	Research in influence of PU and compatibility in other services
Gilbert et al. (2004)	Factors influencing barriers of adoption (The UK)	Research in service quality attributes (e.g. reliability, control, enjoyment)
Gupta and Jana (2003)	Tangible and intangible benefits of e-government implementation (India)	Qualitative analysis of the benefits of e-government are subjective in nature
Horst et al. (2007)	'PU of e-government', 'PBC' and 'worry about e-government' are insignificant (The Netherlands)	Research with different sample is suggested
Pilling and Boeltzig	Systematic barriers of adoption (The US and UK)	Research on strategies to overcome digital barriers

(2007)		
Schaupp and Carter (2005)	PEOU, Image and relative advantage does not directly affect intention to use e-voting (USA)	Demographics of the sample is restricted

Table 2. Empirical Findings and limitations of G2C e-government adoption studies

Research/Study	**Highlights of research/study**	**Limitations**
Bhatnagar (2003a; 2003b)	Transparency; efficiency, cost effectiveness, accessibility, and reduction in corruption in public service delivery	Inferences from only few case studies. Limited in presenting the discussion on accountability at 'policy level' stage of government
Dossani et al. (2005)	Factors influencing e-government adoption by rural Indian citizens	Limited discussion on individual characteristics of adoption
Nikam et al. (2004)	Focus on bridging the rural-urban divide, by making e-government services available to rural and disadvantaged section of the society	Presents a limited discussion on cultural and social barriers
Saxena (2005)	Discusses techno-centric and citizen centric focus of e-governance. Proposes model for 'excellence in e-governance'	This is a theoretical model under consideration based on performance monitoring, auditing and management
Singh (2005)	Influence of technology on agriculture, education, telecommunications, e-governance, Internet services etc.	Presents brief overview and limited by scope and scale of research issues addressed in the study
Thomas (2007)	Discusses regulatory reforms, policies and importance of ICT in e-government services	Fails to address the gap between telecom based government services and ICT based e-government initiatives.

Table 3. Highlights and Limitations of the research studies in context of e-government adoption in India

State Government	**Type of initiative**	**Objective**
Andhra Pradesh	e-Seva; Computer Aided Registration of Deeds (CARD)	Providing several e-government services and registration facilities through single portal
Karnataka	Project "Bhoomi"	Digitization and immediate access to land records.
Kerala	Project Information Kerala (PIK); and 'FRIENDS'	Applications for identity/ legal documents and social welfare schemes; one-stop portal for taxes and utility bills
Madhya Pradesh	Project "Gyandoot"	Services related to land records, maps, online registration for income, caste, domicile certificates, and email service in Hindi language.
Rajasthan	Project related to "Mandis" (commodity trading exchange)	Providing online rates for commodities by connecting 236 "Mandis"
West Bengal	Vernacular interface project	Information on tax and public utility payments

Table 4. E-government initiatives taken by various state governments in India (Source: Nikam et al. 2004; Singh 2005)

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