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Understanding e-Government Failure from an Actor-Network Perspective: *The Demise of the Thai Smart ID Card*

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Table of Contents

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Abstract

Through the lens of actor-network theory, this paper offers a case study of the Smart ID Card project failure in Thailand. Adding to the extant knowledge on e-government failure that attributes this phenomenon to some internal and external factors, this paper proposes that failure occurs through a cumulated process of the failed creation and maintenance of an actor-network around a suitable e-government objective. The selected case is a smart-card e-government project in a developing country, but the findings could be generalized to developed country contexts, and to the design and implementation of different kinds of information and communication technologies.

A. Introduction

Since the mid-1990s, the wide adoption of Internet-based information and communication technology (ICT) has encouraged many countries to implement e-government initiatives, which were expected to transform the public administrative system and improve public service efficiency.

According to Navarra and Cornford (2005, p. 9), "e-government involves the creation, development and interlinking of a variety of social, institutional and technological ecologies to deliver services which are perceived as legitimate, innovative, useful and welfare enhancing". This implies that e-government projects are innately complex, involving multiple tasks, such as constructing a large scale ICT infrastructure, restructuring public activities, and offering broad ranges of public services. Due to these complexities, e-government projects are generally at risk of having undesirable outcomes, e.g. budget overspending, falling behind schedule, delivering limited functionality, or even outright failure (Gauld, 2007; Goldfinch, 2007). The situation in the developing world is even more severe, where some estimates identify 80% of e-government projects having partially or completely failed to achieve their main aims (UNDESA, 2003).

E-government failure is a widely existing phenomenon and has been the subject of particular research attention from information systems and public administration scholars (Goldfinch, 2007; Gronlund, 2004). However, most studies focus on developed countries, while e-government failure in developing countries appears to be less-well understood (Avgerou, 2008; Bhatnagar, 2002; Ciborra, 2005). This paper adds to the literature by drawing upon actor-network theory (ANT) to dissect the case of Smart ID Card project failure in Thailand. Our research question is: how do different causes accumulate, ultimately leading to e-government failure?

This paper is structured as follows. Section B is the literature review on e-government in developing countries, focusing on the failure phenomenon. Section C justifies ANT as an appropriate theoretical lens for our research, and proposes a method of using ANT to analyze the failure mechanism of an ICT project. Section D introduces the case background, and the methods of data collection and analysis. Section E draws upon ANT terminologies to dissect the case of the Smart ID Card project in Thailand. In Section F, theoretical findings on e-government failures are discussed. Useful lessons are drawn for countries to prevent failure in their e-government initiatives. Theoretical reflections are made on using ANT to uncover the deep failure causes of an ICT project, particularly e-government.

B. e-Government and its Failures in Developing Countries

To obtain an overall view of the extant knowledge and identify research gaps on the causes of e-government failure in developing countries, we conducted a systematic

literature review. We have referred to the structured and systematic approach of Webster and Watson (2002) in selecting the relevant journals and articles for review. Firstly, in nature, e-government research belongs to the public administration and information systems disciplines. Following Heeks and Bailur (2007), seven information systems journals and seven public administration journals were selected, which were all ranked top in their domain by the ISI Web of Knowledge. Investigations were then carried out issue by issue and article by article. Only a few articles on e-government in developing countries were found. This means that high-end research on this topic is rare in the two domains. Secondly, we searched through the University of Manchester's electronic journal database and identified six journals focusing on e-government. We then scanned each of these six journals issue by issue, firstly looking at titles, and then the abstracts of the articles. Of those being screened as relevant to our theme, we read the full texts. In total, 43 articles were found useful. Thirdly, to ensure the inclusion of articles in back issues, we investigated the ABI and EBSCO databases using the keywords "e-government in developing countries" and "electronic government in developing countries". Most of the relevant articles found in this way were the same as those uncovered by using the first two methods. However, we found 8 additional relevant articles. This total of 51 articles included both empirical and documentary research. From further analysis of relevance to the topic of e-government in development countries, we finally selected 36 empirical articles for review. Review results are documented in Appendix 1 that categorizes the factors causing e-government failure in developing countries, and Appendix 2 that summarizes research foci, findings, framework, and methods.

The literature review discloses important research gaps. Firstly, scholars have illustrated that a lot of e-government projects have flaws in not only implementation but also the design process (e.g. Gronlund, 2004). However, the current research mainly uses model-based and category-based frameworks to identify several factors that have constrained the implementation of an e-government project, such as retarded economic growth, low productivity, lack of skilled personnel, bad ICT infrastructure, low Internet access, and high computer illiteracy etc. in the developing world (e.g. Chen at al., 2006). On the one hand, their research results lack generalization, as various factors could be deduced from and applied to different cases. On the other hand, several social, economic, political, organizational and technological elements are linked to the results of the e-government failure (Heeks and Bailur, 2007), but the dynamic mechanism of this complex phenomenon is largely ignored. Secondly, e-government projects are complex, involving various actors. In real projects, these actors have varied resources and interests, but work together. However, papers normally focus on the role of one specific sort of actors in a particular e-government initiative, such as citizens and public agencies (e.g. Chircu, 2008; Rowley, 2011), but do not draw a full picture of the common efforts of different actors.

We argue that an e-government project should be viewed as a process, during which different challenges may appear at different stages that cumulatively lead to the outcome. Moreover, we need to investigate the interactions of different actors, which determine the success or failure of a project (Madon, Sahay and Sahay, 2006).

In this paper, we draw upon ANT to address these research objectives and expose the deep roots of the e-government failure phenomenon.

C. ANT as an Analytical Lens

In this section, we justify ANT as a suitable theoretical tool for filling gaps in the e-government failure literature, and for addressing the research objectives identified above. In particular, we attempt to demonstrate that the ANT terminologies and method allow us to disclose the causes of e-government failure, which are the failed formation of an actor-network by different actors throughout the whole process of system design and implementation. ANT argues that an actor-network is composed by both human and non-human elements, such as technological artefacts. It studies the motivations and actions of different human actors, which make efforts to align their interests around the non-human artefact (Walsham and Sahay, 1999). ANT has the strength to disclose the social structure constructed by different actors in an ICT project, e.g. an e-government project, whose properties determine its success or failure (Gronlund, 2004). In nature, it can offer researchers rich insights into the failure of a project. This is evident from the original works by actor-network theorists, such as Callon's (1986) case study on the problems arising in a scientific project, Law and Callon's (1992) analysis of the life and death of an aircraft project, and Latour's (1996) explanation of the demise of a technology system implemented in Paris. In particular, ANT has been used to investigate how and why an ICT project fails. For example, Gao (2007) analyzed the reasons behind the failure to implement a wireless local-area standard in China; Mahring et al. (2004) explored why a information systems project could not deliver the intended outcome; Sarker, Sarker and Sidorova (2006) explained the implementation failure of an ICT-supported business process change initiative. This paper extends the application of ANT to e-government failure analysis.

