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UNDERSTANDING EGOVERNMENT FAILURE: AN ACTOR-NETWORK ANALYSIS OF THAILAND'S SMART ID CARD PROJECT

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Abstract.

This study explores the failure of Thailand's Smart ID Card project through the lens of the actor-network theory. It was found that the cause of failure came from (1) errors in problematization that initiated starting point failure, (2) incomplete interessement that created more chance of failure, and (3) uncontrolled chaos in the enrolment process.

Keywords: Actor-network theory, eGovernment failure, Smart ID Card, Thailand

1. Introduction

Since the movement of New Public Management (NPM) reform in developed countries, around the 1980s and 1990s, governments have paid more attention than before to quality of service or response to the needs of citizens. The notions of NPM in public administration have increasingly emphasized on professional management practices, and customer and result oriented administration. Because of these results, governments need to create better connections with its citizens, improve access to public services and respond to social development (Saxena 2005). Therefore, in the 1990s, e-government was introduced to enhance and support NPM reform. In the early days, e-government was used for information and communication technology (ICT) to produce and distribute public information through the Internet. However, the information was quite static at that time. Currently, with more than a decade of experience, e-government has developed into a more advanced application of ICT as a critical tool, which can develop good and responsive government that provides better value at a lower cost (OECD 2005). Perhaps, it can be claimed that e-government is the second revolution in public administration after New Public Management (Saxena 2005).

In the e-government area, it is found that studies contain crucial gaps which could be used for specification in developing countries. Firstly, Heeks and Bailur (2007) said that in the e-government area, there is generally a lack of theory used, and in a shared statement, Gronlund (2005) stated that e-government is a new field of study which needs to use more theory, thus helping scholars and practitioners to communicate and speak in the same language. Secondly, e-government projects have been increasingly developed and implemented in developing countries, and they are expected to act as a panacea for enhancing greater efficiency and effectiveness in public service operations. However, in this phenomenon lays the painful story that 85% of e-government in developing countries fails either totally or partially. This high failure rate is responsible for serious financial expenditure; damaged morale, creditability and trust; and obstacles against the advantages gained from e-government's implementation (Heeks 2003). Moreover, the taxpayer loses money while the country foregoes the opportunity of enhancing effectiveness and efficiency (OEDC 2001). Nevertheless, the knowledge of e-government failure in developing countries is relatively little, especially analysis of failure through the lens of theory.

This article aims to investigate the failure of an e-government project, namely, the Smart ID Card in Thailand, by using the lens of the actor-network theory and, specifically, the sociology of translation concept. The reasons why this theory is applied can be found in the original work of Callon (1986), who deeply explored details, stage by stage, of the association between human and nonhuman actors in the actor-network. Furthermore, in the study of failure in such an information system, Sarker, Sarker and Sidorova (2006) and Lee and Ho (2005) stated that the sociology of translation concept can be a powerful vehicle in investigating a failure case study.

2. Actor-network theory

This section provides the background and fundamental concept of the actor-network theory, which is employed as a main theoretical tool in this study

Callon (1987 p.97) stated that "the actor-network theory describes the dynamics of society in terms totally different from those usually used by sociologists." A socio-philosophical approach of the actor-network theory "…rejects any sundering of human and nonhuman, social and technical elements." (Hassard, Law and Lee 1999 p.338). The actor-network theory accepts the differences between human and nonhuman actors, but denies treating them separately. It supposes that everything is an actor in the network, where elements of any kind hold together such as humans, technological artefacts, organisations, institutions, etc., and it does not differentiate between or delegate priorities of any kind of elements.

To analyse everything in the actor-network, every actor or element should be treated with the same analytical vocabulary (Callon 1987; Hassard, Law and Lee 1999). This concept, for actor-network theoreticians, is called the principle of generalised symmetry. The concept of abandoned differentiation between humans and nonhumans is named the principle of free association (Callon 1986). However, these principles of two extreme positions have been beneficial for scientific and technological studies. Walsham (1997 p.467) states that "..the rigid separation of humans and nonhumans is a very valuable one in this age of hybrids, and blurred and negotiable boundaries". Law (1992 p.97) also stated, " … sociologies that do not take machines and architecture as seriously as they do people will never solve the problem of reproduction in society", because it is materially heterogeneous in reproducing itself."

