ICT Development and Organizational Change in the Thai Public Sector

by

Radaphat Chongthammakun

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Doctoral Committee:

Assistant Professor Steven J. Jackson, Cornell University, Co-chair
Professor John L. King, Co-chair
Emeritus Professor Michael D. Cohen (Deceased)
Associate Professor Allen D. Hicken
Assistant Professor Joyojeet Pal

To Mom and Dad, for everything

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Abstract

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Chairs: Steven J. Jackson
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Information and communication technology (ICT) has long been central to modernization in the public sector. Socio-political factors within which the technology is developed and used play an important role in informing the design of the technology, and determine how it is used in public sector organizations. Thai bureaucracy has been constrained by long-established bureaucratic culture, strict social status, and hierarchical control, which give rise to distinctive public administration styles, organizational arrangements, and work practices. This dissertation examines how these socio-political characteristics result in distinctive patterns of ICT development and adoption in the Thai public sector.

By analyzing ethnographic fieldnotes, interview transcripts, and government artifacts collected from a 12-month period of fieldwork, this dissertation explores three key aspects of ICT development efforts in the Thai public sector: (1) relations between ICT and managerial control in the public sector; (2) processes of standardization in government information infrastructure development; and (3) the importance and complexities of boundary work in digital government development efforts.

Beyond its effects on public administration and service provision processes, the development of computerized technology is associated with a series of organizational changes that often produce challenges and tensions attending ICT development efforts. The dissertation offers

lessons for digital government scholarship and the wider field of information science by specifically exploring changes in power structures, work practices, and the roles and relationships of government officials within and across agencies resulting from the implementation and use of new technologies. Following selected findings extend the understanding of technology development and organizational change in the public sector. *First*, information systems are used to reinforce existing hierarchical control power and authority, leading to tensions and resistance to the systems and control. *Second*, infrastructure development and standardization are a politically loaded process provoking conflict among agencies competing for power and autonomy over information resources. *Third*, the effects of technology adoption on work practices and relationships among officials are concentrated among lower- to middle-ranking officials, with relatively little impact on the practices of higher-ranking officials. *Fourth*, computerization does not necessarily increase the speed and efficiency of public administration as paper-based practices are still dominantly in effect.

Chapter 1
Introduction

Governments worldwide have increasingly turned to information and communication technology (ICT)-enabled processes in recent years to reengineer internal and external processes of government in pursuit of key improvements in public sector performance: better and more efficient information exchange within the government, improved delivery of public services, and greater efficiency and effectiveness of government operations through reduced transaction costs and times. Such changes have also been associated with increased opening, responsiveness, or democratization of government through new forms of citizen engagement and democratic accountability and transparency.

ICT development efforts in the public sector, often referred to as digital government development efforts, involve redesigning processes and relationships with internal and external stakeholders, which can alter long-standing communication flows and challenge classic public administrative principles of hierarchy and rules, centralization, coordination, and bureaucratic accountability. Some argue that these changes move public administration into a distinctly new era – 'new public management,' digital-era governance, or the post-bureaucratic state, for example [52,53,86,95,145]. A consequence of digital government development efforts has been to connect external reform trajectories (e.g., the shifting interface between government and citizens, private firms, and social groups) with internal reforms aimed at relationships within and among governments (e.g., bureaucratization and virtualization) [59,86]. The use of modern ICTs, such as the Internet and web-based applications, to reshape programs, service delivery, agencies, and policy networks has brought about new patterns of organization in the public sector that go beyond physical boundaries. Examples include joined-up government [95], virtual government organizations [10,145], government interoperation [71], or virtual states [59].

As a government official working during a period of computerization in Thailand, I became interested in the relationship between ICT development and organizational change in the public sector. In this dissertation, I examine digital government development efforts and their impact on organizations and individuals in the Thai government by addressing three central research questions: What are the socio-political factors that affect the development and adoption of technology in the Thai public sector? What are the social and political consequences of technological introduction and adoption in the Thai public sector? And how do Thai government officials adapt to the change and respond to the challenges, limits, and tensions brought about by the deployment of technology? More specifically, I investigate the development and use of stand-alone and inter-agency information systems to understand the organizational impacts at different levels ranging from the individual to group, agency, and government units.

The Thai public sector has long been subject to governance and political institutional arrangements influenced by the region's history of mixed European institutional influences – established as a combination of the British model of constitutional monarchy employing a parliamentary system, and the French model of local administration. It has been constrained by a long-established bureaucratic culture, strict social status, and hierarchical, which result in distinctive work processes and practices in both pre-computerization and post-computerization systems. These socio-political conditions both support and impede the adoption and use of technology in the Thai public sector, resulting in work practices that diverge from the intended goals of adopting new technologies. This study seeks to understand the patterns of ICT development, adoption, and use in the Thai public sector, which combine the use of traditional manual work and physical documents and electronic processes, forming a mixed paper-electronic ecology of work practice. Such an ecology appears to have become embedded in government work across organizational functions. This practice has led to technological and organizational challenges and tensions accompanying digital government development efforts. The thesis also investigates how government officials understand and respond to the changes and tensions resulting from the deployment of ICT in their work.

1.1 Background: Survey of Digital Government Literature

Before digital government scholarship emerged as a field of study, scholars in various academic disciplines (including social studies of computer-based technology, organization studies, management science, and IT/MIS) studied the implementation and use of ICT in organizations, and their relationships with organizational change. Unfortunately, the majority of the literature on ICT in organizational studies, management, and IT/MIS was based on studies of private sector organizations. With the exception of work at the University of California at Irvine, early research in public management, information systems, or business administration rarely focused on computing in public organizations [103]. Until the emergence of digital government scholarship in the late 1990s, digital government researchers borrowed theoretical and conceptual frameworks from those allied fields of study to explain information system development, adoption and use phenomena specifically in public organizations and subsequent transformation. Examples of analysis of technology adoption and use in government organizations and the impact of new technologies on organizational change are Laudon 1974 [114]; Bozeman and Bretschneider 1986 [27]; Bugler and Bretschneider 1993 [30]; Kraemer 1977 [102]; Kraemer and King 2006 [109]; Kraemer et al. 1987 [104]; Robey and Sahay 1996 [166]; and Kraemer and Dedrick 1997 [103].

For instance, Laudon [1974] and Kraemer and Dedrick [1997], studying the development and deployment of information technologies in public agencies, point to social, political, historical, and cultural factors within which the technologies are developed as playing an important role in the crucial decisions that inform the design of technologies and determine how they are used [103,114]. Technologies may be used as tools to reinforce and/or reshape organizational structures and control power arrangements (e.g., centralization or decentralization), and may redefine the roles and relationships for individuals or groups in a bureaucracy. American bureaucratic reform in the 1960s addressed the urban crisis – governance and political problems stemming from the inability of federal and local governments to collect, store, and process information quickly enough to help executives evaluate and redesign programs on housing, welfare, transportation, unemployment, and social security [114]. Laudon finds that the sources of crisis in public policy lay in the organizational structure of American government. More specifically, Laudon cites

fragmentation of power among political jurisdictions, decentralization of authority, and "localistic" attitudes of politicians and bureaucrats [114, p. 48-49]. These organizational factors impede information flow within government and inhibit rational decision-making. Although technology makes possible bureaucratic reform leading to the redistribution of control over information and centralized information systems, traditionally isolated and separate organizational structures as well as low social integration among agencies causes delay and resistance to information sharing and centralization. Laudon concludes that initial social and political conditions taken from sociological literature (i.e., the levels of interdependence, internal integration, and homogeneity among agencies) and the histories of bureaucratic reform affect how integrated information systems are designed and used in those agencies. Additionally, Laudon finds that the levels of centralization in organizations associated with these systems are the result of political and bureaucratic forces rather than technology. Information technology is a tool whose ultimate social meaning, content, and consequences are subject to the influence of the specific political values and interests that inform its use [114, p. 311]. In their studies of computing in U.S. local governments, Kling [1978] and Kraemer and Dutton [1979] conclude that those with power in organizations use computing to reinforce existing power structures [96,105].

Kraemer and Dedrick [1997] similarly conclude that managerial action and decisions coupled with internal and external factors of public organizations, such as organizational history and context, resource availability, and legal as well as political features, are the key influences shaping organizational structure [103]. Centralized and decentralized structures of computing functions are powerful tools for reinforcing existing power arrangements, as well as facilitating trends in organizational restructuring whether centralized, decentralized, hierarchical, or networked [103,106,160]. By itself, however, computing is unlikely to affect organizational structure [103]. The discussion among scholars regarding changes in organizational structure and power distribution appears to conclude that computing technology remains a useful instrument of organizational and administrative change in the public sector. Such rearrangement involves both intended (or planned) and unintended (or unplanned) change in operational, managerial, political, legal, and technical aspects. As a result, change often creates limits, challenges, and tensions for digital government development efforts, and in the worst case, heightens resistance to technology among government officials.

The question of how ICT affects public sector organizational structure rearrangements, and the relationships among government employees, has become central to contemporary digital government scholarship. Recent work has tended to focus on the development of ICT and its effects on organizational structures at *the government or inter-organizational level*. This work centers on novel forms of government built on new information infrastructures – the Internet and near-ubiquitous networked computing technologies. This area of research has emphasized organizational change and related issues including information and service integration and sharing, collaboration, and standardization, enabled by new information technologies, across traditional agency boundary. Examples include Fountain 2001 [59]; Bekkers 2003 [10]; Dawes 2000 [48]; Gottschalk 2009 [71]; Kraemer and King 2006 [109]; Mayer-Schönberger and Lazer 2007 [129]; Pardo and Cresswell 2004 [151]; Pardo and Jiang 2007 [152]; Scholl 2001 [173]; Scholl and Klischewski 2007 [174]; and Yang 2003 [203]. Changes and tensions at *the local or organizational level* and their effects on individuals, however, have been less thoroughly addressed in recent digital government scholarship.

Nevertheless, recent scholarship congruently emphasizes the changes necessary in both social and technical elements of government to achieve some of the promising benefits from ICTs as well as the advantages of organizational networks over hierarchies. The development of cooperative interaction and information integration in and among governmental agencies requires restructuring of the institutional arrangements in which transactions are embedded [59]. The change involves mobilization of limited resources, evolving inter-organizational relationships, establishing collaborative norms and culture, establishing institutional incentives to collaborate, and changing coordination mechanisms [39,59,153]. It also involves decision and policy change in terms of information and technology sharing and integration, information ownership and stewardship, accountability, jurisdiction, authority, autonomy, and trust that affect relationships among agencies [57,59,95,109,150,153].

However, such changes are not universally welcome. Inter-organizational information services also rely on information infrastructure and standardization of government information processes and formats [95,153]. Efforts at information infrastructure development and standardization in digital government involve new work processes, along

with significant organizational change in the practices, norms and culture, structures, and laws of individual agencies at the local level [152]. These processes are often embedded in larger political and institutional environments which shape their goals and circumscribe their choices. Therefore, such efforts pose challenges to enterprise or policy domains at the inter-agency or inter-governmental levels, and invoke tensions and resistance among individuals or groups in the government. An understanding of the process of ICT development, adoption, and use in organizations, and the interdependence between technology and organizational structure, promises to help both digital government scholars and practitioners anticipate and overcome those socio-technical challenges and tensions.

Most digital government literature has investigated bureaucratic modernization and computerization and consequent organizational change in the context of developed countries. Much less research work has focused on the developing world. Although governance and computerization in developing countries seem to be fundamentally similar to those of their developed-world counterparts, differences in the social tradition, political history, and bureaucratic culture of individual countries may help scholars and practitioners understand differences in ICT development and implementation processes and trajectories. More specifically, traditional organizational culture, norms, and practices in each agency constrain how the same ICT is implemented and used, which may result in different practices around it. Due to the socio-political dissimilarity of developed and developing countries, researchers indicate the difficulty in transferring ICT solutions and digital government development models, as well as organizational concepts, from developed to developing countries [82,84,175,206].

Scholars like Heeks [2001, 2002], Schuppan [2009], and Yildiz [2007] emphasize the importance of a context- or cultural-oriented approach to digital government development and analysis [82,84,175,206]. Schuppan argues that transferring digital government organizational principles from Western industrial countries to developing countries represents an oversimplified view of efficiency [175, p. 121]. He demonstrates the complexity of administrative conditions and contextual factors in Sub-Saharan African countries which impact digital government development and functionality. Low-performance public administration corresponding with low resources in African and other developing countries lead to inefficient and ineffective public administration and political

will implementation [175]. The low performance is characterized by a rigid centralism with a neo-patrimonial leadership style (i.e., personalized power structures based on patron-client relationships), rent-seeking behavior of bureaucratic elites, a weakly developed administration, corruption, and unmotivated and unqualified officials [194].

Schuppan suggests that initial institutional, cultural, and wider administrative contexts in developing countries must be considered to avoid unintended effects on the technological implementation [175]. These contexts include political-administrative factors such as low levels of democratization. Many African countries are governed by military dictatorship, rendering administrative reforms difficult. Also, many developing countries do not tend toward the types of administration-oriented reform that would help them prepare to implement digital government. Another important factor is the values and attitudes of the citizens in developing countries regarding political administrative systems. In countries where citizens are familiar with the ability to negotiate with government officials, those citizens may resist digital government applications because they will lose this ability. Access to the Internet and other basic infrastructure in developing countries is still low and costly. While the present digital government discussion is still often limited to the advantages of providing online services, the problem of Internet access constrains this perspective [82]. Therefore, intermediaries may be necessary in the developing-country context [83]. Moreover, the personnel expenditures of African administrations are only one-tenth of those in western countries [83]. Substituting officials with ICT could, under these conditions, lead to a less efficient administration. Therefore, the cost-to-benefit ratio and return on investment in developing contexts are different from those in developed countries.

Digital government development efforts in contemporary Thailand have been understudied in both digital government and public administration scholarship. My study aims to address gaps in the current literature, and provide researchers with insight and support for further comparative studies of ICT development in the public sector. The results also help digital government scholars and practitioners understand which elements of the earlier literature were general enough to apply to the very different context of Thailand – and conversely, what may be observed in studies of other nations that are near Thailand, which have been underexplored. Additionally, the study offers practical lessons for efforts at government system development for oversight and control implications, information and process

standardization and interoperability, and their relationships with existing work practices, culture and norms, incentive and reward structures of the public sector in the specific national context of Thailand, and in the broader government bureaucratic context.

I believe that the Thailand case offers an insightful case in the adoption and use of ICT, and the effects of that use on government. The findings and implications from my study may contribute to the digital government community, and the wider field of information science.

1.2 Study Overview

I present my dissertation in seven chapters. This chapter introduces central research problems in digital government scholarship concerning the relationships between the development and use of ICT and organizational change in public sector organizations. The chapter presents a survey of existing issues and arguments in the field of digital government, and particularly illustrates the research gap in developing countries. It also lays out the main contribution of this dissertation to the digital government research and practice communities as a whole.

Chapter 2 discusses the methodology used in the research. The discussion includes the research design of my dissertation and the theoretical significance of ethnography in organizational studies, and public sector organizational change in particular, for understanding the relationships of organizational members and their interdependence with information technology. This chapter also addresses the challenges, limitations, and trade-offs of ethnography and other means used in the data collection for this dissertation.

In chapter 3, I outline a historical background of Thai polity and bureaucracy including a series of public administrative reforms. This chapter reviews early efforts at computerizing government processes and public service delivery, which have led to change in existing control power and organizational structures. This change also includes the emergence of new organizational and institutional arrangements, in addition to new practices for government agencies and employees.

Chapter 4 describes how ICT is used as a managerial method and tool for improving control and oversight in Thai bureaucracy. Based on scholarly work in sociology, communication studies, information science, organizational studies, and CSCW, I discuss how the

government and agencies develop and use ICTs for managerial purposes. These information systems include three major government-level systems and one agency-level system. I also explore the barriers, challenges, and resistance brought about by the introduction of computerized managerial tools at the government and agency levels, and how individual agencies and officials respond to such control. The response involves how officials at different hierarchical rankings develop their own workarounds and adjustments to maintain their monitoring power and the autonomy of their work through manual and electronic practices.

Chapter 5 examines the development and implementation of four contemporary efforts at information and system standardization, integration, and interoperability at the government level in the Thai public sector. The development process involves changes in the roles and relationships of government officials within and across individual agencies. This chapter also portrays the competition over budget, power, and information, and the strategic plans and actions each agency employs to avoid losing critical organizational resources. Finally, the chapter addresses the social and technological limits and tensions attending information infrastructure development and standardization, drawing on literature in sociology, science and technology studies, and IT.

In chapter 6, I adopt the concept of boundary objects to highlight the role of artifacts used in government communication and coordination. I extend the boundary object notion to the active yet likely invisible roles of human actors in the boundary work, who are identified as boundary agents, and the roles of the Ministry of ICT (MICT) and its supervised organization – the E-Government Agency, or boundary organization, who performs specific tasks in information standardization and integration. I investigate boundary work specifically in the development and use of e-Document systems as in-agency stand-alone systems, and as interoperable systems for government-wide communication. Such boundary work involves the roles of physical and electronic documents, and the work of administrative staff in sending and receiving documents; the work of ICT officials in coordinating, bridging, and linking global and local systems and practices in the interoperability effort; and the MICT's process of establishing and enforcing government interoperability. As in previous chapters, I explore socio-technological challenges and tensions attending boundary work.

Chapter 7 summarizes key social, political, and technological challenges and tensions in digital government development from my findings. This chapter revisits the questions about the relationship between ICT development and organizational change, and identifies socio-political factors that affect and are affected by the implementation of technology. Lastly, it offers practical lessons for and the future outlook of digital government development efforts in Thailand as the main contribution of this dissertation to the communities of digital government research and practice.

Chapter 2
Methods and Methodology

My research centers on the question of how the adoption and use of ICTs affects different groups of government officials in their working lives. In particular, my research focuses on the change in organizational factors that relate to hierarchical structures and lines of command, the roles and relationships among officials within and across organizations, autonomy and power of different groups of people in organizations, and work practices of officials at different levels in organizational hierarchies.

My project focuses on organizational factors that changed, and those that did *not* change as a result of the introduction of ICT. The unchanged factors represent long-established bureaucratic cultures, norms, values, and work practices that may be barriers to the adoption and use of technology, or may alter the initial goals of technology development. Furthermore, I am interested in the effect of technology at the individual level. Therefore, I examine how technology affected government employees; how they changed and/or were required to change their work, and the roles and relationships between themselves; and how they adapted or developed workarounds to deal with change.

In this chapter, I describe the qualitative research methodology and its challenges, limitations, and trade-offs for this dissertation. The adoption and use of ICT in the public sector give rise to change that may be categorized into two broad approaches. From the public policy perspective, on the one hand, the adoption and use of ICT impact the relationship between government and its citizens. ICT promises to improve public sector responsiveness, efficiency, effectiveness, transparency, and accountability. On the other hand, ICT brings about change within public agencies including organizational forms and structures, hierarchies, cross-agency information integration, and information and service standardization. As existing research suggests, different groups of people both affect and are affected by technology development and how technology is used in their organizations

[7,59,61,99,143,144,207]. The literature presented in chapter 1 outlines organizational change resulting from the implementation and use of ICT in the public sector of developed Western countries. This literature also suggests that the adoption and use of various computing technologies – mainframes, microcomputers, and client/server applications – do not produce significantly different results in terms of organizational operation [44,109,114]. However, modern ICT such as ubiquitous networked computing and the Internet has brought about novel forms of public sector operation, organizational structures, and public service delivery. I use this literature to suggest guidelines for what I should consider when entering field sites and analyzing data.

For this project, I conducted exploratory research that seeks, through qualitative data analysis, to holistically understand organizational change in the Thai public sector that occurred as a result of the adoption and use of government ICT. Ultimately, I propose a theoretical framework for ICT adoption and organizational change in the public sector.

2.1 Qualitative Research Methods

For this research, I wanted to gain an in-depth understanding of the experiences of study respondents regarding the adoption and use of ICT in the government. Yildiz [2007] surveys digital government literature and notes that output-focused studies focus their research on the output of digital government efforts, artifacts such as websites and online government services [206]. On the other hand, outcome-oriented studies explain how a particular digital government effort positively or negatively affects a certain governance performance indicator, such as cost savings, transparency, efficiency, participation, responsiveness, or accountability. However, research that examines end-products of digital government efforts does not tell us what is happening inside the black box of digital government [206 p. 660]. Congruent with Yildiz's finding is Heeks and Bailur's [2007] criticism that the stage models of digital government give some insights into *what* is happening in digital government but offer little understanding of *why* things are happening [85, p. 255]. They further argue that such literature often ignores institutional, political, organizational, and cultural contexts, which either facilitate or constrain the development of digital government applications in particular societies. Yildiz emphasizes the importance of process-oriented methodology because it helps researchers understand and explain digital government processes and generate theory [206]. This methodology involves extensive

fieldwork and a variety of data collection methods such as interviews, participant observation, and archival analysis.

To understand the practices and patterns of ICT development, adoption, and use, and their relationship with organizational change in Thai bureaucracy in this project, qualitative methodologies were used to capture a range of variation in ICT practices and their impacts on government agencies and officials. I employed an ethnographic study which included ethnographic observations and semi-structured interviews. The project started as part of the requirements of a course, SI 724 – Qualitative Methods, taught by Professor Elizabeth Yakel in Winter 2010. In that study, I focused on two central questions:

1) What are the current patterns of ICT development, adoption, innovation and use in the Thai public sector?

2) What are the principle organizational barriers, limits, and consequences of ICT development, adoption, innovation, and use in the Thai public sector?

In the preliminary study, I examined the processes and patterns of ICT adoption in the Thai public sector, focusing particularly on the sociology of technological development, implementation, and adoption processes, and the use of ICT in public organizations.

The preliminary investigation was conducted between January and May 2010 through semi-structured interviews over Skype and via email communication. 10 interviews were conducted in total with eight officials in two government agencies – the Ministry of Commerce and the Land Development Department. Details regarding site selection and respondent recruitment are discussed in later sections of this chapter. Moreover, I examined documents related to ICT development such as the agencies' ICT master plans. This small-scale research project enabled me to frame my research questions for the ethnographic observations [42] and in-depth interviews during my subsequent fieldwork.

The main body of fieldwork for this study was conducted in two rounds, first between May and August 2010, and thereafter between May and August 2011. The first round of fieldwork (May – August 2010) involved 60 interviews with 55 respondents at six organizations. The initial findings from this preliminary study provided me with an overview of public sector ICT development and use, an understanding of individual information systems and standards used in the government, and helped me scope my

fieldwork research regarding which organizations and information systems I should pursue when entering the field and what questions I should ask in the semi-structured interviews. During the subsequent round I examined the development and use of three main government functional information systems – the financial management, personnel management, and documentation management systems. I also examined the government's collaborative effort at integrating and standardizing information systems and practices for cross-agency interoperability among these three major systems.

The second round of fieldwork focused on follow-up interviews and observations to confirm the ICT practices and patterns discovered during my previous fieldwork. I conducted in-depth interviews with the same 18 informants from the first round of fieldwork in addition to other respondents on the same and additional information systems. I also expanded the study from common government applications to specific-purpose applications developed exclusively for internal use. Between these two rounds of fieldwork, conducted one year apart, I tracked ICT development and implementation efforts and progress. A certain number of ICT collaboration projects quietly faded out or were discontinued. Government structures and authorities among organizations involved in digital government development also changed. As a result, the number of sites studied was expanded from six to 11 agencies.

In addition to interviews and observations during the fieldwork, I also reviewed information provided publicly on the government agencies' websites, formal and informal documents used within the organizations including meeting minutes, ICT master plans and budget plans, and annual reports. Also, I studied information and system use through the agencies' intranets and knowledge-sharing sites. This combination of multiple forms of data collection through interviews, document investigation, and ethnographic observation allowed me to achieve a form of triangulation, and form the basis of the categories elaborated in chapters 3 through 6 of this thesis.

2.2 The Study Sites and Recruiting Process

During the preliminary study, I carried out interviews with officials at the Ministry of Commerce (MOC) and the Land Development Department (LDD). The MOC is representative of Thailand's six ministry-level agencies, all of which are located in the same

geographical location with the MOC. The LDD represents departmental agencies that are under the supervision of a ministry, and have field offices throughout the country.

The selection process during the 2010 preliminary project reflects how I gained access to the organizations. Contacting a government agency for interviews, research, or other sorts of cooperation within my time constraints requires a personal connection with someone inside of the organization; such a connection should be initiated at the higher levels of the agencies. Without an informal connection, I would need to submit request letters to individual agencies waiting for their response, which could have taken months, and likely would have concluded with denial. Personal connections helped me conduct ethnographic observations and interviews in agencies where formal requests were unlikely to yield the same result. Therefore, one of the site selection criteria was my level of accessibility to individuals within the agencies. As my goal was to uncover government efforts of interoperable and integrated technology development and use, and to explore the underlying practices of government officials, a selection process based on personal connection to the studied subjects did not seem to pose a severe limitation to my study.

As a government official myself, I used this inside connection to my advantage. I asked my supervisors to initiate contact with the executives and directors of ICT Centers in other agencies. Such informal or personal connection among officials is typically initiated through attending formal meetings and seminars organized by government agencies or software vendors. In ICT-related events particularly, ICT officials share experiences and stories about their ICT implementation practices. They exchange contact information for future cooperation, and request site visits if they are interested in the work their colleagues are doing. As one of my initial contacts, I was connected with the chief information officer of the LDD, who assigned an official to help coordinate my interviews with officials at the organization. My supervisor also connected me with the MOC's ICT Center director. The Commerce Ministry and Land Development Department represented different agency levels – The MOC represented small-sized ministerial level agencies, and the other represented large-sized departmental level agencies according to their annual budget, and the number of personnel in their agency. This was useful for establishing my project as a case study. These selected agencies were also good representative of government agencies regarding the development and use of common government ICT applications for internal use, such as e-

Document systems, personnel management and finance management information systems. The agencies also had electronic applications to deliver their public services throughout the country.

Both agencies also served as the starting point for my recruiting process through snowball sampling [13]. At the Ministry of Commerce, the director of the ICT Center introduced me to both ICT and non-ICT officials who were involved in the use of various information systems including three main government applications – e-Document systems, the government's fiscal management information system, and the departmental personnel information system – and other specific-purposed applications. Both agencies also participated in the MICT's pilot project on integrated e-Document systems. My fieldwork extended my samples to the MICT and relevant agencies for broader ethnographic understanding of ICT practices at the national level in the Thai public sector. As such, I interviewed the staff at the MICT on the integrated information system effort and interviewed the consultant to the MICT on the development and adoption of the national standardized information framework. From the MICT, I was introduced to the Customs Department and its efforts at integrating national trade-related processes through the e-Customs and National Single Window system.

Throughout my multi-phase, yearlong fieldwork, I employed ethnographic methods at 10 government agencies consisting of four ministerial agencies, four departmental agencies, one state-independent agency, and one public organization. The organizations I studied include (Figure 1):

- Ministries (The Permanent Secretary's Office):
    - The Ministry of Commerce
    - The Ministry of Interior
    - The Ministry of Transport
    - The Ministry of Information and Communication Technology
- Departments:
    - The Department of Land Transport under the supervision of the Ministry of Transport

- The Land Development Department under the supervision of the Ministry of Agriculture and Cooperatives
- The Customs Department under the supervision of the Ministry of Finance
- The Department of Provincial Administration (Ayutthaya Provincial Office) under the supervision of the Ministry of Interior
- The Office of Public Sector Development Commission under the supervision of the Prime Minister's Office

- Judiciary and independent agency:
  - The Administrative Court and its Office
- Public organization:
  - The E-Government Agency under the supervision of the MICT

Structurally, Thai government includes 20 ministries. In each ministry, the permanent secretary of the agency is the highest ranked executive official and performs organizational-level administration work of the ministry. At each ministry, two main offices serve the minster and the permanent secretary – the office of the ministry and the office of the permanent secretary. The ministries oversee and monitor their dependent departments' operational plans, performance, and budgets, and play a role in integrating operational plans and budgets (including ICT master plans and budget plans) among all departments. With around 200 officials each, the ministerial agencies are smaller than the departmental agencies in size. This is because they perform the roles of policy maker and monitor while the departments execute plans, implement policies, and deliver public service, as well as interact with citizens throughout the country. A summary of information about each studied agency is as follows:

The Ministry of Commerce (MOC) is in charge of trade-related affairs including internal and foreign trade, business development, trade negotiation, consumer protection, export promotion, intellectual property, entrepreneurship, and insurance. There are seven departments, one state enterprise, and two public organizations performing specific tasks under the MOC's supervision. For example, the Department of Export Promotion's tasks are central to promoting goods in other countries worldwide. Although these departments

are physically located in the same area as the MOC, they each have their own autonomy over the budget and organizational resources management.

Like the MOC, the Ministry of Transport (MOT) consists of six departments and 13 state enterprises. Its work is related to transport affairs including land transport, highways, railway, mass transit, ports, airports, and airways. The levels of system integration and cross-agency ICT development at the MOT and its dependent departments tend to be higher than at the MOC. The ICT Center at the MOT has played a significant role in ICT development. The ICT Center has developed several information systems and has distributed applications to the organizations they supervise depending on their willingness and readiness for technological adoption and maintenance. From the interviews and observations during the first week of my fieldwork at the MOT, I found that the Permanent Secretary's Office of the MOT exerted greater influence on ICT development over other agencies within the MOT boundary. Under the MOT's supervision, the Department of Land Transport (DLT) is equivalent to the U.S. Department of Transportation in Thailand.

The Ministry of Interior (MOI) is one of the largest and most powerful organizations in Thai bureaucracy as it has a wide range of responsibilities including local administration, internal security, citizenship and registration, disaster management, and public works. The MOI is also responsible for appointing governors of 76 provinces throughout the country. The governors are appointed from the central office through the Department of Provincial Administration (DOPA). Among elected politicians, the MOI is considered important because of its nation-wide authority and responsibilities, which require a large budget and significant administrative resources. However, the Ministry is also known for its closed-system of administration with a long tradition rigid structural hierarchical. This strong organizational culture limited my access to the ministry.[1]

The Administrative Court is a judiciary agency established according to the Constitution of the Kingdom of Thailand, B.E. 2540 (1997). This Constitution stipulated that the Administrative Court be separated from other courts. According to the Constitution, the Administrative Court has the power to try and adjudicate administrative cases. It adopts the

[1] A senior official at the Ministry required me to submit a request for access grant letter to the permanent secretary before I could conduct my research at the General Division. The ICT official interpreted that as a

inquisitorial system as opposed to the adversarial system adopted by the Court of Justice. The Office of the Administrative Courts (OAC) performs the administrative duties necessary to support the Court and the judges. The OAC is a state-independent agency and has a status equivalent to a ministry. There are about 300 judges and 2,000 officials working at the Supreme Administrative Court, the Central Administrative Courts, and other nine Regional Administrative Courts and their Offices.