ANT has been used in different ways in analysing the failure of an ICT project. Firstly, the four moments of translation of Callon (1986), i.e. problematization, interessement, enrolment and mobilization, can help researchers describe the process leading up to the failure, step by step, from the actor-network's formation until its collapse (Greener, 2006; Lee and Oh, 2006; Mahring et al., 2004). Secondly, failure can be tracked via the notion of global and local networks (Law and Callon, 1992). This method is useful for explaining why two levels of actor-network, which should share the same objectives, fail to work together (Lambright, 1994). However, one approach alone may be limited in explaining the failure (Hassard, Law and Lee, 1999). Following Sarker, Sarker and Sidorova (2006), this paper uses the four moments of translation as the core method of ANT analysis of the Smart ID Card project in Thailand, due to its capability of delineating the process of e-government design and implementation as the association and disassociation of the actor-network, stage by stage, from the beginning to the end of the project. In the analysis process, we also employed some supplementary ANT terminologies (Table 1) in order to explain the causes of failure in the formation and maintenance of this e-government project's actor-network.

Vocabulary	**Definitions**
Actor	Any human or non-human element which makes others dependent upon itself and translates their will into its language (Callon, 1986, Latour, 1996, Sarker, Sarker and Sidorova, 2006).
Artefact	A non-human actor created by an actor-network (Walsham and Sahay, 1999).
Actor-network	Heterogeneous network of aligned interests, including people, technology, and organisations (Walsham and Sahay, 1999).
Betrayal	A situation where actors do not abide by the agreements arising from the enrolment of their representatives (Callon, 1986).
Device	A tool or thing used by a focal actor in locking other actors into proper positions in the process of interessement, for example texts, conversations, meetings and debates (Callon, 1986).
Enrolment	The third moment of translation, wherein other actors in the network accept (or become aligned to) the interests and roles defined for them by the focal actor (Callon, 1986).
Focal actor	A focal actor is an actor who has a capacity to set up and control an actor-network (Callon, 1986).
Interessement	The second moment of translation involving negotiation with actors to accept the definition of the focal actor (Callon, 1986).
Mobilization	A set of methods used by the focal actor to ensure that all actors have their representatives or spokespersons act according to the agreement and not betray the initiator's interest (Callon, 1986). The fourth moment of translation.
Obligatory passage point (OPP)	A situation that has to occur for all of the actors to be able to achieve their interests, as defined by the focal actor (Callon, 1986; Sarker, Sarker and Sidorova, 2006).
Problematization	The first moment of translation when the focal actor defines the identity and interests of other actors as being consistent with its own, establishes translation as an OPP, and thus renders itself indispensable (Callon, 1986).
Swift translation	A process when an embedded actor-network rapidly inherits actors, relationships, roles and agreements from its host actor-network with little involvement or negotiation (Mahring et al., 2004).
Translation	Alignment process of interests in different actors in the interests of the focal actor (Callon, 1986; Law and Callon, 1992).
Trojan actor	A potentially fatal threat by an actor to its host actor-network. It would betray the initial problematization (Mahring et al., 2004).

Table 1: ANT Vocabulary used in the Case Study

Translation refers to the activities of creating a temporary social order, or the movement from one order to another, through changes in interest alignment in a network (Sarker, Sarker and Sidorova, 2006). Problematization is the first moment of

translation. In this moment, the focal actor, an organization with the capacity of setting up and controlling an actor-network, creates a project and identifies other participating actors from its point of view. Additionally, the obligatory passage point (OPP) is a key concept, which each actor must pass in order to achieve its interests, as defined by the focal actor (Callon, 1986). It is a major challenge for the focal actor to negotiate with others in order to set an OPP acceptable to all.

In the interessement moment, the focal actor convinces other actors to align their interests around the project target, and motivates them to overcome obstacles to pass through the OPP. In doing this, necessary devices, such as standardization, budgeting, meetings, debates and conversations, are manipulated by the focal actor in order to lure other actors into fitting positions in the actor-network (Callon, 1986; Sarker, Sarker and Sidorova, 2006).

If interessement is successful, enrolment will occur, when the focal actor negotiates with other actors to define their various roles in creating the technology artefact, and uses different strategies to convince them to align their interests to their designated roles (Callon, 1986). In this moment, swift translation may happen, which is a process whereby an embedded actor-network rapidly inherits actors, relationships, roles and agreements from its host actor-network. A Trojan actor-network may emerge, which is a betrayal to the host actor-network set up in the initial problematization stage (Mahring et al., 2004).

The final moment is mobilization, which aims to keep actors' interests aligned with that of the focal actor, and to ensure the actor-network works as a single unit, so as to achieve the goal as planned. Otherwise, the actor-network might be betrayed and collapse (Callon, 1986). In the Smart ID Card project, it is evident that mobilization was not reached, and the actor-network stability was not present. Thus, in this paper we will analyze how different actors betrayed the actor-network, which led to its failure, rather than consider the mobilization moment in full terms.

D. Research Overview

D1. The Thai Smart ID Card case project

A case study is suitable for answering 'how' or 'why' questions about a contemporary set of events, over which the investigators have little or no control (Yin, 2002). Our research focuses on the accumulation of different factors, ultimately leading to e-government failure, for which a longitudinal case study is an appropriate method. The Thai Smart ID Card project will serve as our study example. This project was initiated in 2003 by the Thai Cabinet as a part of its ambition to use the Smart ID Card, a state-of-the-art technology, to revolutionize the national public administration system and transform Thailand into a world leader of public service modernization. The use of new ICT in the public sector was expected to reduce corruption, advance transparency and improve governance. The project was planned

to finish by 2007 in four stages. However, as shown in Table 2, the stage goals were not achieved in the set timeline. In total, only 12 million ID cards were issued to citizens. This was far behind the original target of covering all of Thailand's 64 million citizens (Department of Provincial Administration, 2004). Moreover, these cards had no electronic functionality and could not replace the identity card, civil servant card and medical care card that people currently used. Various problems continued to emerge, which finally led to the failure of this project (NECTEC, 2003).

