Human Computer Interaction and E-Government: Components of the System and Its Evolution

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***Abstract*— E-Government is a recent development that aims to utilise the benefits of technology to provide benefits to the ultimate end users - the citizens. Towards that end, e-government provides certain unique benefits like transparency, timeliness, and accountability and user friendliness. E-government can bring together governments and citizens at a number of different levels. There are some unique benefits of e-government; however there are some barriers that need to be overcome before e-government systems can be utilised to their full potential.**

The technical nature of the process implies that Human Computer Interaction (HCI) has a major role to play in this regard.

E-government differs from e-governance in the sense that the former is related to the technology, while the latter is concerned with policy level planning. However both impact one another and this interaction will decide future developments.

***Index Terms*— E-Government, Human Computer Interaction, E-Governance, Information and Communication Technology (ICT), Policy Planning.**

I. INTRODUCTION

The evolution of Information Technology (IT) has majorly impacted citizens' interaction with their governments; this in term has affected their expectations from the government (Dodd 2000). While e-commerce has resulted in changes in dealings on the private sector, e-government has done the same for next generation developments in the public sector. Governments in different parts of the world are actively introducing e-government initiatives as a way of reducing costs, providing better services to the citizens and raising effectiveness of delivery at local, regional, and national levels. As many as 179 out of 192 UN members have reported on strategy development for implementation of e-government systems; naturally e-government has emerged as one of the top priorities for governments throughout the world (UN 2008).

E-government has been variously described as Electronic Government, Electronic Governance, Digital Government, Online Government, e-Gov, etc. (Gronlund 2004). There are many definitions for the term e-government, thereby reflecting the priorities of the government in its strategies. According to Fang (2002), e-government allows governments to use innovative information and communication technologies (ICTs)- specifically web-based internet applications - so that citizens and businesses are able to conveniently access government information and services. It is also directed towards improving quality of services as well as encouraging participation in democratic institutions and processes. E-government is not necessarily only about businesses and processes. The focus is on using ICTs for transforming structures, operations and the culture of government (Alshchri and Drew 2010). According to the OECD, e-government can be an important vehicle for any kind of reform process since it serves as a tool of reform, regenerates interest in public management reform, focusses on internal inconsistencies and realigns commitment to good governance objectives (OECD 2003). According to the World Bank (2001) e-government is the system of information and communication technologies owned or operated by the government which transform relations with citizens, the private sector and/or other government agencies in order to encourage empowerment of the citizens, raise delivery of services, improve accountability, increase transparency and increase efficiency of the government (Nodu 2004).

The rest of the paper is organised as follows:

Section 2 provides an overview of the literature in this area and attempts to provide a setting for this paper. Section 3 explains the different categories of e-government. Section 4 lists the benefits of e-government. Section 5 relates to the barriers normally encountered in the implementation of e-government systems. Section 6 relates to the application of HCI techniques to e-government systems.

Highlight a section that you want to designate with a certain style, and then select the appropriate name on the style menu. The style will adjust your fonts and line spacing. **Do not change the font sizes or line spacing to squeeze more text into a limited number of pages.** Use italics for emphasis; do not underline.

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II. LITERATURE REVIEW AND JUSTIFICATION FOR THE STUDY

Kossak et. Al. (2001) have considered the suitability of HCI research for such applications in the form of a case study. They concentrate on the development of large data sensitive software systems. They base this on their experiences in a project dealing with administration software for the health insurance sector, where they developed a HCI prototype

Moon (2002) has chosen a more micro approach as he focuses on the application of e-government in municipalities. For this purpose he has employed the 2000 E-Government Survey by the International City/County Management Association and Public Technologies Inc. Apart from evaluating the current situation, the author has also identified size and type of government as the two main factors that influence adoption of e-government at this level. The conclusion is that e-government being at a nascent stage, has not delivered on many of its promised benefits. Some of the barriers in this regard have also been identified.