The Land Development Department (LDD) is a departmental agency responsible for soil analysis and improvement, as well as land use planning and development to assist farmers in soil and water conservation practices. The Ministry of Agriculture and Cooperatives oversees the Department.

The Customs Department is a large-scale department under the oversight of the Ministry of Finance. The role of the Customs Department is to collect national revenues through imports and exports, facilitate global trade, and exercise control over imports, exports, and transit goods.

The Office of Public Sector Development Commission (OPDC) is also a departmental agency under the supervision of the Prime Minister's Office. The Commission is responsible for analyzing and improving government work processes and management through organizational redesign and restructure, and for monitoring and evaluating public sector performance. The OPDC is classified as a central technocratic unit providing technical assistance for the government regarding public sector development. The OPDC implemented the redesigned government performance evaluation and improvement programs, as well as the nation-wide performance management information system that allows each agency to enter and update their strategic plans and goals.

Lastly, the Ministry of Information and Communication Technology (MICT) is responsible for public sector ICT development and implementation, otherwise referred to as digital government or e-Government projects, and for other ICT-related issues of the nation. Its role involves planning, developing, and implementing public sector information infrastructures and standardization. The MICT spearheads government ICT integration programs such as the development of integrated and interoperable e-Document systems across agencies. In addition, it formerly led the development of the trade-related National

Single Window before the project was transferred to the Customs Department. The MICT has faced major issues such as understaffing and a lack of technical expertise among its officials. These issues have made it difficult for the MICT to develop and implement ICTs in the public sector. In February 2004, the government established the e-Government Agency (EGA), a public organization under the supervision of the MICT, whose main duties involve developing and implementing e-Government projects, providing the government with information infrastructures, integrating public sector information systems such as the e-Document systems that were previously under the direct authority of the MICT. Most of the EGA staff are computer engineers. Thus, while the MICT has become the ICT planning and regulating unit, the EGA has become the implementer.

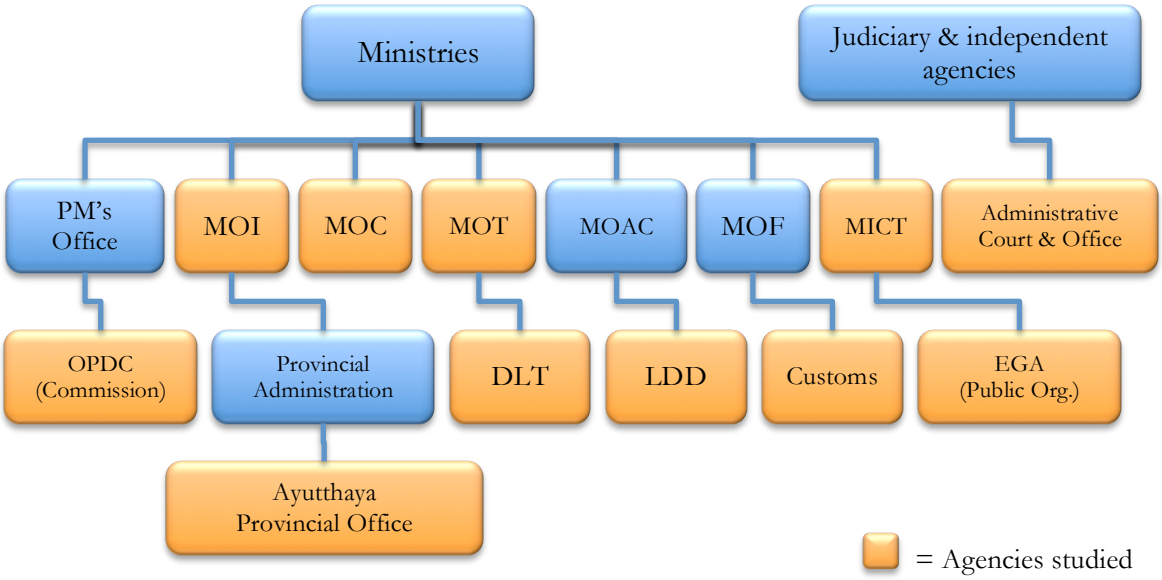

Figure 1 Government agencies studied in this research

Most of the agencies listed above are located in Bangkok, except for the MOC, for which the head office and its supervised departments are located in Nontaburi province. For the Ministry of Interior and the Administrative Court, I also conducted interviews with officials at their regional offices in Ayutthaya and Rayong provinces, respectively.

Though the initial selection was based on personal connections and snowball sampling, I selected these agencies based on the characteristics of the organizations including their annual budget, the number of their staff, and the nature of their work. This selection allowed me to cover a wide variety of organizations based on those characteristics. For instance,

Ministries of Commerce and ICT are considered small ministries due to their small annual budget of less than 0.5 percent of the government total budget, while the Ministry of Interior is the largest Ministry in terms of the budget with its 309 billion baht (approximately $10.3 billion) or 12.9 percent of the total budget.[2] The Administrative Court is representative of another type of government agency – state-independent agencies with small block grant budget.

Agencies	Budget (million baht)[3]		Number of Staff as of 2007[4]
	2012	2013	
The Prime Minister's Office	22,123.7	25,246.8	6,587
OPDC	268.4	295.5	N/A
Ministry of Interior	285,255.0	308,835.0	44,177
Provincial Administration	34,307.9	34,795.9	14,295
Ministry of Commerce	6,592.7	7,430.3	4,106
Ministry of Transport	88,852.7	95,948.7	15,778
Dept. of Land Transport	2,320.9	2,511.4	4,011
Ministry of Agriculture and Cooperatives	76,721.3	72,882.9	38,604
Land Development Dept.	4,247.1	5,337.8	N/A
Ministry of Finance	191,415.1	180,707.9	32,529
Comptroller General's Dept.	1,184.0	1,348.1	N/A
Customs	2,757.4	2,815.0	N/A

[2] "Budget documents of 2013 (B.E. 2556)," The Bureau of Budget. Retrieved from ครมhttp://www.bb.go.th/budget_book/e-Book2556/ on February 3, 2013.

[3] "Budget documents of 2013 (B.E. 2556)," The Bureau of Budget. Retrieved from http://www.bb.go.th/budget_book/e-Book2556/ on February 3, 2013.

[4] "Government personnel 2007 (B.E. 2550)," The Office of Civil Service Commission. Retrieved from http://www.ocsc.go.th/ocsc/th/files/Stat/BCCD/kamlungkhon_civilt_50_1th.pdf on February 7, 2013.

Agencies	Budget (million baht) [3]		Number of Staff as of 2007[4]
Ministry of ICT	3,761.7	7,598.8	839
E-Government Agency	579.3	1,536.3	N/A
Administrative Court	1,466.8	1,794.6	1,931

Table 1 Studied agencies' annual budget[5] and number of staff

Regarding the ICT development and deployment, I considered various types of systems including the stand-alone and inter-organizational, as well as integrated and standardized, information systems they have implemented. The agencies represent varying degrees of proficiency regarding ICT. For example, the Ministries of Transport and Interior are very well-funded due to the nature of their work involving nation-wide infrastructure development and the national citizens registration database. These ministries have their own information networks throughout the country, and thus have a greater degree of freedom from close supervision and in utilizing their own networks. They are also subject to greater freedom regarding compliance with the government's ICT policies compared with other agencies. Furthermore, they tend to be ready and willing to spearhead national-level information system development projects.

Departmental agencies, on the other hand, are constrained by both government policies and those of the supervising ministry for ICT strategies. At the same time, they must maintain their autonomy in developing their internal systems and associated practices. Studying the development and use of ICT in agencies at various levels provided a more thorough overview of how agencies compete for autonomy over their ICT-related budget and development projects within the same ministry, and how they formulated strategies in response to national- and ministry-level policies.

I also studied the use of ICT at selected provincial units of the agencies. These provincial offices faced limited organizational resources, specifically regarding personnel and IT-related expertise. However, they were required to adopt technologies and systems deployed

[5] Thai government's fiscal year begins on October 1st of the previous calendar year and ends on September 30th of the next year. For example, the 2013 (B.E. 2556) fiscal year is from October 1, 2012 to September 30, 2013.

by the supervising agency. Studying these provincial units demonstrated to me how they allocated internal resources to maintain their work while being obligated to meet their head office's top-down requirements. I hypothesized that due to limited personnel resources, the adoption of systems is prone to failure among provincial units.

The study of system development and use at various agencies allowed me to compare how each individual agency developed, implemented, and used the same systems. This comparison revealed contrasting and complementary findings about how each agency responded to government policies given different levels of autonomy, freedom, resources, and power to negotiate and comply with the MICT in the national efforts of integrated information system development.

Studying these 11 agencies provided a range of ICT development, adoption, and use patterns and practices and their impacts on public sector organizations. Many of the agencies were participating in national information system integration efforts while facing distinct technical and social challenges within their own agencies. The effects of the development, adoption, and use of ICTs varied based on existing organizational factors and officials' perceptions, norms and culture, values, and work practices. As indicated earlier, however, this limited set of selected samples may impart a selection bias to the study. This thesis does not intend to generalize the findings about ICT development for use in other organizational settings, or to digital government development efforts worldwide or nationwide, although the findings here may also have important implications for digital government development efforts elsewhere. Rather, it aims to explain and interpret ICT development and use in the Thai government. Moreover, I believe that this particular study set constitutes a representative sampling of Thai government agencies at all levels, ranging from ministerial to provincial offices. Each of the agencies participated in both stand-alone and interoperable systems for major government functional systems. A more detailed discussion of unit selection is provided in the next section.

2.3 Data Collection Process

During my fieldwork, I conducted semi-structured interviews with 113 government officials in different positions ranging from the chief information officer, to the deputy secretary general, the division directors, and administrative staff. Their work involved developing

and/or using ICTs as part of their organization's work processes. The interviews were conducted in Thai. I also interviewed consultants to government agencies, software vendors, and contractors, six in total, about the ICT development and implementation efforts at the national and agency levels. Eighteen informants were interviewed more than once for follow-up interviews when I needed to confirm information about their work and practices. Interviews ranged from 30 minutes to two hours, with most lasting about one hour. The interview protocol and example empirical questions are shown in the appendix. I flagged about 30-40 of the most relevant interviews to be fully transcribed for future reference and quotes. The recorded audio files of those flagged interviews were transcribed and translated (from Thai to English).

I also conducted ethnographic observation during government business hours. The observation sessions included shadowing ICT officials when they went to provide service in other divisions to investigate how ICTs were used in the agencies; what issues the system users had; how ICT officials interacted with the users; as well as the social status of the ICT officials in the agencies. On the system user side, I observed how users interacted with the e-Document systems, the government fiscal management information system, and the departmental personnel information system, in addition to interviewing them about their perceptions of and practices around the systems. Also, I wanted to evaluate the computer literacy of the users – whether they knew how to do initial troubleshooting, and whether they developed workarounds for such systems in response to changes in their existing practices. Additionally, I followed artifacts including physical and electronic documents officials used in their day-to-day communications within and across agencies, and case dockets and case docket logbooks administrative case officials used for their case management at the Administrative Court. I followed how administrative staff used information on the official documents, and how they worked with the documents before forwarding them on. I also observed how the documents went through and across the organizational hierarchy for agency communication and coordination.

On the days that I conducted my ethnographic fieldwork at particular agencies, I also scanned each agency's intranet to understand how the officials shared information, and what types of information were posted online or circulated physically. Some organizations provided the number of readers in each news thread, such that I could see what types of

information were of greater interest than others. The observation of online information use in the agencies supplemented the data from my interviews regarding communication patterns and ICT practices in the public sector. I also asked ICT officials for permission to see the network and disk utilization logs between internal and external communication. The reason for my interest was that I wanted to compare the amount of information (the number of pieces of information) posted online with that circulated in a physical format. However, most agencies I studied did not have such reports available, as these types of information were not mandated or were not a major concern for ICT utilization.

I also employed participant observation at the MICT's seminars on government information security, and at the public hearing on National Single Window development organized by the Customs Department, where I met ICT officials from several agencies, as well as software vendors who were involved in the project. I was invited to attend the seminar on Enterprise Architecture held by the MOT where I conducted informal interviews with ICT officials from other agencies and many other software vendors.

During the 12 months of fieldwork, I took notes and recorded audio for all of the interviews, recorded my observations in writing, and photographed relevant artifacts used in the work of government officials. While following the workflow of materials, for example, I photographed different types of official documents – external documents and memos for internal use, for example. I sometimes recorded video with a digital camera showing how officials interacted with the artifacts and worked with the e-Document systems. There were some restrictions on taking photos and recording video on case-relevant documents at the Administrative Court. The documents were used strictly inside of the courthouse by the judges and the case officials who were involved in the case. The informants did not allow me to take any photos or make a copy of their documents, but I did request a copy of empty forms and documents for my own reference.

2.3.1 Units of analysis

Most of the ministries and departments in my study have adopted information systems that facilitate three major government operational functions – documentation, financial management, and personnel management. However, these systems differ across individual agencies in terms of computer platforms, information structures, network protocols, and

work and system practices. Individual agencies have developed and used customized e-Document systems, financial management information systems, and personnel management information systems. The agencies have outsourced their system development to over 30 different software vendors. As a result, these systems have been operating in stand-alone versions at individual agencies. Until the late 1990s, the government made an effort at integrating common operational information systems under standardized information structures and technologies in order to facilitate information sharing across agencies and centralize the control of public sector resources. The technological and social change resulting from this integration effort raises questions about whether and how individual agencies have been required to change their existing ICT-related and organizational practices. My interest in addressing these questions led me to study the development, adoption, and use of e-Document systems, financial management, and human resources management information systems as stand-alone and inter-agency systems at the agency and national levels.

In the inter-agency realm, the integration of e-Document systems employs a gateway strategy, using the government standardized information framework called Thailand electronic government information framework or TH e-GIF. The TH e-GIF has been employed in various government applications related to integrated information and services for interoperability across local legacy systems. For example, the MICT initiated the development of an integrated e-Document system project aimed at connecting various e-Document systems developed and used by agencies with different information and technology platforms. Work practices around e-Document systems at the agency level, therefore, remain varied. On the other hand, the government has implemented government fiscal management information systems, developed by the Comptroller General's Department (CGD) in 2004, to maintain financial and accounting procedure standardization across agencies at all levels, and to centralize control of government expenditures in real time for decision-making and planning purposes. The government has also adopted the departmental personnel information system, developed by the Office of the Civil Service Commission, to standardize government-wide reporting and procedures around recruitment, evaluation, promotion, salary, and benefits. Both national-level systems require agencies to adopt the new systems and practices at the local agency level.

At the national level but on a smaller scale, I also investigated the e-Customs and National Single Window (NSW) implementation efforts among trade-related agencies. The development of NSW was originally carried out under the MICT's leadership using the TH e-GIF framework before the government transferred the project to the Customs Department. The associated efforts at integration and inter-organizational system development and use allowed me to examine cross-agency cooperation and competition over budget, power, and other organizational resources, as well as relationships among different interest groups of officials and politicians in the public sector.

Moreover, I wanted to examine the development and implementation of specific-purposed systems at the agency level. This would help me understand how the implementation and use of such systems affects relationships among officials within the organizations, and how their use has changed existing work practices related to power and decision-making structures. One of the informants at the Ministry of Transport (MOT) recommended that I visit the Department of Land Transport (DLT) to see how the DLT reengineered its vehicle registration process and implemented the corresponding system. There, I witnessed how implementation of the vehicle registration system has transformed authorization and control structures within the department.

Lastly, I studied the development and use of the case tracking and management system at the Administrative Court and its Office. This examination revealed attempts at managerial control through computerization within the organization, which officials at lower levels, who were required to adopt a specific system, responded to with resistance. These officials developed workarounds and adjustments in response to the attempts at control.

To summarize, I carried out my research on the following systems across the agencies I studied:

- e-Document systems (as stand-alone systems)
- Inter-organizational standardized information structures (TH e-GIF) with interoperable systems using this framework, i.e., the National Single Window (NSW), and the interoperable e-Document systems
- The government fiscal management information system (GFMIS)

- The department personnel information system (DPIS)
- Specific-purpose systems:
    - The vehicle registration system; and
    - The case tracking and management system
- The performance management information system to support the key performance indicators and performance management quality award (PMQA) implemented by the Public Sector Development Commission and its Office (OPDC).

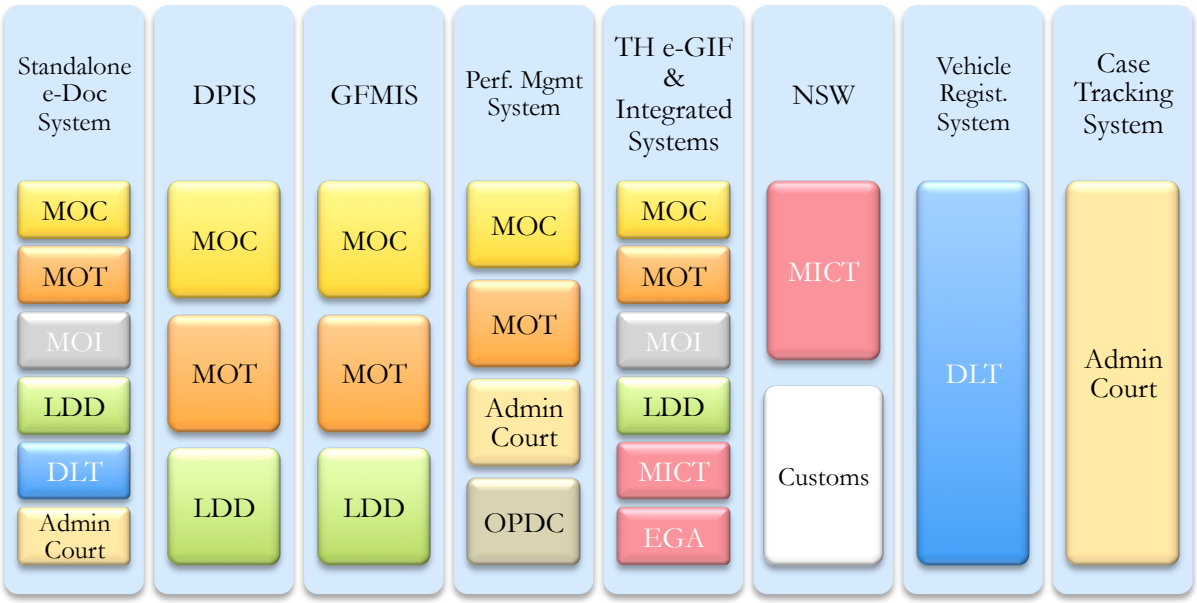

Figure 2 Systems studied in individual agencies

My research was not meant to be a constructed series of mini-research projects through varied systems. Rather, these systems were common applications that most government agencies have been implementing and using. The study of the development, deployment, and use of these applications enabled me to unfold recurring themes of ICT development and use in the public sector.

2.4 Data Analytical Process

The data analysis in the dissertation was derived from a mixture of sources – semi-structured interviews, ethnographic observation, and document analysis – to ensure data triangulation. In my empirical analysis, I combined data from all sources. However, data collected from the interviews proved most influential in my analysis since the interviews allowed me to access many people at a given time, and because I could verify the responses

of one informant by comparing them with others. The empirical examples provided by the informants and which I myself observed played a key role in verifying responses from the interviews.

During the fieldwork, I took notes during every interview I conducted, and recorded them in an observation journal. These written interview and observation materials served as the main media for data analysis. As ethnographic researchers suggest, written notes or field notes in ethnography are objects to be studied; they are reordered and rewritten, selected, and incorporated for analytic purposes [56,125]. I reviewed my notes several times to discern key themes. As suggested by Charmaz [2006] and Strauss and Corbin [1990], I analyzed my interview and observation notes via a process of iterative thematic coding and marked emerging themes of interest during the coding process [38,186]. Some of these themes concerned the persistence or change in the nature of hierarchical authority in the content of new system development: for example, required tasks, skill, and authority in computerization; changes in the relationships between supervisors and subordinates; change in organizational structures; interagency information systems; managerialism and control through computerization; limits and challenges of control; and resistance to hierarchical control. Others related to the premises underlying information systems and organizational properties. These themes included, but were not limited to, misalignment of technologies and organizational properties; barriers, challenges, and tensions attending the adoption of ICTs; resistance to new technologies; and the development of practical workarounds and adjustments. Still other emerging themes involved the context of government ICT development, such as the notion of boundary objects, agents, and organizations, information standardization, and information infrastructure development. As the coding schemes evolved over time, I did not restrict myself to a closed set of coding schemes or themes.

2.5 Limitations and Complexities of My Research Methods

Ethnographic methods helped uncover insider perspectives and behaviors on ICT development, adoption, and use through observation of formal and informal interaction among officials, and through observation of Thaksin ICT-related practices of government staff. Empirical evidence captured from insider perspectives in ethnography helps highlight causal links that add credibility to support emergent theories [8]. Moreover, if other forms of data are suspect, lacking, or missing, ethnographic approaches are often the most reliable

and practical means of collecting data. Ethnography enables research to focus at the micro-level, a level of analysis that is often ignored or assumed to be insignificant.

Ethnographies for this particular research field are, nevertheless, subject to limits and challenges. *Firstly*, ethnographies typically study only one organization and/or a limited number of samples, undermining generalizability to grander theory [8,79]. For my particular research project, an ethnographic study of ICT development and adoption in the Thai public sector may not be generalizable to other organizational settings with different political and administrative contexts. Similarly, data based on interviews and observation notes are a product of the researchers participating in the field; they are constructed through the process of analysis and the writing of the ethnographer [79].

Secondly, the recruiting and sampling process for this research does not rely on statistically random sampling. Rather it depends on mutual trust and snowball sampling. Ethnographic data has been criticized as being inherently biased, both in a statistical and normative sense, hence limiting its reliability [8]. This limitation was very much present in my recruiting process. There may have been informants that were ignored in the study due to the non-statistical sampling process. As a consequence, there may have been stories or cases that were not included in the findings.

Thirdly, ethnographers have been accused of being "native," which leads to normative bias [8]. Familiarity with the community being studied, that is, with informants at the micro-level, may lead researchers to adopt insider viewpoints without critical self-reflection. Researchers need to recognize this challenge when collecting data. To produce richer understandings and enhance the validity of their findings, the researcher must combine other data collection methods with ethnography for triangulation. For example, researchers may employ interviews, participant observation, and document analysis in combination. In the field of digital government scholarship, moreover, researchers may use quantitative methods such as surveys to gain a broader understanding of how ICTs are used in the public sector before narrowing their research and questions to specific systems or practices.

My study intended to gain a deep understanding about social and political factors and consequences of technology development and deployment. The rationale for using qualitative methods for data collection and analysis was based in the larger questions

motivating the study: whether and how do those consequences result in tensions and challenges to ICT development efforts of the Thai government, and how do the government officials deal with those issues? To answer these questions, it requires a prolonged ethnographic observation to see emerging patterns of how government officials interact with technology. The semi-structured interviews were employed to help validate the data collected from the observation. The interviews also enabled me to ask the officials for explanation and clarification of the rationale for their practices associated with particular information systems and artifacts in their work. Furthermore, the interviews helped me ask the officials to think back and compare their current practices with those after the computerization efforts. The mixed qualitative methods consisting of ethnographic observation, semi-structured interviews, and artifact analysis I adopted allowed me to uncover and understand the changes caused by the introduction of technology, and how the people make sense out of such changes that affect their routines and work practices, as well as how they respond to the tensions and challenges resulting from the use of technology.

My project was exempted from Institutional Review Board (IRB) review because it did not include identifiable private information about individual members of the organizations studied in the research. However, with the data collection methods I employed I encountered a certain number of ethical and logistical challenges. *First*, similar to other ethnographic researchers, I faced a dilemma between data collection and presentation and the ethical treatment of research participants. Some questions that were related to political issues in the agency or in the government as a whole were considered sensitive and some informants were reluctant to express their opinions. Questions about corrupt actions regarding ICT procurement and development were also sensitive. Although informants wanted to tell me about that information, they were afraid that it would be traced back to them, and that they would suffer negative consequences. Therefore, it was imperative for me to ensure informants that their personal information would never be revealed. Sometimes, I was asked to stop recording an interview or taking notes when informants wanted to talk about their bosses or about corruption. In such cases, I needed to rely on my memory or my shorthand notes instead.

A *second* issue I encountered is related to informants' creditability and willingness to talk. Some informants were more willing than others to explain how a particular system worked,

how they used the system, and how the system had affected their working life. I found that lower-level officials tended to be more willing to talk about specific systems than higher-level officials. Lower-level officials often provided vivid empirical examples of particular situations where they had to adjust their existing work practices. Higher-level officials, on the other hand, did not interact directly with the systems, or used them only at the administrative level, such as reading summary reports and approving transactions in the system.

Some middle-ranked officials who supervised particular divisions and systems were trying to maintain a good image of the organization, but were not familiar with the systems in detail. Thus, they may have intentionally or unintentionally avoided saying negative things about the particular systems. Because of this, I always had to check with lower-level officials or staff who worked directly on the systems.

A *third* issue common to ethnographic studies is unbalanced level of depth. To gain access and earn trust among informants require that the researcher take time and effort to make the informants comfortable with their presence. At the Administrative Court, many people were still familiar with me from the time I spent working there, although six years had elapsed since that point. I was able to receive honest responses about how officials felt about the organization, the executives, the current administration and control, and the systems. Respondents were candid in their responses about how they used the systems and developed workarounds during implementation. I also generated a significant amount of observational notes data at the Court as I could walk around the agency freely without making appointments. At other agencies, I was a complete stranger to the informants. Thus, I had to rely on the coordinators' communication skills and their personal connections with the informants to initiate contact and to help me establish my identity and research objectives. Some informants hesitated to tell me how they felt about using the systems. Consequently, the data I generated about the Administrative Court was much more detailed than that from other agencies. When I analyzed the data, I had to be careful to balance out the details and depth of the findings across all agencies and informants.

Fourth, I was a Thai government official myself, having worked at the Office of the Administrative Court's ICT Center for over 10 years. As a former ICT official, I experienced

the insider/outsider tensions central to the ethnographic role acutely. Fox [2008] explains that as a member of the community where one is conducting his or her research, conflict arises between the researcher's dual role as a member of the community and as a detached scientist. She notes that there is always a trade-off in being a native and insider between the issue of moral basis of the *observation* element and the head start provided by the *participant* element of the participant-observation task [62, p. 4]. I had to exercise caution not to let my own opinions, attitudes, or judgments affect the way I evaluated other officials doing their work when I was collecting data. I had to enter field settings with a fresh eye rather than as a government official. However, I could take advantage of having served as a government official as it gave me a deeper understanding of the hierarchical structures of the public sector, and about how official documents travel across divisions and agencies both in horizontal and vertical directions. I entered the field with prior knowledge about government structures, ICT planning, budget approval, and procurement processes, what common government applications were, and how they had been implemented. This allowed me to save a significant amount of time during the preliminary investigation and fieldwork.

Fifth, one might argue that a four-month preliminary study and eight months of fieldwork is quite short for an ethnographic study. As discussed earlier, unlike many ethnographic researchers, I did not have to learn the language (Thai); nor did I need to learn the functions and responsibilities of individual agencies, divisions, and positions in the public sector; technical terms used in the government; or culture, norms, and hierarchical structures of the public sector. My professional background provided me with a basic understanding that would have required a great deal of time to acquire. Each round of my preliminary study and fieldwork confirmed and verified the findings drawn from previous ones. This has emphasized the data triangulation. Moreover, my professional status as a government official helped me gain access in the organizations relatively quickly. As the informants knew that I had also served as a government official, they were generally comfortable talking to me. Sometimes they asked me about ICT practices at my former agency to compare with their own practices. Therefore, I was able to situate myself in the studied sites easily and quickly.

Lastly, I encountered the issue of site accessibility. While most studied sites welcomed me and allowed me to conduct my research and interviews freely, some sites limited my access.

For example, the Ministry of Interior (MOI)'s ICT Center allowed me to interview ICT officials regarding ICT development, implementation, and use, including the development of an e-Document system at the MOI. The documentation section head of the General Division, on the other hand, did not allow me to carry out my interviews and observation about how their administrative staff used the system until I had an official request letter approved by the ministry's deputy permanent secretary. The level of accessibility at the sites played a meaningful role in the site selection process.

In this chapter, I described the methodology, study sites, recruitment process, data collection, and analysis methods employed in my thesis. I also discussed the importance of process-focused methodology and ethnography in digital government research, particularly as they relate to this study. This chapter has provided an overview of the government agencies and information systems studied in this research. Finally, I have addressed the potential methodological challenges, biases, and limitations of the study, as well as how I overcome such issues.

In the chapters that follow, I explore three key themes that emerged from the empirical program outlined above. The first involves ICT and bureaucratic control and managerialism in the public sector. This thematic analysis touches on several government information systems at both the agency and government levels. The second theme relates to information infrastructure development and standardization in the government's interoperable information system development efforts. The third theme incorporates the concepts of boundary objects and boundary work in government communication to analyze the use of e-Document systems in government agencies for internal document management and inter-agency communication.

Chapter 3
Histories of Modernization, Development, and Reforms in the Thai Public Sector

Considering the particular kinds of history and relationships the Thai government bureaucracy has developed over time is crucial for contemporary efforts to develop technologies to support administrative practices and reforms. The way bureaucracy has developed in Thailand greatly affects the nature of technological development and adoption, and has implications within the realm of digital government scholarship. However, digital government scholarship has tended to neglect these important historical dimensions. Therefore, in the following section, I offer a nuanced historical account of bureaucratic reforms and technological transformation in the Thai public sector. This account demonstrates the process of modernization in Thai bureaucracy and its relationship with information technology deployment in the public sector.