Intended goals	Outcomes of project implementation
Phase 1, 2004 • To produce the 1st batch of 12 million Smart ID Cards and issue them to citizens. • To substitute medical treatment card and social security card. • To enable Smart ID card holders to access both public and private services via electronic machines or website.	• The ICT vendor was awarded the contract to produce 12 million Smart ID Cards under supervision of the Ministry of ICT. • A test by the National Electronics and Computer Technology Centre (NECTEC) found that all the ID cards produced had a misspecification. • The Smart ID card could not substitute any other cards or be used electronically. • Ministry of ICT therefore was against Ministry of Interior in issuing them to citizens.
Phase 2, 2005 • To produce and issue the 2nd batch of 26 million Smart ID Cards. • To substitute cash card, debit card, credit card, and telephone card with the Smart ID Card. • To use the Smart ID card for residence registration, referendum or election.	• The Cabinet forced Ministry of Interior to accept the 1st batch of 12 million Smart ID cards. • The Card began being issued to citizens officially in October 2005. • Production of the 2nd batch of 26 million Smart ID Cards was not completed on time. • The Smart ID cards produced could not substitute other cards or be used electronically.
Phase 3, 2006 • To produce and issue the 3rd batch of 26 million Smart ID Cards. • To substitute passport, driving licence, debit card and credit card with the Smart ID Card.	• Bidding for the production of the 2nd batch Smart ID Cards did not go through. • In August 2006, Ministry of Interior stopped issuing Smart ID Card as it had run out of stock. • In September 2006, a military coup overthrew the government in Thailand and interrupted the Smart ID Card project.
Phase 4, 2007 • To give the Smart ID Card project alternative uses such as dual contact i.e. contact or contactless.	• The Smart ID Card project came under investigation from the new government regarding corruption and lack of transparency. • A magnetic card was issued to citizens and used instead of the Smart ID cards.

Table 2: Intended Goals and Outcomes of Smart ID Card Project

The Cabinet was the focal actor of the actor-network in the Smart ID Card project, which made decisions on key issues regarding the project implementation, and restricted the actions of other actors. Other main actors include the Ministry of ICT, responsible for card production, the Ministry of Interior, in charge of card distribution, and the citizens, as the card users. These actors had different interests in, and varied resources for, this project, with different responsibilities (Table 3). To coordinate the Smart ID Card project, the Cabinet formed the Committee for the Integration and Reform Registration System (CIRRS). Chaired by the assigned Deputy Prime Minister, CIRRS was composed of ministers concerned, high ranking officers from various departments, and ICT and management experts. The Smart ID Card project is a good case for us to gain insight into the root causes of e-government failure, which existed throughout the process of project design and implementation, involving the participation of various actors.

Actors	**Goals and Interests**	**Resources and challenges**	**Tasks**
The Cabinet	To revolutionize Thai public services by the Smart ID Card project	Strong political will but lack of financial, legitimate resources and technological capability, and at times unstable	Negotiate with, collaborate and motivate other actors
Ministry of ICT	Gain leadership in cutting-edge technology of smart ID cards	Lack of knowledge, experience and technology resources	Produce high capacity blank smart ID cards
Ministry of Interior	Have centralized control over citizen data	Only have fundamental citizen data, with different databases not integrated	Distribute smart ID cards to each citizen allowing them to have access to useful public services
Citizens	Enjoy improved public services	Lack of readiness for new public services	Adopt the smart ID card and services

Table 3: Actors in the Actor-Network of the Smart ID Card Project

D2. Research methods

The four moments of translation form the structure that guides our data collection and analysis. In particular, we follow the process of problematization, interessement, enrolment and mobilization to narrate the story of failure. In terms of data analysis methods, we draw upon relevant ANT terminologies (Table 1) to depict why actors in the Smart ID Card project failed to form an actor-network and the translation could not go through, and what happened in this process. Following Latour's (2005) guidance that an ANT analysis should take actors as the study objects, we articulate the specific roles and actions of different actors in each translation moment.

We need to collect data that may allow us to describe the process of the Smart ID Card project (Table 2), and capture the interrelations of various actors (Table 3). To achieve this, the authors of this article first conducted documentary research. Initially, we gathered general information on e-government and the Smart ID Card project in Thailand from different government organizations' websites, for example the Ministry of Interior (http://www.moi.go.th). We collected 194 pages of meeting minutes, which offered us the real scenarios of the project. Furthermore, we referred to newspaper clippings to find more in-depth details and trace back to past events of the project, which were available from Thai newspaper databases in a Thai university library. We searched online newspapers using keywords such as 'ID card', 'identity card' and 'Smart ID Card project' in both Thai and English. In total, 442 newspaper clippings were collected for this study. Reports on public media interviews and speeches by high-level government officials, such as ministers and the Prime Minister, and key persons in the Smart ID Card project, were found in the news. These data sources offered insights into the interests and roles of different actors and their involvement in the project. Additionally, we were able to access all minutes of the 2003 CIRRS meeting, which discussed the key issues concerning the design and implementation of the Smart ID Card project. The minutes, totalling 64 pages, are particularly useful for us to understand the process of actor-network formation in this project.

Furthermore, to draw a full, detailed picture of the Smart ID Card project, we interviewed a total of 41 executives, officials, scholars and citizens, who all participated in this project. The interview arrangements are summarized in Appendix 3, with the names of informants disguised. The interviews were semi-structured. Before the interviews, we contacted our informants by letter, in which we introduced our research objective and clarified our interview purpose. We informed the interviewees that they were expected to outline the project process and identify milestone events as part of their interviews. To broaden the points of interest that the interviewees regarded as relevant, we did not have a questionnaire to follow during the interviews (Blaikie, 2000). However, for each interviewee we specifically prepared some questions, according to their particular experience and knowledge about this project. The interviews were conducted in Thai and recorded, each lasting about 45 minutes.

The above methods, including documentary research and interviews, yielded a report of more than 1,000 pages of data, which was coded by drawing upon the ANT terminologies (Table 1). Data from different sources were cross-validated before use. Finally, we were able to depict the process of the four moments of translation, during which a sustainable actor-network failed to be formed, which led to the failure of the Smart ID Card project.

E. ANT Case Study of Smart ID Card Project Failure

E1. Flaws in problematization

The life cycle of an actor-network begins with the problematization stage, when the focal actor decides the project objective and selects the actors. The focal actor needs to set an OPP that can align the interests of different actors (Callon, 1986). In the Smart ID Card case, the Cabinet, as the focal actor, failed to set an OPP that might hold important actors with different concerns together. Each actor faced obstacles in their efforts to achieve allotted tasks and pass the OPP. For example, the Ministry of ICT was responsible for supplying blank smart ID cards, despite not having knowledge on card design and lacking experience in organizing card production (Table 3).