Walsham and Sahay (1999 p.468) summarised and concluded by saying, "the actor-network theory examines the motivations and actions of actors (both human beings and nonhumans such as technological artefacts), who form elements, linked by associations, of heterogeneous networks of aligned interests."

However, all networks are different, at least when human actors and technological artefacts interplay in organisations or social life. They have their own actions. These varied actions from different actors produce, and are produced by, different actor-networks through the translation process. In the process of the actor-network, many programmes of actions are inscribed (Hanseth, Aanestad and Berg 2004). These mutual actions make up the relationship among actors in the actor-network. A successful relationship is possibly influenced by the extent of actor-network interaction. Actors are continuously produced and reproduced (Hassard, Law and Lee 1999; Doolin and Lowe 2002). Latour (1992) gave an example of this concept, as follows. When guests at a hotel are asked by the manager to leave their room keys at reception before going out, this verbal request might not be heeded. Therefore, a written notice might be added, and finally a large weight or tag is attached to the key. The objects in the network; room keys, hotel managers and weights, simultaneously and continuously affect, and are affected by, the interests they adhere to and their strategic references. It can be assumed that the "actors and actor-network are naturally embedded in open ranges of relationship, which cannot be artificially limited by the scope of any particular analysis" (Cordella and Shaikh 2006 p.10).

To translate is "a verb which implies transformation and the possibility of equivalence, the possibility that one thing (for example an actor) may stand for another (for instance a network)" (Law 1992 p.386). The concept of translation focuses on the continuity of the displacements and transformation that happen in the story; for example, displacement of goals and interests, and also displacement of human devices and inscriptions. Displacement happens at every stage (Callon 1986). Law and Callon (1989 p.52) stated that in a translation shaped by a set of compromises between a somewhat different set of actors "… translation is the product of continual negotiation." In conclusion, translation is the mechanism of progressive temporary social orders, or the transformation from one order to another through changes in the alignment of interests in a heterogeneous network (Sarker , Sarker and Sidorova 2006).

Callon (1986) described that the sociology of translation is composed of four moments, namely problematization, interessement, enrolment and mobilisation.

Problematization is the first moment of translation, which relates to the process of a focal actor striving to become indispensable to the other actors by defining the problem and motivating them into the network, and suggesting that the problem would be resolved if the actors negotiated the "obligatory passage point (OPP)". Problematization describes a product of alliances, or associations between actors by identifying what they want (Callon 1986). OPP refers to a process in which a focal actor convinces all other actors to accept the proposal of a network. OPP also refers to a process in which a focal actor shows an interest in all the actors who accept the proposed network (Callon 1986).

Interessement is the second moment of translation, which relates to a series of processes where a focal actor attempts to lock other actors into a position that has been offered to them in the network.

Interessement also means the group of actions by which the focal actor aims to impose and stabilise the other actors' identity. These actions are defined through the problematization process. Different devices for different actors are used in these actions. For example, in the scallop case, some devices of the interessement process had a favourable balance of power: the fishermen's device was the towlines in St. Brieuc Bay and their scientific colleagues used devices such as texts and conversation, which attracted the actors concerned to follow the project (Callon 1986). If the interessement succeeded, then enrolment could take place.

Enrolment is the third moment of translation, which refers to a set of strategies in which a focal actor attempts to define and inter-relate the various roles that allow other actors to enrol. The process of enrolment involves "group multilateral negotiations, trials of strength and tricks that accompany the interessements and enable them to succeed" (Callon 1986 p.211). When the negotiation between actors has been achieved, the inscription appears. The inscription is a process of artefact creation that ensures the protection of some interests (Sarker , Sarker and Sidorova 2006). In brief, an enrolment relates to the other actors' acceptance of the interests defined by a focal actor through the process of bargaining and making concessions (Madon, Sahay and Sahay 2004 ; Sarker, Sarker and Sidorova 2006).

Mobilisation is the final moment of translation, which relates to a set of manners utilised by a focal actor to ensure that all actors have legitimate speakers to represent them in groups, and avoid betrayal in various collectives from the latter (Callon 1986; Madon, Sahay and Sahay 2004). Speakers or representatives are actors who speak or deputise for other actors (Walsham 1997). In the scallop case, the researchers, as focal actors, were the legitimate speakers for the Scallops at St. Brieuc Bay.