3.1 Thai Polity and Bureaucracy: Historical Background

The current political system and the bureaucracy of Thailand are the result of major regime transitions, first from an absolute monarchy to a bureaucratic polity in 1932 (B.E. 2475[6]), and then to a democratic polity in 1973 (B.E. 2516). From 1855-1932, Thailand, or the Kingdom of Siam, was under absolute rule of the kings. The notion of modernization in Thailand emerged by way of external forces and threats such as colonialism in countries to the west of Thailand. However, the process of modernization was initiated and controlled by the kings and ministers appointed by the kings. Because Thailand had never been colonized, the kings were able to claim their centralized power, and change the political and bureaucratic systems as they wanted [170]. Modernization in Thailand, therefore, was criticized as the process of *state-building* rather than *nation-building* because the rulers and

[6] B.E. stands for Buddhist Era, which is 543 years ahead of Christian Era.

bureaucratic elites used social resources to expand their power, roles, and authority while citizen participation was neglected [170, p. 4-6]. Under absolute monarchy, the bureaucracy was the kings' means of exercising ultimate governing authority over the country [23,162]. Bureaucrats were royal servants who served the kings [23].

Although a democratic revolution brought about by a small group of military and civilian elites broke out in 1932, and Thailand became a constitutional democratic monarchy with a prime minister as the head of government, the nation did not yet transform its government and political system into a democratic polity. Rather, the revolution, led by westernized bureaucrats and the tradition-oriented military, simply freed the bureaucracy from the control of the king [170]. As a consequence, political power changed hands from the king to the bureaucratic elites. After the revolution, therefore, the country had entered the bureaucratic polity. Throughout this era, bureaucrats and military elites retained their higher social status over other groups in society because they controlled the use of capital, military, and other resources of the country. Thai politics had become a matter of competition between bureaucratic cliques for the benefits of government [197]. These bureaucrats were appointed as cabinet members and members of parliament. Career advancement of bureaucrats relied heavily on the power of their respective patrons and cliques, which is a clientelistic characteristic of Thai political and public administration [161]. Bureaucratic elites were the patrons in Thai society, exclusively controlling and administering public policies, while the interests of the people were not developed [164,170,177,197]. The state was dominated by small groups of business and bureaucratic groups, who enjoyed revenue factions gained from state enterprises and favored companies [168]. The patrimonial structure of administration led to policy and legal changes that reflected the interests of those in the coups, and limited the state's ability to respond to other social and political groups outside that structure [168]. Therefore, Thai social and economic development lacked a political participation dimension [170]. Rather, development focused on two other dimensions – national security and social development. These dimensions promoted the deep-rooted influence and power of the bureaucracy, particularly the Ministry of Interior (MOI) and the Ministry of Defense (MOD), across the country during the 1960s.

The initial transition of the Thai government from a bureaucratic polity to democracy occurred in late 1973 (B.E. 2516) when economic, political, and social change and conflicts

arose. The transition primarily resulted from an increase in demands for public services and increasing expectations for the government from the private sector and citizens throughout the country [170]. Mass uprisings in 1973 overthrew the military government, and had shaken the Thai bureaucratic polity [23]. The revolution symbolizes the beginning of the end for legitimacy of military rule and coups, while marking a major step towards democratic rule. Politics had separated from bureaucracy and taken a role in controlling the public sector. Politicians had interfered with the decision-making power and responsibilities of the bureaucracy. In the meantime, the public sector, following Weber's bureaucracy which is characterized by division of labor, hierarchy of formal positions, rules and regulations, and jurisdictional areas, was criticized for its structural inflexibility and insensitive adaptability to new circumstances [170]. But it was expected to deliver public services as the public demand increased. Consequently, the public sector continued to increase the scope of its structure in response to the increase in duties and responsibilities. The bureaucracy had issued many rules and procedures to empower individual agencies to perform public administrative functions. These rules and procedures were inflexible, thereby becoming restrictions and limitations to public administration in return. The problems of structural rigidity and legal restrictions diminished the public administrative efficiency of the bureaucracy.

As the nation transformed from a bureaucratic polity to a democratic polity, the political arena moved away from bureaucracy and military to general elections [23]. The major cabinet positions had been occupied mostly by businessmen, rather than former bureaucratic elites. The military elites had lost their political role and power, social status, as well as secondary incomes. However, military and other societal forces still managed to retain their economic privileges and be closely interconnected with bureaucratic and political elites through mutual business interests [149].

Meanwhile, democratic polity had brought about a struggle of political power among political parties [23]. In Thai politics, within a party, the competition for ministerial positions is based on the seniority of elected politicians. Moreover, elected politicians and political appointees had replaced bureaucratic elites as the new heads or superiors of bureaucrats in Ministries. Bureaucrats perceive elected politicians and ministers as new patrons who can support their career advancement within the bureaucracy [23,170].

Empirically, the interviews with seven senior officials in four ministerial-level agencies reveal that political interference in bureaucracy has grown even more strongly in the past ten years. Appointment of the senior ranks from division director to permanent secretary positions in ministries and departments rarely depends on traditional merit and seniority systems. Rather, the purchase and negotiation of taking office in these positions are now commonly conducted among politicians and bureaucrats. Officials who offer better deals and who show their loyalty to the elected government and ministers tend to be rewarded with top positions, power, and authority, whereas those who are more senior yet politically neutral are usually titled in non-authoritative positions such as consultants or inspectors. Those who do not follow the politicians' orders are likely to be punished by being banished to service in regional units. To remain in their positions or to be promoted to higher positions, high-ranking bureaucrats are forced to take sides politically and to serve the politicians' demands, willingly or otherwise. Cases illustrating this reward-punishment system of career appointments are found in the large-project procurement processes at most studied agencies in my thesis.

Thai politics have been dominated by money politics partly due to the rapid economic transformation in 1968 through the end of the Cold War [157]. The Cold War left behind suppressive controls and a hegemonic antagonism to popular political movements. This allowed politician-businessmen, especially those in rural areas, to control elections and monopolize parliament through extensive use of cash, intimidation, and pork barrel. Politicians competed for support from the citizens by embracing populist economic policies targeting people with lower socioeconomic status in rural areas, who represent the majority of Thai voters.

The foremost politician who succeeded in gaining a majority of supporters using these policies is Thaksin Shinawatra. Other political parties and later governments copied and adopted similar models of political positioning. Various forms of subsidies and giveaways figured prominently in the most recent election of July 3, 2011. Political parties promise to increase incomes and develop a better quality of life by lowering tax rates, offering tax rebates for first homes and first cars, reducing public debt, raising the minimum wage, creating new jobs, and guaranteeing the price of rice, while simultaneously freezing gas

prices; offering free Internet in public areas, providing free medical services, free education, and free electricity for low-income earners.

3.2 Public Administrative Reforms

Public Administrative reforms can be viewed as the primary instrument that Thai political leaders have historically uses to further their political goals [26]. Early public administrative reforms in Thailand during the 1890s were initiated by King Rama V or King Chulalongkorn (1868–1910) to strengthen his authority and legitimacy, and to facilitate the goal of state-building [170]. Public administrative reforms during the absolute monarchy concentrated on "government reform" rather than "political reform." The MOI and the MOD had been empowered directly by the King to perform a leading role in creating a unitary state. Structures of the public offices were organized following Western principles – based on a hierarchy of formal positions and the division of labor and specializations rather than personal connections [170, p. 59-63]. The result of public sector modernization and state-building was that the military and civil servants expanded their authority in the government. Decision-making power in domestic and foreign affairs, policing, national security, finance, and justice was incrementally transferred from the kings (King Rama V – King Rama VII) to the ministers from 1892–1932.

After the democratic revolution in 1932, the first written constitution was promulgated in Thailand. Additionally, the military coup aimed to rearrange the relationship between executive and legislative powers. To that end, the coup established a committee to draft the Civil Service Act of 1933 (B.E. 2476) and the Government Organization Act of 1933 to separate and control executive power from political power for the first time [170, p. 105]. Influenced by French government organization, Thai public administration was organized as a combined system of centralized, deconcentralized, and decentralized functions. Since 1892, the MOI had been central to government power. The government organization model in 1933 ultimately resulted in the organization that exists today. That is, ministries and departments located mainly in Bangkok perform centralized administration functions by formulating and executing policies. Most of the ministries and departments form regional or provincial administrations in Thailand's 76 provinces. These units undertake deconcentralized functions by translating the government's policies into practice, delivering public services to citizens in these regional areas, and reporting back to their own head

offices. The provincial units authorize certain decision-making responsibilities under the guidelines and supervision of the ministries and departments. Provincial governors appointed by the MOI head these provincial units. Local administration is self-governing and is characterized by a decentralization of functions. There are two distinctive types of local government: provincial and district municipalities and special administration areas, which include Bangkok Metropolis and Pattaya City.

The MOI has had administrative power in the regional or provincial areas of the country over other agencies with limited interference of the elected governments since King Chulalongkorn's reign. Therefore, it has developed a deep-rooted autonomy in the Thai bureaucracy through a number of government reforms for over a century [170, p. 136].

After the 1932 revolution, moreover, Thai government was typically comprised of bureaucrats and military leaders. Military leaders took turns assuming political power, and administrative reform centralized power in the hands of military rulers [26, p. 42]. Political change in Thailand focused on the separation of executive power between bureaucratic officials and political officials who were also bureaucrats [170]. In the bureaucratic polity, the power of bureaucracy was strengthened through the Civil Service Act, the Government Organization Act, and other relevant acts. The prime minister's authority had been expanded to various areas of responsibility including government budget, civil servant, ombudsman, economic and social development, and the council of state. Following the Office of the President, the Office of the Prime Minister was established in 1959 as a centralized unit of major civil service authorities. The Office consisted of supervised units such as the Bureau of the Budget (BOB), the Office of the Civil Service Commission (OCSC), the Office of the National Economic and Social Development Board (NESDB), and the Office of the Ombudsman, among others. Executive or decision-making power had been delegated from the prime minister to these organizations, particularly the Bureau of the Budget and the National Economic and Social Development Commission, whereas the cabinet of ministers was assigned to make decisions about administrative work rather than strategic matters. Bureaucratic autonomy has been enhanced by institutional weakness in the system of political control [146]. Moreover, the number of staff agencies under the supervision of the Prime Minister's Office rapidly increased from 1959–1971 [37], demonstrating the centralization of executive power under a prime minister who came from the public sector.

From 1959–1975, the power of the prime minister had been emphasized through the Government Organization Act of 1959 [170]. However, the prime minister was designated and perceived as a chief executive officer rather than as a chief politician [170, p. 164].

The Thai public sector had gone through comprehensive administrative reforms focusing on personnel management system, and government downsizing and privatization throughout the 1980s and early 1990s [22,146]. During the 1990s, notions of globalization and democratization from Western countries and international institutions such as the World Bank, the International Monetary Fund (IMF), and the United Nations Development Programme (UNDP) were major forces for the promotion of good governance in Thailand [191,201]. Principles of democratic governance including accountability, citizen participation, decentralization, smaller central government, and strong civil society became dominant [26]. The 1997 Constitution of Thailand laid the foundation for a democratic governance regime, and provided accountability mechanisms such as the establishment of the Constitution Court and the Administrative Court. A series of reform commissions including the Civil Service Commission (OCSC) were established to impose a modernization strategy of staffing, administration, management and financial reforms. A mix of new public management programs and structural adjustment downsizing measures was recommended [147]. As a result, a 1999 Public Sector Management Reform Plan was initiated consisting of five main priority areas: revision of roles, functions and management practices of government departments; budget, finance and procurement management reform; personnel management reform; legal reform; and reform of cultural and public values (ethics and anti-corruption). Further, after a military crackdown in 1991 (B.E. 2534), the Government Organization Act and the Organization of State Administration Act decentralized executive power from the prime minister down to ministers, permanent secretaries, and section heads in the central units and chief district officers in regional offices [170].

However, scholars have criticized that the solutions implemented to address the issues of inflexibility, inertia, and complexity of government hierarchical structures in the Thai public sector did not adequately address structural issues [170, p. 168]. While the problems resulted from large, complicated, and inflexible structures, the solutions rather focused on various forms of decentralization and autonomization instead of reorganizing the problematic political and bureaucratic structures. Furthermore, the reforms did not address

fundamental problems systemic to the culture of the Thai bureaucracy – bureaucratic inertia and legal and bureaucratic complexities [23,25]. The bureaucracy resisted the change and remained true to its longstanding culture [23,147], defined by factionalism, departmentalism, and a tendency to preserve the status and autonomy of individuals, cliques, and departments [177]. Thus, reforms were criticized for representing a combination of political convenience and superficial transplantation of new public management ideas to strengthen the power of politicians and political institutions while failing to consider the impact of persistent bureaucratic culture [23,25,26]. Though elected politicians had become more powerful, bureaucrats still retained power over ministers because political power was diffused among elected coalition governments. Moreover, officials still performed their work on a traditional law- and regulation-oriented basis.

Since the most recent public administrative reforms in 2003, the bureaucracy has substantially changed in its organizational and power structures, and in terms of decision-making power and managerial control in traditional Thai bureaucracy. The new managerialism and reforms have integrated the development and use of ICTs in the public sector. The deployment of new ICTs has affected the role and relationships of government agencies and officials, the emergence of government organizational innovation, and the development of government information infrastructure and standards.

3.2.1 Recent public administrative reform

Since the country entered democratic polity in the 1970s, elected politicians have challenged the bureaucrats and traditional elites for executive and legislative power and for a greater share of control over patronage and procedures. In particular, Thaksin Shinawatra (in office from 2001 – 2006) and his allies have sought to assert greater political control over executive procedures [146,147]. Thaksin determined to implement his populist policies through his national election platform. Coming from the business sector, Thaksin demanded the implementation of modern business principles into the existing bureaucracy. The new demands from both citizens and politicians had put bureaucrats under pressure to increase the quality, speed, and efficiency of service provision and public administration.

The Thaksin Government launched a public sector reform program including a series of public administrative, managerial, and technical reforms in 2003.[7] This most recent administrative reform program was announced as the Strategic Plan for Thai Public Sector Development under the charge of a new Public Sector Development Commission and its Office (OPDC). The OPDC was established specifically in order to speed up the reform agenda that had long been delayed by the Civil Service Commission and its Office (OCSC) [92]. In addition to the strategic plan, the Royal Decree on Good Governance of 2002 was also promulgated. The results of the reforms included restructuring of the bureaucracy and implementation of instruments of public management reform. These new instruments included results and performance management standards; key performance indicators (KPIs) that shift the orientation of public administration from legal and regulatory to goals and results; result-based budgeting systems, finance, and procurement reform; personnel management reform; and reform of civil service core culture and values.

The performance management and KPI programs have been widely implemented. The OPDC was established to be the prime minister's assistant in determining budget allocations and in exercising discipline and control of all government agencies by deploying a performance agreement and management program. The program helped the Prime Minister's Office, which supervised the OPDC, coordinate and control bureaucratic management, as well as evaluate the performance of each agency. The OPDC reported directly to the prime minister.

Some scholars criticize the reform agenda, finding that it is best viewed as part of a politicization strategy aimed at centralizing political control over bureaucracy [26,147,158]. Additionally, these new reform instruments still emphasize centralization rather than promoting autonomization or decentralization to regional units or local areas. The principles of democratic governance initiated in the early 1990s were reversed by reforms that aimed to consolidate government power in the hands of the prime minister [26]. The power of ministers, politicians, and bureaucrats had been minimized, and the model of

[7] My periods of observation (2010 - 2011) took place long after the Thaksin administration. However, many administrative reform programs and subsequent ICT initiatives from the Thaksin government have been carried over into recent administrations up to my observation periods.

government had changed from power distributed among multiple centers to a hierarchy with a single center of authority or "CEO government" on top.

Viewed as a politicization program rather than as a managerial one, these reforms were deployed to redistribute bureaucratic power to the chief political executive [147]. The reform efforts included four main strategies: revision of the budgetary process, the establishment of CEO governors, the restructuring of government, and revision of personnel and performance management.

Budget reform

Traditionally, Thailand's budget system has been highly centralized at the Bureau of the Budget (BOB) and based mainly on a rule-driven approach [202]. The BOB based budget allocations on historical precedents, modified by adjustment factors. Interviews with senior officials at six government agencies indicate that every agency has an obligation to spend their entire budget before the end of the fiscal year (September 30) because the benchmark of good budget management depends on whether the agencies make use of the funds as proposed. If not, it is very likely that the next fiscal year, the agencies will have a budget cut. Moreover, agencies are given little responsibility for how funds are spent, and hence assume little responsibility for spending wisely [202]. Therefore, agencies have historically tended to not develop the accounting and budgeting capacity to allocate funds more effectively or to deliver outputs using fewer resources.

Budget reforms were accomplished when a proposal for an output-based performance budgeting system replaced the traditional rule-based system [147]. The Thaksin Government wanted a budgeting system with the capacity to shift resources quickly in response to changing political priorities. As a result, the budget reform agenda has relocated approval authority, as well as the finalizing and submitting of budget bills, from the Bureau of the Budget to a Budget Commission, chaired by the prime minister, and consisting of ministers and Members of Parliament (MPs) appointed by the PM's cabinet. Under the reformed system, the Budget Commission would sign a public service agreement (PSA) with each minister on fiscal and service delivery targets that were aligned with government strategy targets [149]. Each departmental head would then sign Service delivery agreements (SDAs) for the delivery of the required outputs. The performance of portfolio

ministers was evaluated against the PSAs, while departmental heads were accountable for the SDAs. These new budget systems have transformed performance management in the government, and have influenced new measurement techniques for official performance or KPIs at the individual level. Moreover, the development of GFMIS was also a result of budget systems reform.

Replacing the rule-based, item budgeting system, output-based budgeting has shifted the focus of budgetary politics from negotiations between department heads and the BOB to a new system where ministers enter into performance agreements with the Budget Commission. Senior ICT officials in four agencies in my study reported during interviews that the Budget Commission and its sub-commissions automatically cut down each ICT proposal by 15%-20% regardless of how carefully the agencies prepared their proposals to meet standardized technical specifications and prices. Many ICT projects, as a result, need to be downsized, downgraded, or even terminated due to insufficient approved funding. In one interview, an ICT center director who has worked for the government for over 25 years expressed that he and his staff have to ask for budget approval from and explain the need and complexities of information systems to the MPs, many of whom are not experienced or knowledgeable about ICT-related matters. Moreover, many MPs are wealthy, young, low-educated people who happen to be locally powerful and influential in some districts or provinces. Yet, they have a higher status and more power than senior government officials. According to the ICT director, the comparatively lower status and power of government officials bothers him and his colleagues because senior officials, although typically more experienced and having higher levels of education and expertise, must abide by the decisions of inexperienced politicians. Further, agency budgets and career advancement depends on the goodwill of those inexperienced people. Nevertheless, the new reform agenda has locked in ministerial and departmental expenditures to the government's strategies [147]. The agenda has been criticized as being aimed at top-down politicization of the budgetary process, providing Thaksin with levers to assert his political control at a micro-level, and thus entailing a challenge to the dominance of the strategic planning and budgeting process by technocrats and bureaucrats.

CEO-governors

The current Thai public administration is a combined system of centralized, deconcentralized, and decentralized functions. These functions are divided into three administrative levels according to the Organization of State Administration Act of 1991 (revised 2002 and 2007), the Government Organization Act of 1991 (revised 2002 and 2007), and the Civil Service Act of 1992 (revised 2001 and 2008). The Ministry of Interior appoints provincial governors, whose roles include handling general interior affairs in the provinces and supervising local government, while other ministries and departments still oversee their field offices in the provinces.

Reform of the public sector in 2003 engendered the new concept of CEO-governors. The CEO-governors were considered to be the prime minister's assistants, acquiring their controlling power and authority from other central agencies [147]. According to the Cabinet resolution of February 25, 2002, the Bureau of the Budget authorized budgetary control of individual regional offices in each province to CEO-governors. In this manner, the CEO-governors assumed control over provincial budgets from individual ministerial and departmental field offices. Other central agencies also granted CEO-governors their authority in provincial areas. As a result, CEO-governors perform cross-ministerial and departmental, integrative, and executive roles in planning and coordinating provincial development, and are accountable for overall provincial affairs. Moreover, the cabinet issued resolutions on the integrative role of the CEO-governors, directing that the appointment of CEO-governors is under the authority of the cabinet and that the governors can be selected from among senior officials at any agency instead of solely within the Ministry of Interior as usual.[8]

Government organizational restructure

The Thaksin Government also implemented a major government reorganization of ministries and departments in October 2002. This restructuring resulted in 20 ministries and 143 departments, an increase from the 14 ministries and 126 departments that existed previously. The Ministry of ICT was one of the newly established agencies along with the Ministries of Social and Human Security Development, Tourism and Sports, Natural

[8] Cabinet resolutions of April 22, 2003, and July 22, 2003.

Resources and Environment, and Culture. The reorganization also resulted in an increase in the number of newly-created top positions for both politicians and bureaucrats [147]. The emergence of top positions and the reallocation of functions were perceived as a key part of Prime Minister Thaksin's political legacy. He exercised the power of patronage to strengthen his control of the Thai bureaucracy through the appointments and transfer process.

In addition, the Public Administration Act of 2002 (B.E. 2545) allowed ministries to form clusters of supervised departments with related functions. Clusters are headed by a deputy permanent secretary, who can be delegated the permanent secretary's executive powers over the cluster departments. The long-term objective of this arrangement is to more closely integrate ministerial services, functions, management, and budgeting processes [147].

In addition to the reorganization of central coordination, the administrative reform strategy also introduced the notions of service integration, cross-departmental operation, and information sharing to other facets of the public sector. The OPDC proposed the idea of integrating service via service delivery units or service links, whereby agencies within each ministry provide their public services at the same physical location and/or electronic services at the same virtual site. A service link office gathers public services and officials at a single location to deliver all services. Service links are part of the new service improvement strategy under the performance agreements between each individual ministry and the prime minister.

Personnel and performance management

In the pre-Thaksin period, the Office of Civil Service Commission (OCSC) started gathering information from all agencies about senior officers who would be qualified for appointments and promotions in the public sector. Although the primary criteria were seniority and selection from within the agency, the OCSC and sometimes the agency ministers exerted their influence on the appointments screening process, selecting the chair of the committee, and expanding the pool of candidates [147]. Personnel who appeared on the qualified lists, called Senior Executive Service (SES), would be considered for promotion and additional training. The implementation of this system was linked to proposals for performance review, merit pay, and recruitment.

The Thaksin Government, in 2003, approved a fast-track system of senior appointments to external applicants, across agencies and from the private sector, to encourage the movement of existing officials between ministries and departments [149]. The resulting need for centralized databases of cross-agency senior officials led to the development of a national personnel information system known as the Department Personnel Information System (DPIS). In addition to the SES of the OCSC, the OPDC and the Comptroller General's Department implemented KPIs and performance ratings associated with the performance management reforms discussed previously. The government also allocated pay raises and monetary performance awards to high-performing agencies. Evaluation at the agency level is based on the progress and final reports in the performance management information system, developed by the OPDC and implemented at most of the ministries and departments throughout the country.

To address the limits of the Thai bureaucracy's traditional legal and regulatory approach, at the individual level, the OPDC has prioritized performance review and evaluation as key reform targets. The OPDC demands that all government agencies set up their annual plans as contracts between agencies and the prime minister, between divisions and the permanent secretary, and between officials and the directors. At the beginning of each fiscal year, for instance, an official and his or her division director reach an agreement about what tasks the official is committed to achieving over the coming year. The contract contains performance indicators for each task to help both parties measure whether the official meets the commitment at the end of the year. Higher-level officials, from division directors to permanent secretaries, sign two such performance agreements – one governing individual performance and one governing the performance of the agency, including its compliance with plans and strategic priorities at the national level. Ministers convert relevant policies into agency operational goals, which are then divided and assigned to specific divisions. Division directors in turn assign these to individual officials, where they show up as features of individual performance contracts. Some agencies have developed performance management information systems to track the performance of individual officials throughout the fiscal year, whereas others still rely on physical reports.

As indicated earlier, these reform strategies have resulted in the development and deployment of centralized and integrated information systems at the national level. The

implementation of these systems has resulted in changes to existing decision-making power and organizational structures, relationships between officials within and across agencies (and sometimes between officials and politicians), and practices in the public sector.

3.3 Early Computerization in the Public Sector

The history of ICT introduction in the Thai public sector has been largely absent from scholarly work on Thai public administration and politics. The majority of research to date has focused on public administrative reform and on changes in political and bureaucratic power, decentralization, and autonomization [22-26,92,139,146-148,162,164,169,170]. Although a handful of scholars have studied the development and implementation of ICTs in the Thai public sector [40,122,133,167], their work has generally considered information technologies from the early 1990s such as networked computing, software development, and digital government initiatives. As discussed earlier in chapter 2, such output-oriented and model-based studies have been criticized for their failure to fully address the process and rationale of organizational change resulting from adoption of the new technologies [85,206]. Moreover, the history of traditional information technology development in the public sector in earlier periods, including processes related to document and file management, have for the most part been overlooked by scholars.

Before the era of computerization, individual government agencies developed document and file management systems for internal use. Each agency established documentation and archival procedures to manage their physical documents. These procedures varied from agency to agency. In 1953, led by the Prime Minister's Office, the government formed a committee to draft the Government Documentation and Archives Procedure. The Procedures of the Prime Minister's Office addressed three main concerns: the process of document circulation and archiving; standards for official document formats and printed papers; and directories and cataloging for statistical and reporting purposes. The cabinet approved the first two sections of the Procedures in January 1954, and the third section one year later.[9]

[9] "Instructions on official document writing," Cooperative Promotion Department. Retrieved from www.cpd.go.th on November 10, 2011.

In late 1963, the cabinet approved the revised Procedures on Government Documentation. The Procedures were issued and enacted on January 1, 1964, and were observed for nearly 20 years until the next revision in 1983 (B.E. 2526). The Procedures identified six types of official documents, the components of each document type, and the officials authorized to sign each document type; the urgency levels of official documents and associated protocols; the procedures for document delivery and receipt; and preservation, cataloging, and loaning. The Procedures required that all official documents be preserved for at least 10 years at each agency.

Agencies were allowed to determine their own individualized documentation practices as long as they complied with the criteria spelled out in the Procedures. This resulted in different practices from agency to agency. For instance, while general practices on internal documents (memos) were that supervisors may write down their comments or additional directions at the bottom of a document (Figure 3), an agency might determine that the memo would have a specific space on the right side of the page for supervisors to do so (Figure 4).