To understand the background of the Smart ID Card project formation and the OPP setting by the Cabinet, we analysed minutes for the 2003 CIRRS meetings that discussed the project plan. Meetings were held on January 20, March 5, April 30, June 19, July 31, and December 12. We found that the Cabinet from the start was determined to set up the Smart ID Card project with strong will and ambition. The Ministry of ICT and the Ministry of Interior did not object to the decision of the Cabinet, as they were probably eager to receive huge government investments. The setting of an irrational objective for the Smart ID Card project turned out to be the starting point of failure to maintain the actor-network. The head of an ID card issuing station said:

> "In creating this project the Cabinet ignored the interests of citizens. It did not consider the readiness of our society and the capability of the public sector for adopting the smart ID card. As a result, the project objective is set to let Thailand become the world leader in e-government by equipping every Thai citizen with a smart ID card. This is impossible to accomplish within even 10 years. This project is very complicated, involving more than 60 million citizens. In my opinion, it already failed when it was initiated."

E2. Incomplete interessement

At the interessement moment, the focal actor uses various devices to lock important actors into their respective positions and establish a balance of powers between actors, ensuring that these actors are able to overcome a series of obstacles and go

through the OPP (Callon, 1986). In the actor-network of the Smart ID Card project, the interessement moment was incomplete due to the inefficient use of relevant devices (Table 1), which further jeopardized the actor-network.

In the beginning the Cabinet was not fully aware of the obstacles faced by different actors while carrying out their respective tasks in the actor-network, and later offered little help to them with tackling the problems. In the CIRRS meeting on December 12, 2003, the Ministry of ICT reported that it was unable to issue the cards to the public on time, and the Ministry of Interior said that it could not function as the hub of different sorts of citizen data, which was the designated goal set by the Cabinet However, there was no evidence in the meeting minutes that the Cabinet had attempted to create feasible strategies to motivate the different public agencies, which owned various fractions of citizen data, to develop and build their database and information systems under a coherent plan by the Ministry of Interior. The Cabinet failed to help the actors to overcome their respective problems in passing the OPP, e.g. by using efficient devices (Table 3).

Firstly, the government budget could be a device for the focal actor to control other actors (Stanforth, 2007). However, the budget was limited, which restricted the capabilities of Cabinet to organize the actor-network. An official from the Ministry of Interior gave us a scenario:

> "The project is huge. The money allocated by the Cabinet is not enough to get the jobs done. This budget is mainly for the Ministry of ICT to produce blank smart ID cards, and the Ministry of Interior to construct a technology infrastructure for citizens all over the country to use the cards. Other agencies are not considered, for example hospitals that need money for developing information systems compatible for the ID cards, and public agencies in remote north-eastern areas that require investment in network infrastructure, computing equipment and training on offering services to the card owners".

Secondly, standards could offer non-human actors a universal language for interaction within the actor-network, but this device was ignored (Markus et al, 2006). A high ranking officer from the Ministry of Interior, in charge of citizen database management, said that each organization had developed its own database within its own capabilities, while neglecting the integration with other organizations. He believed that the lack of a common database standard across different public sector agencies severely hindered the implementation of the Smart ID Card project.

Thirdly, a variety of actors within the actor-network could refer to laws and regulations to effectively force the interessement (Callon, 1986; Sarker, Sarker and Sidorova, 2006), but such devices were unavailable for the Smart ID Card project. Consequently, different actors could not be locked into good positions in relation to designing, producing and diffusing smart ID cards. Moreover, laws and regulations supporting the smart ID cards' use were absent. A researcher of a Thai university reflected as follows:

> "According to the relevant Thai laws, when contacted by a citizen, a public agency must require the citizen to provide a photocopy of his card. This means in practice the smart ID card cannot be used in a smart way. No matter how much personal information the card is able to offer and how good the information systems are in processing the smart ID card services, the public agencies would still offer the same services and do the same thing as they normally do. We need new laws and regulations to ensure the smart ID card may function smartly".

E3. Uncontrolled chaos in enrolment

In the enrolment moment of translation, the focal actor enrols other actors to the actor-network, and mobilizes these actors to accept the interests defined for them (Callon, 1986; Madon, Sahay and Sahay, 2004). In our case, errors in the enrolment process, together with impairments in the earlier problematization and interessement moments, resulted in a chaotic, out-of-control actor-network.

In the earlier problematization moment, the Cabinet assigned the Ministry of ICT to produce a large number of blank smart ID cards, a high-tech artefact, in a rigidly short timeframe (see Table 2). This was beyond the capability of this Ministry, which had to enrol an ICT vendor into the actor-network of card production. A swift translation started to occur; in a short time period the vendor as the new actor had to translate its original interests to align them with that of the Ministry of ICT. Meanwhile, without powerful devices like budgeting, the Ministry of ICT struggled to manage the swift translation of the vendor and help it overcome the technological obstacles in passing the OPP set by the Cabinet; the focal actor of the main actor-network of the Smart ID Card project.

In fact, the Ministry of ICT could not influence the performance of the vendor because it lacked strong political backup. The vendor successfully persuaded the Cabinet to accept its card design and new specifications. The National Electronic and Computer Technology Centre (NECTEC) was responsible for testing the vendor's blank ID card samples. The test results revealed problems in card design, specifically in the security mechanism and memory storage management. A Director of the Ministry of ICT confirmed that one card was embedded with a microchip with limited memory space and information processing capability, and did not support connections to major public databases. The card was made of three layers, and was thus susceptible to damage and forgery. In terms of timing, it was too early to issue the cards, as the integrated smart ID card infrastructure was not formed yet. The different parts of the smart ID card infrastructure were still incompatible. For example, the citizen database was composed by several sub-systems, which were controlled by different government branches and could not communicate with each other (Bangkok Post, 2005).

The Cabinet, eager to see a successful Smart ID Card project, stood on the side of the vendor. Under strong pressure from the Cabinet, the Information and

Communication Committee of the House stated: "The project should not be scrapped due to what was considered to be minor technical glitches" (Bangkok Post, 2009). The House urged the Ministry of Interior to issue the cards to citizens soon, despite the wrong specification.

Consequently, the Ministry of ICT lost control of the non-human actor, the blank smart ID cards, and its actor-network responsible for card design and production. The cards were produced to the wrong specification. Such a smart ID card could be called a Trojan actor, whose emergence was fatal to the host actor-network led by the Ministry of ICT (Mahring et al., 2004). When it reached citizens' hands, it functioned as a normal card instead of the expected smart ID card. Finally, the Trojan actor, caused by the swift translation of the vendor, had demolished the actor-network of the Smart ID Card project, which could not achieve its mission.