3. Research method

This section provides a research method that can be used as a means to answer the research question, 'why was this project a failure?' This part is also combined with data collection and data analysis.

3.1 Data collection

One of the main objectives of this study is to investigate the causes that contributed to the failure of the Smart ID Card project in Thailand. Such profound understanding would, in turn, help to rectify the problems encountered by the Thai government and other actors. The research method employed in this study is a qualitative one. Yin (1994) stated that the qualitative research method provides comprehensive detail of a particular social phenomenon in a real life context. The nature of qualitative research provides a holistic picture of the project. At the same time, research techniques in this study used in-depth interviews and documentary research, giving access to the information needed for analysis (Myers 1997).

The actor-network is a unit of analysis in this study. To comprehensively explore the interrelation in it, this research carried out in-depth interviews as well as document research for data collection. The following section explains the data collection process

3.1.1 In-depth interviews

In this research, in-depth interviews were employed to key persons involved with the Smart ID Card project. In-depth interviews allow the researcher a chance to learn from the interviewees and closely understand their meanings and interpretations in society. Moreover, they allow the informants to identify and describe their own situations, and express what they have been involved in (Dexter 1970 and Blaikie 2000). In so doing, semi-structured interviews are composed instead of an inflexible set of questions in a structured interview. This provides the interviewees with more flexibility, and also ability to broaden the relevant points of interest (Denscombe 2004).

Table 1. Table of interviewees involved in the Smart ID Card project

Position	Involvement in the Smart ID Card project	Number of interviewees
Deputy Provincial Governor	Responsible for monitoring issuance and management of the Smart ID Card in the provinces	1
Deputies of the Regional Director	Responsible for facilitating all technical issues of the Smart ID Card in regional areas.	2
Scholars	Interested in public sector project implementation	2
Deputy District Governor	Head of issuing stations	4
Citizens	The end user of the Smart ID Card project	8

3.1.2 Documentary Research

Part of this study relies heavily on documentary research. Formal and informal kinds of documentary material were investigated. In the case of formal or government documents, their crucial source of information was reviewed, especially official policies and plans, government publications, minutes from meetings and memos. For informal documents, newspaper clippings and magazines, from 2002 to 2006 were used.

There are several ways to access documented information. General information can be obtained from newspaper clippings or various sources including university libraries and on-line news clipping services available in Thailand. Other sources of information come from official documents, orders, policies, and minutes from meetings, from which disclosure can be requested under the new Government Information Act.

3.2 Data analysis

In order to analyse large amounts of qualitative data derived from documentary sources and interviews, a coding scheme was developed and applied. This involved putting qualitative data into categories and labelling those categories with themes (Creswell 2003). The purpose of this process was grouping similar events under a similar heading or classification (Strauss and Corbin 1988). In order to allow the contents to be systematically verified, the codes were separated into different topics, and the categories continually compared, so as to identify common themes (Glaser and Strauss 1967).

To analyse the data, this study employed the concept of template analysis. In template analysis, the researcher needs to produce a list of codes (‘templates’) that represents themes identified in the textual data (King 2005). This concept is a flexible technique in allowing researchers to tailor the codes to match the requirements of the study.

Following King, this research began by creating an initial template. In this process, the initial template was guided by a set of questions that were used for interviewing the interviewees. This established high-order codes. However, as a semi-structured interview was used in this study, new issues were sure to arise during the interviewing process. There was also much data from the documentary research such as minutes from meetings, official documents and newspapers. Therefore, as new

themes emerged, the initial template needed to be adjusted. The initial template was revised after transcription of the interview process. The aim of the revision was to adjust, the template to cover all data.

After completing the revised template, it was put into a table, so as all data could be added and categorised into relevant themes. In doing this, the template analysis should be very useful for researchers in the triangulation of data sources, and would also help to increase the validity of this study.

4. Background of the Smart ID Card project

The objective of this project was to enable every Thai citizen to use all government services by utilising one card only, which would provide a more convenient and faster service. It would have also greatly reduced the use of paper, document files and copies. At card issuance, the Ministry of Interior became responsible for initial data, which included birth date, ID number and registration of name/surname. All data were included in the Smart ID Card. Other public agencies had the right to record and amend the data directory and fields for which they were responsible, based on the data standard of the card-reading machine, security system, and communication method of the card and reading machine. The planning and implementation of the system was based on convenience, safety, durability, cost-effectiveness, high quality and uniformed standard across the same database. The parliamentary cabinet also expected to promote and locally produce as much of the necessary hardware and software as possible, with Thailand becoming a base for card and software production. (National Electronics and Computer Technology Centre 2003).