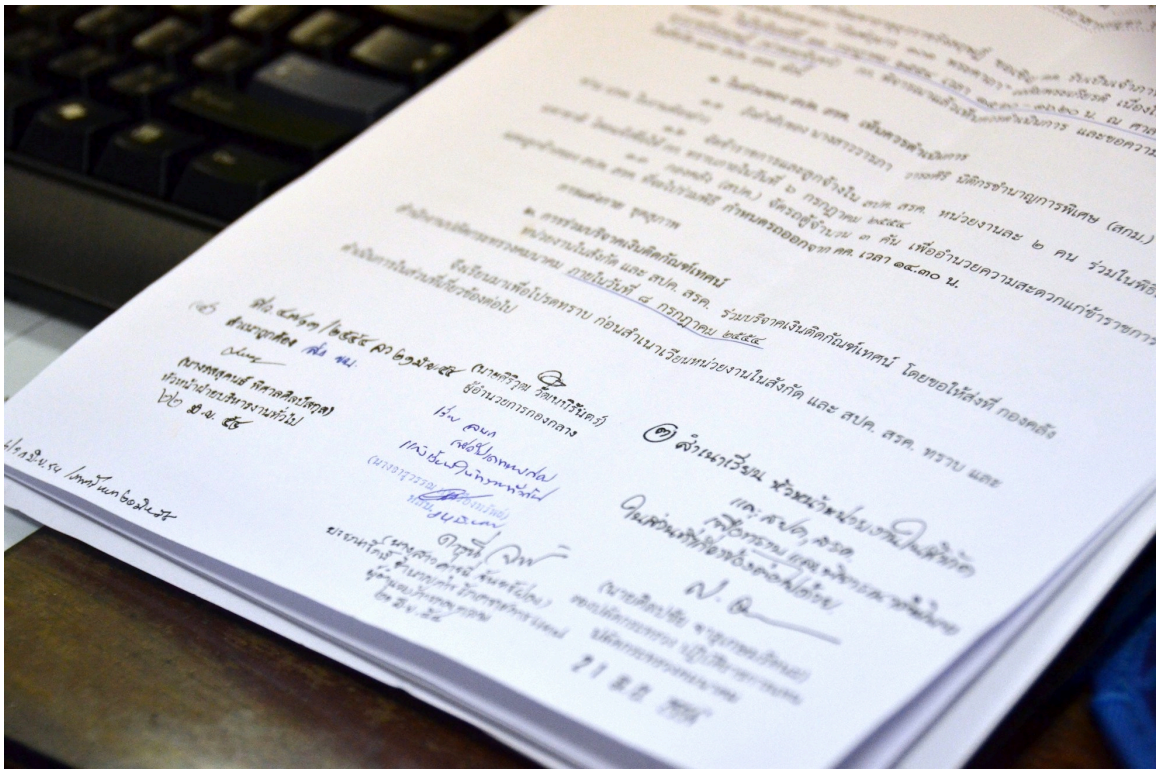

Figure 3 Traditional documentation practices in which comments and commands are written at the bottom of the page

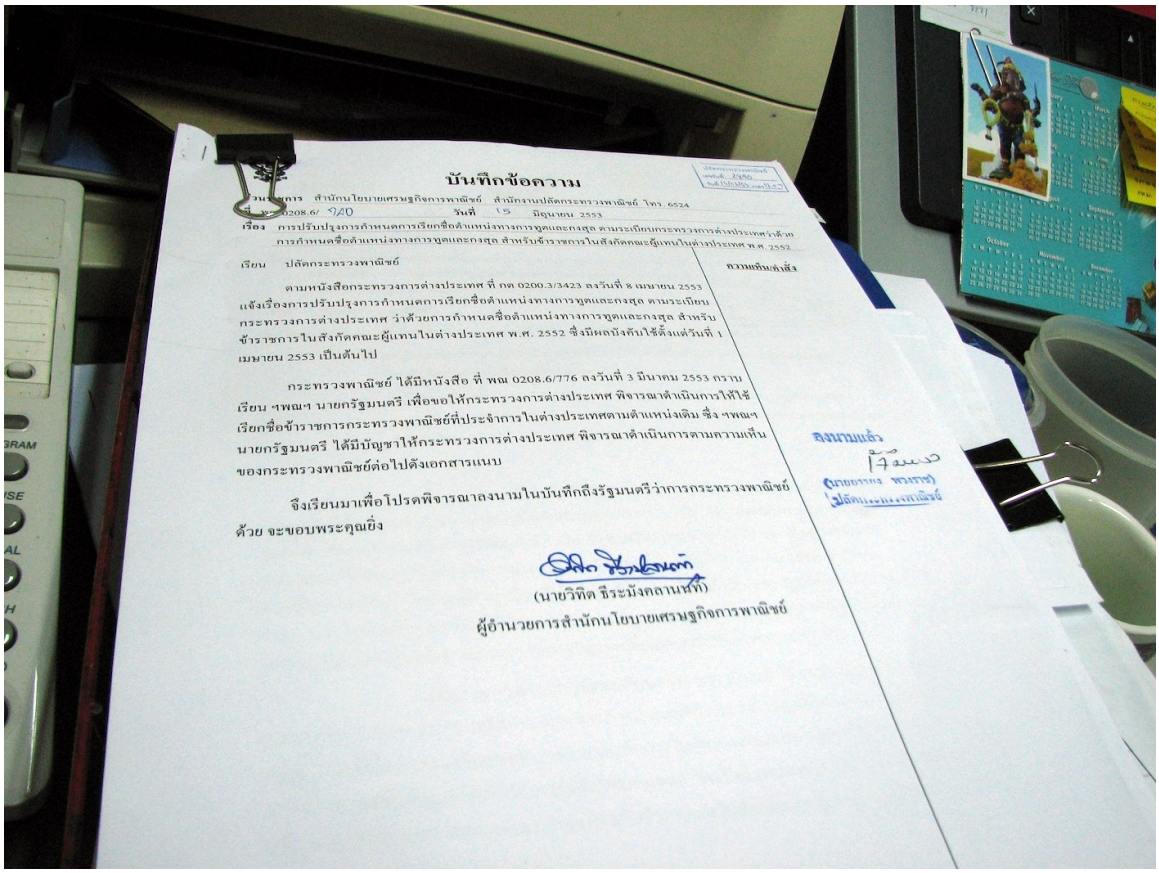

Figure 4 A memo with a space on the right for additional comments and commands

During the computerization period, the government adopted modern information technologies mainly for data processing. Computerization in the Thai public sector essentially began in 1963 when two mainframe computers were installed at the National Statistics Office for processing census data, and at the Faculty of Commerce and Accounting at Chulalongkorn University to support educational programs [121,122]. In the early period of computerization, government agencies sent their data to the National Statistics Office for processing. Later, in the late 1980s and early 1990s, many agencies established computer centers to process their own data. For example, the Ministry of Interior (MOI), which handled a large volume of operational data, started to develop computer applications to support their routine functions. Influenced by computerized operations in the private sector, individual agencies that could afford computer applications outsourced their ICT projects to private sector software vendors. These applications addressed three major government back-office functions – personnel record management, financial management, and documentation management. Among the most common applications were electronic

document management systems (e-Document systems). While the Office of Prime Minister's Documentation Procedures did not define electronic forms or procedures related to government documents, many agencies started using their own e-Document systems, and introduced internal Electronic Documentation Procedures incorporating new practices of electronic documentation work into traditional procedures. Other agencies implemented their own versions of e-Document systems. As the Government Procedures did not yet acknowledge electronic documents as official documents to replace the physical ones, individual agencies adopting the e-Document system could not and did not terminate their existing manual practices. As a result, the adoption of e-Document systems involved creating additional steps for scanning documents, entering metadata, and forwarding electronic documents.

Individual agencies had outsourced e-Document system development to as many as 25 different software vendors, resulting in different system versions and a variety of associated practices. One of the interviews I conducted with a senior computer official revealed that even for the same vendor, different system development groups offered different versions of e-Document systems, resulting in issues of interoperability and interagency coordination during later stages of government computerization.

Individual agencies had developed their back-office information systems independently, resulting in disconnected systems and uneven development programs. Therefore, the Thai government started incorporating ICT development plans into the country's modernization initiatives through a series of administrative and technical reforms. In 1992, the government established the National Information Technology Committee (NITC), chaired by the prime minister, consisting of ministers, permanent secretaries, and high-level officers from both the public and private sectors.[10] The National Electronics and Computer Technology Center (NECTEC) performed the secretarial work of the NITC. The committee promoted the development of a national ICT infrastructure to improve public administration services [40]. As a result of its efforts, the committee issued the first national information technology policy framework for a 10-year period (IT2000), endorsed by the cabinet in 1996, and later

[10] "National Electronics and Computer Technology Center (NECTEC) (2001)," Country Paper: Thailand. The 12th International Workshop on Information Policy and Management in the Public Sector. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN012806.pdf on November 11, 2011.

created the National ICT Master Plan (2002-2006). Additionally, Government Information Technology Services (GITS) was established to provide information and telecommunication infrastructure, including the Government Information Network (GINet) in 1997. GINet was the first government ICT platform for government web-hosting, high-speed Internet connectivity, and cross-agency information communication channels.

The second national information technology policy, for 2001-2010 (IT2010), aimed at developing the e-Thailand initiative composed of five major flagships: e-Society, e-Education, e-Commerce, e-Industry, and e-Government. The Thaksin administration addressed policies concerning e-Government development, and emphasized the use of appropriate and inexpensive ICTs for good governance – accountability, transparency, and efficiency [40]. Reviewing NECTEC's progress report on the e-Thailand project, however, one would argue that the government's ICT development efforts for public administration and services, at least in the initial stages, tended to focus on creating agency websites to provide the public with information and electronic services rather than transforming the agencies' internal operations through the use of ICTs. Moreover, the ministries and departments expanded their ICT development to include information sharing and integration of their services and applications within the agencies. The government's focus during this period was to build a shared network infrastructure within each ministry. Well-funded and geographically distributed units such as the Ministries of Transport and Interior developed their own intra-ministry physical networked infrastructure to share information among Department- and Provincial-level sub-units. Other agencies that could not afford their own physical networks leased telecommunication lines from either state-owned or private service providers for intra-ministry information sharing. These networks were disjointed, costly, and duplicative across agencies.

I would argue that the national digital government initiatives before and through the 1990s served as roadmaps for less technologically advanced agencies to catch up with their counterparts, and for the government to provide technical and financial assistance to those agencies. Agencies that were more advanced in adopting ICT, such as the Ministries of Commerce, Transport, Interior, and Revenue already had a head start implementing ICT projects for service delivery and administration. Their projects, such as e-Tax filing and vehicle registration renewal, were used as showcases for the government to report to the

World Bank, the United Nations, and other international financial institutions.[11] As a consequence of the ICT adoption gap among agencies and the misalignment of ICT projects of individual agencies with national digital government initiatives, government agencies later encountered issues related to service and system interoperability.

To summarize, there are three themes from the history of public administrative development which contribute to the current form of bureaucracy, politics, and digital government efforts in Thailand. *First*, the Thai public sector has long been subject to organizational tensions between the push for hierarchical control and accountability and contradictory demands for discretion, autonomy, and freedom. These tensions have emerged as the result of periodic waves of bureaucratic reform. The current political regime and bureaucracy are the result of the transitions from an absolute monarchy to a bureaucratic polity in 1932, and again to a democratic polity in 1973. These transitions redistributed political control of state apparatuses, first from the monarchy to the military and bureaucratic elites, and then again from the elites to elected politicians. Social and political history greatly impacts the development of technology in a country's governmental organizations. Therefore, the study of ICT development, adoption, and use in organizations should not ignore history and founding conditions as explanatory variables. The history of political and bureaucratic development or "modernization" has significant consequences for the ongoing structures, practices, cultures, and norms of public sector organizations. Therefore, any efforts to introduce new technologies in this space need to consider historical developments in order to foresee and avoid problems of structural misalignment and technological resistance, as well as unintended consequences of the adoption of new technologies.

Second, the Thai public sector has long been criticized for its inefficiency and resistance to innovation. Critics decried public sector organizations as having excessive rules and regulations, slow and redundant procedures, rigid and conservative decision-making, and byzantine administrative complexities – all of which undermined both the efficiency and transparency of government operations. Pressured by its citizens and the principles of

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[11] Some examples can be seen in reports the government provides to international financial institutions such as on the United Nations Public Administration Network (UNPAN) website. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/apcity/unpan012807.pdf on November 12, 2011.

globalization, good governance, and democratization, the Thai government introduced a series of public administrative reforms in the early 1990s focusing on five main areas – revision of roles, functions, and management practices of government agencies; budget and financial management reform; personnel management reform; legal reform; and reform of cultural and public values [147]. However, these reforms were criticized as representing a combination of political convenience and superficial transformation. The public sector remained operationally and structurally the same.

Nevertheless, the conservatism of the Thai public sector provides a balancing force for reform. Charles Lindblom [1959] argues in his classic justification of policy and decision-making through "muddling through" that bureaucratic inertia may be necessary for the stability of administrative practice [120]. Incremental change maintains traditional practice, structures, and cultures of the public sector. And policy change through successive limited comparisons, social incremental values, and the actual experience of public administrators reinforce existing behavior patterns of the bureaucracy [51]. Incremental change may allow for certain forms of learning across change, whereas rapid change may result in obsolete routines and procedures [200, p. 91].

Third, the introduction of modern ICTs in the Thai public sector parallels public administrative development, back to the 1960s when the first computers were used for data processing. Since the late 1980s, the development of information systems and infrastructure has taken place first at large ministries and departments such as the Ministry of Interior, the Ministry of Transport, the Revenue Department, and the Customs Department. Among others, first government applications are three major government back-office functions – personnel record management, financial management, and documentation management. The systems have become a vital part of the infrastructure of government agencies as the design of these systems was integrated with work processes of the organizations.

The design of Thai government applications reflects centralization or decentralization of authority and control in organizations. The relationship between socio-political and organizational conditions of particular governments and digital government development efforts calls digital government scholarship's attention to the causal relationship between the use of information technologies and change in power structures – it leads to either more

centralized or more decentralized structures, or reinforces the existing structures – and change in existing organizational forms. The use of interoperable and interagency systems also brings about new organizational and institutional arrangements, as well as requirements and practices for government agencies. This chapter has laid out the social and political background, and modernization histories through administrative reforms and computerization of the Thai government, which have a significant impact on the design and development of government ICTs. Therefore, digital government may be understood as the collision among four major forces – government process expedition, centralization or decentralization of decision-making structure in daily operations, information and service integration and interoperability, and managerial control. In the next chapters, I examine how the Thai government and its agencies deploy information systems for their service delivery, public administrative performance improvement, and managerial control tools at the agency and national levels.

Chapter 4
ICTs for Managerial Control in Public Administration

Large and complex organizations face problems of control and coordination. Managerial methods and tools including information and communication technologies have been developed to improve control and oversight in organizations. ICTs have played a central role in public sector reform efforts for the past 20 years as they by improving administrative efficiency and the quality of service delivery. However, the implementation of new ICTs brings about a new set of barriers and challenges resulting from old practices, legacy systems, and traditional power structures in the public sector. These tensions lead to adjustments and workarounds intended to limit and deflect the deployment and impact of new technologies. Digital government advocates have largely neglected the issues around resistance to ICT adoption and deployment efforts.

4.1 Bureaucracy, ICTs, and Control

Bureaucracy emerged in the first nation-states with centralized administrations, such as Mesopotamia and ancient Egypt, and became more sophisticated in the preindustrial empires of Rome, China, and Byzantium [11, p. 13]. Bureaucracy has served as the primary means to control large social systems. The goal of bureaucratic organization is to coordinate and control collective activities through explicit and impersonal commitments. Scholars studying management and control in organizations have long recognized Max Weber's [1968] ideal type of bureaucracy, which displays six characteristics as follows [193]:

1. The principle of *official jurisdictional areas*, which are ordered by rules, that is, by laws or administrative regulations. Bureaucratic agency or enterprise is comprised of collective activities assigned as official duties. The authority to give the commands required for these duties is distributed in a stable way. Only persons who qualify under general rules are employed in the organization;

2. The principles of *office hierarchy of formal positions* impose a clearly established system of supervision and subordination;

3. The management of the office is based on *written documents* (the "files"). Written rules and standardized operating procedures further the rationalization of bureaus and offices as they demote personalized decision-making;

4. Specialized office management presupposes thorough *division of labor* and training in a field of *specialization*;

5. Official activity demands the *full working capacity* of the official; and

6. The management of the bureaucratic office follows general *rules and regulations*, which are stable, exhaustive, and can be learned. Knowledge of these rules represents the officials' possession of special technical expertise. Weber notes that the stability and permanence of bureaucracy are assured through regular career promotion based on objective criteria [193].

The ideal type of bureaucracy may be used as a reference point enabling us to determine in which particular respects an organization is bureaucratized. For Hall [1963], bureaucracy is a form of organization which exists along a number of dimensions [78]. But not every formal organization possesses all of the characteristics of the ideal-type bureaucracy. Udy [1959] finds that these characteristics are not either all present nor all absent in any single organization [190].

Bureaucracy is seen to resolve some of the shortcomings of traditional organizational forms, such as feudalism, where authority arises either from tradition and custom (i.e., traditional authority) or from loyalty to the personal qualities of the ruler (i.e., charismatic authority) [41]. To the contrary, bureaucratic organizations are developed through rational-legal authority where acceptance is bounded by the rules and procedures of the organization with a clear technical qualification. Weber stresses that the rational-legal form is the most stable for both supervisors and subordinates as it is reliable and clear, yet allows subordinates a certain degree of independence and discretion. The features of bureaucratic organization allow the authority of officials to be subject to written rules and practices [41]. As a result, Weber argues that bureaucracy is able to handle more complex operations in large-scale organizations, and to attain a higher degree of efficiency than other forms of organization [41,176]. Bureaucratic organization is thus the most rational means of exercising imperative control over human beings [41]. But such order, for Weber, depends on the flow of formal authority and key advances in information technology – the invention of modern filing systems, without which such order and cohesion were impossible.

Nevertheless, scholars (including Weber) point out important weaknesses or dysfunctions of bureaucracy [41]. The most widely recognized weakness of bureaucracy is the increased rationalization inherent in social life, or what Weber refers to as the "iron cage of modernity." Decision-making is likely to be categorized and programmed, and thus discourages the search for alternatives or tailored operations. Standardization of inputs, outputs, individual roles, and procedures makes adaptation difficult when circumstances change. Moreover, the exercise of control based on knowledge leads to the development of experts with technical competence, whose opinions and attitudes may clash with those of managers and supervisors. Rational-legal authority works ideally when supervisors have more knowledge and skills than their subordinates [41, p. 27,72]. Bowker and Star [2000] liken the notion of bureaucratic control through standardization to the concept of classification [20]. Classification systems are historical and political artifacts, as well as part of modern bureaucracy. The creation of classification schemes preserves control, enhances comparability, and makes visible what is wrongly invisible [187, p. 205]. Embedded with classified and standardized forms and procedures, information technology operates through a series of displacements, from action to representation, from the politics of conflict to the invisible politics of forms and bureaucracy [20, p. 320]. For Bowker and Star, Weber's iron cage of bureaucracy constrains humans' true freedom of action through a set of rules [20]. Freedom is traded off against structurelessness; too much freedom may be confusing, or may lead to breakdowns in comparability across settings, thus impairing communication [187]. On the other hand, too much control and enforcement renders an information system unfriendly to its users. Information technology, as information infrastructure, adds another level of depth to/ the iron cage. As Bowker and Star note, *"In its (information infrastructure's) layers, and in its complex interdependencies, it is a gossamer web with iron at its cores"* [20, p. 320].

4.1.1 ICTs and bureaucratic control

Subsequent studies have built on this insight, emphasizing the use of ICTs as a tool for bureaucratic control and coordination. Goody [1986] asserts that the rise of modern and pre-modern state forms of development of writing allowed a new centralization in the exercise and function of administrative power [70]. Writing is essential in the development of bureaucratic states because it enables the administration to grow and maintain direct authority throughout the hierarchical order. Contact between rulers and ruled in a large-

scale organization is indirect, carried out through a hierarchy of officers distributed throughout the nation, relying on intermediaries to transmit messages between them. Writing standardizes communication between geographically dispersed members in a large bureaucratic organization. Furthermore, the written word enables subordinates to communicate in a formal manner with their superiors from a distance [70]. The separation characterizing organizations of the Weber-type bureaucracy depends on the increased formalization of administrative procedures that writing promotes, as evidenced in the Near East empires [70].

Yates [1989] makes a similar point about control and organization technologies for complex bureaucratic organizations [204]. Internal and external growth and systemization of organizations require new methods of management that can help achieve efficient coordination of large, multifunctional organizations. Systematic management was developed to eliminate confusion and oversight, coordinate efforts, and return organizational control to higher-ranked people in organizations [204, p. 9-10]. Organizations sought to achieve better control of processes and outcomes by imposing systems of standardized procedures, formal communication, and record-keeping. Standardized systems and procedures, rather than reliance on individualized practices, enabled the managerial class to exercise control over the working class. Moreover, records, reports, and other documents became a collective repository of organizational memory and freed organizations from relying on individual memories.

Besides written documents, hierarchies providing downward and upward flows of communication are another essential tool for managerial control of finances, facilities, materials, and processes [204]. Processes were recorded in handbooks and other written records, and passed down the hierarchy to govern work methods. In this way, work processes became institutionalized and independent of the individuals performing them. Likewise, records and reports documenting actual operations were sent up to higher levels for operational analysis and performance evaluation. Cost accounting systems were invented to help management compare operational performance among units. All performance evaluation and production control systems depended on documentation and upward flows of information to allow middle and upper management to monitor, control, evaluate, and improve operations at lower levels. Additionally, horizontal flows of written records and

communications across the hierarchy within organizations enabled coordination of activities between functional areas.

As organizations grew in size, structural complexity, and geographical dispersion, other information and communication technologies than just written documents were implemented to support organizational management. Yates argues that filing systems served as tools for organizing work and the division of labor [204]. Filing technologies in many forms such as flat files, folders, and vertical files affect the function and form of communication within modern organizations. Yates discusses the impact of filing systems on the function and nature of internal communication. Vertical filing systems, in which documents were organized by intended use on their edge in folders made papers easier to arrange and to use, thereby creating an accessible corporate memory to supplement or supersede individual memories [204, p. 56-62]. Filing systems enabled organizations to handle increased documents and correspondence by increasing the efficiency of storage and retrieval. The enhanced accessibility of records and internal correspondence facilitated the use of internal communication as an effective tool of systematic management. The early years of the twentieth century witnessed the creation of centralized filing departments to handle the files of large organizations, in addition to decentralized filing and local files for ready reference at departments and subunits of departments [204, p. 62].

Regarding the use of information for social control, Beniger [1986] argues that bureaucratic organizations themselves are information processors and controllers [11]. For Beniger, bureaucracy serves as the generalized means to control any large social system [11, p. 13]. Like Yates, he asserts that control is achieved through hierarchical supervision and administration. The rise of bureaucratic control is enhanced by innovations of information technology for creating, recording, storing, and processing information and communicating with and possibly controlling its internal and external environments. In his analysis of control systems, Beniger refers to rationalization as preprocessing of information and argues that computerization employs this information preprocessing to serve control through Weber's notion of rationalization [11]. Through rationalization, he notes that, *"control can be increased not only by increasing the capability to process information but also by decreasing the amount of information to be processed"* [11, p. 15]. Beniger further examines the implications of rationalization for control. In Weber's time, control was realized through bureaucratization

and standardization, whereas today it is accomplished through computerization [11]. Rapid growth in the amount of information to be processed results in the development of standardized paper forms within a bureaucracy to convert unstructured, nuanced, and detailed information into the limited range of formal, objective, and impersonal information represented by standardized forms.

The use of information and communication technologies for control and coordination in organizations brings about tensions and challenges for workers at lower levels, whose work practices are forcibly affected. A thorough examination of tensions around computerization and control at the organizational level can be found in Zuboff [1988], who emphasizes the roles and goals of management in using information technology to reinforce its sense of control over both production and organizational functions, thereby reinforcing hierarchy [207]. The "informating" potential is built into new computer-automated work systems, codifying organizational functions, events, and processes and displaying them as information. Zuboff refers to this process as "textualizing" the organizational environment [207, p. 126]. The informating power of technology results in radical change in the ways in which organization carries out its tasks and in which the organizational members use information. It gives managers new resources of oversight and control by making the performance of subordinates more visible through more accurate, timely, and detailed records of ongoing work practices. Informating systems automatically, continuously, and transparently record almost anything the management wants to capture. They thus become a monitoring tool called an information panopticon, a concept derived from the work of Jeremy Bentham [12]. For subordinate workers, this produces new forms of surveillance. It challenges the employee's role and undermines the sources of authority on which his/her influence depends with direct consequences for work life quality and workplace power. It may also spark new and subtle forms of resistance, as workers seek to limit, undermine, or work around the "informating" tendencies of the new technologies. Conversely, information systems are also used as technical means of subordinates' defense against their superiors. When subordinates lack confidence in the shared values of the authority relationship with their superiors, they rely on technical means of self-protection [207, p. 344].

Electronic text is the result of a more radical centralization as information is gathered and codified in a single computerized system. However, this radical centralization enables an

equally radical decentralization [207, p. 180]. In principle, the contents of electronic text can be constituted at any time from any place, and thus can infuse an entire organization at any time anywhere. In Zuboff's study of a banking institution, the database environment changed the structure of the banker's role by reintegrating those functions. Although the banker did not oppose the new technology, they resisted this reintegration of their roles because they were concerned about loss of self-protection from shedding routine activities and the dependence on others. Another issue concerning the new technology's implementation related to how bankers were evaluated and rewarded [207]. The database environment was perceived by the bankers as turning performance evaluation from subjective to objective by quantifying their ability to generate profits. Individuals were judged and their mistakes were discovered. The account officers, thus, resisted the notion of the database environment. Furthermore, the database environment resulted in the banker losing control over the information infrastructure. As data was automatically generated from business transactions, it became available and accessible to everyone. The bankers' influence derived only from knowledge about the data, not ownership. Therefore, the integrated database challenged the preeminence of upper-level managers in their role as the organization's thinkers.

In this way, informating technology poses challenges to organizations and their environments, causing organizations to change their traditional behaviors to align with the premises underlying the technology to be implemented. Otherwise, mis-aligned organizational environments can become a major barrier to the adoption of the technology. Moreover, workers at different hierarchical and functional levels may resist the implementation of the technology.

4.1.2 The limits of control: Tensions and resistance

A number of scholars in the field of technologies and organizational change speak to tensions and challenges attending the adoption of technology and resistance to technology in organizations. Markus [1983] offers social scientific theories of social resistance to technology in order to inform Management Information System (MIS) professionals about better system implementation strategies [127]. Markus is an organizational politics analyst in segmented institutionalism, as categorized by Kling [98]. She builds her theories on Kling's theoretical perspectives and conducts a case study on organizational impacts

surrounding the implementation and use of management information systems to evaluate her theories and their assumptions.

Markus's three divergent theories explain why resistance of individuals or organizational sub-units to technological change occurs [127]. Her *people-determined theory* finds that a person or sub-unit resist because of factors internal to the person or group. People intuitively resist all changes. Secondly, Markus's *system-determined theory* finds that a person or group resist because of factors inherent in the application or system implemented. People's behavior is determined externally by the environment or by technology. They tend to resist systems that are not ergonomically designed, technically deficient, or not user friendly. Markus further explains that these two theories can be held simultaneously. A compound theory gives an explanation about resistance that *"there is always a tendency for people to resist systems, but, other things being equal, they are less likely to resist ones that are well designed"* [127, p. 431]. Finally, her *interaction theory* asserts that people or groups resist technological systems because of an interaction between characteristics related to the people or features of organization and social context and characteristics related to the systems. One aspect of social context involves politics and power dynamics among groups and divisions within an organization. A system in which characteristics are not aligned with characteristics of the organization or the people in the organization is likely to be resisted. For instance, organizations with decentralized authority structures resist systems that centralize control over data. Similarly, people who stand to lose power will resist systems that alter the balance of power in organizations, whereas those who look to gain power will accept them. Additionally, relationships among individual or groups and incentive schemes that may facilitate or hinder organizational change and the implementation of systems need to be identified. Incentive schemes that do not reward desired behaviors or punish undesired behaviors when a system is implemented will create resistance to the system.

Concurring with Kling, Markus refers to technological systems as vehicles for creating organizational change [127]. Greater implied change is more likely to create resistance. The interaction theory can explain different responses by the same group of users to the same system, and different outcomes for the same system in different organizational settings. The theory consists of variations. First, the socio-technical variant focuses on the distribution of responsibility for organizational tasks across various roles and on organizational

communication and coordination around this division of labor. New information systems may result in change in a division of roles and responsibilities. Another variant is political version, which explains resistance as a product of the interaction of system design features with the intra-organizational distribution of power.

In order to evaluate those theories, Markus argues that we cannot test theories directly whether people resist technology because of internal factors, external factors, or interaction effects [127]. However, we can examine and compare basic assumptions underlying the theories with actual cases. Then, we can test predictions derived from theories against observed occurrences. The basic assumptions of the theories involve assumptions about information systems (system-determined) and assumptions about the nature of the organizational setting (people-determined). A third assumption is beliefs about the nature of resistance.

Assumptions about information systems describe purposes of the systems. The rational theory of management, for example, holds the assumption that the purposes of information systems are to rationalize work or achieve predictable outputs with consistent units of input, to enhance managerial decision-making and planning, to control and motivate the performance of employees, and to improve intra-organizational and inter-organizational communication and coordination among organizational members and their relevant social parties such as customers, suppliers, and competitors [127]. Non-rational systems theorists like Kling [98] and Markus find that the purpose of non-rational systems is to change the balance of power in an organization in order to gain control over or reduce dependence on members of a different occupational group.

Assumptions about organizational settings describe organizational contexts of the workplace in which information systems are used in terms of structure, culture, and employment contracts. These assumptions help explain how people and groups are affected by proposed information systems and how resistance occurs. The rational theory of management believes that all organizational members share common goals for the organization and will collaborate to achieve these goals [127]. In contrast, the non-rational theory assumes that different individuals or groups have different goals depending on their location in the organizational hierarchy. Thus, they can be expected to try to achieve local

objectives rather than global organizational objectives. This assumption is aligned with Kling's class politics analysis which assumes the existence of competing intra-organizational goal systems.

Assumptions about the nature of resistance define resistance as behaviors intended to prevent the implementation or use of a system, or unintended behaviors resulting from ignorance of the system's existence [127]. The interaction theory explains that the interests and intentions of users and designers are identified and compared. When these interests are similar, resistance is unlikely to occur. As the difference between their interests increases, the possibility of resistance also increases.

Drawing on an empirical case study, Markus concludes that people-determined and system-determined theories cannot make accurate predictions about eliminating resistance to a new computer-based system. Rather, she argues that the interaction theory can predict resistance-generating conditions as *"mismatches between the patterns of interaction prescribed by a system and the patterns that already exist in the setting into which the system is introduced"* [127, p. 438].

Studies of technological resistance are also substantially discussed in the world of Computer-supported cooperative work (CSCW) research. Grudin [1988] studies the adoption of electronic calendars featuring automatic meeting scheduling on a networked system [73]. His findings suggest that electronic calendaring applications are resisted because of the disparity between those who will benefit from them and those who must do additional work to support them [74,75]. While managers who call a meeting benefit from such systems, subordinates do not perceive a direct benefit from the use of the applications. They perceive that the costs of using the applications outweigh the benefits, and thus do not want to use electronic calendaring systems [73]. Grudin summarizes that the design processes of the electronic calendar and automatic meeting scheduling systems fail because the intuition of the decision-makers is poor. Managers see the potential benefits for people similar to themselves, but ignore the implications for others, such as subordinates who will need to do extra work [73]. To avoid application resistance, Lucas [1975] suggests that system developers need to get top management support as well as multi-level user involvement in the design process [123].

Furthermore, Grudin argues that social, political, economic, and motivational factors affect the adoption of technology [75]. Actions of organizational members are implicitly and unconsciously guided by these factors, and by awareness of the personalities and priorities of surrounding people. Technology that interferes with the existing social dynamics and political structures of users in organizations tends to be resisted. From a design perspective, Grudin suggests that technologies which ignore the sensitivity of certain social conventions and motivational concerns of organizations and users, which lead to undesired social processes or work practices, are likely to be resisted. For instance, a work management system that automatically forwards employees' priority problem reports to the chief executive officer violates the sensitivity of certain communications. The unintended result of implementing such a system is that employees may stop reporting problems. Moreover, technically savvy employees may practice workarounds such as writing a program to change the dates of the reports in order to satisfy the automatic monitoring system.

Consistent with Grudin, Kraemer and King [1988] also find that most efforts to develop supportive decision-making technology have focused on the relatively narrow, rational view of the decision process [108]. As experience shows and as decision behavior models suggest, however,

> *"This rational viewpoint is limited in its utility to real-world decision making because it specifically excludes the baffling nonrational or quasi-rational behaviors individuals often exhibit" [108, p. 135-136].*

Such ambiguities in decision-making processes make system design for group decision support systems difficult. Ackerman [2000] refers to this gap between social practices and technological feasibility of technologies as the social-technical gap – a gap between social requirements and what technological artifacts afford [1]. While social activity is fluid and nuanced, networked electronic systems often have considerable difficulty handling this detail and flexibility [1, p. 181].

Orlikowski [1992] studied the adoption and use of Lotus Notes groupware and collaboration technology in a large consulting firm [142]. According to her findings, structural properties of organizations, consisting of reward systems, policies, work practices, culture, and norms, need to be aligned with the underlying premises of the technologies. If the premises are incompatible with the organization's structural properties, it is unlikely

that collaboration technologies will be used and workers are likely to exhibit resistance to the desired use of the technologies. The organizational failure to adopt Notes exemplifies the alignment issue. While Notes was introduced in an organization to promote the coordination of activities, the organization's competitive and individualistic culture and rigid hierarchical career path did not support cooperation or sharing of expertise and knowledge with peers.