E4. Betrayal in the actor-network

According to Sarker, Sarker and Sidorova (2006), a flaw in the early stages of translation may cause betrayal in the actor-network later on, which would lead to a breakdown in the association among actors and the immobilization of the actor-network. In our case, the various problems described above in the first three stages of translation led to the presence of betrayals throughout the process over the entire actor-network. Specifically, the Ministry of ICT and the ICT vendor betrayed the actor-network by not producing the ID cards with appropriate properties following the correct specification. The artefact was transformed into a Trojan actor, a normal card that could not work as expected, rather than a smart ID card. The focal actor failed to control the chaos in the enrolment stage, and finally left the actor-network. Due to this series of betrayals, the actor-network of the Smart ID Card project ultimately collapsed. Overall, this e-government initiative failed to modernize the Thai public sector.

F. Discussion and Conclusion

F1. Failure causes of the Smart ID Card project: a contextual analysis

From the perspective of ANT, this paper sheds light on e-government failure, a widely existing but poorly understood phenomenon (Heeks and Bailur, 2007). In the Thai Smart ID Card project case, we found that errors existed from the beginning of the social translation process i.e. the problematization moment. The initial actor-network was closed, excluding the participation of independent, professional organizations with technical knowledge and practical experience in ICT project design and implementation. Moreover, in the decision-making process, the focal actor treated the citizens as passive actors, showing no concern regarding their interests. Consequently, an unachievable objective for the actor-network was set, which meant that the focal actor failed to establish an OPP that might hold

important actors together. This was the starting point of the Smart ID Card project failure.

Furthermore, the interessement moment was incomplete due to the inefficient use of apt devices. The budget was insufficient and set incorrectly, which created problems rather than helping the project. Other important devices, such as standards, laws and regulations, were ignored. Consequently, the Cabinet failed to encourage different actors to commit to their designated roles in the actor-network. Moreover, the enrolment moment resembled chaos without any clear control. In line with Mahring et al. (2004), chaos in the enrolment moment came from the effects of inefficient management of swift translation, which in this case happened between the technology vendor and the Ministry of ICT in card production. Consequently, we saw the emergence of the Trojan actor, the malfunctioning blank smart ID cards. Lastly, betrayals of different actors to the actor-network caused the Smart ID Card project to collapse.

According to Walsham (1997), in actor-network research, a contextual analysis is critical in allowing people to understand the mechanism of actor-network formation and maintenance, which in our case explains the causes of ICT project failure. Particularly in developing countries, a national ICT project is often strongly affected by its political environment (Avgerou, 2008; Gao, 2007). In Thailand, politics was typically involved in the operations of public agencies. It was normal for unqualified companies to receive a big share in a project, as for example the vendor responsible for ID card production in our case. The politicians were often influenced by their own interests in decision-making. The Smart ID Card project had in fact been set up as a kind of hype by politicians, who used it in a political game for political interests and to influence the public. Eager to demonstrate its achievement in transforming public services, the Cabinet had strong interests to see the project move quickly to meet public expectations.

However, the Thai political situation was unstable. The Thai government experienced frequent reshuffles, and the party controlling the Cabinet changed frequently. Throughout the translation process, the responsibilities for implementing the Smart ID Card project were carried by different Cabinets. Consequently, the actor-network of this project was often out of control; the initial ambition for this Smart ID Card project was not carried on by new governments, and the required huge investment could not be committed. One senior officer told us: “public policy changed every time when we had a new Cabinet.” The discontinuity in policy hindered the progress of this project. Meanwhile, the Cabinet, as the focal actor, had conflicting interests when aligning itself with the project. Often, there were conflicts within the actor-network between different actors supported by different politicians. In fact, two key government actors, the Ministry of ICT and Ministry of Interior, had different supporters in the Cabinet. The unstable focal actor led to the instability in the actor-network of the Smart ID Card project.

E2. Theoretical reflections

As our literature review on e-government failure in developing countries has demonstrated, most of the existing research statically classifies various economic, organizational and technological factors as ones responsible for failure. In line with Heeks and Bailur (2007), we can see e-government projects in developing countries entail issues concerning information, technology and politics. In fact, this conclusion also applies to other kinds of ICT initiatives in the private sector and the developed world. For example, Gauld (2006) studied the failure of an information systems project in a public hospital in New Zealand, demonstrating that ill-planned, ill-managed large and multifaceted projects are likely to fail, where political and organizational issues are highly influential. Similarly, based on four case studies in New Zealand, Gauld and Goldfinch (2006) attributed e-government project failure to the public officials' enthusiasm about the roles of superior ICT in solving every existing, or imagined problem, and thus helping transform the public sector and improve public services. This case study contributes to the literature by validating such a general theoretical proposition: ICT project failure is an accumulated process that involves different actors, who fail to work together around the project goal.

Goldfinch (2007) identified the problems of enthusiasm, control and complexity, which can make the failure of a large project almost inevitable. We argue that other issues may also emerge. The focal actor, when managing the actor-network, faces different challenges at different stages. At each stage, the specific problems must be solved to ensure that the actor-network is maintained and survives to the next stage.

Firstly, our findings on the causes of failure in the problematization process support Lambright (2004) and Mahring et al. (2004), who stated that initiating a feasible project proposal is critical. Especially for complex projects, such as e-government projects, when setting the project objective, an open strategy should be adopted, to prevent the enthusiasm of a few government organizations from dominating the decision-making process. The focal actor should invite actors from a broad range of backgrounds to participate, as the limited involvement of relevant actors could lead to the formation of unreasonable objectives (or possibly over-expectations), which may hinder the implementation processes (Gauld, 2007). In accordance with Markus et al. (2006), the focal actor should stress the heterogeneity of actors in both their resources and interests, as they can understand the project from different but complementary angles.

Secondly, in the interessement moment, strong devices should be manipulated to lock key actors into applicable positions in the actor-network (Sarker, Sarker and Sidorova, 2006). Thirdly, in the enrolment stage, the focal actor should ensure the homogeneity of the actors' interests and heterogeneity in their capabilities. In particular, actors with the required technological capabilities must be recruited into the actor-network at appropriate times. Meanwhile, the formation of a counter-network must be avoided by removing some incapable and uncooperative actors from the actor-network. The focal actor must keep monitoring the dynamics of the actor-network, and be prepared to address emergent issues, especially when swift

translation occurs and new actors are introduced into the actor-network. Ultimately, the focal actor should do its best to control the actor-network and prevent the emergence of irreversible and chaotic situations.