4.1 The 4–stage goal of Smart ID Card utilization

There were great expectations of the Smart ID Card project, initiated by the Prime Minister, Dr.Thaksin Shinawatra. On February 4, 2002, he was reported as saying at the Strategy of Information Communication Technology Development meeting that he had dreamt of Thailand having an e-Citizen system. He foresaw everyone possessing smart cards containing a vast amount of personal data, which would help in administering the country efficiently and transparently.

Therefore, a 4–phase goal was set to deal with applications and the utilisation of the Smart ID Card, as follows (Department of Provincial Administration 2004).

Phase 1, 2004. Aim the Smart ID Card at substituting the free medical treatment card, social security card and ATM card. The Smart ID Card holder can access and contact electronic services of both the public and private sector via electronic machines or websites.

Phase 2, 2005. The Smart ID Card substitutes the cash card, debit card, credit card and telephone card. It can also be used for recording change of address and voting in a referendum and election.

Phase 3, 2006. The Smart ID Card substitutes the passport or border pass, national and international driver's licence, and national and international cash card, debit card and credit card.

Phase 4, 2007. The Smart ID Card has alternative uses such as 'dual contact', i.e. contact and less contact.

4.2 Time line of the Smart ID Card project of Thailand

May 2002	The cabinet set up a committee to integrate and reform the registration system, chaired by the Prime Minister. It was proposed that this committee improve and develop the country's registration

	system as a foundation of e-government.
January 2003	The cabinet endorsed the year 2003 as 'the year of electronic services for citizens'.
March 2003	The government allocated a budget of 2 billion baht (approximately 37 million pounds) for the Smart ID Card project. There were 5 ministries, 6 organisations and 18 subprojects under this project, of which the leaders were the Ministry of Interior (for card issuance) and Ministry of Information and Communication Technology (ICT) (for production of the ID card, software and hardware).
October 2003	The Ministry of ICT reported problems with card production to the government. It was announced that the card might not be produced in time for the opening ceremony. The government (i.e. Prime Minister) responded by hiring a private company to do the job instead of the ministry.
March 2004	The government aimed to issue the Smart ID Card to all Thai citizens within 3 years (2004-2006). The rate of production would have been 12, 26 and 26 million cards in the year 2004, 2005 and 2006, respectively, for a total of 64 million.
March 2004	There was conflict in the Smart ID Card committee about the security of the smart card system and card manufacturing. These conflicts caused some key persons to resign.
April 2004	The government kicked off with a grand opening ceremony for the 'Smart Card for Thais at the International Level'. The first 10,000 smart cards were issued to VIPs such as the Prime Minister, cabinet members and members of parliament, senators, governors and high ranking bureaucrats.
December 2004	The goal of issuing 12 million Smart ID Cards in 2004 for Thai citizens was not achieved.
November 2005	Planned issuance of the Smart ID Card failed again. At the same time, the government forced relevant organisations to produce the first 12 million cards as soon as possible.
July 2006	The auction for card production in phase two showed signs of problems, with the possibility of corruption in the process.
August 2006	The government notified 1,077 card issuing stations over the country to stop production, due to a shortage of material, and old-fashioned magnetic cards were issued once again.

Sources: Department of Provincial Administration 2004, and The committee for the integration and reform registration system 2003

Analysis of the project is limited to the period of 2002-2006, because after the military coup in Thailand, the political situation fluctuated enormously. There have been five Prime Ministers between 2006 and 2010. Even so, the Smart ID Card project was re-launched after its cessation in 2006, but it still faced the same problems. Currently, in 2010, it has seemingly been halted again, due to suspected lack of transparency in the auction process.

The following section describes the project through the lens of the actor-network theory. The sociology of translation are used as a crucial framework to investigate and explain the phenomenon.