Moreover, the consulting organization's reward systems and incentive schemes were not aligned with the premises of Notes [142]. In an organizational environment where knowledge is power, consultants feared that sharing their expertise would hurt their chances of generating a unique contribution [144]. They worried that their use of the collaborative properties of Notes would threaten their status within the firm. Also, the firm's time-based billing structure did not allow consultants to bill their learning or using of Notes to clients, requiring them to sacrifice their personal time to learn it. They were therefore unwilling to spend time with the software.

Finally, a lack of explicit procedures and policies, and ambiguity about the nature of responsibility and liability around Notes, led to the difficulty of enforcing policies and implementing Notes organization-wide [142]. When an organization deploys a new technology that does not fit with the organization's structural elements, those elements will likely require substantial changes.

Another obstacle of adopting new technology is the absence of communication and proper training to help users understand the system's purposes and how to use it [142,207]. Zuboff argues that *"computerization should be accompanied by a serious educational effort, if the informating capacity of the technology is to be exploited"* [207, p. 217]. Similarly, Orlikowski suggests that introducing a new technology requires the organization to communicate about product information to its employees and to provide a training program to augment existing technological frames so that the adoption, understanding, and use of the technology will be aligned with the purposes of the technology [142].

4.1.3 ICTs and organizational structures

Scholars studying information technologies and organizational change have debated the impact of computerization on control in organizations. This debate concerns whether

computerization causes greater centralization or decentralization of authority and control in organizations. Some scholars claim that computers encourage centralization because information is available and reported upward to higher levels. Decision-making moves upward in the organizational hierarchy. Among advocates of this position, Leavitt and Whisler [1958] were among the first to contend that the introduction and use of computerized information systems leads to the centralization of organizational decision authorities [117]. Whisler [1970] noted that when they automate, firms centralize their administrative offices; the decision-making moves upward in the organizational hierarchy and managers are usually more robust while clerical jobs diminish in scope, variety, and autonomy [196]. In the following decades, other researchers conducted empirical studies that supported this argument [87,126,136,163,165,199,205].

However, other researchers have argued that the use of information systems tends to decentralize power and control [5,15,16,31,94,131,156]. Empirical studies supporting this viewpoint suggest that computers replace or displace routine decision-making at lower and middle levels, thereby increasing the capacity of these levels to handle less routine decisions [94]. The consequence is greater decentralization. Blau and Schoenherr [1971] demonstrate that computerization plays a major role in bureaucratic and administrative control of lower levels. Computer systems are an essential tool for formalizing tasks and monitoring lower-level decision outcomes [16]. Although this appears to be greater decentralization, it may entail the delegation of more routine decisions whose outcomes are more closely controlled through computerization [165]. Enacted by computerization, power and control over the premises for decision-making may be more concentrated than previously.

Whether computerization causes centralization or decentralization of decision authorities, Markus and Robey [1988] define these positions as variants that both assume a causal relationship where computerization causes changes in organizational decision authority structures [128]. This view is referred to as the *technological imperative*. As Markus and Robey argue,

> *"(T)echnological imperative views technology as an exogenous force which determines or strongly constrains the behavior of individuals and organizations" [128, p. 585].*

Still other scholars argue that there is *no inherent causal relationship* between computerization and decision authority structure [29,35,49,50,137,165,188]. Computerization can support either form of decision authority [49]. Buchanan and Boddy [29] and Carter [35] found that the organization of work after automation is influenced by many variables, including but not limited to aspects of the individual computers [66]. Based on his study of the effects of computer information systems on organizational authority and control in eight organizations, Robey [1981] concluded that the instances of *no change* outweigh the incidence of change [165]. He also pointed out that these findings were congruent with Kling's [1978] studies of information systems as an instrument of organizational power [96]. Moreover, where information systems do not produce changes in structure, they reinforce existing structures [165]. Where changes occur, centralization appears to be the most common result as systems produce more centralized control through standardization of information, more complete record-keeping, and faster processing.

A fourth position of the debate over the relationship between computerization and organizational change turns the causality around, suggesting that organizations shape computerization efforts to conform to their prevailing decision authority structures. Researchers in this tradition assume that computerization activities reflect the prevailing centralized or decentralized persuasions of the organizations in which they occur [43,46,54,96,105,114]. Existing power structures affect the technology rather than vice versa [96,103,105,106,160]. Computing technology is viewed as a malleable tool controlled by the dominant coalition in an organization and is used by that group to serve the interests of the status quo. Thus, the power of those in control is enhanced, and the existing power structure, whether it is centralized, decentralized, or a combination of the two, is reinforced [43,54]. Robey also notes that computers do not necessarily affect the distribution of authority and control. Rather, structural changes appear to be consistent with either rational management objectives, political strategies of management, or both [165]. Davis et al. [1984] reason that computers are no longer considered as innovations; they have instead become integral parts of organizations. Therefore, they do not affect organizations and their structures like they did in the past [46]. These findings support the argument about reinforcement politics. Markus and Robey categorize these studies as *organizational imperative*, which assumes that:

> *"(A)lmost unlimited choice over technological options and almost unlimited control over consequences…(I)nformation technology is the* ***dependent*** *variable in the organizational imperative, caused by the organization's information processing needs and manager's choices about how to satisfy them" [128, p. 587].*

Markus and Robey's argument further assumes that systems designers can manage the impacts of information systems by attending to both technical and social concerns [128]. Systems are viewed as tools for solving organizational problems.

George and King [1991] underline the importance of managerial intent and managerial action as factors shaping the desired decision authority structure in organizations, and call this the *managerial action imperative* [66]. As they summarize,

> *"(T)he reinforcement politics argument does not predict a particular outcome from computerization. Instead, the existing structure, which usually favors those currently in power will be reinforced" [66, p. 69].*

From an organizational management science standpoint, similarly, computers and information technology are organizational resources over which different actors may lay claim [17]. Top managers can review the performance of their subordinates and can be more involved in decision processes through monitoring and reporting information systems [165]. Systems lead to greater centralization and stronger control over lower-level decisions and require greater standardization of input data from lower levels. Information system modifications may be used to affect a planned change in the social structure, or to enhance the relative power of the information systems group [6]. However, George and King point out problems with assuming a management imperative. First, there are components that constrain the actions managers can take. These constraints involve the inertia of the existing technological infrastructure and the traditions of existing political or administrative systems [54,198]. Second, external influences affect organizational needs for computing systems, and thus constrain managers' decisions and options on the use of technology [66]. George and King emphasize that:

> *"(T)his external influence must be recognized as a powerful constraint on any management imperative in use of technology, and we assume this constraint extends to the use of technology in reinforcing particular decision authority structures" [66, p. 70].*

Drawing on management science [98] and managerial action imperatives [66], technology development and use is determined by the interests of higher-level managers in society or in

organizations. Management can exert influence on the specific choices of decision authority structure and the uses of computing technology to reinforce those choices through the web of opportunities and constraints [100,115].

4.1.4 ICTs and change in public sector power and control

Early work in computers and bureaucracy, or in what would later come to be called the digital government field shared these critical concerns. Scholars like Laudon [1974], and Kraemer and Dedrick [1997] emphasize tension around managerial control as a key factor shaping patterns of centralization and decentralization in public sector computing [103,114]. Managerial action and decisions coupled with internal and external factors of public organizations, such as organizational history and context, resource availability, and legal and political features, are the key influences shaping organizational structure [103]. Centralized and decentralized structures of computing functions are powerful tools for reinforcing existing power arrangements as well as facilitating trends in organizational restructuring whether it is centralized, decentralized, hierarchical, or networked [103,106,160]. By itself, computing is unlikely to affect organizational structure [103]. Laudon [1974] finds empirical support for these claims [114]. He finds that the levels of centralization in the organizations associated with computerized systems are the result of political and bureaucratic forces, not necessarily of technology. Information technology is a tool whose ultimate social meaning, content, and consequences are highly subject to the influence of the specific political values and interests that inform its use [114, p. 311]. Kling [96] and Kraemer and Dutton [105] studied computing in local U.S. governments and conclude that those with power in organizations use computing to reinforce existing power structures, or to consolidate information needed for decision-making under the control of higher management. Kling, and Kraemer and Dutton demonstrated in their studies that systems for policy analysis in cities serve as political, power-reinforcing instruments. In contrast, automated upward-reporting systems may cause data providers (in this case, local officials), to lose power to data collectors, (here, mayors and city managers). Similar effects were found to accompany the introduction of computer modeling into government operations at the federal level [104].

Drawing on these analyses, Kling concludes that the technical features of the system as well as the political dynamics of the setting in which it is to be utilized must be understood in

order to predict the probable impacts of computing [98]. Moreover, Danziger et al. [1993] argue based on their survey results from 46 U.S. cities that the structure of managerial control is more emphasized than the structure of computing facilities and services whether it is centralized or decentralized [44]. They find that centralized and decentralized computing can prove equally effective. They further suggest that the real concern of advocates for both centralized and decentralized computing functions is political power and control within the organization rather than quality of computing services. If an organization views information as power, then centralized computing will be deployed to concentrate power at higher levels in the organization. Public managers understand the potential of IT when it comes to their own interests, and they exploit it in the pursuit of those interests [109].

Nonetheless, Kraemer et al. [1981] note that trends toward centralization and decentralization of computing functions in public organizations have continued to swing back and forth independent of trends in computer technologies [106]. At the broadest level, efforts at computerization in the public sector therefore constitute a particular kind of 'computerization movement,' subject to tensions around work flow and employee re-skilling, workplace discipline, and a wide variety of interpersonal, intergroup, and institutional relationships and power dynamics [99].

In the previous chapter, I illustrated the struggle over political and bureaucratic power and control in Thailand, and emphasized the centralization of information and decision-making power through public administrative reforms. In this chapter, I discuss the most recent program of public administrative reform. This recent reform program has resulted in major changes to traditional forms of bureaucratic power and control, has impacted relationships between the bureaucracy and political executives, and has promoted the expansion of the prime minister's power in day-to-day administration. Later, I lay out the development and use of computing and information technologies in the public sector as stand-alone systems for daily operations and managerial control in individual agencies, such as the Court, drawing on both existing published work and my own empirical study. As a consequence of the most recent public administrative reform agenda, the concepts of information and service integration and interoperability were introduced to the Thai bureaucracy. Moreover, managerialism at the national level has been imposed through computerization efforts such as the fiscal management information system, and performance evaluation and management.

4.2 Managerialism through Computerization in the Thai Public Sector

Government agencies have worked to increase government efficiency through a series of bureaucratic reforms and New Public Management (NPM) strategies and instruments. Since the 1990s, agencies have introduced modern ICTs aimed at improving public service delivery and increasing the quality, speed, and efficiency of basic operational procedures. Major operational functions such as budget and financial management, human resources management, and documentation work were computerized through digital government applications. However, these ICT developments were implemented at the agency level, and remained disjointed, inconsistent, and uneven, marked by local proliferation and weak linkages [89]. The recent reforms of the early 2000s brought about the concept of information and service integration, interoperability, and centralization. Through computerization, the recent reforms also gave rise to the development and adoption of ICTs as administrative and political control tools for the elected government to monitor and control information and other resources. I discuss government managerialism through the implementation of four information systems resulting from the most current administrative reform efforts – the Government Fiscal Management Information Systems (GFMIS), the performance management information system, the Departmental Personnel Information System (DPIS) implemented at the national level, and the case tracking system at the agency level.

4.2.1 Government Fiscal Management Information System (GFMIS)

In 2003, as a result of budget reforms during the Thaksin Administration, the Cabinet appointed the Commission of Government Fiscal Management System Improvement, chaired by the prime minister, and consisting of ministers and officials from the Ministry of Finance, the Comptroller General's Department (CGD), and relevant agencies.[12] The Commission set up a sub-commission to work on the development of the Government Fiscal Management Information System (GFMIS), which integrated the budget procedures of all government agencies so that the government could plan, approve, monitor, and manage budget allocation and expenditures nationwide in real-time, while each ministry or department could monitor and manage the budget within its agency at the provincial or

[12] Cabinet resolution of January 15, 2002.

district level. The GFMIS is one of the first computerized systems employed by the government for managerial control at the national level.

Prior to the GFMIS, agencies submitted requests for treasury payment to the CGD through a manual system. Once the CGD approved a request and transferred money to the requesting agency's bank account, the agency would issue a check and notify a vendor that their payment could now be claimed. With these manual practices, the CGD struggled to reconcile the various non-standardized financial and accounting procedures, formats, and bookkeeping entry methods used by individual agencies. Further, the CGD was unable to track agency expenditures in a timely fashion. With the advent of the GFMIS, the CGD has established new financial and accounting procedures that all agencies are required to follow. The GFMIS has standardized government financial procedures and formats and has centralized government control of financial management among agencies throughout the country. The new system also accelerates financial transactions, including direct transfer and deposit from the CGD to vendors.

The CGD, an agency under the supervision of the Finance Ministry, hosts the GFMIS servers and provides terminal computers at ministerial and departmental agencies. All transactions and processes are conducted on the CGD's central servers. Owing to concerns about information security, access to the system requires user accounts and passwords along with access cards. Due to the limited number of computers and network bandwidth, the CGD can provide each individual ministerial and departmental agency with only two computer terminals and two accounts. For provincial offices where the CGD does not provide terminals, the CGD provides electronic financial templates in which officials can record their financial transactions offline, and upload the encrypted records to the GFMIS on the Internet. The government mandated that all agencies adopt the GFMIS. Besides its system provision capability, the CGD has financial and budgetary power over other agencies. Accordingly, it was able to require all agencies throughout the country to switch from their legacy systems to the GFMIS, whether voluntarily or involuntarily. In the words of one senior financial officer I interviewed:

> *"The GFMIS is mandatory. We have to use the system for all budget and expenditure requests. Otherwise, our payments to the vendors will never be approved by the CGD."*
>
> *(Informant interview, July 2011)*

The implementation of the GFMIS has brought about change in government budget and expenditure procedures, practices, and budget control structures at both the national and local agency levels. The GFMIS has increased transparency and has made transaction information instantly accessible to the CGD. This allows the CGD to monitor agency expenditures at all times and to discover potential transaction errors more easily. Although monitoring has tightened, officials did not express concern about being watched through the GFMIS. Rather, they expressed concerns about needing to be more careful and thorough in their own work. Previously, payment requests passed through hierarchical levels in the financial division before being sent for further approval to the CGD. Several people within the division reviewed the requests before sending them to the CGD. The repetitive processes required additional review steps, which helped officials detect errors manually before requests were approved. In the GFMIS, the system eliminates the repetitive processes and paperwork required in the manual system, as the financial section head becomes the request approver, and must rely on her own careful review. Middle managers, such as financial section heads, do not necessarily welcome the autonomy given by the GFMIS because it implies more responsibility and greater liability. In contrast, financial division directors may benefit from the autonomy as their accountability is lessened and transferred through the delegation of responsibilities. Moreover, since the GFMIS automatically transfers money to the vendors listed on the requests, even more careful work is required from the officials who have approval authorization. One financial section head reported that:

> *"I am always anxious when submitting the requests in the system because once I hit the submit button, the money is transferred to the vendor's account by the next day. I have to check again and again if that is the correct vendor."*
>
> *(Informant interview, July 2011)*

The GFMIS has enabled the government to evaluate the cost-efficiency of agency tasks and activities at the ministerial, departmental, and provincial levels, as well as comparing costs of individual agencies to support the government's results- and goals-oriented performance management objectives. The system requires agencies to identify their itemized expenditures into cost categories, such as infrastructure development, upkeep and maintenance, etc. These categories help the CGD analyze the expenses of each agency, and afford comparison across agencies. In this way, the system serves as an information

repository and allows the central agency to reuse the information for analysis, something that was difficult to do in the manual system. A financial official noted that:

> *"In the manual system, papers did not remember the transactions. When we bought the same items, same brands, same models, the CGD could not compare for price differences. But now, the GFMIS remembers everything. So, the CGD can compare how much we pay and how much the other agencies pay for the same thing."*
>
> *(Informant interview, July 2011)*

The CGD underlines the importance of activity-based costing – that all agencies must calculate and identify the costs of each activity in each division so that the CGD can compare figures across agencies. This process requires accounting officials to trace every transaction, find its original division, and contact the division to confirm the expense. They then have to match each transaction to the cost and activity category to compute the activity-based cost accounting. Each year, there are more than 2,000 transactions at a ministerial agency. A financial director I interviewed reported that she had experienced higher turnover among her accounting staff due to the tremendous amount of work resulting from implementation of the GFMIS.

The GFMIS instituted standardized government financial procedures and practices, and centralized control of the government's budget and expenditures. However, officials at local agencies find that the adoption of the system has given rise to frustrations with the limits of the GFMIS with regards to supporting the agencies' internal operations. Due to system security and license limitations, the CGD prohibits individual agencies from connecting their local financial systems with the GFMIS. The system is designed to be closed, unconnected to agencies' individual financial systems, facilitating the CGD's objectives of budget approval and financial and accounting monitoring and control at the national level. The design of the GFMIS does not take into account financial and accounting practices on the ground, as it does not support the practices of individual agencies regarding internal financial and accounting procedures, reports, and audits. Therefore, most individual agencies still maintain their existing computerized or manual systems in order to generate appropriate reports and statistics for their internal operations. Moreover, the GFMIS only provides on-screen reports for the user agencies and does not allow any report printouts or exportable data. Agencies typically must capture the on-screen reports and print them as proofs of submission, and for their internal use (Figure 5).

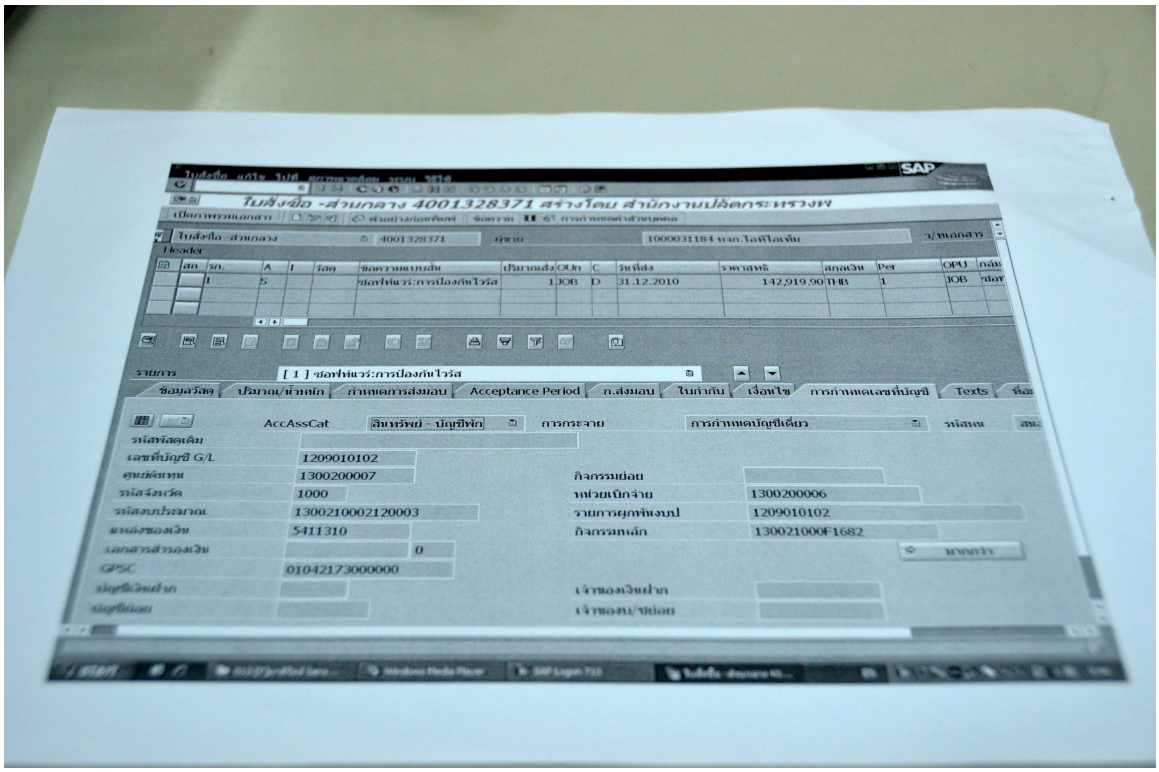

Figure 5 On-screen report printed out from the GFMIS for local-agency use

Further, the design of the GFMIS does not consider financial and accounting practices on the ground. A financial section head at one departmental agency explained the way in which the officials actually used the system:

> *"The GFMIS is very secure. The CGD determines that there must be a locked room for the system. It is not convenient because the financial director usually does not have time to walk to the room and work with the system. So, the director assigns me to do her system-related job. I am using her account."*
>
> *(Informant interview, August 2010)*

Given security requirements and the limited number of computers and accounts that the CGD provides for each agency, officials are forced to rotate their shifts to work with the system. This illustrates that while the CGD takes full advantage of system implementation for control and management purposes, each user agency is forced to deal with access limitations or tensions attending their work practice. The agency has to adapt their work around these limitations. Local agencies and officials usually refer to this type of practice as a 'survival system' in which higher-ranking agencies or officials gain benefits from particular

systems or practices, and leave their lower-ranking agencies or subordinates to deal with resulting issues. The financial section head described the situation thusly:

> *"Every end of the fiscal year, all staff in financial, accounting, and budget sections plays musical chairs to get those two seats in the GFMIS room. We need to process all the requests before the end of the year. They even have to stay late to 2am to get it done…. The system is actually fine, and even better off for the CGD. But the CGD does not think about how we are going to do with it. The system does not facilitate our work much. This is what we call a 'survival system' where the higher authorizations get to choose what they want. They get want they want. And we have to follow their instructions."*
>
> *(Informant interview, August 2010)*

At the lower levels of the Thai government, a change in roles and relationships within the financial divisions of local agencies has accompanied the adoption of the GFMIS. Prior to the GFMIS, when a particular division requested a purchase payment, the financial section was responsible for making treasury payment requests, whereas the accounting section was tasked with bookkeeping and handling the agency's cost accounting analysis. Once the financial section submitted a payment request and a transaction took place, all corresponding papers were sent to the accounting section. The implementation of the GFMIS has primarily impacted the accounting staff. The financial section now records costing accounts when submitting a request, meaning the accounting staff no longer needs to carry out this task. Instead, their role has become to audit of the agency monitoring expenses of individual divisions within the agency. Accounting officials largely do not recognize benefits of the change in their role. Although the new would appear to reduce their workload, the accounting staff often finds that the data entered by the financial staff are incorrect or incomplete, and that the input process is slow. As a result, the accounting staff spends a lot of time verifying and correcting the data in the system before they can perform their accounting task. The data verification is tedious and delays their work. Moreover, the interagency cost comparison feature in the GFMIS has required accounting officials to come up with ways to describe and allocate expenses of the agency within the standard forms and categories laid out by the GCD. In this role, they face contradictory interests and pressures – from agency management, who want to present costs as low as possible, and from the CGD, who wants the itemized costing system to be standardized across agencies.

4.2.2 Results-based performance evaluation

To address the limits of the bureaucracy's traditional legal and regulatory approach, the Public Sector Development Commission (OPDC), established in 2003 specially to implement and expedite the administrative reform agenda, has prioritized performance review and evaluation as a key reform target. The OPDC requires that all government agencies set up their annual plans as contracts between agencies and the prime minister, between divisions and the permanent secretary, and between officials and directors. At the beginning of each fiscal year, for example, an official and her division director reach an agreement regarding what tasks the official is committed to achieving over the coming year. The contract contains performance indicators of each task to help both parties measure whether the official meets her commitment at the end of the year. Higher-level officials, from division directors to permanent secretaries, sign two such performance agreements – one governing individual performance and one governing the performance of the agency, including its compliance with plans and strategic priorities at the national level. Ministers convert relevant policies into agency operational goals, which are then further divided and assigned to specific divisions. Division directors in turn take these goals and assign them to individual officials, where they show up as features of individual performance contracts.

At the national level, the OPDC provides a performance management information system that allows each agency to enter and update their strategic plans and goals in the system. Through this system, the OPDC can track the achievements of individual agencies throughout the year, and can assess agency performance at the end of the year. The OPDC strongly encourages each agency to develop and implement its own performance management information system. Most ministries and agencies have outsourced the project development to software vendors and consulting groups. Both the systems provided by the OPDC and those developed and used in individual agencies require individuals and divisions to set up their goals, performance agreements, and tasks. Some systems closely resemble off-the-shelf project management software. Most systems provide progress reports with a variety of visual presentation tools including pie charts and bar graphs. The officials and divisions are responsible for updating the accomplished tasks, manually calculating the percentage of total goals accomplished, and uploading supporting documents as proof of accomplishment. Overall agency performance is calculated as an aggregate of individual

division reports. High-performing agencies are acknowledged by the prime minister, and, in the early years of the program, received a monetary bonus to be distributed among officials within the agency. One of the common findings drawn from the use of the performance management information systems is that both the OPDC and local agencies still rely on physical site visits and paper-based documents as proof of task achievements. There appears to be an implicit mutual agreement among officials that physical documents are more important than electronic documents, as paper-based documenting practice has been long established and still remained the primary mode of communication and coordination in the government work, except when the OPDC requests to see results in the system during fiscal year-end evaluation. The interviewed officials find that they often have to create additional documents electronically, and feed them into the systems as required by the OPDC.

Many interviewees outside the OPDC feel that the results-based management initiatives and the development of the performance management information systems have affected the public sector operation in both positive and negative ways. The government has been able to track the work progress of each individual agency through the OPDC-provided information system. Similarly, higher-level officials can now track and evaluate the performance of lower-level officials and divisions through internal systems. Output-oriented tasks have been initiated and accomplished to a greater degree. Moreover, the new evaluation method is believed to provide explicitly fairer and more objective performance assessment.

However, the roles and relationships between management and lower-level officials within agency have changed. Before the results-based management initiatives and the development of the performance management information systems, public sector managers ranging from section heads up to permanent secretaries had performed the role of giving instructions to and monitoring their subordinates. Most of their work was related to receiving orders from the higher levels, and passing them down to lower-level officials, following up the work and acknowledging the accomplishments of their staff, and approving task-related budget requests. The managers' own performance assessments typically did not rely on the accomplishments of their supervised units or the collective achievement of the individual officials under their charge. Relationships between managers and subordinates were built on a one-way, top-down dominant pattern: if a lower-level official failed to meet expectations, that particular official would take sole responsibility, reflected in smaller or slower raises

and advancements in rank. An official's success or failure was held to be a matter of personal responsibility, and her supervisors' performance evaluation would not be affected by the official's performance.

Under the new performance management information systems, in contrast, individual performances are attributed to the section, division, and agency levels, spreading the consequences of underperformance upwards in the managerial hierarchy. On the part of higher-level officials, this builds a clear and obvious incentive for tighter monitoring of subordinate performance – a pattern replicated at multiple levels of the organizational hierarchy. As a junior ICT official explained to me:

> *"If I cannot implement the Knowledge Management system by the end of September, my bosses will definitely not let it go because the system is listed on the ICT Center's performance agreement… Approaching the end of the fiscal year, we have to make sure everything on the agreements - both individuals' and the division's - has been met, and we have appropriate evidence to prove the achievements."*
>
> *(Informant interview, July 2011)*

One senior ICT official I interviewed argues at length the performance management system as one that discourages a collaborative environment in the agency. ICT staff in the agency are typically individualistic; officials do not share or pass on their ICT-related skills and knowledge as those are the unique knowledge assets which keep them valuable to the organization. Performance agreements and management systems emphasize the individualistic characters of the officials, who focus on the facets of their work related to achieving their personal goals and agreements. The network and application groups do not coordinate on their annual agreements, which sometimes results in conflicting plans and tensions among the staff in the division, in turn requiring the supervisor's attention. The findings from another agency mirror the disconnect demonstrated between groups in the ICT Center.

Beyond their implications for incentives, the new performance management information systems also supply managers with new tools for the monitoring of subordinate activities. Managers can check on the accomplishment percentage provided in the system to know how close tasks are to being done, and to see which specific tasks will require more staff.

In its current configuration, performance management information systems make *all* agreements, including those of supervisors, visible and accessible to everyone in the agency. As evaluation results are tied directly to rewards, this can lead to new tensions around the assignment of credit and reward that may undermine rather than advance reform goals. As one junior staff member explained to me,

> *"We (non-managerial officials) see no point of defining our performance agreements. No matter how hard we work to achieve the goals, we get almost the same raise every year. The bonus is definitely not great motivation either. We have worked so hard trying to meet the goals. But we earn just about 4,000 baht (approximately US$130) max, while the directors, deputies, and the secretary general get tens or hundreds of thousand baht each. Most of their accomplishments are actually "our" tasks… The time and efforts spent on working, updating working progress, and preparing proof of task completion simply outweigh the benefits we gain from the evaluation… I would rather not have to do the annual agreements. The bonus is just not worth the trouble."*
>
> *(Informant interview, June 2010)*

This imbalance between the workload and rewards of officials at different levels has created new organizational pressures and tensions among officials. A middle manager in the human resources (HR) division at a ministry in my study concurred with the officials' response to the new management methods. She reported that:

> *"Honestly, I have no idea how the performance agreements are supposed to be done. I actually think that the progress reports on the system, and evidence of accomplishment got into the way and slowed down our actual work. So, I have assigned two newly recruited officials to work specifically on this thing."*
>
> *(Informant interview, June 2011)*

The performance management information systems are not well perceived among non-managerial officials either, and so have not been widely adopted in the agencies. A staff member of the managerial system development section at one ministry described the issues concerning the performance evaluation and the use of the systems.

> *"Throughout the year, all tasks have rarely been updated. The progress would show at 10% completion for ten months. And all of a sudden, the tasks would be completed at the end of September (i.e., the fiscal year end). We cannot see the progress through the systems unless the permanent secretary demands that he wants to see it by next week or so. Then, we have to visit each and every division begging them to update the task progress. We sometimes even have to help them do the data entry."*
>
> *(Informant interview, June 2011)*

Inevitably, the new performance management methods have been tweaked to satisfy the purposes of both lower- and middle-level officials. A vast majority of officials I interviewed resist the use of the systems. Executives have been unable to monitor the divisions' and officials' performances online without notifying them in advance, and the objectives of monitoring and evaluating agency and individual performance through the systems have clearly deviated from those initially established by the OPDC.

