E-Government Implementation for Bangladesh - Actor Network Theory (ANT) Approach

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Abstract

E-Government is regarded by international financing institutions as a core component of the public sector reform programs that are currently reinventing government in developing countries. Because adaptation of e-Government is a key for smart governance and making information and communication technology (ICT) relevant to ordinary citizens in developing country where a large proportion of the population suffers from digital divide. But a successful project implementation is an important analytical issue for e-Government research in developing countries. There are various models proposed in the literature for e-Government issues in terms of success and failure. In this paper, actor-network theory (ANT) is proposed as a framework for understanding the processes of implementing e-Government initiative. Overall, ANT is seen as having a potentially wide area of application and finally discussed how ANT contributes to reform a traditional government into an e-Government.

Key Words: Actor Network Theory, e-Government, e-Democracy, Bangladesh.

1. Introduction

The world is going through an internet revolution where the magnetic "e" is leading us from mail to e-Mail, business to e-Business, governance to e-Governance and democracy to e-Democracy etc. This 'e-' lead is unprecedented and it is hard to predict its future scope and opportunities that it can provide to our world. The simple concept of e-government means: conducting any aspect of government business operations over the Internet—from providing information by government to paying bills to the government [Forhad 2005]. Nowadays, information and communication technology (ICT) has tremendous impact on socio-economic livelihood of people. It moves beyond old 'IT in government' models thanks to the new digital connections that ICTs permit. These new connections strengthen existing relationships and build new partnerships within civil society. E-governance therefore embraces e-Government, e-Citizen and e-Business [Paul, Stephan, and Steven]. Government functions are the most profound areas where ICT plays a pivotal role in fostering and ameliorating citizen centric services.

E-Government refers to the use of internet technology as a platform for exchanging information, providing services and transacting with citizens, business, and other arms of government. It allows ordinary people to interact with the government at various levels on matters of governance to provide inputs for decision makers. Thus the whole world is now connected in a single node called "Network", which has been made possible by virtue of modern computing and communications facilities and features that variously supports

teaching, learning and a range of activities in education, business, politics etc. In a single word, all these tools are called ICT (Information and Communication Technology). This Networked communities are quickly evolving through the Internet, and citizens are increasingly using the new technologies to organize themselves so their voices can be heard, and to develop tools to attempt to influence government policy and programs at the political and public administration level. Thus e-Government is a tools, which is a shorthand term for the use and impact of technology, in particular information and communications technology (ICT), in governance systems" [Chrisanthi].

Like any other ICT project, e-Government project also cannot be developed in a total vacuum but rather under the influence of a wide range of surrounding factors. The factors including ICT regulations and its capabilities, readiness of political, financial, human resource, legal and infrastructure etc. All of those factors are closely related or connected to how parties involved in project act. The acts parties have carried out, and all of these influencing factors, should be considered together. This is exactly what the term actor-network theory accomplishes. An actor network is "the act linked together with all of its influencing factors in building a network" [Suchman 1987 and Hanseth et. al. 1997]. When going about conducting a project – i.e., undertaking an e-Government initiative – all above of factors influence directly or indirectly to make a successful project. There are various models proposed in the literature to analyze trajectories of e-Government projects in terms of success and failure [D. Selcen et. al. 2009]. Actor-Network Theory (ANT) of Latour [Latour 1988, 1992, 1993] and Callon [Callon 1986b] is considered one of the best models for interaction factors among network actors and actants [Heeks et. al 2007]. It offers a set of analytical resources for implementing a good e-Government [Frohmann 1995] project. Therefore, theoretical framework for any e-Government project analysis must be sufficiently rich to comprehend the complexities of all network actors' interactions.