5. Analysis in the sociology of translation

When describing the idea of an actor-network theory in the Smart ID Card project, it could be said that there were some flaws in each moment that caused the project to fail. This section reveals what went wrong in each step and gives possible suggestions or alternative choices for e-government initiatives. The lessons learned from the failure of an e-government project; in this case the Smart ID Card in Thailand can be analysed in detail as follows:

5.1. The errors in problematization initiated the starting point of failure

This process mainly translates the ideas in starting the project. Then the obligatory passage point (OPP) is set up and the actors involved are later identified (Callon 1986). Regarding the flaws in this process, with respect to the Smart ID Card project, the following analysis could be applied.

The government was the focal actor in what proved to be an unrealistic OPP - set up to improve public services via Smart ID Card technologies, which seemed acceptable in general terms. However, detailed investigation showed that achieving the OPP was seemingly unreachable. The idea of government setting up an OPP was not based on a pilot project or feasibility study. The timeframe of 3 years (2004-2006) was quite rigid and likely derived from government terms. All 64 million people in the Thai population should have had a Smart ID Card in this timeframe. Moreover, the card should have been multi-functional in order to access many public services.

The main point was that the OPP and its details were not revised or adjusted by the other actors. Therefore, no alternative choice was provided. Some public servants said that to improve or enhance Thai public services, the old magnetic card could function just as well as the Smart ID Card, if public agencies developed their database to interface with the magnetic card.

Another crucial point refers to the vague way in which the focal actor translated the project concept/idea. There were few details of the project, especially on smart card technologies. Therefore, it is no exaggeration to say that smart card technologies were a passive actor or merely an assistant's tool in this project. When a non-human actor is not treated like or equal to a human one, the result may be a broken actor-network caused by betrayal from a non-human actor.

5.2. Incomplete interessement created more chance of failure

Problematization could not be perfect, even if the project went further in the interessement process. This second moment seemed as if the focal actor was trying to lock all actors into its ally (Callon 1986). However, when analysing the whole Smart ID Card project, it was found that some non-human actors were forgotten and had not been locked into the actor-network.

A non-human actor was identified in the problematization of the Smart ID Card technology. However, it was not treated like an actor, but only as an assistant's tool. Therefore, this situation became a loophole, and actors in the actor-network were unlikely to notice it being wider in the second moment. Smart ID Card technology, such as the ID card itself, card management system, card issuing machines, card readers, etc., were only found in the latter stages. These technologies were locked into the actor-network by means of a big budget and being sent to the organisation directly responsible for them. It seemed in order for that organisation to take charge, because the money was attached to the technology actor.

However, evidence showed that the actor-network had forgotten about existing technology, which involved large portions for the Smart ID Card. The Thai citizen database responded to this through the Ministry of Interior. The database had been developed for more than 10 years, and finally reaped reward for the Ministry of Interior by winning the Smithsonian Award in 1990. This existing technology did not propose the problematization process, as all actors seemingly thought that it worked well, with no problems or need for updating.

Unfortunately, the existing technology did not lock well into the actor-network in the latter process, and was found to be incompatible with new technology. This created a severe problem among organisations.

5.3. Uncontrolled chaos in the enrolment process that led to project failure

When the inscription process occurs, the actor-network translates the idea/plan into the artifact, as in the case of the Smart ID Card project, and the actors need to inscribe their interests into the artifacts as well (Czarniawska 2002). Therefore, the negotiation or bargaining of interest alignment continue in this process (Sarker, Sarker and Sidorova 2006). This was the point of creation (the Smart ID Card), when the actor-network must face reality. Many unexpected events or problems could emerge depending more or less on actor-network stability, capacity in the interest alignment, association of actors, and continuation of translation (Callon 1986). If an actor-network can survive this process, it may guarantee that the OPP is almost achieved.

Chaos in the enrolment process of the Smart ID Card project might have been caused by a flaw or impairment in the prior two moments, problematization and interessement, or from the delicate details of the enrolment process itself. Consequent analysis of what went wrong in this moment could be categorized as follows.

5.3.1 The problem of non-human speakers

From the very beginning, no actors could speak well on behalf of non-human actors regarding the Smart ID Card technologies, and there was no improvement in attempts to understand them. As described earlier, non-human actors were treated as assistant's tools and not as actors.

This was evidenced by the Ministry of Information and Communication Technology's (Ministry of ICT) response in producing a blank Smart ID Card, with a Term of Reference (TOR) for the auction process written in only 18 pages. No doubt the TOR was vague and hard to predict, and details of the Smart ID Card's specification were difficult to understand. This problem created further problems that were more severe than a swift translation.