Finger and Pecoud (2003) have dealt with a conceptual, but nevertheless interesting topic. They first examine the existing changes in statecraft. Next they couple this with the new information and communication technologies. Finally on this basis they have tried to predict future trends. In doing so they have also the considered the evolution towards e-governance and its impact - both positive and negative - on the State and society at large. Lastly they have provided a comparison of their models with existing definitions and conceptualisations of e-governance and e-government.

Ciborra and Navarra (2005) have adopted a cautionary tone by trying to highlight the unfulfilled potential of e-government in developing countries, originating from insufficient development of the relevant systems.

Atkinson and Castro (2008) have drawn attention to the fact that designing of e-government systems demands consideration of factors relating to implementation aspects. These may include disintermediation of the government and its citizens, influence of economic, social and political factors, the issue of cyber attacks and disruptions in the existing areas.

Velsen et. al. (2008) are of the view that e-government systems can be made more user-friendly involving the prospective users in the requirements engineering stage. Feedback from such users can be conveyed back to the designers, thus enabling improvement in the quality and effectiveness of the system.

Scapin (2009) provides a review of current issues in e government in literature with a view to highlighting cases where there is a genuine prospect for research in HCI applications in e-governance. In this connection mention is made of software tools for mass production of e-government software, security and trust, personal information management and internationalisation.

Sharma (2010) has addressed the issue of interaction between the government and its citizens. According to him, this interaction can take several forms, including but not exclusive to acquisition of information, communication and payment through the World Wide Web.

Alshehri and Drew (2010) have tried to provide a context by laying down the fundamentals of e-government. As per their own admission, they have tried to reorganise the existing knowledge on e-government through definition, types advantages and barriers to e-government.

Imran et. al. (2013) throw some light on the implementation of these systems. As per these authors, successful implementation requires understanding of the function of government websites, user expectation in a citizen-centric framework and the barriers that preventing from effective delivery from the websites.

III. CATEGORIES OF E-GOVERNMENT

Depending on the needs of the users, e-government systems can be classified into the following types:

Government-to-citizen (G2C)

This includes the major part of government services. Citizens can conveniently and instantly access information and services provided by the government from anywhere anytime, through the utilisation of multiple channels. In addition to facilitating transactions such as certifications, paying fees and applying for benefits, the fact that G2C initiatives help to overcome space-time barriers, can enable citizens to come into contact with each other, thus increasing citizen participation in governance initiatives (Seifert 2003).

Government-to-Business (G2B)

This includes various services exchanged between the government and businesses, including distribution of policies, memos, rules and regulations. Business services may consist of current business information, new regulations, downloading of application forms, payment of taxes, license renewal, registration of businesses, obtaining permits, etc. G2B services can also help in the development of business, particularly small and medium enterprises. G2B services directly promote initiatives like e-procurement, development of an electronic market for government purchases and facilitating government tenders through electronic means for exchange of information and goods. As a result, the government can gain from the online experience of businesses in areas like strategies for e-marketing. Like G2C, G2B can be equally useful, leading to better efficiency and quality of communications and transactions with businesses, while simultaneously raising equality and transparency in government contracting and projects (Moon 2003).

Government-to-Government (G2G)

G2G involves online communications between organisations, departments and agencies related to the government, based on a database maintained by the government. It also covers the relationship between the government and its employees. Application of online communication and cooperation permitting sharing of databases and resources as well as the combination of skills and abilities Information on compensation and benefit policies, training and learning opportunities and civil rights laws becomes easily and conveniently available (Nodu 2004).

A major goal for G2G processes is to better and strengthen inter-governmental organisational processes through more efficient coordination and cooperation. Savings in time and cost along with improvements in service can be materialised through the utilisation of the latest IT tools for sharing and centralisation of information, or for sharing and streamlining of intergovernmental processes like regulatory compliance (Gregory 2007).

Government-to-Employee (G2E)

This area has received the least amount of attention in terms of research focus. Sometimes it is considered as a subset of G2G; at other times it is dealt with as a totally separate area (Riley 2001). As the name suggests, G2E is limited to the relationship between government and its employees alone. It is geared towards employees through the provision of online services such as annual leave applications, checking leave balance, review of salary pay records, etc (Seifert 2003). It may be described as combination of information and services provided by government institutions to their employees so as to enable them to come together and encourage knowledge sharing among them. Employees can access information on compensation, employment benefits, opportunities for training and learning. It permits the employees to reach relevant information online through a fast and easy communication model.