2. Bangladesh e-Government Evolution and Current Status

Completed in 1994-95, and running successfully since, the railway ticketing system automation was the one of first noticeable large-scale e-Government projects in Bangladesh, and was a major milestone in the path of e-Government. Since then, a fairly large number of different initiatives have been taken by the government for the implementation of e-Government. Initially, there was a clear emphasis on building ICT infrastructure, possibly deemed as a pre-requisite to the delivery of e-Citizen services. However, despite some successes, many of these e-Government projects did not sustain in the long run due to lack of long-term visions for those projects, and myriad other challenges. Over time, the government modified its approach and undertook strategies to address some of those challenges. Increasing number of citizen centric e-Services projects was gradually undertaken. However, due to various factors, many of those projects had limited scope, and interoperability and integration between those services were largely absent. In the era of the present government, a confluence of favorable factors has been playing a positive role towards a renewed vigor towards the prospects of e-Government [Farooq 2010]. Table 1 indicates the e-Government status in Bangladesh among the South Asian Association for Regional Cooperation (SAARC), and table 2 indicates other components related to e-Government initiative. [United Nationas e-Government Survey : 2008, 2010 and 2012].
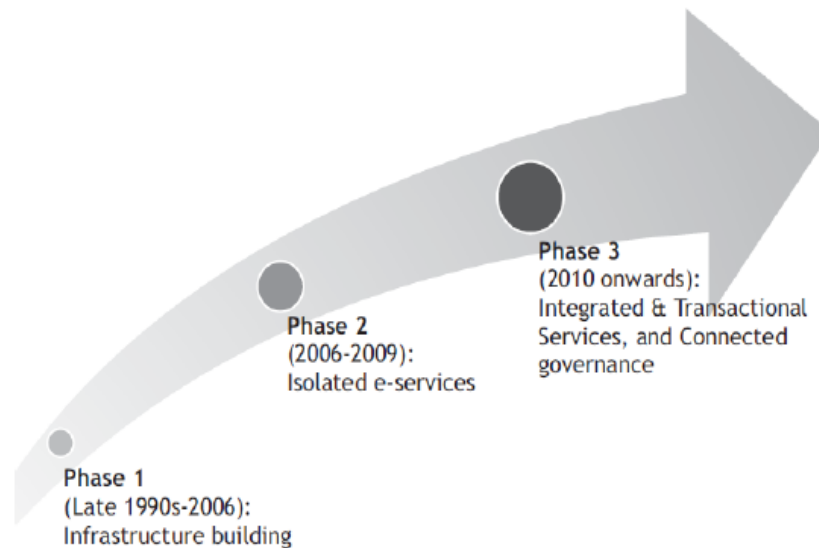
Figure 1: Evolution of e-Government in Bangladesh

**Table 1: E-Government development index (SAARC Region) : 2010-2012
(Total no. counted country: 190/2012, 183/2010 and 182/2008**

Country	E-Gov. Development Index			World E-Gov. Development Ranking		
	2012	2010	2008	2012	2010	2008
1. Maldives	0.4994	0.4392	0.4491	95	92	91
2. Sri Lanka	0.4357	0.3995	0.4244	115	111	101
3. India	0.3829	0.3567	0.3814	125	119	113
4. Bangladesh	**0.2991**	**0.3028**	**0.2936**	**150**	**134**	**142**
5. Bhutan	0.2942	0.2598	0.3160	152	152	131
6. Pakistan	0.2823	0.2755	0.3074	156	146	134
7. Nepal	0.2664	0.2568	0.2725	164	153	110
8. Afghanistan	0.1701	0.2098	0.2098	184	168	167
Sub Regional Average	0.3464	0.3248	0.3391			
World Average	0.4882	1.4406	0.4514			

Source: United Nations E-Government Survey from 2008, 2010 and 2012

Table 2: E-Government development index (SAARC Region): 2012
(Total no. counted country: 190)

Country	Country Rank	E-Gov. Index value	Online Service Component	Telecomm. Infrast. component	Human Capital Component
1. Maldives	95	0.4994	0.3268	0.3599	0.8114
2. Sri Lanka	115	0.4357	0.3791	0.1922	0.7357
3. India	125	0.3829	0.5359	0.1102	0.5025
4. Bangladesh	150	0.2991	0.4444	0.0641	0.3889
5. Bhutan	152	0.2942	0.3529	0.1143	0.4153
6. Pakistan	156	0.2823	0.3660	0.1239	0.3572
7. Nepal	164	0.2664	0.2876	0.0597	0.4521
8. Afghanistan	184	0.1701	0.2353	0.0573	0.2178

Source: United Nations E-Government Survey 2012

3. Methodology

This study is a combination and composition of heterogeneous attributes e.g. science and technology studies (STS), human and non-human actors (e.g. artifacts), network among the infrastructure of organization which links together both technical and non-technical elements. The Actor Network Theory [ANT] fills a big gap between technological and social networks, which both has some weaknesses and strengths. ANT is neither social network nor technical network but it is their both combination and intersection. Technological networks are mostly built over non-human entities, such as databases, computers, machine parts etc. which do not cover any social or cultural entity and social networks are also lack of those non-human entities. Callon, who first collects those two different actors in the same network, names the collection of networks as convergence and identifies this convergence as a translation of actors to the networks [Callon 1986a]. Therefore, this research study is based on ANT and literature reviews.