In addition to enriching the theoretical understanding of the mechanisms of ICT project failure, this paper also lays the theoretical foundation for using ANT as a vehicle to expose the deep causes behind an ICT project failure. We found that ANT is efficient at disclosing the factors of an ICT project failure, which accumulate and take effects as the actor-network moves forward. In line with Sarker, Sarker and Sidorova (2006), we argue that the four moments of translation should be used as the core framework for narrating a project process, stage by stage, from its initiation to its end. Meanwhile, some ANT terminologies should be used to explain the deep causes of success or failure accumulated in different moments of translation, like betrayal, device usage, swift transition, and Trojan actor (Table 1). This way, we can systematically disclose why a project fails to achieve such an alignment, and avoid the descriptive story-telling style observed in traditional ANT research. At present, most ANT studies in ICT management superficially link the failure of an ICT project to the results that the focal actor fails to align the interests of different actors around the artefact (Gao 2007; Lee and Oh, 2006; Walsham and Sahay, 1999).

E3. Practical implications

Useful lessons can be drawn from the case of Thai Smart ID Card project for other countries when designing and implementing ICT projects. A project should start with the formation of an objective that is feasible and acceptable for all of the key actors. To achieve this, the focal actor should adopt an open principle in initiating the actor-network, and ensure that actors with key resources and capabilities for the project have the opportunities to voice their concerns. The focal actor must hold a strategic view of the whole actor-network. It needs to enrol important actors into the actor-network at favourable times. It should prevent the emergence of conflicts between actors, and solve such conflicts if they do arise. Important devices should be available for the focal actor to manoeuvre, in order to ensure that each actor may play its role in the actor-network.

The outcome of an ICT project relies on the selection of a focal actor that is able to efficiently manage the actor-network. Ideally, the focal actor should remain under a state of stability, so that its interest in the maintenance and operation of the actor-network can be sustained (Law and Callon, 1992). Against this criterion, the Smart ID Card project was managed by an unqualified actor, the Cabinet. Having an independent committee under Congress/Parliament to take charge of a project would have been a better option. Moreover, particularly in developing countries, e-government plans should consider the technological capabilities of ICT system design and implementation, and local adoption levels. If possible, big nationwide projects, like the Smart ID Card project, should be included in the country-level strategy for national informatization, which could offer a more stable status for the actor-networks.

E4. Conclusion

Adding to the extant knowledge which attributes e-government failure to several internal and external factors, this paper has proposed that this phenomenon should be seen as an accumulated process incurred by the failed creation and maintenance of an actor-network around a feasible objective. Furthermore, the deep causes of the failure of an ICT project can be traced and explained by following the four moments of social translation process, and referring to relevant ANT terminologies. Specifically, from the ANT perspective, the focal actor must ensure the smooth translation of the actor-network by actively solving various problems at different moments. At the start of actor-network, the problematization moment, the focal actor must invite relevant actors to contribute their ideas in setting the objective of the actor-network, to ensure that it is feasible in terms of technology, time, and finance. Forming an improper project objective can be the starting point of actor-network failure. In the interessement moment, the key challenge faced by the focal actor is to support other actors in the actor-network to work properly, and avoid betrayals appearing, by employing different devices. In the enrolment moment, the focal actor's key concern is to avoid the emergence of Trojan actors. The focal actor should be guaranteed with a stable status, which is critical for the actor-network to survive the translation process. To expand findings of this case study, future research should consider different types of e-government projects, by different kinds of public agencies and in different countries.

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Appendix 1. Categorization of Factors for e-Government Failure In Developing Countries

E-government failure factors	**Articles**
Lack of knowledge about e-government in both society and public agencies	Al-Fakhri et al. (2008); Arif (2008); Ciborra and Navarra (2005); Higgo (2003); Kumar and Best (2006); Subramanian and Saxena (2008)
Lack of capable and skilful public employees in e-government	Arif (2008); Higgo (2003); Kumar and Best (2006); Mutshewa (2007); Sahu and Gupta (2007)
Lack of a standard setting in hardware, software and information	Arif (2008); Holiday and Yeb (2005); Hussein et al. (2007); Mutshewa (2007); Parajuli (2007)
The problem of the digital divide	Kumar & Best (2006); Lau et al. (2008); Subramanian and Saxena (2008); Wong et al. (2007)
Outdated regulations and laws for e-government requirements	Al-Fakhri et al. (2008); Chhabra and Jaiswal (2008); Lau et al. (2008); Luna-Reyes, Gil-Garcia and Cruz (2007)
Lack of ICT infrastructure, especially in remote areas	Chhabra and Jaiswal (2008); Kumar and Best (2006); Subramanian and Saxena (2008)
Failure to focus on the desires of citizens	Abanumy, AlBadi and Mayhew (2005); Arif (2008); Lau et al. (2008)
Negative attitudes toward e-government development	Al-Fakhri et al. (2008); Luna-Reyes et al. (2007); Subramanian and Saxena (2008)
Lack of awareness in designing applications	Abanumy et al. (2005); Parajuli (2007), Shi (2007)
Focus on ICT rather than citizens' needs	Tseng et al. (2008); Wong et al. (2007)
Flaws in policy setting lead to problems in implementation process	Ciborra and Navarra (2005); Mutshewa (2007)
Lack of security and privacy in e-government applications	Holiday and Yeb (2005); Parajuli (2007)
Applications not in languages for different citizen groups	Holiday and Yeb (2005); Parajuli (2007)
Lack of a partnership among stakeholders	Wong, Fearon and Phillip (2007)
Lack of strong political will to support the e-government initiative	Subramanian and Saxena (2008)
Lack of financial support	Kumar and Best (2006)