IV. BENEFITS OF E-GOVERNMENT

With the help of well thought out e-government strategies the government can help to deliver information effectively and efficiently to all relevant sectors. It allows government agencies to align their efforts so as to raise service levels and bring down operating costs (Ndou 2004). According to the OECD (2006) the advantages of e-government include greater efficiency in processing large amounts of data; improved services through a better understanding of user requirements; achieving better policy outcomes through sharing of information and ideas among the stakeholders; supporting the attainment of government economic policy objectives through promotion of gains in productivity inimical to ICT and e-commerce; helping in the reform of governance through greater transparency, helping in information sharing and identifying internal inconsistencies; and promoting trust building between government and the citizens through the application of internet-based strategies for encouraging citizens to get involved in the policy making process, thus demonstrating government transparency and accountability.

V. BARRIERS TO E-GOVERNMENT IMPLEMENTATION

A. ICT Infrastructure
B. Privacy
C. Security
D. Policy and Regulation Issues
E. Lack of Qualified Personnel and Training
F. Lack of Partnership and Collaboration
G. Digital Divide
H. Culture
I. Leaders and Management Support

VI. HCI TECHNIQUES AND E-GOVERNMENT

The application of HCI techniques to e-government is urgently required as the growth of services to the citizens is hampered by the fear of lack of necessary resources because of insufficiently tested technologies along with lack of requisite experience. This is further exacerbated by the need to get new computer systems and software approved through a top-level formal process in big organisations.

It is not easy for large organisations to replace the equipment needed for a large volume of the workforce. At the same time, there is considerable scope for designers and developers to work within constraints and utilise scientific research for improving usability of the output. Generally developers, managers and users do not realise that usability engineering is a very developed field with availability of extensive knowledge (Giller and Tscheligi 2000).

Some of the factors that can play a major role in this connection include:

a. User Involvement
b. Consistency Across Applications
c. GUI Appearance

VII. TRANSITION FROM E-GOVERNMENT TO E-GOVERNANCE

E-Government is ultimately based on the governance structure that is in existence. Thus e-government leads to further evolution in e-governance, which in turn leads to newer developments in e-government. Changes in e-governance are further mediated by the following factors:

a) Levels

This refers to the various levels at which changes can take place. In addition to those induced by events like globalisation, changes can take place at the local, regional and global levels. New actors can constantly emerge, who are active at various levels.

b) Actors

Besides policy changes, actors also keep emerging constantly. These actors have involvement in policy-making, service delivery and regulation. Actors can include private players, as well as those from civil society.

c) Functions

The state has three primary functions viz., operations, policy-making and regulation. Though state has always been involved with these functions, globalisation and privatisation has forced the state to make a greater distinction between these functions.

d) New Information and Communication Technologies (NICTs)

There are different degrees to which NICTs can be a part of the process of state formation. Specifically it is related to

information, interaction and transaction. Information represents the lowest level of interaction between the state and its citizens. Such information has an educational dimension and is generally found on government websites.

Interaction involves citizens communicating with the state through the NICTs. This allows citizens to engage more actively , usually at the policy and regulation levels.

Transaction involves even greater use of NICTs by citizens, almost entirely at the policy level.

VIII. CONCLUSION

E-Government is becoming a more commonplace element of governance across countries. Unsurprisingly, it has a direct correlation with technological developments. Hence HCI can always factor in as a leveraging element.

HCI can engage at a variety of levels. While it provides some clear benefits, there are a variety of barriers that prevent e-government to manifest fully. Effective utilisation should obviously keep both the advantages and difficulties in mind.

E-government and e-governance have a symbiotic relationship; one influences the other. This relationship is further impacted by the levels of policy making, the actors involved, the functions and technologies involved. How the relationship develops in future will depend on the role played by these factors.

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