4. Reason to Select Actor Network Theory (ANT) Approach

Actor–network theory is an approach to social theory and research, originating in the field of science studies, which treats objects as part of social networks. Although it is best known for its controversial insistence on the capacity of nonhumans to act or participate in systems and/or networks, ANT is also associated with forceful critiques of conventional and critical sociology. Developed by science and technology studies scholars Michel Callon and Bruno Latour, the sociologist John Law, and others, it can more technically be described as a "material-semiotic" method. This means that it maps relations that are simultaneously material (between things) and semiotic (between concepts). It assumes that many relations are both material and semiotic [Wikipedia, the free encyclopedia].

Broadly speaking, ANT is a constructivist approach in that it avoids essentialist explanations of events or innovations (e.g. explaining a successful theory by saying it is "true" and the others are

"false"). However, it is distinguished from many other STS (Science, technology and society) and sociological network theory for its distinct material-semiotic approach. Thus ANT can be presented as a complementary approach to information system studies, which have also largely avoided technologically deterministic hypotheses of causality between ICT innovation and particular organizational or societal effects. Besides there are some specific reasons to choose this approach. These are as follows:

First - It is well established and there is an important hinterland of work explaining, critiquing, developing, and applying the theory;
Second - It is a comparatively stable;
Third - It overcomes some important limitations of the technologically deterministic "ICT as an enabler" perspective taken by some management literature.

5. Study with ANT Approach

5.1 Background

Actor–network theory (ANT) was first developed at the Centre de Sociologie de l'Innovation (CSI) of the École nationale supérieure des mines de Paris in the early 1980s by staff (Michel Callon and Bruno Latour) and visitors (including John Law). Initially created in an attempt to understand processes of innovation and knowledge-creation in science and technology, the approach drew on existing work in STS, on studies of large technological systems, and on a range of French intellectual resources including the semiotics of Algirdas Julien Greimas, the writing of philosopher Michel Serres, and the Annales School of history. Many of the characteristic ANT tools (including the notions of translation, generalized symmetry and the "heterogeneous network"), together with a scientometric tool for mapping innovations in science and technology ("co-word analysis") were initially developed during the 1980s, predominantly in and around the CSI. The "state of the art" of ANT in the late 1980s is well-described in Latour's 1987 text, Science in Action [Latour 1987].

From about 1990 onwards, ANT started to become popular as a tool for analysis in a range of fields beyond STS. It was picked up and developed by authors in parts of organizational analysis, informatics, health studies, geography, sociology, anthropology, feminist studies and economics. As of 2008, ANT is a widespread, if controversial range of material-semiotic approaches for the analysis of heterogeneous relations. In part because of its popularity, it is interpreted and used in a wide range of alternative and sometimes incompatible ways. There is no orthodoxy in current ANT, and different authors use the approach in substantially different ways. Some authors talk of "after-ANT" to refer to "successor projects" blending together different problem-focuses with those of ANT [John et. at. 2005].

5.2 Three Major Elements of ANT

There are two different forms of network that determine the result of an IT/ICT project [Callon et. al. 1989] : Global network and Local Network. All functions are passed between these local and global networks, are referred as the intermediaries. Usually a project office controls

the flow items between the two networks. This controlling institution is named as the Obligatory Point of Passage (OPP). Therefore, any project (especially technology based) whether it will be succeed or not, depends on following three interrelated functions (Law et. al. 1992). These are:

1. **Global Network** – The presence of a global network ready to provide various resources. Global network consists of global actors/stakeholders : World Bank, Asian Development Bank, Ministry Leadership etc.
2. **Local Network** – The capability of forming a local network that can utilize resources that the global network gives in return for the expectations of the actors of global network. Local network consists of global actors/stakeholders: Consultants, Potential users, civil society etc.
3. **OPP** – The ability to build and maintain an obligatory point of passage.
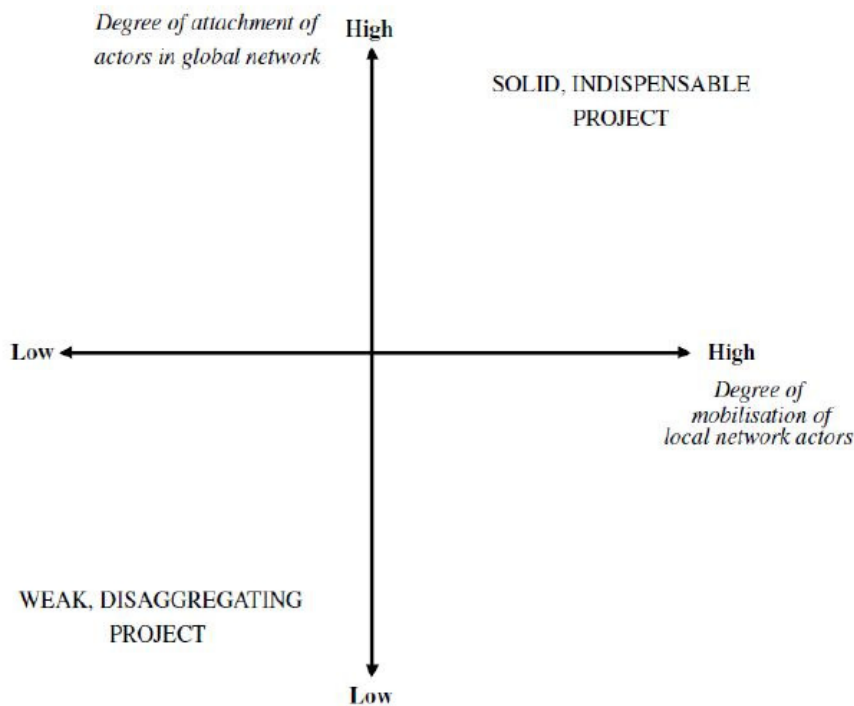

Figure 2. Mobilization of local and global networks (Law et. al 1992)

5.3 Other Elements of ANT

ANT approach has been widely accepted to interpret surrounding process of technology implementation projects (Mitev 2000 and Walsham et. al. 1999). In this paper, also proposes an ANT approach to uncover the social processes associated with a technology implementation initiative, namely the Bangladesh e-Government Initiative. Table 3 illustrates the other stakeholders of ANT.

Table 3: Classification by function of the key stakeholders of ANT

Stakeholders	Functions
Actor	Any element which bends space around itself, makes other elements dependent upon itself and translate their will into the language of its own. Common examples of actors include humans, collectivities of humans, texts, graphical representations, and technical artifacts. Actors, all of which have interests, try to convince other actors so as to create an alignment of the other actors' interests with their own interests. When this persuasive process becomes effective, it results in the creation of an actor-network.
Actor Network	A heterogeneous network of aligned interests, including people, organizations and standards (Walsham et. al. 1999, p.42).
Translation	ANT is the concept of translation, in which innovators attempt to create a *forum,* a central network in which all the actors agree that the network is worth building and defending. This process consists of four major stages: (Callon, 1986a; Walsham 1997). 1. **Problematisation**: Which defines the problem and the set of relevant actors who, by defining the problem and the program for dealing with it, make themselves indispensable; During problematisation, the primary actor tries to establish itself as an Obligatory Passage Point (OPP) between the other actors and the network (Callon 1986). 2. **Interessement** : During which the primary actor(s) recruit other actors to assume roles in the network, roles which recognize the centrality of the primary actor's own role (Callon 1986). 3. **Enrollment** : During which roles are defined and actors formally accept and take on these roles; and 4. **Mobilization**: During which primary actors assume a spokesperson role for passive network actors (agents) and seek to mobilize them to action (Callon 1986).