5.3.2 The swift translation

As the Ministry of ICT could not produce the card independently, IT venders were needed for taking charge of this duty in the enrolment process. Mahring, Holmstrom, and Montealegre (2004) stated that this event could be named, 'the swift translation'. It referred to a new actor having to understand the project in a short period of time, with no chance to participate or negotiate from the moment the project was born. Therefore, it was very difficult for IT vendors to act as new actors in this case. Once IT venders won the bidding for producing the card, they faced new and complicated technologies, with limited instruction in just 18 pages of TOR. It can be said that production could be risky, with no guarantee of compatibility with other technologies. However, the actor-network found itself in the same situation for both the first and second batch of 12 and 13 million cards, respectively. The two auctions confronted the same problem of swift and uncertain translation, The IT vendors produced the wrong specification in the eyes of the Ministry of Interior and it could not pass the security test set by the National Electronics and Computer Technology Centre (NECTEC), but the Ministry of ICT opined that all cards met the TOR. These contrasting views caused contradictions in the actor-network, due to swift translation..

5.3.3 Instability in the focal actor

From day one, the focal actor was strongly determined to run this project. However, by the time the process of enrolment arrived, its willingness had gradually weakened. Perhaps, other critical issues in Thailand distracted the focal actor to focus on other actor-networks such as economic issues, social pressure in the committed policy, and more importantly, demonstration of transparent administration. These aspects caused many cabinet reshuffles in the government.

Within three years of this project initiative, The Ministry of ICT had three different ministers. This suggests the difficulty in translating the actor-network as its main part to the people. Some media confessed that they failed to fully understand the project, especially regarding technical issues. Therefore, it was very difficult to gear the project.

However, endevours were made to establish an organisation, as a centre to integrate work from all actors into the actor network, but the centre only achieved 6 meetings in 2003 and nothing more. The indecisiveness of the focal actor signaled uncertainty in the other actors, and confusion and curiosity spread about the project's direction each time the focal actor made changes.

Furthermore, the Thai bureaucratic system works to a top down management culture, where public servants are dependent on what the government tells them to do. Therefore, public agencies could do nothing automatically or by themselves without support, approval and final decisions made by government, which is politically motivated. It is normally known that public agencies largely adhere to politics, and politics or government very often deal in details of administration in public agencies. Some say that the public agencies are the gold mine of the government. On the other hand, the government, as a focal actor, had some conflicts of interest when aligning itself. Much news or many rumours were commonly spread about companies being awarded big budgets in the project, with people from the government involved. In brief, when a focal actor is uncertain, it seriously affects stabilization in the actor-network.

5.4. Mobilization was not mobilized

The Smart ID Card project was not mobilized, which refers to the fact that it could not achieve the OPP. However, the question remains, was there any attempt to mobilize? The answer seems unclear from the opinions of interviewees, who gave contradictory answers. Firstly, some said that the actor-network tried to mobilize, but it ran into great difficulty because, for example, the actor-network underestimated the technology actor, and the focal actor lost focus on the project, causing little attempt to link other work corporately. Secondly, others stated that the actor-network was not trying to mobilize because some actors had already got what they wanted from the budget. It would seem that this project was clouded with suspicion of corruption during the auction process, as discovered by post coup investigators after the Thaksin government

6. Conclusion

This study attempts to expand use of the actor-network theory in another context, which is rarely used in this field of e-government. The actor-network theory is seen as widely used in the information system area, which has clear boundaries and limited context. This study shows that when the actor-network theory is applied in a wider context, it explains, for example, e-government at not only organisational, but also the national level; and it is still a powerful theory that can explain the interaction between human and nonhuman actors, and also the social construction of technology.

In terms of failure analysis, the sociology of translation can be an excellent framework for investigating the root of failure stage by stage. This study exposes that the case of failure could have occurred in every moment of translation. It can confirm the statement of Latour (1987) that we are

sitting on leaky black boxes, which refers to the association of an unstable actor-network across time and space and its possible collapse at anytime.

Regarding lessons learned for the practitioner, it can be said that a skilful focal actor, who can determine the success or failure of an e-government project, is very important. Moreover, the balance of interests, equality among human and nonhuman actors and the actors' exclusion from and/or inclusion into the actor-network are also crucially important in maintaining and balancing the actor-network in order to achieve its goal.

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