Appendix 2. Summary of Review Articles on e-Government in Developing Countries

Articles: authors, titles and outlets	Research focus	Research findings	Framework	Method
Abanumy, A., Al-Badi, A., & Mayhew, P. (2005). E-government website accessibility: In-depth evaluation of Saudi Arabia and Oman. *Electronic J. of e-Government (EJEG)*, *3*(3), 99-106.	Performance evaluation of e-government application	E-government websites had low accessibility due to the lack of services, policies and ICT experts.	Model based: W3C web content accessibility	Quantitative research; questionnaire
Al-Fakhri, M. O., Cropf, R. A., Kelly, P., & Higgs, G. (2008). E-government in Saudi Arabia: Between promise and reality. *International J. of Electronic Government Research (IJEGR)*, *4*(2), 59-82.	Assessment of e-government implementation	Government websites were ineffective due to the lack of regulations, trust, training and knowledge in society and public agencies.	Category based	Quantitative research: questionnaire
Arif, M. (2008). Customer orientation in e-government project management: A case study. *EJEG*, *6*(1), 1-10.	Assessment of e-government implementation	Government websites failed to achieve their objectives due to the lack of standardized procedures, trained employees and poor knowledge management.	Model based: Customer orientation model (Jaworski and Kohli 1993)	Qualitative research: interview
Chang, I.-C., Li, Y.-C., Hung, W.-F., & Hwang, H.-G. (2005). An empirical study on the impact of quality antecedents on tax payers' acceptance of Internet tax-filing systems. *Government Information Quarterly (GIQ)*, *22*(3), 389-410.	User acceptance of e-tax application	Users rejected e-tax due to the slow speed of the system and awareness of security, privacy.	Model based: Technology Acceptance Model	Quantitative research: questionnaire
Chen, D.-Y., Huang, T.-Y., & Hsiao, N. (2006). Reinventing government through on-line citizen involvement in the developing world. *Public Administration and Development*, *26*(5), 409-423.	Performance evaluation of e-complaint application	E-complaint reduced the cost of citizen involvement, but failed to increase citizen satisfaction as no organizational reform to support the new system.	No framework	Quantitative research: questionnaire
Chhabra, S., & Jaiswal, M. (2008). E-government organizational performance framework: Case study of Haryana State in India – A log linear regression analysis. *IJEGR*, *4*(3), 57-80.	Performance evaluation of e-government application	Issues on government websites: transparency, organization culture, ICT infrastructure and regulatory environment.	Category based	Mixed method: questionnaire, interview
Ciborra, C., & Navarra, D. D. (2005). Good governance, development theory, and aid policy: Risks and challenges of e-government in Jordan. *Information Technology for Development*, *11*(2), 141-159.	Assessment of e-government design	E-government in Jordan faced problems due to the top-down policy of government, demands, less involvement from citizens, new technology.	Theory based: New institutional economics theory	Qualitative research: interview, meeting
Mirchandani, D. A., Johnson, J. H., Jr., & Joshi, K. (2008). Perspectives of citizens towards e-government in Thailand and Indonesia: A multigroup analysis. *Information Systems Frontiers*, *10*(4), 483-497.	Assessment of e-government implementation	E -government foci should be the integrated platform, reliability of information and citizen involvement.	Framework based	Mixed method: questionnaire, interview
Fu, J.-R., Chao, W.-P., & Farn, C.-K. (2004). Determinants of taxpayers' adoption of electronic filing methods in Taiwan: An exploratory study. *J. of Government Information*, *30*(5/6), 658-683.	User acceptance of e-tax application	E-tax users were more satisfied than non-users.	Model based: Technology Acceptance Model	Quantitative research: questionnaire
Gupta, M. P., & Jana, D. (2003). E-government evaluation: A framework and case study. *GIQ*, *20*(4), 365-387.	Assessment of e-government implementation	E-government reduced manpower, increased automation and transparency.	Category based	Qualitative research: interview

Articles: authors, titles and outlets	Research focus	Research findings	Framework	Method
Higgo, H. A. (2003). Implementing an information system in a large LDC bureaucracy: The case of the Sudanese Ministry of Finance. *Electronic J. of Information Systems in Developing Countries (EJISDC)*, *14*(3), 1-13.	Performance evaluation of e-finance application	Factors hindering e-finance are fear of employees, lack of lessons learned, insufficient standardization, and bureaucratic system.	Category based	Qualitative research: interview
Holliday, I., & Yep, R. (2005). E-government in China. *Public Administration and Development*, *25* (3), 239-249.	Performance evaluation of e-services	E-government in China was surface change rather than fundamental system rework.	Model based: Dunleavy et al. (2002)	Quantitative research: online survey
Hung, S.-Y., Chang, C.-M., & Yu, T.-J. (2006). Determinants of user acceptance of the e-government services: The case of online tax filing and payment system. *GIQ*, *23*(1), 97-122.	User acceptance of e-tax application	The high acceptance of taxpayers can be explained from subjective norm, perceived behaviour control.	Model based: Theory of Planned Behaviour	Quantitative research: e-mail questionnaire
Hussein, R., Karim, N. S. A., Mohamed, N., & Ahlan, A. R. (2007). The influence of organizational factors on information systems success in e-government agencies in Malaysia. *EJISDC*, *29*(1), 1-17.	Assessment of e-government implementation	Factors predicting success of e-government include goal alignment, management style, centralized decision making.	Framework based	Quantitative research: questionnaire
Hwang, C.-S. (2000). A comparative study of tax-filing methods: manual, Internet, and two-dimensional bar code. *J. of Government Information*, *27*(2), 113-127.	User satisfaction of e-tax application	Manual tax filing method had the lower rate of user satisfaction than 2D bar-code and Internet filing methods.	Category based	Quantitative research: questionnaire
Joia, L. A., & Zamot, F. (2002). Internet-based reverse auctions by the Brazilian government. *EJISDC, 9*(6), 1-12.	Performance evaluation of e-auction	E-auction was successful in terms of efficiency, effectiveness, transparency.	Framework based	Quantitative research: observation
Joia, L. A. (2007). A heuristic model to implement government-to-government projects*. IJEGR*, *3*(1), 1-18.	Success/failure analysis	Three key success factors for the G2G project: security system, organization culture and sufficient training.	Category based	Qualitative research: observation, interview
Joia, L. A. (2008). The impact of government-to-government endeavours on the intellectual capital of public organizations. *GIQ*, *25*(2), 256-277.	Success/failure analysis	This project had a positive effect on the intellectual capital of public agencies.	Framework based	Quantitative research: questionnaire
Kumar, R., & Best, M. L. (2006). Impact and sustainability of e-government services in developing countries: lessons learned from Tamil Nadu, India. *The Information Society*, *22*(1), 1-12.	Assessment of e-government implementation	The project failed for lack of trained personnel, sustained public leadership, consistent evaluation and monitoring, and involvement of all stakeholders.	Category based	Qualitative research: interviews, observation
Lau, T. Y., Aboulhosen, M., Lin, C., & Atkin, D. J. (2008). Adoption of e-government in three Latin American countries: Argentina, Brazil and Mexico. *Telecommunications Policy*, 32(2), 88-100.	Assessment of e-government implementation	The e-government was at the development stage	Framework based	Quantitative research: online survey
Luna-Reyes, L. F., Gil-Garcia, J. R., Cruz, C. B. (2007). Collaborative digital government in Mexico. *GIQ, 24*(4), 808-826.	Assessment of e-government implementation	E-government development is impacted by organizational form, digital divide, network of decision makers, and stakeholders.	Theory based: Institutional theory	Qualitative research: interview
Luna-Reyes, L. F., Gil-Garcia, J. R., & Estrada-Marroquin, M. (2008). The impact of institutions on interorganizational ICT projects in the Mexican federal government. *IJEGR*, *4*(2), 27-42.	Assessment of e-government implementation	E-government initiatives are affected by technology decisions and designs, and organizational structures, goals and performances.	Theory based: Institutional theory	Quantitative research: questionnaire
Madon, S. (2004). Evaluating the developmental impact of e-governance initiatives. EJISDC, 20(5), 1-13	Evaluation of e-government initiative impact	E-government improves trust between citizens and state, life quality of citizens and services.	Model based: Sen's notion of capabilities	Qualitative research: interview