6. Proposed ANT Framework for Bangladesh

For Bangladesh perspective, the main global actors are LGED (Local government and Engineering Department), ADB (Asian Development Bank), World Bank, EC (European Commission) etc. Local actors are suppliers, govt. office, educational institutions, civil society, users/clients etc. Since the project is ICT related, the Obligatory passes point (OPP) would be a ministry concerning to IT. This is ministry of Science & and Information and Communication Technology (MoS&ICT). But this ministry has distributed its ICT function to BCC (Bangladesh Computer Council). That means all ICT projects are control by BCC. So BCC would role play as OPP (figure 3) for implementing e-Government. The inter connectivity among the different sectors of government; business partner and other external and internal actors/stakeholder have sketched in figure 4.
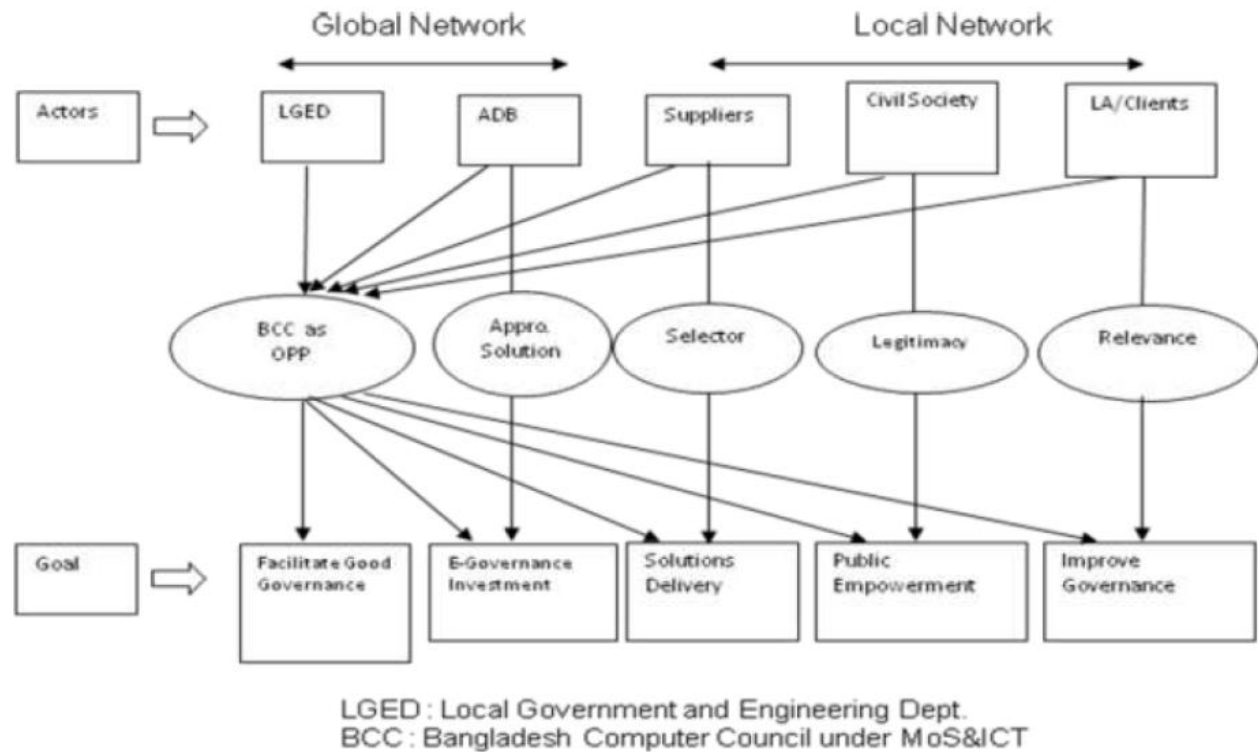
Figure 3: Proposed e-Government process through ANT approach for Bangladesh
[Translation in Action, Adapted from Callon 1986a]

7. ANT Contribution to Implement e-Government

ANT can potentially open up new avenues of network evaluation by examining first, the heterogeneous associations that constitute networks. And second, by paying closer attention to how networks are performed instead of attempting to provide a snapshot of a network based on inputs and outputs. Following are major ANT contribution for implementing e-Government:

7.1 Connectivity of Actors (Local and Global)

Application of ANT theory would help to identify that e-Government implementation in developing countries involves networks at both the global (the sponsorship) and the local (the implementation) levels. Of course, it is clear that a withdrawal of support by both networks can only result in crisis and a disaggregating, failed project, whereas it is through the active and mobilized support of both networks that project goals can be successfully met. From the empirical research, it has shown clearly that systems implementation is an inherently political process. Actors with diverse interests and power bases sometimes succeed in translating their interests into the development and use of ICT applications. Information

system innovation is a contingent outcome that is determined not by the properties of the technology but by the result of contested interests of actors linked together in complex networks.
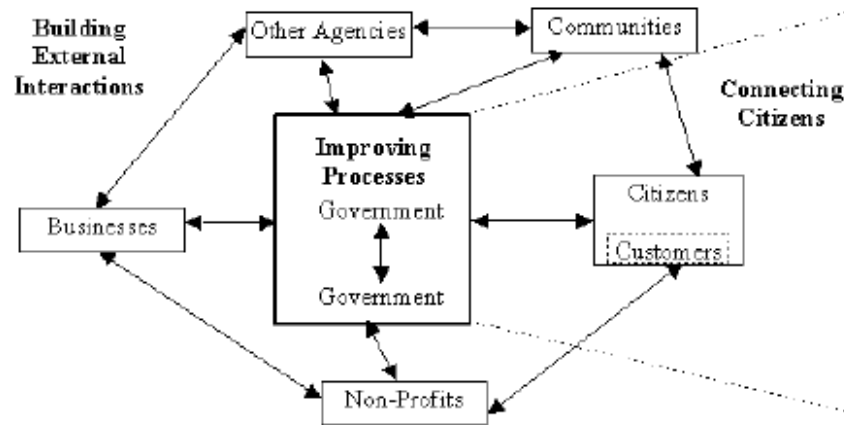

Figure 4: Network connectivity among Actors (Local and Global) for e-Government.