4.2.3 Departmental personnel information system (DPIS)

The Departmental Personnel Information System (DPIS), developed by the Office of the Civil Service Commission (OCSC) in 2003, is an information integration and interoperability initiative designed to standardize government-wide reporting and procedures around recruitment, evaluation, promotion, transfer, salary, and benefits of officials across the country. It is also intended to provide the OCSC with an overview of government manpower. Similar to the CGD, the OCSC has personnel power over other agencies. Changes to existing organizational structures or in the number of positions in ministries and departments must be approved by the OCSC. Although the OCSC does not enforce other agencies' adoption of the DPIS, it strongly encourages them to do so. The OCSC benefits directly from the implementation of the DPIS, as it enables the office to oversee and use information about manpower in individual agencies and in the entire government workforce at any time. The OCSC allows individual agencies to download the DPIS application and install it on their own computer servers. Unlike the GFMIS, the ICT Center for local agencies is responsible for providing computer equipment and network connections for the DPIS, whereas the OCSC only provides the software and technical support for the application. Installation and implementation must be carried out by local ICT officials. The DPIS adoption, thus, depends on local agencies' readiness for the system regarding financial resources, technological infrastructure, and technical expertise of their staff.

The system is meant to support routine operations of the personnel staff at local agencies and to provide standardized human resources information for cross-agency information exchange and transfer. Therefore, it is designed to imitate the typical personnel procedures and practices of government agencies. However, individual agencies have developed their own procedures to facilitate their specific needs. For example, some agencies have redesigned their organizational structure and job allocation from the official structures

approved by the OCSC, in order to better serve their internal operations. This internal structure re-organization affects the salary structure of the agency. Agency executives may require different reports for making decisions about job promotion and raise consideration. Therefore, each agency has outsourced and developed its own personnel management information system, or used word processor and spreadsheet software to manage personnel information to facilitate their internal management. When adopting the DPIS, the information from legacy systems cannot be imported into the national, standardized DPIS, and thus requires a new data entry process for personnel records.

Prior to the use of DPIS, the OCSC dictated the use of physical record cards called OCSC#7. When an official starts working with an agency, the personnel division creates a record card for her. The card contains personal information about the official including name, address, birthdate, educational background, and starting work date. This card is stored at the personnel division and is updated to reflect rank and position reassignments, official promotions and/or punishments, salary raises, annual performance evaluation records, and additional diplomas or training certificates. This personal information is associated with physical copies of certificates, official orders, and other documents. Each individual OCSC#7 is stored in a binder along with photocopies of the supporting documents.

When an official moves from their current workplace to another one, the official's OCSC#7 is transferred to that agency. Otherwise, it is kept at the current agency until the official retires or no longer works for the government. The cards are typically kept after officials retire for pension purposes until they pass away. The personal information contained in the OCSC#7 is considered confidential. Individual officials can request a copy of their own record, but are never allowed to change any of the information on the card or to have ownership of the physical card. Only authorized staff at the HR division are allowed to access, add, or edit the information on the cards.

The development of the DPIS is intended to gradually replace the use of OCSC#7. The DPIS stores the same information as the OCSC#7. Ideally, when an official transfers from one agency to another, the information about the official will be transferred electronically. Once they have adopted the DPIS, in practice, HR officials enter all information previously

contained in the OCSC#7 into the system. A great deal of time and effort is required for large agencies to digitize the information of all agency officials into the system.

As the DPIS system is meant to be a national information system about government manpower, its implementation has raised issues of system rigidity and incompatibility of the system with local information requirements and practices. HR staff reported that the standardized system does not accommodate all information that needed to be entered. For example, the DPIS does not include codes for all educational institutions, occasionally omitting the small, local, or now-defunct ones from which some officials graduated. Individual agencies could identify their own codes to represent those institutions, but as a result, the codes are not consistent across agencies. Two institutions may be assigned to the same code, or the same institution may be assigned to multiple codes at different agencies. A problem occurs when this inconsistent information is shared. In contrast, paper-based systems better accommodated such issues as the HR staff was able to write in a school name on the OCSC#7 regardless of whether or not a code existed for it. Compared to what they have in their physical records, to the HR staff, the information in the system is unreliable and inconsistent. As HR information is crucial to the effective operation of government, the unreliable information also raises problem of trust in the system. Although the system facilitates HR procedures such as issuing orders, the HR staff still prefers manual procedures because they are more likely to trust the manually-entered information. A recruitment section head at a ministry explained that:

> *"We trust the people more than the system. Because the system has the issues of invalid and unavailable input options for us, it does not reflect the real-life information about individual officials. If there is an error in their personal information, we are liable for that error. We could be sued if the incorrect information is used and led to wrong decisions related to the officials' promotion and selection. In contrast, it is easier for us to use our discretion with physical records and manual work."*
>
> *(Informant interview, June 2010)*

Additionally, agencies have specific requirements for personnel reports for internal promotions. For instance, decisions may be based on the seniority level of all qualified mid-ranking officials. The term "seniority," however, can be defined differently from agency to agency. Some agencies define it by the age of the official. Others use in-service duration as the defining quality. Still others use the date that an official entered their current position.

As the OCSC does not have specific rules for these criteria, the system does not make these options available for individualized judgment. Local agencies, then, must work on these similar reports manually. Often, the agencies create separate spreadsheets containing personnel information they need for reporting purposes rather than using ones provided in the DPIS.

The DPIS also does not fully support personnel-related practices at the local level. As the OCSC only needs to have an overview of the personnel in each agency, it does not need to see copies of certificates or other substantiating documentation. Therefore, the DPIS is not designed to provide a document digitization feature for such supplemental documents, even though local agencies still need to maintain them. The personnel division has to maintain physical copies of the documents outside of the system. Consequently, the OCSC#7s are still maintained, and even remain as the primary reference for personnel staff at every agency. When working with personnel information, the HR staff always updates the information on the OCSC#7 first, and then enters the information in the DPIS. While the DPIS does not change the work of the personnel division at local agencies, the use of DPIS has created an additional burden in terms of data entry and management requirements.

Mid-ranked and senior HR officials reported that they are more comfortable working with physical records, as they are more reliable. An official noted that:

> *"Between the DPIS and OCSC#7, I still prefer the OCSC#7 because if information is lost from the system, I don't know how to retrieve it. And sometimes information loss happens in the system, and the ICT staff cannot be very helpful… At least the OCSC#7 records are still there, always. Moreover, I don't like the way the DPIS handles edited information. Although the DPIS keeps logs of who edits what information, it doesn't explicitly show. It's different from what we have done physically on the OCSC#7. On the system, we don't see right away what particular information has been edited unless we look at the system log. But on the OCSC#7, we can see scratches, correction marks, and so on. So we see what information has been changed."*
>
> *(Informant interview, July 2011)*

Although the OCSC implicitly requires the use of DPIS so that it can generate a yearly summary of the government manpower for the whole country, HR officials have observed that the OCSC itself does not fully utilize the information in the system. Every year, the OCSC still requires physical reports from local agencies even though the system provides the same reports in an electronic form. At the local agency level, the personnel division is

the only unit that uses the DPIS. Executives still rely on physical reports provided by the division. They do not express a preference for whether the information is retrieved from the system or other sources. Therefore, divisions have the freedom to choose which sources of information they will use to generate reports. Most of the time, the reports are generated from their legacy systems and from offline spreadsheets outside of the system.

4.2.4 Case tracking system

At the agency level, the judiciary agency in my study has developed and used a case tracking system as a monitoring tool for executive judges (the president and the vice presidents of each court). The system shows the historical and current statuses of each case. The executive judges use this information to track current progress of the cases; how long a particular case will take to be finished; what judges perform better or more poorly than others; and to follow up with individual judges. The executive judges of the Supreme Court can oversee the performance of individual Courts of First-Instance throughout the country based on information from the case tracking system. The system allows the executives to know which courts and judges have the most pending cases so that they can better identify whether the courts are in need of more judges, case officials, administrative staff, or computers, and to determine the performance of individual judges and the efficiency of individual courts.

When a case is filed, the court creates a case docket containing all physical artifacts the plaintiffs and defendants have submitted to the court. Documents are accumulated, categorized, and indexed into the docket until the case is finished. During a trial, the associated docket is kept at the court at all times for security purposes. Judges and case officials need to know the whereabouts of the docket at any given moment. Therefore, the court created case docket control logbooks to help case officials track the whereabouts of dockets. Case officials may send dockets to the subpoena-issuing group to create a subpoena, or to the docket management group to store the dockets when not in use.

The information about case status comes from two sources – case officials, and the docket management group. During each trial process, case officials record where and when the dockets leave their hands, as well as recording the status of the case into the case tracking system. There are 22 major procedures and over 50 minor procedures in the system that

judges and officials are required to update when an action is taken throughout the trial procedure, while the judges and officials know the status of their own cases. Practically, the system does not accommodate the work of non-managerial judges and officials as much, as it provides information for oversight and decision-making to the executives.

Another source of information is the docket management group. After a subpoena is issued, dockets are sent to the docket management group, where the staff records the activities of the case into the logbooks and enters the same information into the system as well. This information is the other part of the dockets' whereabouts after they leave the case officials' hands. There, the logbooks are stored in binders, and shared among the staff who access them when answering phone inquiries about the case status.

As for ownership of the information about the case status, the case officials who own the case and the staff at the docket management group have different logbooks containing different information about the case – actions performed in the context of their work. Both groups of officials really only need their own information to perform their work related to answering case status inquiries. Consequently, neither of them perceives the importance of using the case tracking system, and would not care about maintaining up-to-date information in the system except that they are ordered to do so.

Executive judges, on the other hand, rely on both parts of the case status – including information from individual and shared logbooks, for managerial purposes. They require updated case statuses to enable tracking of the court's and the judge's operations. While the information in the system is almost useless for ordinary judges and case officials, it is the most essential information for the executive judges. As the Court has not terminated the use of physical case docket control logbooks, or declared the use of the electronic system to be mandatory practice, judges and officials are free to stick with their traditional paper-based practices. The information necessary for the executives, consequently, remains outside of the system unless it is demanded.

4.3 Challenges and Tensions Attending Managerial Implications and Computerization Efforts

Computerization as a managerial control tool for higher-level agencies or officials in the public sector requires both organizational infrastructure and resources. The implementation

of information systems for managerial control usually encounters limits related to organizational factors and information infrastructure. Officials may resist what they perceive to be control through computerization, and may employ workarounds as a result. The introduction of ICTs as surveillance and control tools often imposes managerial limits on the government because local agencies and officials develop informal workarounds to avoid such control. Similarly, the implementation of ICTs at the agency level provokes workarounds and adjustments or even resistance from lower-level officials whose roles and work practices are forcibly altered.

4.3.1 Mismatches of local accomplishments and global goals

As the case studies show, different system implementations carry different affordances and engender resistance to control at various levels of the hierarchy. The implementation of performance management information systems across agencies has deviated from the purposes of the system and performance improvement initiative. As the system enables the OPDC to compare performance scores among agencies across the country, local agencies and their executives do not want to score poorly in this implied competition. Not only does a poor score signify lower bonuses and other rewards, it also reflects poorly on the agencies and executives in the public sector community, thereby threatening their professional advancement. A number of agencies have sought ways to improve their appraisal scores, while not necessarily improving actual performance. Instead of creating incentives or motivating performance improvement in the public sector, the performance management program and its systems have resulted in officials from local agencies deliberately reinterpreting and misusing systems to suit their own interests.

The OPDC has intended to use the performance improvement program to enhance the performance of government agencies and individuals. Although the OPDC has introduced the use of key performance indicators to identify achievements for each task in work agreements at the individual level, it does not specify what tasks should be included in the agreements or how each indicator should be determined. The OPDC is concerned that if the indicators were to be strictly determined from the beginning, the result-oriented performance evaluation may pose negative effects to the public sector, and officials may initially resist the program. At the agency level, the interpretive flexibility of tasks and achievement indicators can result in the reporting of routine work rather than strategic or

innovative work in divisional agreements, because units do not want to fail the evaluation or score lower than other divisions. Therefore, the permanent secretary has to determine what tasks are considered challenging and innovative, and allocate them equally to every division so that every division will have similar levels of innovative and challenging tasks to accomplish.

4.3.2 Misalignment of organizations' structural properties and the underlying premises of systems

The implementation of the case tracking system has encountered barriers owing to the misalignment of workloads with incentive structures. By the Court Procedures, the annual salary of a judge increases based on at the length of her service at the court. This reduces the possibility that executives will discriminate against judges in their evaluations. Therefore, judges show little concern for whether a case status in the system reflects the actual status of the case, and whether it shows their performance. Further, less productive judges may not want the system to include complete information of a case status, as it may demonstrate their poor performance. In contrast, leaving the case status unclear may help them escape undesirable consequences. Diligent judges are not rewarded for their good performance, while unproductive judges are not punished for their poor performance. Consequently, judges are unlikely to care about the administrative tasks like updating the case status. They do not even require their case officials to help them on this particular task. As a junior judge at the Central Court explained:

> *"Our payment and raise depends solely on how long we have been at the Court. There is no serious punishment if I cannot finish a single case a year. And I will not get higher payment even though I am working harder than others either. So, most of us (judges) do not care whether or not the case status is updated. The information in the system doesn't mean anything to us."*
>
> *(Informant interview, June 2011)*

All of the judges at the Court have an equivalent organizational status. They only differ from each other in their roles. Executive judges have additional administrative duties, while the rest of their time is spent working on the cases. The executive judges do not have the authority to demand other judges to work on specific tasks, such as updating their case status in the system, and cannot exert any pressure on them to speed up the case trail process. Court Procedures determine that the judges are to be free from any influence or

pressure in order to maintain their freedom to provide justice. Therefore, executive judges can only shift their enforcement target to the Office and its case officials instead, and force them to perform the administrative work for the judges.

4.3.3 Two systems problems

The managerial control imposed by higher levels in the hierarchy through computerization is often associated with work practices that are not aligned with system procedures. The adoption of computerized systems for managerial control may encounter some challenges due to existing work practices. In some cases, such conflicts are unavoidable because of deeply-rooted traditional practices and procedures in the organization. Officials may perceive the use of ICTs and electronic records as practices outside of their comfort zone, and may not trust the new tools. For example, case officials at the Court repeatedly reported in my interviews that they always update the flows of the case dockets and the case status in their physical logbooks first, and will do so in the case tracking system only when it is necessary or demanded. Case officials rely heavily on the case dockets. In their personal case control docket logbooks, case officials record where the physical dockets are currently; and when the dockets left their hands. They also record the case status. But this information does not satisfy their information needs. One case official stated that:

> *"The dockets are our hero and our lives. Even if we do not have computers and the system, we can still continue our work as long as we have the dockets…. We definitely cannot lose the dockets because they contain all relevant documents and artifacts about the case provided by both parties. We would have a serious issue if we lost them. So, each of the case officials has their own transaction logbook to keep track of what status the case is now, and whom we have left the corresponding docket with. The information in the system does not say who actually receives the dockets. It just tells which section is supposed to have them. We need to deliver the dockets hand to hand, and see "in person" who is having the dockets… My transaction logbook has my name, office location, and phone number on the cover in case I forget or misplace it."*
>
> *(Informant interview, June 2011)*

The logbooks fulfill the case officials' information requirements, and thus the use of the case tracking system has become a duplicative and burdensome task. Case officials are primarily responsible for entering the information from their logbooks into the system to meet the information requirements of the secondary users, the executive judges, but they do not perceive the benefit of this extra work. Therefore, the information for the executives is often lacking. Case officials have not adopted the case tracking system and its electronic

procedures as their primary tool. They deliberately retain their existing practices, and are unlikely to replace them with the new computerized versions.

Besides the performance management information systems and the case tracking system, the problem of working on two systems – manual and computerized – in parallel is also exhibited in the deployment of DPIS. Officials reported that the primary artifacts they depend on for personnel information are physical records and copies of documents. These same officials update information in the DPIS occasionally just to serve the OCSC's purposes. The OCSC is aware of this practice, and thus has not been able to discontinue the use of OCSC#7. Most HR-related procedures are also conducted in separate applications. As a result, this persistent *two systems problem* [195] represents a limit of hierarchical control through computerization. Higher-level agencies and officials have not been able to depend on information in the systems for decision-making or planning, as they cannot be sure whether the information is up-to-date or correct.

The design and implementation of the GFMIS and performance management information systems intentionally reinforce the control and monitoring power of the central agencies (the CGD and OPDC, respectively). The CGD aims at monitoring the government budget and expenditures of individual agencies. The GFMIS allows the CGD to approve requests for treasury payment, and to make direct deposits to vendors' bank accounts. At the same time, the system allows the CGD to control government procurement across the agencies. The system fully supports the operational functions and managerial goals of the CGD.

However, the implementation of the GFMIS creates tensions around internal management and control within the local agency boundary. The system is not designed to fulfill the internal management and information requirements of individual agencies. Financial information categorization and granularity deployed in the system are likely to vary from local agency requirements. The GFMIS provides financial reports annually at the end of the fiscal year to serve the CGD's goals, whereas local agencies need such information bi-monthly or semi-annually based on executives' preferences. The agencies also need to create different cost accounting categories to suit their internal financial management needs and for audit purposes. Many agencies have to maintain their legacy financial information

systems in order to serve their managerial purposes and maintain authority within the agency.

The introduction of ICTs to reinforce the control and power of high-level officials in public administration gives rise to resistance and workarounds among the lower-level agency staff who are required to adopt the systems and change their existing practices. My empirical study shows that officials at lower levels often feel obligated to adopt and use new systems against their will, and the results are resistance to the systems, the maintenance of legacy systems and practices, and the development of workarounds.

4.3.4 Resistance resulting from disparity of work and benefits

The Court developed the case tracking system for judges and case officials to use for tracking of their cases, and for executives to monitor the performance of the courts and the judges. In practice, judges and case officials do not perceive any benefit from the system. Case officials have their own docket control logbooks to keep track of case dockets. The same information must be entered into the case tracking system for the executives to use it for case tracking and performance monitoring purposes. Most of the case officials, thus, consider work with the system to be duplicative, burdensome, and valueless. One case official explained that:

> *"The system only helps the executives; no one else. We (case officials) do not need any information in the system because we have all information we need. But we have to use the system as we have to update the case status in the system for the executives to be able to see and track all the cases. "*
>
> *(Informant interview, June 2011)*

A middle-ranked case official criticized the system as follows:

> *"Among us (case officials), this system is referred to as the 100-million-baht system, developed specifically for only three users – the president and the vice presidents."*
>
> *(Informant interview, August 2011)*

Although the executives mandate the use of the system, and use the completion of case status as a component of performance evaluation, the structure of the system is not aligned with the incentive, reward, and punishment systems of the judges and officials. This misalignment leads to resistance of the system, as a middle-ranked case official explained:

"The officials are forced to update the case status. Otherwise, our annual performance score will be deducted up to five percent. But compared to the performance score of case-related work such as writing subpoenas, orders, and judgments, which is over 80%, that five-percent does not mean anything to us"

(Informant interview, June 2011)

4.3.5 Tensions in new procedures and practices

As seen in the empirical cases of the performance management information systems, the DPIS, and the case tracking system, officials still maintain their traditional practices around physical documents. Furthermore, government officials tend to trust information on the physical forms to a greater degree than that in electronic formats. This pattern is consistent across the government's many agencies. For example, physical logbooks remain the primary records for case officials even though the case tracking system provides similar features and information for its users. A junior case official who has worked as on the case management staff reported that:

"When I first came to work, my senior colleague told me to record case activities both on physical records and in the system. I don't really know why we continue working on both things although both sets of information are roughly telling the same thing. Maybe, the records on the logbooks have much more detail than the system because we can write as much detail as we want in the logbooks…When the party calls in asking about the status of a particular case, we run from our desks getting the logbook stacked on these shelves back to our desks, and answer it."

(Informant interview, August 2011)

New information systems and information requirements from higher-level agencies and officials have forced officials to change their existing work practices to some degree. However, practices and beliefs that appear "sticky" [28] have impeded the adoption and use of information systems. Officials have found it difficult to transform their work procedures from manual to electronic systems. They adopt workarounds to the new systems. At the Court, an official discussed how to override the case tracking system for subpoenas with an old-fashioned practice:

"It is so much easier and faster to create a subpoena manually using Word processor. But as we are required to update the status, we typically work on the case manually and come back to update those processes once in a while. It is like we have to do the same thing twice – manually and electronically. So, it's up to our convenient time; we update the status from the beginning to the end of the case on the last day after the court issues its judgment. And so, the

case status and the number of pending and finished cases in the system do not reflect the actual status along the way."

(Informant interview, June 2011)

4.3.6 Performance deception

Stemming from the government's commitment to results-oriented performance management, officials at local agencies have resisted new evaluation tools. While high-level officials want their subordinates to work hard to achieve the goals set forth in performance agreements, they also tend to avoid reporting poor performance of their subordinates, as that also affects their own performance evaluation. Some executives or division directors may let their subordinates change their agreements when they see a sign of failure.

As the rewards of new systems are not aligned with the work of the agencies, officials have tended to write their routine tasks and operations into their agreements so that they can ensure that the work is completed with little additional effort. Similarly, managers list routine operations rather than strategic or challenging tasks in their agreements to guarantee the fulfillment of goals, and thereby to receive their full bonus. In doing so, supervisors do not have to worry about the failure of their subordinates, and their subordinates are free from being closely monitored by their supervisors. A junior ICT official responded to my request to see her performance agreement that:

"It is a shame. All tasks listed here are what I am supposed to do everyday – monitoring the agency network usage; backing up system data; this and that. If there is a project worth mentioning among computer officials in our section, it should be the disaster recovery plan my co-worker is working on. That's it... Although the director is not too happy with the way we do with the agreements, she has to play along."

(Informant interview, June 2011)

4.3.7 Delegation and arm's-length adoption

The introduction of ICTs in the public sector requires government officials to learn how to use new electronic systems. In practice, most senior officials have encountered difficulty with the new systems, as they are often not comfortable using computers. The majority of senior officials are not computer literate. Still, learning to live with computers is a basic requirement of adapting to new systems. During my observation, older officials with lower-level positions, such as administrative staff, expressed enthusiasm about using specific computer applications. For example, the staff that is working on the e-Document system

demonstrated proficient use of the system, although they reported that it took over six months of on-the-job training and additional mentoring for them to learn how to use it. Before using the e-Document system, these workers had little experience with computers. Transforming work from a paper-based to a computerized system obviously represented a big step for them. Consequently, they only know how to access and use this particular system without having a basic, broader understanding of computers. For instance, they cannot create a folder on a computer or move files from one folder to another, and have to ask junior staff to help them on such tasks. Similar practices are also exhibited in the use of GFMIS among senior staff. Those who could not adjust to the new working environment have been reassigned to non-computer related tasks, either voluntarily or involuntarily. When there was no transfer option available, particularly in the case of those who were eligible for early retirement, they sometimes chose to leave the division or agency.

In contrast, senior officials in higher positions can require assistance from their subordinates, and can compensate for their computer illiteracy with other knowledge or skills. Although they do not resist the use of ICTs for managerial purposes, they try to avoid computerized tools. The transformation from paper-based to computer-based practices has increased senior officials' dependence on junior staff. My observation reveals that executive bureaucrats rarely use any information systems, and are accustomed to requesting information from their subordinates. Having assistants represents power and influence in public bureaucratic organizations. Furthermore, different training programs offered to middle- and high-level officials and lower-level officials underscore the power structure in organizations. For instance, the training programs for the GFMIS, DPIS, and e-Document systems for higher-level officials aim to provide an overview of the system without requiring officials to actually interact with the systems, since the senior officials do not intend to use the systems anyway. To access relevant reports from the systems, officials ask their subordinates to prepare those reports for them. In the meantime, the primary target users of these systems are lower-level officials who interact with the systems. Therefore, they are the ones who receive training on how to use the systems.

In my study of the adoption of the performance management information system, I also noted that directors and division heads rarely used the system themselves. A typical way for a manager to overcome this shortcoming of expertise is to shift the responsibility for the

system to her subordinates. In all of the agencies where I studied the use of the GFMIS, user accounts had been assigned to less senior financial officials, as the financial directors were too busy and/or computer illiterate. The monitoring and control authorization, however, still remains with the director. Physical papers are still used for approval authorization within the agency, as the director relies primarily on the physical records. The delegation of computer-related tasks reflects the traditional power structure in public sector organizations. Higher-level officials may assign to their subordinates specific work that they do not want to do, and junior officials cannot question the assignment. The delegation of duties emphasizes the importance of the seniority system and authority structure in the Thai public administration.

The delegation of computer-related activities tends to become the norm in the public sector. Interviews with three executive officials and two middle-ranking officials revealed that high-ranking officials typically demand more subordinates and supportive artifacts around them in order to represent power, privilege, and high social status. For executives, the use of computers is considered to be a lower-level function to be performed by subordinates. This norm has negative effects on the implementation of ICTs in the public sector because it is widely recognized that the executives rarely use the systems themselves. Lower-level officials, then, can develop workarounds to deviate from the intended goal of the systems, avoid being monitored by their supervisors, or even manipulate information and reports. In the study of the case tracking system, for example, case officials learned that the executive judges never log in to the system randomly to check for a case status. Instead, the executives would ask the Office to prepare the summary reports. Therefore, the case officials would be notified in advance about such a request. In this way, they would have time to update their case status in the system.

4.3.8 Hierarchical audits

With the limited number of computers and user accounts available to access the GFMIS, officials in individual agencies have developed workarounds to delegate transaction-recording tasks to their subordinates while auditing their operations. The limited number of user accounts results in local agencies inventing their own ways of sharing the accounts. However, tensions have developed over potential misuse of the accounts. A financial section head reported that there had been thousands of lawsuits over account misuse, system

misconduct, and fraudulent transactions since the implementation of the GFMIS. In response to these limitations, individual users adopted workaround to satisfy local needs. One financial section head explained her strategic adjustments around the use of the GFMIS to deal with monitoring and inspection:

> *"We have only one access card to share among financial staff for payment request submission. So, I separate work among my three subordinates by the amount of money in each request and assign each of them to this separate group. For example, person A takes care of the requests in range of 50,000-100,000 baht; person B is responsible for 100,000-500,000 baht requests; and so on. If there is an error, at least I have something to trace back who was doing that particular transaction. I have to be extremely careful."*
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> *(Informant interview, July 2011)*

4.3.9 The invention of misleading reports

The cost allocation requirement in the GFMIS has given rise to agency tensions around achieving cost-efficiency goals of individual agencies. As the CGD can compare the activity-based costs and cost-per-unit in similar tasks across agencies, local agencies have attempted to invent cost calculation methods that will help them show the lowest costs compared to other agencies. The CGD leaves some negotiable room when defining the calculation methods for each individual agency to interpret their expenses. All of the agencies in my study have abused this interpretative flexibility and come up with various methods to bring down costs. That is, they use the largest possible number of units as the denominator when calculating the cost per unit. A ministry, for example, calculates the cost of outsourced cleaning services by dividing the total cost by the number of their officials while a Department that has a similar facility size but fewer employees uses the area in square meters as a divisor. In this way, both agencies can have smallest possible expense per unit, and can thus avoid being charged for overspending. Consequently, the reports are almost useless to the CGD.

4.4 Summary

Drawing from my empirical studies, as illustrated in this chapter, my findings are congruent with earlier arguments that information systems have been used as tools for reinforcing existing power and control structures and strengthening authority, making information gathered from subordinate levels of organization newly available and accessible to those at higher levels of authority [59,96,104,105,107,114,207]. The government can implement

new systems as a way of tightening its control over expenditures of individual agencies, and can in some cases oversee the government workforce through a single system. It can also encourage efficiency improvement among government officials through the use of new performance management techniques and tools. These changes have led in turn to changes in roles and relationships among officials at multiple levels. The GFMIS and DPIS have given a new role to local officials, who must work with transactions and records in the government-level systems to provide information for higher-level agencies, while still maintaining local practices and records in their own systems for administrative purposes at the agency level. The implementation of a new performance management approach and its associated systems results in tighter supervision and monitoring tools in the hierarchical chain. These changes increase the supervisors' level of involvement in their subordinates' work and performance. However, it does not necessarily mean that the supervisors, particularly middle managers, gain or regain control and exercise power over their subordinates. Rather, it implies a greater reliance of middle managers on their subordinates' performance, with greater responsibility and accountability for the achievements of their staff. Nevertheless, the system has become a monitoring tool for the government, specifically the OPDC, to assign tasks, and supervise the work progress of individual agencies, which is eventually related to bonus and other incentive allocation.

Moreover, the empirical findings from the implementation of the GFMIS, the DPIS, performance management information systems, and the case tracking system suggest that these systems appear to allow higher-level agencies to exert control over lower-level agencies. They promote upward flows of communication and control directly from lower levels to the top level, bypassing middle management levels. Nevertheless, the systems do not encourage coordination across agencies or units within the same department or agency.

The changes resulting from the deployment of such systems have also encountered barriers and tensions that limit the managerial ambitions of digital government reform. In some case, compliance with new electronic information systems cannot be enforced, and agencies opt instead to continue using traditional practices and legacy systems alongside the new systems. This "two systems problem" has persisted in the Thai public sector for a long period of time. Resistance to the implementation of ICTs for managerial control has resulted in the development of workarounds at lower levels, such as intentionally reinterpreting the goals

and practices of particular systems, delegating relevant work to junior staff, and not using the systems. Such limits are inextricably tied to the overall shape of ICT development in the public sector. ICTs are a malleable tool for higher-level agencies and officials if they intend to use the technologies for managerial control. However, the technologies can also be used as a tool for lower-level agencies and officials to manipulate end results, or to avoid being monitored.

The implementation of new performance management information systems has changed the relationships between higher and lower officials, tying the performance of subordinates to supervisors (and vice versa) in new and ambivalent ways. On the one hand, the capacity of new information systems to make agreements and evaluations widely available has increased organizational transparency. On the other hand, such transparency has provoked conflict among lower-level officials within and across divisions, and inflamed cross-level tensions within local agencies, as the previously confidential reports of higher-level officials has become newly visible. If properly implemented with clear goals and processes, the performance management information systems would be efficient tools for higher-level officials to monitor the performance of organizations, and government performance would improve.