Articles: authors, titles and outlets	Research focus	Research findings	Framework	Method
Mitra, R. K., & Gupta, M. P. (2008). A contextual perspective of performance assessment in e-government: A study of Indian Police Administration. *GIQ*, *25*(2), 278-302.	Performance evaluation of e-government application	There are positive impacts in internal efficiency, employee satisfaction and public satisfaction.	Framework based	Quantitative research: questionnaire
Mutshewa, A. (2007). The information behaviors of environmental planners. *GIQ*, 24(2), 429-442.	Assessment of e-government implementation	Problems include insufficient standardized information, lack of skilful officers and a bureaucratic system.	Category based	Qualitative research: interview
Parajuli, J. (2007). A content analysis of selected government web sites: a case study of Nepal. *EJEG, 5*(1), 87-94	Performance evaluation of e-government application	Four main problems exist: lack of privacy, low accessibility, less interactivity and few usability features.	Category based	Quantitative research: online survey
Rahardjo, E., Mirachandani, D., & Joshi, K. (2007). E-government functionality and website features: a case study of Indonesia. *J. of Global Information Technology Management*, *10*(1), 31-50.	Performance evaluation of e-government application	Issues for improving e-government: website quality, acceptance of citizens and variety of needed services.	Category based	Quantitative research: questionnaire
Sahu, G. P., & Gupta, M. P. (2007). Users' acceptance of e-government: A study of Indian Central Excise. *IJEGR*, *3*(3), 1-21.	User acceptance of e-government application	The acceptance rate was low due to the anxiety of users, less skilful employees and lack of ICT facilities.	Framework based	Quantitative research: questionnaire
Santos, E. M. (2008). Implementing interoperability standards for electronic government: An exploratory case study of the E-PING Brazilian framework. *IJEGR*, *4*(3), 103-112.	Assessment of e-government implementation	E-government standardization was difficult, due to the lack of resources, technological incompatibility and changes in the technological context.	Category based	Mixed method: questionnaire, interviews
Shi, Y. (2007). The accessibility of Chinese local government Web sites: An exploratory study. *GIQ*, *24*(2), 377-403.	Performance evaluation of e-services	Chinese local government websites had significant accessibility problems.	Model based: W3C model	Quantitative research: online survey
Stanforth, C. (2007). Using actor-network theory to analyze e-government implementation in developing countries. *Information Technologies and International Development*, *3*(3), 35-60.	Success/failure analysis	The trajectory of e-government projects depends on the association among actors.	Theory based : Actor-network theory	Qualitative research: interview, memo
Subramanian, M. & Saxena, A. (2008). E-governance in India: from policy to reality. *IJEGR*, *4*(2), 12-26.	Performance evaluation of e-government application	The project increased efficiency and service speed, but lacked political will, the need for change and ICT infrastructure.	Category based	Interviews
Tseng, P. T. Y., Yeh, D. C., Hung, Y.-C., & Wang, N. C. F. (2008). To explore managerial issues and their implications on e-government deployment in the public sector: Lessons from Taiwan's Bureau of Foreign Trade. *GIQ*, *25*(4), 734-756.	Performance evaluation of e-trade application	E-government projects can be improved by having a concrete plan, reducing user resistance and advancing employees' ICT skills	Category-based	Qualitative research: interview
Wang, Y.-S., & Liao, Y.-W. (2008). Assessing e-government systems success: A validation of the De Lone and McLean model of information systems success. *GIQ*, *25*(4), 717-733.	Success/failure analysis	Five factors supported e-government success: system quality, information quality, service quality, usefulness, user satisfaction.	Model based: De Lone and McLean model	Quantitative research: questionnaire
Wangpipatwong, S., Chutimaskul, W., & Papasratorn, B. (2008). Understanding citizen's continuance intention to use e-government website. *EJEG*, *6*(1), 55-64	User acceptance of e-government application	Perceived usefulness, ease of use and computer self-efficacy affected the citizens' continuance intention.	Model based: Technology Acceptance Model	Quantitative research: online survey
Wong, K., Fearon, C., & Philip, G. (2007). Understanding e-government and e-governance: stakeholders, partnerships and CSR. *International J. of Quality & Reliability Management, 24*(9), 927-943.	Stakeholder involvement in e-government development	To enhance e-government development, citizens should be considered as a partner, and have the social inclusion of relevant stakeholders.	Theory based: Stakeholder theory	Qualitative research: interview

Appendix 3. Interview Arrangements

Informant no. and interview time	**Informant organization and role in the project**	**Interview topics**
# 1 2009 November	• An official, Ministry of Interior • Monitor issuance and management of Smart ID Card in the provinces	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 2-3 2009 November	• Officials, Ministry of Interior • Facilitate technical issues of the Smart ID Card in regional areas	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 4-8 2009 November	• Heads, Smart ID Card Issuing Stations, Ministry of Interior • Issue ID cards	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 9-13 2010 May	• Officials, Ministry of ICT • Coordinate nationwide implementation of Smart ID Card project	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 14-15 2010 May	• Officials, NECTEC • Provide strategic plan for national ICT initiatives	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 16-17 2010 June	• Officials, Office of the Public Sector Development Commission • In charge of e-government policy and implementation	• E-government in Thailand • Project background • Problems in design, implementation
# 18-20 2010 July	• Scholars, a Thai university • Interested in public sector ICT project	• E-government in Thailand • Project background • Problems in design, implementation
# 21 2010 July	• CEO, a Thai ICT manufacturer • Work with public agencies as a sub-contractor	• Project background • Responsibility for the project • Obstacles in organisations • Problems in design, implementation
# 22-41 2010 August	• Citizens • The end users of the Smart ID Card project	• Project background • Responsibility for the project • Opinions in design, implementation