7.2 Addressing the Issue

Adopting an actor-network perspective would help to address the issue of what actions to be taken to ensure e-Government project goals are met. Linking the two networks is important: a point of passage should be identified. Planned control of the networks is unrealistic but a means to address project issues as they arise during implementation, to take incremental action, and to improvise as necessary is required. Project management that steers "a creative drifting process" [Ciborra 1999)] rather than imposes control is suggested. This implies that the point of passage must be through a culturally embedded and committed individual: for example, a senior civil servant would be appointed full-time as program director.

7.3 Reaching to the Goals

An actor-network perspective would recommend to the designers of e-Government projects that they carefully consider how the translation process might occur. If they themselves are not to be the heterogeneous engineers that build the networks that will lead to technical innovation and systems implementation, they must consider what other entities need to be enrolled. A flexible but pragmatic approach is advocated to tackle this issue: one that considers all elements of the envisioned organizational change necessary to reach the project goals. Recognizing that "efficiency, truth, profitability and interest are simply properties of networks" [Latour 1999], the construction of sustainable networks becomes vitally important in the implementation of e-Government projects that are targeted at improved governance. So ANT makes: arguing that everything – people, organizations, technologies, nature, politics,

social order(s) – are the result, or effect, of heterogeneous networks. This has following significant consequences [Darryl 2009].

1. **New Shape:** It certainly puts into a new shape previous ideas on the organizational change that must take place in order to move from the current to the future system. The translation trajectory is mapped, together with the technological trajectory, thus indicating the socio-technical priorities that need to be addressed in a successful project.
2. **Credible:** One advantage of using a well- known method and the accompanying vocabulary is that it does make complex results more convincing than the simple listing of factors found in other analyses. It also provides the basis for further argument and debate framed around the model rather than simple assertion versus counter assertion.
3. **No Essences – only heterogeneous networks:** The social world is neither entirely social nor inevitable. Any kind or form of social ordering - be it work, economics or education - is the effect of the associations within a heterogeneous network. Even people are the effect of a heterogeneous network. Thus, for ANT there are no causes, only effects. There are no essences, only heterogeneous networks.
4. **No Priority:** The division between micro and macro actor-networks is not to be assumed *a priori*. There are, obviously, differences between the two; but, like the analytical and conceptual symmetry between the social and the technical, ANT turns away from conventional distinctions and dichotomies. Thus, following the language of generalized symmetry, we are not to change frameworks when dealing with actor-networks of different sizes.
5. **Mobility of the power:** ANT is an appropriate perspective through which to analyze the dynamics of the power relationships that will characterize World Bank/ADB funded reform programs in developing countries that employ ICT as "an enabler" of change. Neither the technology nor the social characteristic determines the outcome: the success of a project is dependent on the process of someone or something managing and controlling the various forces at play, both technical and social.

8. Conclusions and Future Research

Actor-Network Theory (ANT) is being used and implemented not only in the field of technology but in information technology and system as well. It is a well-established approach to (Stanforth, 2006; Jarke, 2007) explain application of IT projects in developing countries (Stanforth, 2006), particularly the e-Government services [D. Selcen et.al. 2009]. However, technology is only a medium and a driver of new and important trends in society to the extent that they are driven by new ideas, conceptual constructs that contain innovation and creativity. Technology is not the creator of change, but is simply a tool. Usage of technologies, no matter their form, results in cultural evolutions because of the way that people adapt them. Implementation of new technologies may change the way societies organize and administer themselves, but they are never the driver of ideas, only the facilitator. Original ideas come from the mind of one person or from collective debate that then drives philosophical, cultural, societal, organizational, and administrative change. In this paper, we have presented a literature review of ANT and explained its central concepts, and thus a brief overview of e-Government initiatives in Bangladesh have been presented by the ANT perspective. Further research should focus on developing a deep and

detailed case study by collecting primary data from the project network human actants. In terms of non-human actants, an interesting current issue raises interest for research.

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