Similar changes have accompanied the introduction of the GFMIS, which has imposed new accounting and reporting barriers while shifting relations of accountability and responsibility around public sector finances. The implementation of the DPIS and the case tracking system has created burdensome, duplicative work for officials (that is, the primary users) in order to serve the information requirements of the OCSC and executives judge (that is, the secondary users) respectively. Such developments have been met in turn with a series of adjustments aimed at limiting or undermining the effects of control functions – or in some cases simply maintaining necessary bureaucratic operations in the face of externally imposed 'solutions.'

For digital government scholarship and the wider field of information science, my findings carry important implications. The *first* is the need to reincorporate issues of oversight and control as central themes of digital government scholarship, both for the autonomous interest such topics occasion, and their likely effects (including negative ones) on the

achievement of other digital government reform goals. The *second* concerns the need to study oversight and control in a symmetrical way, with attention being given not only to the control implications of any new or potential technological change, but also to the practical and strategic limits and resistance such changes are likely to provoke. *Finally*, this study adds additional weight to the general importance of fit between new information systems and existing work practices, norms, values, and reward structures. In the absence of such consideration, information systems designed to improve efficiency and accountability in government operations are likely to produce outcomes that are exactly the opposite.

Chapter 5
Infrastructure and Standards in Digital Government Development

Information and public service standardization, integration, and interoperability are central to most of the benefits claimed for digital government. Digital government advocates point to cost savings associated with non-redundant systems and the centralization of resources and expertise in government. Standardization and interoperability can support cross-agency cooperation efforts, improving the speed and efficiency of public service. Common or interlinked IT platforms may simplify the maze of otherwise separate bureaucratic systems, improving transparency and accountability. And standardized systems may support a more transparent and navigable window on government, aiding efforts at public engagement and participation central to the democratizing promise of much digital government scholarship.

Work on inter-organizational information integration in the digital government field has spoken of the importance of infrastructure development [53,60,69,86,95,124,145] and standardization [64,86,95,153,195] in this process. Such changes are often accompanied by and predicated upon a shift in the organizational forms of government itself: away from traditional bureaucratic silos, functional fragmentation, and innovation-stifling hierarchies, and towards forms variously labeled as inter-organizational networks [153], digital era governance [53], joined-up government [95], and virtual agencies [59]. Such new forms are intended to transform fragmented agencies and systems into a cooperative and interactive whole, largely on the basis of standardized inter-organizational information systems and services [47,71,86,95,153].

But as a growing body of work (mostly outside the field of digital government) has shown, standards and standardization are a good deal harder and more complicated than first meets the eye. The world is full of missing standards: systems that by any measure of intelligent design ought to interoperate, but don't (save for a good deal of costly intermediation work).

The world is equally littered with failed or broken standards: systems that may *seem* to line up, but ultimately don't. Even standards that 'work,' fulfilling (more or less) their stated function, may do so in ways unintended or unimagined. And common standards often carry implications, fitting more and less smoothly with the interests, aspirations, and lifeworlds of the individuals, groups, and organizations encountering them. Similarly, the complex work of standardization and infrastructure development in digital government development efforts has been understudied in a growing body of digital government scholarship. Literature in this field has tended to neglect social and technical challenges and tensions attending the process of inter-organizational information infrastructure development and standardization in the public sector.

5.1 Information Systems, Infrastructure, and Standards

Scholars in many fields of study have examined the relationship between a technology and the social systems with which it is coextensive. From science and technology studies (STS)'s point of view, it is essential to examine the technology itself as a social object, whose meaning and use is determined by relevant social groups [159]. Relevant social groups are defined as institutions and organizations as well as organized or unorganized groups of individuals [159, p. 30]. Members of a particular social group share the same set of meanings, attached to the artifact through its interpretation. Various social groups that form around certain technologies interpret and perceive problems with respect to that technological artifact differently. The design and development of the technology elicits many conflicts to the same problems, such as differing technical requirements for different social groups, or moral conflicts. Solutions to these conflicts and problems are not only technological, but also judicial and moral [159, p. 38-39]. The design and development of systems depends on differing social meanings of the systems determined by the organizational members. In other words, the systems and their characteristics are developed based on how the members define meanings and content of the systems to solve organizational problems.

Latour [1996], another influential sociologist and theorist in the field of STS, studies the power of inscriptions and the relationship between inscriptions of work practices and infrastructure and standards. He notes that to understand information technology in human organization, it is important to treat human and non-human actors as part of a network of

associations [112]. In his discussion, he defines information systems as artifacts that are active social actants (or actors). They construct through mediation and delegation shifting competencies and affordances back and forth between one another and between human agents [111]. Human agents and systems act upon each other symmetrically to produce action. For Latour, the interaction of humans with artifacts is a reciprocal exchange between actors [113]. Information systems inscribe social arrangements in the form of intentions, controversies, activities, and meanings to programs of action through processes of negotiating, redefining, and appropriating interests. The inscriptions essentially establish the work routines. His analysis of a speed bump or a "sleeping policeman" illustrates that the speed bump as a technological artifact translates driver's goals from "slow down so as not to endanger students" into "slow down and protect your car's suspension." Also, the non-human artifact serves as a delegate for carrying out the articulated goals and intentions of other humans such as urban planners, lawmakers, and engineers. Thus, the speed bump performs a delegation task of translating humans' programs into artifacts [113]. Once the programs are inscribed in infrastructural artifacts, they become invisible yet capable of acting [180]. Furthermore, Latour's concept of human and non-human delegation addresses trade-offs and strategic choices involved in selecting human and automated intermediaries in the design of information systems [111]. For example, his analysis of choosing between implementing door hinges and hiring a porter demonstrates concerns in various dimensions; including considering installation and maintenance costs of the hinges versus reliability and discipline of the porter, how to delegate human actors' deskilling to non-human actors' reskilling, and moral and ethical issues concerning delegated action [111].

Kling [1991], a scholar in social studies of computer-based systems, also sees computer systems as social objects that contain social organization or arrangements of users' behavior [99]. Computing arrangements restrict access to the systems and information by limiting access time to the systems, or controlling the way people can use the systems. For example, debit cards have a social system of regulation that limits consumer rights to the choices of payments, and increases consumer responsibilities compared to the social system of credit cards [99]. He further argues computerization is a social and technical process. It is an ongoing process that requires some changes in system, social life in organizations (e.g., work practices, social choices, values, employees' skills, etc.), and many key social relationships (e.g., reinforcement politics, workplace disciplines, and interpersonal, intergroup, and

institutional authority and power relationships) that are coextensive with the system as it is introduced and used over time. However, the same system can have different social consequences when the associated social arrangements are substantially different [99].

Kling's argument about computerization and social contexts is aligned with the sociology of technology's studies on the relationship between technological artifacts and relevant social groups (e.g., Bijker, Hughes, and Pinch [14]). However, he extends the scope of the relationship between computer-based systems and social context onto how the systems are used, or in his own terms '*consumed*', and whether and how the use transforms parts of the social order rather than just how the system is designed and developed, which is the central focus of the sociology of technology [99]. Kling uses a metaphor of a "package" rather than a "tool" to represent a computer-based technology that is something more than the physical device, as it comes with a diverse set of skills and organizational units to supply and maintain computer-based technology [98]. The use of computing technology often introduces recurring difficulties and problems in the workplace [97]. Many difficulties that users face with computer-based systems lie in the way in which the computing package is embedded in a complex set of social relationships [98]. Information systems and their data often entail contact with different social groups and when a system is embedded in a complex social setting it becomes a social object, and its development and use a social act. As a package, therefore, computing becomes more problematic when it is more technically and socially complex.

Bostrom and Heinen [1971] point out that political or power issues arise due to conflicts of interest among various groups in organizations and anticipated shifts in the balance of power caused by the implementation of a system [18]. The design and development process of the system are frequently distorted and overlaid by the political issues. Each involved party represents different roles and positions of power, and has its own preferences. The social interaction among those people creates system constraints and alternative designs. The solutions for alternatives are often based on the mobilization of power resources among individuals [18].

Furthermore, Bostrom and Heinen argue that organizations constantly evolve [18]. Therefore, the development and implementation process of a system is not immediate, and

several transitional states may be passed through by the organization. They underline the adjustment and ongoing management of the system design and implementation. Meanwhile, the action carried out during the design process may also create organizational changes. Essentially, the design process is a fluid, iterative process with political/dynamic dimensions of system development, and not a linear sequence of steps as in a traditional approach or rational/static view where design and implementation are a rational systematic process [144]. The rational/static view of the systems development process also assumes that the organization has a set of well-defined information processing problems. Implementation of solutions to the problems is then assumed to transform the organization immediately into a more effective state [18, p. 28].

Other information system scholars also agree on the joint association between social and technical systems in information system development, and the ongoing process of system development. Lee [2004], for example, notes that an organization, as a social system, requires information from an information technology, as a technical system, so that it can function and achieve its goals [118]. The organization and its members also define how the technology is designed, implemented, installed, and used to deliver the information the users require. Once the system is implemented, moreover, the social system requires new or different information requirements. The technical system, thus, is changed to satisfy those requirements. On the other hand, the change also triggers new and different organization requirements for the technical system. Thus, the social system needs to change its organizational arrangements to meet the technical system's requirements. Lee emphasizes that *"changes in either the social system or the technical system will be accompanied by changes, whether designed or not, in the other system"* [118, p. 12]. Therefore, an information system is defined as an emergent result of an iterative and mutually transformative process. [18,19,118].

Researchers whose work discusses technological artifacts and their development and use in social systems agree on the nature of social and technical relationships between the technologies and their social systems. In the context of information system development and use in organizations, this finding emphasizes that information systems encode social arrangements including political and historical context, organizational practices, meanings,

and values of relevant social systems into them. This point also underscores the importance of coextensive social components when studying information systems.

After the systems are implemented and adopted, they become part of the organization and its work. The embedded work practices and social relationships in the systems result in the systems becoming working infrastructure or the background for organizational members' work. At the same time, the systems restructure and transform work practices and social relations within the organization and among organizational members. Therefore, it is crucial to view technological development, adoption, and use and its impact on organizational changes as an evolving, ongoing process. Questions arising from this point include questions as to when a system becomes organizational infrastructure, what makes it infrastructure, and whether and how the system overcomes conflicting values and meanings among various social groups in and across organizations.

5.1.1 Information systems as organizational infrastructure

Kling's social analyses of computerization have been widely adopted and extended in social studies of technology. Star [1999] extends Kling's argument about computer systems as complex social objects containing social context, built infrastructure, and the distinctive histories of social arrangements within which the system is developed. Star notes that information systems are repositories of work and procedure, requiring constant tailoring, workarounds, and other forms of articulation work to coordinate the activities of organizational members and encode organizational decisions in the design, structure, and practice of the built environment [179]. For Star and Ruhleder [1996], information systems become infrastructure in relation to organized practices [183]. Infrastructure is *embedded* into social arrangements and technologies. In 'normal' use, it is *transparent* to use, providing invisible support to the goals of organizational actors. This transparency fails (infrastructure becomes *visible*) primarily when infrastructure breaks down. Infrastructure is learned through *membership* in specific communities of practice, shaping and shaped by the conventions of those communities. It plugs into other infrastructures and tools in a *standardized* fashion. It is also *built on an installed base* and inherits strengths and limitations from that base. Partly because of this, changes in infrastructure come in the form of *local and modular increments* through negotiation and adjustment processes rather than all at once or globally. An infrastructure, then, forms upon configuration of these dimensions [183].

Star sees infrastructure as a problematic part of human organization [180]. Star introduces the notion of fringes in information infrastructure. Strangers or people outside a particular social world often have trouble with the fringes of language: the nuances, the historical context, and indexicality. Indexicality requires insider knowledge such as history, nuance, and context as it cannot explicitly be put into a representation for the outside world. In their study on the Worm Community System, Star and Ruhleder define a set of fringes from both the design and use worlds of the system [183]. They emphasize the understanding of infrastructure on group interactions as they point out the impact of the clashing fringes between users and designers who do not have shared meanings of the system. The system requires users to acquire a certain level of skill that is taken for granted by system developers. They note that despite good user prototype evaluation in the system development there are unforeseen, complex challenges to usage involving standards and infrastructural and organizational relationships. In addition, fringes change with the contexts and tasks surrounding system use through resistance and social movements. Therefore, the system is not widely adopted and people switch back to familiar technology in their routine work [183].

Information systems represent and encode organizational work processes. However, they are always incomplete with respect to both the complexity and the indexicality of the processes represented [180,182]. This causes organizational agents to adjust and work around the system to get on with their jobs. Star argues that a partnership between the system developers and the ethnographers is an effective approach to studying and understanding the relationships and interactions among organizational agents and with information systems [179]. This approach allows the system designers to examine the organizational problems that the system will solve whereas the ethnographers investigate the organizational setting. To study information system adoption and implementation, using an ethnographic model can help us understand the interactions between the agents and the systems and whether the premises underlying the systems are aligned with the organizational practices and structures. If the systems are not aligned with the organization's practices and norms, they are likely to become barriers attending the adoption and use of the systems rather than facilitating the organization's operations since they are not embedded in the practices [179].

For designers and ethnographers alike, the nature of systems as infrastructure that inscribes work processes and procedures poses distinctive methodological challenges [179]. She suggests the methodological implications of infrastructure study, which includes decisions about encoding and standardizing, tinkering and tailoring activities, and the observation and deconstruction of decisions, is carried into infrastructural forms. As infrastructure has relational rather than objective property, it confronts differently placed actors in different ways. Information systems may have significantly different meanings, costs, and values for different actors. The differences bring about ongoing contests over resources, procedures, and efforts to reshape routines and the nature of work in organizational settings. The systems may also require real-time adjustments, or 'articulation' work, which is invisible in the systems, to complete the work processes and weave together organizational routines [179]. However, system designers usually cut off the people who carry out the invisible work from the systems [180,184]. As a result, there are layers of silence built into the infrastructures surrounding organizational tasks. Thus, information system ethnographers need to define the invisible work and the support personnel in order to discover the need for the adjustments to complete the processes [179,180].

5.1.2 Standards in information systems

Standards in information systems play an important role in organizational communication, coordination, and interoperation. Standards come in various forms, such as classification systems, communication protocols, restructured work practices, organizational knowledge, values, and policies, and are embedded or integrated as modules in information systems. A number of researchers have pointed out the duality or structuration of technology in which technological rigidity gives rise to adaptations which in turn require adjustment and standardization [45,101,141]. Some scholars have extended Latour's notion of inscriptions and their relationships with organizational arrangements to examine technological standards. There emerges a tension between local, customized, intimate, and flexible use of technology on the one hand and the need for standards and continuity on the other [183]. Standards become a challenge in the design of large-scale information technology because there are no genuinely universal standards; one person's standard is another's nightmare. The need for customization and standardization of technologies is different from one community of practice to another which may use technologies differently. Standardization is

essential in the study of technology affecting organizational transformation as standards inscribe organizational practices and are usually deeply invisible, as is the work involved in creating and using them (or not using them) [180].

In modern organizations, the purpose of standardizing is to streamline procedures or regulate organizational behaviors, to demand specific results, or to prevent harm [182]. Standards inscribe organizational codes, moral orders, and regulations and are embedded in infrastructures such as systems or tools in order to facilitate other tasks. Star and Lampland [2009] argue that Max Weber's concept of rationality and the iron cage of bureaucracy have become a socio-technical cage – sticky and partly binding but also complexly structured with technological infrastructures and organizational agent behavior [182]. Standardized procedures are created and enforced by governmental agencies through legal procedures and other authority. For Star and Lampland, Weber's work on modern bureaucracy and complex organizations is related to issues of distribution and enforcement of standards through degrees of delegation.

Star and Lampland summarize characteristics of standards as forms of compression and representations of actions [182]. They are *nested* inside or linked with one another. For instance, the standard of having specific content such as a telephone number is linked with making an appointment on computerized calendars. Standardized forms drive interactions among people. People may need some flexibility, negotiation, and workarounds in order to maintain the continuity of the work. Socio-technical standards are *distributed unevenly* according to political regime, class position, and other socio-political attributes. Standards and the actions surrounding them are also *relative* in their impact, meaning, and reach into individual, local communities of practice. Standards are always relative to the infrastructure within/upon/sometimes against which they are implemented, and thus become a recursive problem. They are also *integrated* with one another and drive actions around them. The nature of the integration is global, increasing, and evolving. Lastly, standards *codify or embody ethics and values*, often affecting individuals' actions and their consequences. They embody the fringes and struggles during the development process [182, p. 4-8]. Star gives an example in the creation of maps with different granularity degrees: each map communicates to a different audience with different granularity needs [180].

Star and Lampland relate standardization to quantification; formal modeling and representation; and data mining, reuse, and classification [182]. They argue that standardization is a recursive practice, historical and embedded in a series of complex events and social structures. The nesting properties of standards converge with human behavior to form a complexly 'imbricated' whole. Recurring behavioral and technical norms and conventions have formed standard infrastructural elements through inscriptions, technical delegation and actions both locally and at a distance. Similar to studying infrastructure, it is necessary to deconstruct backstage elements of standards during technological development: their historical development, their bureaucratic and cultural settings, their political consequences, decisions made about them, and the tinkering and tailoring activities around them [182].

Standards are constructed as consequences of negotiation of differences among social groups as shown in Bowker et al. [1996]'s study on classification systems in Nursing Interventions Classification [21]. Bowker and his colleagues define three areas of challenge in crafting a standardized classification scheme for information systems. First, a major purpose of a classification system is to provide good comparability across sites to enhance communication among members within and across organizations. Second, some areas of activity are unclassifiable or intimate, and thus invisible in the system. Intimacy means the system acknowledges common understandings among members of the community. Third, there are trade-offs between the degree of control and the flexibility of a classification system over organizational coordination. The degree of control affects comparability of the system. Bowker et al. argue that there are no perfect classification schemes because these three areas trade off against each other. For example, maximizing visibility and high levels of control threaten intimacy. Comparability and control pull against standardization while comparability and visibility work against the manageability of the system. A standardized classification system requires comparability across sites while leaving a margin of control for its users. Moreover, it needs to uncover invisible work which affects the intimacy of the system. These trade-offs become areas of negotiation and sometimes of conflict. Therefore, to achieve standardization, a system has to optimize between degrees of intimacy and manageability [21].

Monteiro and Hanseth [1996] study the role of standards in the context of information infrastructure and inter-organizational communication in Norwegian healthcare [134]. Their investigation on standards is congruent with Star and Lampland's analysis; they conclude that standards are not just neutral technological components. Rather, they inscribe their use, such as communication patterns and actions, that takes place locally in user organizations. Thus, standards are crucial aspects in the design of socio-technical networks. Standardization involves technological and non-technological elements and the relationships between them [134, p. 334]. Monteiro and Hanseth also indicate that the standardization process is a combination of technical design, representing translated interests, and organizational arrangements, including behavior and practices, into technical details of the standard. Standardized artifacts, thus, inscribe the organizational work routines. As technology matures, standards gradually evolve. And if the agents in organizations do not follow the standards, the technology will cease to work. These particular aspects of standards are aligned with the notion of structuration of technology – organizations involved in the design process shape the standards, while the standards affect the organizations' practices. For example, general practitioners and pharmacies have different interests in and motivations for using a standardized drug identification list. This creates the issue of how to inscribe the drug identification number into the form in such a way that it will not create additional work for the general practitioners or interfere with existing information practices of the pharmacies. The study shows that in the inter-organizational communication, the drug item list is tailored to fit the needs of the general practitioners while the practitioners' medical record systems need to be adapted to make use of the list [134].

Standards can also acquire durability and stability. Once standards are established and aligned with the surrounding, heterogeneous network of institutional arrangements and work practices through bureaucratic maneuvers or other procedures, they are socially and culturally embedded, and achieve what Callon [32] calls "functional irreversibility" [134,182]. The institutional embeddedness and inscription of existing social, organizational, and technological arrangements into an installed base gives existing standards a certain degree of inertia or momentum [88,90,134] and any modification needs to be coordinated and organized to avoid collapsing the organizational behavior. Technologies, organizational relations, and the practices that connect them may move slowly and/or resist sudden

transformational efforts. Standard modifications become increasingly difficult as the standards diffuse, creating network externalities, technological lock-ins, and self-reinforcing effects [134].

There are several approaches to changing standards. A standard may be changed by developing a new version that is compatible with the previous one, in the sense that all implementations of the previous version may communicate with installations of the new one as if they were equal [134, p. 338]. However, this kind of change imposes constraints on the new version. Another strategy is to introduce a new, incompatible version. This strategy removes the constraints, but is difficult to implement: all users may be required to switch over to the new version at the same time, at a so-called "flag-day." However, coordinating such a change is very difficult as the number of installations grows. An alternative is to develop and install gateways between the old and the new [55,90]. The challenges to this alternative depend on the degree of incompatibility between the two versions. Yet another strategy is to build up a new separate system based on the new standard [134]. But this strategy raises an issue of clashing fringes between users and the new system as users may be more familiar with the existing system, standard, and infrastructural and organizational relationships, leading to system resistance. As a result, a number of substantial changes are necessary to overcome the constraints and challenges during the ongoing revision. For example, there has been an attempt to develop a new version of the IP protocol for the Internet since 1990. As other standards are nested in the protocol standards, the new version requires changes in 58 other Internet standards and a huge number of modifications and implementations of these standards [134].

Yet another issue of information standardization and system interoperability is what Peled [2001] refers to as electronic red tape [155]. He finds that computers and information systems often increase, rather than decrease, red tape in organizations. Integrating cross-agency systems through standardizing data definitions, so that one agency can retrieve data from another, creates a new type of red tape. The system integration appears to eliminate red tape in the sense that citizens no longer need to fill out the same data twice for two different agencies. However, it requires agencies to create an elaborate mechanism to ensure the interchangeability and interoperability of data, as well as verify that certain agencies

acquire authority over certain types of data. Therefore, citizens have less red tape, while bureaucrats have more [9,208].

Organizations cannot eliminate a single data element in an old system after a new system is introduced [155]. Although organizations realize that duplicating data entry and relying on old systems in parallel to the new ones is expensive to maintain and difficult to manage, generations of officials have already embedded data processing routines in the old systems. Organizations, therefore, accumulate "electronic mounds" [155, p. 414] consisting of old systems that live on because they provide critical functionality that newer systems cannot provide or replace. These mounds rarely collapse because organizations deliberately embed redundant, duplicate, and back up systems in the mounds. Hence, agencies need to continue developing and maintaining both the old and the new systems. Over time, the mound accumulates "data cemeteries," i.e., poor data that can no longer be verified and corrected [119]. In addition, the electronic mound accumulates massive amounts of rules and exceptions to the rule [155]. As computers invisibly accumulate these rules and exceptions by inscribing them into program codes, they prevent the bureaucrats from noticing this evolving entropy which grows exponentially unchecked.

Standardization, integration, and interoperability are central to most of the benefits claimed for digital government development. Work on inter-organizational information integration in the digital government field has spoken of the importance of infrastructure development [53,60,69,86,95,124,145] and standardization [64,86,95,153,195] in the process of adoption and use of information systems.

5.2 Information Infrastructure Development and Standardization in the Thai Public Sector

As reviewed in chapter 3, computerization in the Thai public sector began when major government ministries computerized their functions to increase quality, speed, and efficiency of service provision. Many ministries and departments developed similar systems and infrastructures to serve their operational functions and work procedures, including developing their own e-Document, human resources management, and financial management systems. However, these systems were implemented for internal use within an individual agency and there was no connection of systems among central and local agencies

within the same ministry or across Ministries, leading to deep problems of interoperability across agency boundaries. Throughout the 1990s, therefore, IT adoption was rather disjointed and uneven due to local proliferation and weak linkages among individual agencies.

In the late 1990s, ministries and departments started moving to the next step of information sharing and integration of their services and applications within the agency. The focus at this period was to build a shared network infrastructure within a ministry. Well-funded and geographically distributed units such as the Ministries of Transport and Interior developed their own intra-ministry physical networked infrastructure to share information among department- and provincial-level sub-units. Other agencies that could not afford their own physical networks leased telecommunication lines from the service providers for intra-ministry information sharing.

Information and system integration efforts in service delivery started in the early 2000s, when ministries and departments grouped and provided their services and applications at the same physical and virtual places, following the digital government development initiatives [40]. Most ministries set up a service link office, gathering public services and officials at a single location to deliver all services. At the same time, ministries developed portal websites that included all services and applications provided by their supervised departments. The Ministry of Commerce, for instance, provided a service center combining available services from its dependent departments into one website: http://www.mocservicelink.go.th/. The Ministry of Transport also had a portal website: http://portal.mot.go.th/indexd.html, and established a service center in Bangkok where officials from its supervised departments and state-owned enterprises, such as the Department of Land Transport, which provides the vehicle registration renewal service, and the Thai Airways International, which provides the air-ticketing service, operated. Nevertheless, the work processes and information structures of individual agencies were yet not integrated or standardized through these linkages. Most of the government virtual service link websites and physical service centers performed as information centers and portal sites redirecting users to specific agencies for particular services. Furthermore, the integration of information and services was still limited within the ministry. Each ministry still defined its own information standards and protocols among the systems of agencies

under its supervision. As for information sharing beyond the ministry's boundaries, independent physical networks and applications resulted in incompatible systems, standards, and technologies. This limitation obstructed the public sector in inter-ministry integration and interoperability of public services, information, and government applications. The government needed centralized information, such as government workforces and expenditures, from all government agencies for planning and decision-making purposes. However, this information was fragmented among agencies and their closed systems.

In 2005, the Thai Cabinet issued its resolution on the e-Government Roadmap and the development of back-office integration systems, identifying a number of central thrusts: providing telecommunication network infrastructure for inter-agency collaboration, setting up cross-government information exchange standards and channels, developing common back-office applications to allow government agencies to share and interoperate, and integrating information systems among agencies to facilitate the government's one-stop service initiative.[13]

In my study, I examined the development and implementation of four contemporary efforts at system standardization and interoperability: 1) the Government Information Network (GIN) as the information infrastructure for the government and the national information standards – Thailand e-Government Interoperability Framework (TH e-GIF); 2) the aforementioned Government Fiscal Management Information System (GFMIS) and the Departmental Personnel Information system (DPIS) as the national centralized government information systems; 3) interoperable e-Document systems which differ among each other regarding information structures and associated work practices, as the national interoperable information systems using the TH e-GIF; and 4) cross-agency integrated systems developed for specific purposes, such as the National Single Window (NSW) for trade-related functions using the TH e-GIF.

5.2.1 Government information networks and framework

In September 2006, the MICT announced the Thailand e-Government Information Framework as a national information standardization guideline for interoperation across

[13] The Cabinet Resolution on the e-Government Roadmap was issued on August 16, 2005, and on the development of back-office integration systems on July 12, 2005.

government agencies. The TH e-GIF has been employed in a variety of government applications for interoperability across local legacy systems and platforms including e-Document systems, and the National Single Window (NSW) for customs and trade-related services. The TH e-GIF offers a summary of standards, rules, methods, and regulations to be used in information system development throughout government, with the goal of achieving national interoperability and integration. It specifies high-level information exchange standards in five key areas: organizational process modeling; business information modeling; electronic data exchange; technical communication protocols; and the TH e-GIF implementation process itself, including standards for reporting on policy, budget, operation, and management planning. As individual agencies hire different software vendors to develop applications to serve their common functions, the TH e-GIF framework provides a base set of requirements and specifications intended to ensure interoperability regardless of vendor or government unit. In principle, this prevents agencies from being tied or locked in to individual vendors. It also allows development firms to orient to these standards, hiring and training personnel in accordance with specific government needs. A pilot project started in December 2006 to build the first standardized data set for enabling data exchange of official correspondences in e-Document systems. The interoperable e-Document systems were implemented for the first time in July 2007 when the government network infrastructure was ready for interoperation.

In January 2007 the Government Information Network (GIN) was launched as a centralized high-speed network linking all ministries and departments in the public sector. Its goal has been to eliminate the redundant and dispersed information networks of individual agencies; increase the speed, reliability, and security of government information exchange; and integrate network-level resources to reduce redundant investments in infrastructure and operational costs paid to private network providers. The GIN is also intended as the primary backbone supporting information exchange for common back-office applications like the interoperable e-Document system, centralized human resources management system, and centralized financial management information system. The Ministry of ICT (MICT) provides this infrastructure by leasing network capacity from two government-linked telecommunication providers and reallocating this capacity to all ministry- and department-level agencies. All costs were borne by the MICT for the initial three-year period, after which agencies have been billed on the basis of network utilization.

Before the emergence of GIN, most agencies had their own network infrastructure either by investing in their own physical networks or by leasing from private service providers. Agencies, such as the Ministries of Interior and Transport, that had their own networks would never give up their investment, whereas agencies with leased communication lines did not want to switch to the GIN either because they would have to change all network configurations, resulting in major changes in application configurations. In the meantime, the MICT does not have authority over other agencies to order system adoption and replacement. As a result, the government has to cover the cost for both the GIN and the agency networks. The government is aware of this issue, and thus mandates the Ministry of Finance to gradually cut down the network infrastructure budget of individual agencies for new budget requests to force the agencies to give up their leased networks and adopt the GIN after the initial three-year period.

During the initial three-year period of GIN implementation, therefore, most agencies adopted the GIN, willingly or not, to serve purposes other than main inter-agency communication. The agencies adopted the system for network backup, for separate Internet connection, or for no purpose at all. An ICT official at a regional office reported that the GIN network equipment was installed at the office, and he was just responsible for keeping the equipment running. The network had never been utilized because the office did not know what to do with it, and the main office in Bangkok did not give any advice on its utilization.

The MICT's GIN and TH e-GIF implementation plan, from the agencies' point of view, focuses the success of interoperability development more on the adoption rate than on the system utilization. A senior ICT official at a ministry noted that:

> *"The GIN promises to provide inter-agency communication network. But the MICT never has a clear plan on what applications will be running on this network. They basically just want us to adopt it, and encourage us to come up with useful applications in order to make use of the network and the TH e-GIF."*
>
> *(Informant interview, June 2010)*

Moreover, the same government-owned service providers offer both the GIN and leased lines to agencies, though the sales and engineer teams of the GIN are different from those of

the leased lines. So the government pays the same companies either way. The project helps increase revenues to those companies, as a senior executive at a ministry reported that:

> *"The GIN is a 400-million-baht project made by the MICT, which distributes the money to those two state-owned telecommunications companies. This project is simply a new money making tool for the politicians."*
>
> *(Informant interview, June 2010)*

5.2.2 National centralized information systems

Among three major common functions, the government has centralized the development of financial and personnel management information systems for purposes of higher-level planning and decision-making. As explained in chapter 4, all government agencies are required to adopt the GFMIS to allow the Comptroller General's Department (CGD) to monitor and control the expenditure of all agencies in real time for decision-making and budget planning purposes. The public sector budgeting, finance, and accounting operations are then standardized and integrated nationwide.

A second recent centralized application is the DPIS, developed by the Office of the Civil Service Commission (OCSC) to standardize government-wide records and reporting around recruitment, evaluation, promotion, salary, and benefits. Although the OCSC does not mandate that all agencies adopt the system, it strongly encourages them to use the system and requests workforce-related reports in the format available in the system. Here, some inter-agency variation is allowed: the OCSC realizes that most agencies' actual organizational structures are different from the one stated by law (e.g., additional divisions and bureaus designed to reduce hierarchical layers and speed up vertical command and reporting). The DPIS therefore allows the agencies some latitude to tailor the system to their own organizational structures and practices.

The details of both systems and their implementation processes were discussed in the previous chapter. It is worth emphasizing that although the systems are intended to replace existing financial management and human resources management systems at local agencies, individual agencies still use and/or maintain their systems parallel to the GFMIS and DPIS. For example, the CGD did not design the GFMIS to facilitate day-to-day accounting operations for local agencies, such as managing daily cash flows, suspended accounts, and in-process reimbursement. Although the system has been improved to include these operations

in later versions, it still cannot fully support local requirements as individual agencies tailor their accounting management to serve their own purposes.

Likewise, agencies use the DPIS as a secondary system to physical records, the OCSC#7s, and their legacy systems. The legacy personnel management systems are typically spreadsheet files consisting of lists of officials categorized based on agencies' information needs. In the interviews, the personnel staff reported that the DPIS is mostly useful for managing information about retired officials because the staff needs to maintain their records for pensions and benefits until the officials pass. As for current information, however, the staff has tended to rely on their locally stored records – either the OCSC#7s or the spreadsheets. As discussed earlier in the previous chapter, the HR officials usually update information on the OCSC#7s, in the spreadsheets, and in the DPIS respectively.

Additionally, agencies do not make use of the DPIS per se. Rather, they reuse the personnel database stored in the DPIS for other systems. The ICT Center uses a staff member's name and division for systems managing check-in and -out time, leave records reports, and for a reimbursement management system, as well as for Intranet web login and access logs.

5.2.3 Interoperable e-Document systems

As previously reviewed in chapter 3, most agencies have developed e-Document systems to improve the speed and accuracy of documentation work in the organization. As noted by Weber, documentation was and remains a central function of every agency because the administration requires documents as proofs of orders, reports, and requests throughout the hierarchical structure. E-Document systems help the agencies deal with the flood of documents coming in, going out, and circulating internally on a daily basis. Traditionally, individual agencies have outsourced e-Document system development to as many as 25 different software vendors, resulting in stand-alone systems with little, if any, compatibility between departments.

To combat this problem, the Prime Minister's Office and the MICT initiated the development of an interoperable e-Document framework in 2006. At the beginning, the MICT developed a national centralized e-Document system with the aim that every agency would adopt the system. However, over 100 agencies, each of which has specific details in document flows and procedures, had already developed and used their own systems.

Although each system shares common documentation functions, it embeds different flows and practices based on the agencies' procedures. So, the agencies were not willing to switch systems. In response to this challenge, the MICT has adopted a 'gateway' strategy, using the TH e-GIF information exchange framework to build interoperability between the legacy local systems.

The interoperable e-Document system relies on web services that retrieve information from a given system and transfer it to the recipients. Individual agencies are required to specify their data elements in an XML schema meeting TH e-GIF standards, and make those elements available to web services operating through the GIN. In this way (in principle) interoperability requirements are met without interfering with the systems, procedures, and information flows adapted to local needs at the agency level.

The MICT has persuaded a number of agencies to sign a memorandum of understanding (MOU) on implementing the interoperable e-Document systems with the use of TH e-GIF. The TH e-GIF gateway retrieves 19 commonly used data fields on correspondence and scanned documents from the source agency's e-Document systems, and then sends them through the GIN to the central database where the destination agencies pull these data into their systems when retrieving the documents. Using this configuration, individual agencies do not have to alter any data structures of their e-Document system. The interoperable systems are believed to help reduce data entry and delivery time.

However, most agencies do not value cross-agency information sharing and time saving in the interoperable systems because the data entry and all document management matters are jobs performed by administrative staff and thus do not benefit mid-ranked officials through executives. The officials merely work on the physical documents once they arrive at their desk. Rather, what they want from interoperable e-Document systems is the capability to track their documents sent to another agency: they want to know where the documents are and who is responsible for a matter so they can contact that particular division or person directly. However, this requirement goes beyond technical agreements. Agencies have to consent to release the information about their internal document flows and relevant hierarchical structure to be shared with other agencies. With different systems and configurations, the interoperable e-Document systems cannot achieve such a goal. A few

ministries like the Ministries of Commerce and Transport took a step further in redesigning their e-Document systems and distributing the software to their supervised departments while still complying with the TH e-GIF information standards for cross-ministry interoperability. Both ministries emphasize the significance of intra-ministry more than inter-agency document circulation because they tend to have more collaborative business conducted among agencies within the same ministry than with other agencies. The Commerce Ministry executives demand an integration of e-Document system of departments under their supervision so that documents can be sent and traced across agency boundaries seamlessly. However, not all departments can adopt the new system due to limits on technological resources. The ministry also has to deal with concerns about privacy and managerial interference issues raised by the departments.

5.2.4 Cross-agency integrated systems for specific purposes

Many ministries have adopted the TH e-GIF framework to integrate heterogeneous functions relevant to service delivery across multiple agencies. For instance, import, export, and logistics in Thailand involve 28 government agencies including the Ministry of Commerce's Department of Business Development and Department of Foreign Trade, the Ministry of Finance's Customs Department, and the Ministry of Agriculture and Cooperatives' Departments of Livestock, along with private firms such as banks, insurance companies, warehouse, and freight forwarders. Although each agency performs different functions in the process of service delivery, many of them require identical data elements from the businesses. The businesses need to go over the data entry at about 60-70% of their interaction points with government because the agencies are unable or unwilling to send the information across organizational boundaries. Such duplication delays and complicates the logistics process, leading to higher costs and frequent problems of data inconsistency.

To eliminate these problems, the Cabinet initiated the development of the National Single Window (NSW) for import- and export-related functions, and mandated the MICT to draw up the development plans.[14] In 2005, the first expenditure was approved for over 200 million baht and given to the MICT to develop a system prototype and establish the standards for trade-related information exchange. Similar to the development of interoperable e-

[14] The Cabinet Resolution on March 9, 2004.

Document systems, agencies would not change their existing information structures and formats. Therefore, the MICT had to invent a mapping structure that takes different information formats and translates them into a standardized one.

During the first phase of development, several agencies, including the Ministries of Commerce and Finance and the Customs Department, tried to gain administrative and budget control of the NSW development project by claiming their leading role in and responsibility for the trade-related functions. When the new government assumed office in 2006, the Cabinet reconsidered the project implementation and transferred the project ownership from the MICT to the Custom Department.

The NSW requires integration and standardization of data elements or data harmonization throughout the whole process using the TH e-GIF to decrease data redundancy. The goal of such harmonization is 'Single Window Entry,' in which the NSW will integrate information from all relevant agencies into a single shared database. This will require businesses to enter data into the system only once, and enable relevant agencies to use and process that information without duplication. It also provides an e-Document exchange hub for cross-boundary trade and transport among agencies in both public and private sectors.

To achieve this goal, the agencies need to modify their own incoming and outgoing data elements, existing work practices and routines, documentation procedures, and relevant legal frameworks that previously might not have complied with the NSW's processes and standards. For example, the Department of Foreign Trade still issues permits for export, the Customs Department issues export declaration, and the Thai Chamber of Commerce issues product quality certificates. All of them have internal processes and systems to perform their routine tasks, encompassing about 60 different laws and procedures. Moreover, each system's data elements might not be TH e-GIF standards compliant, and thus need to be changed so that the data can be exchanged. The agencies also need to change their trade- and logistics-related laws, which still require documents from businesses and other agencies, so that their systems can become paperless.

5.3 Challenges and Tensions Attending Standardization Efforts

As the examples above suggest, efforts at standardization in digital government development involve transformations that go far beyond the apparently technical sounding

language such discussions are usually couched in. Standardization and integration of information and services across traditional government boundaries may require, as well as result in, deep changes to embedded organizational structures and processes. Integration may entail changes in the existing organizational practices, norms, culture, and laws of individual agencies. Integration may also require complex calibration between the internal and historically layered operations of teams, agencies, information systems, and technologies. Each factor may present limits, challenges, and tensions that can delay, alter, or subtly influence digital government standardization efforts.

5.3.1 Structural misalignment of integrated systems with bureaucratic culture

Interviews with senior officials in all agencies in my study reveal that concern about losing control and ownership of information and systems is a common issue among agencies, and the major impediment to information integration and standardization efforts.

The study suggests that agencies have tended to obtain and protect their critical organizational resources, which include authority, money, and information, within their jurisdictions. The integration of information and systems has threatened individual agencies' jurisdictions. Moreover, government officials have worked based on functional silos, and hardly developed cross-functional management skills. Officials typically focus their information collection and use only for their line of work, while the information could be collected by one agency and shared among functions and agencies. For instance, various agencies, including the military, the Ministry of Interior, the Department of Forest, and the Land Development Department, have developed their geographical information system (GIS) using their own versions of maps for specific purposes. Agencies that need to use a GIS also tend to initiate new projects with the development of their own maps because they want to have freedom of control over the budget and information, and to receive credit from the public, as well as to gain a share in the hardware procurement.

A senior ICT official explained that large ICT projects often include hardware purchases because it is the major source of income for politicians. Reusing existing databases and systems would require less hardware. Therefore, agencies tend to initiate new information requirements with advanced computer technology. He noted that:

"Integration is the most difficult thing in the Thai public sector. Even at the ministerial level, each department tries to come up with projects in different names so that they can avoid system integration and overlap. Given different names and purposes written in the departments' plans, the Office of Permanent Secretary cannot integrate or centralize their projects into one integrated plan."

(Informant interview, July 2010)

Also, there has been difficulty among agencies in requesting a share of existing information items collected by one agency because the owner of the data rarely allows information sharing. For example, the Ministry of Interior does not allow the Ministry of Agriculture and Cooperatives to use the citizen registration database for its farmer registration system. Information ownership implies autonomy and jurisdictions, which every agency has tried to preserve. Therefore, the MOAC has to create its own database for this particular purpose.

Executive officials at the MICT emphasized that the challenges facing the integration efforts involve the agencies' unwillingness to share information with others. A senior official reported that:

"Most agencies do not want to share their information with others because they do not know how others will utilize the information and they cannot monitor that usage. They are concerned that others may reuse and alter the information for different purposes without their knowledge while they are still liable for the accuracy of information. By default, officials always think they are obligated to protect their agency's information unless the policy says otherwise."

(Informant interview, June 2010)

This tunnel vision, or functional-silos approach, which is also referred to as "localistic" attitudes [114, p. 48], of officials has led to extensive collection and storage of duplicate information with different standards. The information integration efforts thus face the challenge of information sharing and standardization.

Furthermore, information integration efforts that require changes to current work practices or that create new barriers have caused resistance to the technologies. The collaboration appears to hardly take place unless agencies share the load of responsibility and obligation. A senior network administrator at a ministry reported that the ministry did not want to relinquish its existing leased network lines and adopt the GIN because it would have to change the entire network and application configurations. As he explained,

"Every agency is using the same class network configuration. Adoption the GIN means we all have to change our current settings to avoid network collision. But no one wants to change theirs unless everyone else also changes them."

(Informant interview, July 2010)

5.3.2 Resource asymmetries

Government agencies do not have an equal level of technological resources, including funding, ICT personnel, skills and expertise, and technologies. For instance, the logistics- and trade-related agencies in the NSW system have to build or modify their systems to meet the information exchange requirements of the system. While the Customs Department has advanced its networked systems and infrastructure for its e-logistics system to facilitate business, the Department of Forest has encountered technical resource problems while developing its certificate issuing system due to a lack of ICT staff and computer infrastructure at the Department. The development of the NSW, thus, is delayed because the whole system needs to wait for the Department of Forest to catch up. The interoperable e-Document system faces similar resource asymmetry issues. Many central ministries have offered their e-Document software to other agencies (including their own local offices) for free, to build a broader user base and ensure that intra-ministerial transactions will follow a single centralized system. In many cases, however, local agencies lack the skills and knowledge to implement and maintain the systems.

Besides lack of technical skills and knowledge, local offices usually encounter the problem of insufficient human resources. Provincial offices of the Ministry of Interior, for instance, have a limited number of administrative staff members. Thus, the staff needs to perform multiple tasks, including documentation work, financial management, and other housekeeping work, for the entire office. As physical documents and correspondence remain the primary media for official coordination with the central ministry and other agencies' local offices located in the same building, the administrative staff exclusively works with physical documents and manual records to fulfill the documentation work without adopting the secondary media – the e-Document system provided by the central Ministry. Thus, the electronic copies from the Ministry get dropped off at the regional office.

5.3.3 Security and privacy concerns

Efforts at integration may raise certain kinds of security and privacy concerns. As an integrated system collects information from many systems performing different tasks across agencies, citizens and businesses that submit the information for a specific purpose are worried that the information might be shared among agencies that are not relevant to the given task. Both public and private actors in Thailand have voiced concern around these issues, both in interviews and at public hearings on the NSW National Action Plan.

For instance, the NSW system includes government functions ranging from registering businesses and products to issuing certificates of origin and import/export permits. When a business firm applies for import permission at Customs, the invoices containing information about the company, its business partners, products, and so on are not relevant to the Ministry of Agriculture and Cooperatives. The NSW, however, retrieves and integrates all information regarding the firm and its products, and allows all trade- and logistics-related agencies, including the Ministry of Agriculture and Cooperatives, to access the system. Thus, businesses require the government to carefully design the system in order to protect their information and reveal only what is needed for certain agencies.

Senior ICT officials in my interviews expressed similar concerns about the information sent through the centralized government network (GIN). As the GIN is shared across agencies, some officials expressed concern that sensitive information exchanged within the ministry and its sub-agencies might be compromised. In addition, they do not trust the security management policies of the MICT. Moreover, the MICT does not allow individual agencies to modify the policies of their network allocation. Agencies cannot even monitor the network utilization and security without MICT permission. Thus, the agencies prefer their own established network.

5.3.4 Redundancy (two systems problems)

As the story above suggests, the MICT has continued to face challenges of redundancy and duplication. Before the GIN project, many ministries built or leased their own information networks. The MICT introduced the GIN with the hope of convincing ministries to give up such networks and adopt the GIN instead. However, network administrators interviewed in this study have questioned the MICT's network utilization and security management plans

given limited experience and expertise of the MICT officials, and poor internal management within the Ministry, as well as poor coordination with outsourcing vendors overseeing and managing the GIN project. As a result, individual agencies cast doubt on the GIN's security, reliability, and long-term availability. Thus, those ministries have retained their networks, using the GIN as a backup line instead. Such duplication results in unnecessary ICT expenses.

Similarly, the implementation of the NSW has been limited to government agencies and businesses that have sufficient ICT resources. Some small businesses cannot technically and/or financially afford the computerized system for the trade and e-Logistics transactions with the government agencies, and thus still need to carry out the task manually. Locked out from the NSW, these businesses have sued the Customs Department for unfair treatment, leading to a court order requiring Customs to maintain manual channels to accommodate businesses unready for such electronic transactions. Customs is therefore tasked with running both electronic and manual systems for the NSW in parallel.

5.3.5 Rigidity of integrated systems

Standardization and integration sometimes create tensions in the development and use of systems within individual agencies. A standardized system interoperates with systems on different platforms and structures through a system gateway. The gateway allows an interconnection among heterogeneous systems without converting those systems' internal information structures and procedures. Consequently, the standardized system and its interoperable systems have limited access to the internal information across independent systems. For example, the TH e-GIF allows information exchange among agencies at the ministry and department levels through heterogeneous e-Document systems. Adopting the TH e-GIF, the interoperable e-Document system enables a ministry to send a document to any other ministry or department within the government network. However, it does not allow the ministry to keep track of its document once it is sent to other agencies. Thus, the ministry cannot trace the documents within other agencies' boundaries. This limitation of TH e-GIF becomes a barrier to document tracking between the ministries and departments. Many ministries that have sufficient ICT resources, therefore, reorganize their information structures and develop a centralized, ministry-wide e-Document system that allows every

agency within the ministry to trace documents at division level rather than just adopting the TH e-GIF for interoperability.

Although all agencies within a ministry adopt the ministry-wide, centralized e-Document system, in addition each of them still has different document procedures and flows depending on the agency's documentation policies. The system cannot strictly define whether the documents need to go to the General Division for monitoring and traceability, as some agencies might have different policies, or whether the divisions are allowed to send documents out and issue outgoing document numbers themselves. The centralized e-Document system, thus, can capture only main functions and procedures, and routinely misses or omits detailed procedures and exceptions that are handled differently from agency to agency. In response, individual agencies and users adopt workarounds and other tinkered solutions to local information needs.

As the system becomes bigger and more integrated, it tends to provide less flexibility for agency users. During the public hearing on the NSW National Action Plan, local agencies demanded the system encode trade procedures and policies into the national system to cover all trade-related regulations from national to agency levels. However, the Customs Department and software vendors cannot meet this requirement as the regulations and rules have many exceptions, which would make the national system too complicated, slow, and expensive. Therefore, the committee has to decide which functions and features should and can be included in the national system, and which will have to be developed in separate, local systems.

Workarounds and local adjustments are also characteristic of other centralized systems. The GFMIS and DPIS, for instance, provide the main financial and personnel management functions for the agencies for the purpose of monitoring, controlling, and planning at the national level. However, the GFMIS does not include cash flow and accounting for non-procurement budgets. Thus, the financial staff needs to carry out these tasks manually, or by creating supplementary systems to manage this budget separately. Then they feed the information from the supporting system into the GFMIS. As shown earlier in this and the previous chapters, HR divisions similarly create additional files and reports to manage personnel records that the DPIS does not support.

5.3.6 Ownership, commitment, and control

Most of the centralized and integrated infrastructure and systems, like GFMIS and DPIS, are initiated by a single agency and deployed to all ministries and departments. During the design and development of those systems the agencies that act as the project manager usually interact with the users in all agencies directly to gather system requirements and user feedback. The CGD who works on the GFMIS mostly communicates with officials in the finance divisions of agencies; the DPIS developers collect user requirements from the staff in HR divisions. The ICT officials at the ICT Center of the agencies barely get involved in the design and development process. The involvement of the ICT Centers only occurs during the implementation process – when the developers install computer and network equipment at the agencies' location. The ICT Centers, as the agency's network gatekeeper, just provide physical space and network connection for those centralized systems. However, the systems are a black box to the ICT staff. They do not know anything about the systems, and tend to neglect them. Most of the time, when the users have problems with the systems, they contact the development agencies directly. Thus, the interaction regarding the systems bypasses the agencies' ICT Centers. A junior ICT official reported that: *"When the DPIS is not working, I just help the users contact the OCSC helpdesk explaining what is wrong. Then, I can go have lunch." (Informant interview, July 2010).*

Lack of involvement in the development and maintenance of centralized systems reduces local ICT Centers' sense of system ownership, and creates a distance between the users and the ICT staff in the organization. Consequently, some ICT Centers completely ignore the existence of the systems and leave local users more or less alone with the systems. Further development and cooperation between the developers and government agencies thus gets more difficult.

On the other hand, missing ownership of government-provided networks or systems leads to agencies losing, whether willingly or not, freedom in their internal affairs. As discussed previously, the MICT does not allow individual agencies to setup security management plans for their networks. If the networks fail, the agencies need to contact the MICT as the service provider rather than making a direct contact with the vendors who actually provide the networks. This causes frustration among local agencies as their network availability and

reliability depends on the service contract agreements between the MICT and the vendors. An ICT director noted that:

> *"When the network is down in the early morning, we have to wait until the MICT folks come to their office. That can be as late as 8.30am. In the past, we would contact the vendor directly anytime and get the problem fixed right away because we had an agreement for 24/7 helpdesk with the vendor. Now we have to contact the vendor through the MICT as our contract counterpart is the MICT, not the vendor."*
>
> *(Informant interview, July 2011)*

Additionally, redesigning particular systems that have been standardized and interoperate with other agencies' is difficult, as the change may affect other parts of the integrated system. Local agencies may be perceived to be losing freedom as they lose autonomy while the government gains control over systems and associated work procedures and practices at local agencies.

5.3.7 Legal restrictions

Inter-agency integrated systems, like the NSW, have attempted to reduce the paperwork and documentation process required by different agencies. It aims to require businesses to submit information only once, so the agencies need to redesign their processes to reuse the information as much as possible. As discussed earlier, there are 30 duplicated data elements with multiple data entry points in the entire trade and logistics process. Although the NSW has reduced the paperwork and data entry in the system, the relevant agencies still require copies of documents from the businesses because the laws and procedures remain the same as before the emergence of NSW. There are about 60 laws and procedures related to the trade and logistics enforced by 28 agencies. Until these are changed – itself a costly, time-consuming and politically loaded process – the possibilities of 'paperlessness' and single window entry will remain unrealized.

5.3.8 Power and autonomy in standardization efforts

Integration and standardization efforts require a spearhead unit or agency to perform an integrative role among agencies. The spearhead agencies need to have some form of authority or power. Otherwise, the agencies may encounter challenges or barriers to performing their role. The Comptroller General's Department, the leading agency in the GFMIS development, holds budgetary power over all government agencies, hence being

able to enforce the adoption of the nationally centralized GFMIS. Likewise, the Civil Service Commission also has direct and indirect personnel power and influence over other agencies. Agencies are obligated to comply with the Commission's standards in public sector workforce management systems and reports. Therefore, most agencies have adopted the Commission's DPIS although they still maintain and primarily use their existing systems.

In the case of GIN and the interoperable e-Document system, as well as the early period of NSW development, the MICT plays a leading role. The government empowered the MICT to develop information exchange standards for trade-related agencies and to manage the central budget of the project. The ministry provides technical consulting and assistance for particular agencies participating in the project. It also approved the budget requested by those agencies for their internal system development and improvement in order to be interoperable with the NSW. An MICT official who was involved in the project noted that agencies were collaborative only when the MICT had budgetary power over them. As he reported,

> *"Agencies tended to listen to us and take our advice until we approved their budget requests. After that, we no longer had power or authorization to control their project development. We became a helpdesk providing technical support only when needed. They did not listen to us anymore.*
>
> *(Informant interview, June 2010)*

Similar issues are also seen in the implementation of GIN and interoperable e-Document systems. Unlike the CGD or the OCSC, the MICT does not have any authoritative directives over other agencies. The coordination and collaboration between the MICT and agencies takes place completely on a voluntary basis. It has thus faced challenges in deploying GIN and TH e-GIF that the CGD or OCSC rarely has encountered.

Additionally, the MICT has been faced with the issue of political struggle with other ministries. Larger and more powerful ministries often drag their heels over the adoption of technologies or systems developed by the MICT because they want to be the spearhead of the projects, but the MICT instead takes that role. The Ministry of Interior, for instance, would not accept the new citizen ID cards issued by the MICT and tried to come up with its own standards. According to a senior official at the MICT, the resistance and all the consequential delay have resulted from the MOI not being happy with the MICT's leading

role in the project in which the MOI is supposed to be the leader. From the MOI's view, they own the citizen registration databases and are the citizen ID card issuing unit. Therefore, the MOI should be responsible for purchasing the ID cards. As the previous Cabinet' resolution states, though, the MICT, because they are knowledgeable about ID card technologies, should make the decisions regarding card type, relevant technologies, and vendors in the market. The ID card project is a national mega-project regarding the budget as over 60 million cards will be issued. Moreover, at that time the ministers of these agencies were from different political parties and it is hard for two ministries charged by political appointees from different parties to reach an agreement. Similar competition over project ownership and financial resources among politicians has been commonly seen in other national ICT projects as well.

5.4 Summary

The standardization process deals with coordination among government agencies and, in some cases, the private sector [171]. It is a relationship involving numerous actors in the government, such as agencies, officials, administrative staff, and IT staff in and across individual agencies [183] and comprising various aspects, including technical infrastructure, funding, knowledge, skill, and expertise capacity and other resources, local work practices, and legal frameworks.

The system adoption process of government systems illustrates the relational dimension of standardization. The notion of information and service integration and interoperability is relatively new to government officials who have been familiar with a traditional functional-silo approach. The integration and standardization efforts, thus, face tensions and require changes in the officials' perception and attitudes. Moreover, the efforts need to be aligned with structural elements [142] of the public sector. Otherwise, the misalignment between organizational properties and the integration would bring about tensions and barriers to the efforts. Public sector agencies enjoy their freedom of control over critical organizational resources – budget, autonomy, and information. Information and service integration tends to threaten agencies' budgetary independence and autonomy, and hence are resisted by the agencies. Agencies have been inclined to develop their own information systems and remain disconnected with others in order to gain and regain control over their own information.

While adopting national centralized information systems like the GFMIS and DPIS is compulsory for all government agencies, the national interoperable e-Document system is likely to be optional. As empirically shown, important adoption factors include whether the development and deployment agencies have certain forms of power. While the CGD and the OCSC hold budgetary and personnel power over other agencies, the MICT, as a ministry-level agency, does not have authoritative directives over any other agencies. Therefore, the implementation of such systems needs to go through the gateway development trajectory connecting different systems for interoperability rather than forcing a new standardized system that alters existing work practice, and document formats like the GFMIS and DPIS' approach.

Nevertheless, both standardized and interoperable systems have shaped local routines and practices of the agencies in the network through their embedded procedures in the systems. They also require adjustment of local practices and systems at the agency level to be aligned and comply with mutual agreement on standardized work practices and procedures among agencies [88,90,179,183]. Furthermore, the larger-scale integrated systems accommodate only common routine functions across agencies, but not detailed procedures and practices that agencies carry out differently. Thus, the integrated and standardized systems cannot maintain the flexibility of practices that each small-scale, local system has. Therefore, the rigidity of integrated and standardized systems creates a social-technical gap between agency requirements and technical feasibility [1].

To bridge this gap, the agencies and relevant actors need workarounds or supplementary practices and systems to accommodate their transition from current practices and processes and connection to the standardized systems. Examples of such workarounds include a stand-alone financial management system that manages internal budgets of agencies excluded from the GFMIS and feeds the information into the GFMIS, separate spreadsheets and reports to keep track of the officials' promotion and transition, and customized manual documentation practices at specific agencies in order to meet standardized routines embedded in the system.

To move beyond the momentum of legacy infrastructures and practices to the new ones, a number of actors come into play. The government needs to help agencies that do not have

sufficient technical and financial resources in order to help them catch up with other agencies and fully adopt inter-network systems like the NSW. In addition, the government requires a revision of legal frameworks to facilitate the new practices. Some small private companies that previously used manual systems on their trade and logistics business also need to develop a system connected to the NSW. However, the government still has to maintain the manual channel to facilitate those firms until they are ready to move on to the new system. The gap between the old and new systems results in keeping two systems at the time, creating a classic two systems problem [195].

As we see in the case of Thai digital government development efforts, standards and standardization of information infrastructures and systems are crucial yet challenging problems for digital government development. At a bare minimum, successful implementation and adoption will require careful attention to the social and technical limits, challenges, and tensions attending standardization processes. Deeper theoretical and empirically-grounded understanding of such processes may help both digital government practitioners and researchers overcome the obstacles and reach more effective, responsive, and accountable information systems in the public sector.

Chapter 6
Boundary Work in Digital Government Development Efforts

Coordination and communication within and across government agencies plays an important role in enabling the accomplishment of government work. Government coordination and communication is established, in part, through official document artifacts carrying commands and reports vertically within and horizontally across agency boundaries. These artifacts travel through formal hierarchical arrangements organized along Weberian bureaucratic lines. As we will see throughout this chapter, official documents in various forms are crucial artifacts for bureaucracy and officials. They are embedded in routine coordination and communication work. They are also resources for understanding organizational practices and activities as they tell the users how to approach the documents with the objectivity of action [80]. The documents, however, rely on human actors to perform the tasks of moving reports and commands within and across agencies. Although their collective roles are crucial boundary work in making the foreground work and functions perform seamlessly, these human actors have tended to be invisible and hence under-recognized by other groups of individuals. In this chapter, therefore, I try to uncover the roles and work of human actors in the boundary work of the Thai public sector.

In the efforts at information standardization and inter-organizational information systems development, the culture, norms, and practices of individual agencies and the public service as a whole have to be interoperable with the global standards for cross-agency information systems and integration, and also may require adjustment before the desired integrative outcomes can be achieved. This requires tremendous amounts of collaboration among government agencies. There have to be certain groups of individuals and entities to perform the crucial role of coordinating, bridging, and linking practices, procedures, and systems of individual agencies with the inter-agency government information system requirements. Here again these actors and organizations and their background work have been neglected and underappreciated among government officials and agencies as the connection between

the local and global systems, and as the transition from stand-alone to inter-organizational systems is expected to happen without interruption to existing work.

Star and Griesemer's concept of boundary objects has been widely adopted in the field of science and technology studies, computer supported cooperative work, project management, and organizational studies to help understand the integrative role of artifacts linking otherwise separate organizations, social worlds, or communities of practice. This work has emphasized the role of boundary objects in helping scholars understand socially organized practices and reasoning surrounding the use of artifacts, and has theoretical and empirical implications for the general design of systems to support collaborative work and information reuse. Other scholars have sought to expand the concept of boundary objects to individuals and entities acting as boundary agents or boundary organizations in science, technology, public administration, and organizational settings. Employing and extending the concept of boundary object, I analyze the role of these people and organizations in promoting (and sometimes frustrating) information technology and public sector reform efforts or digital government in contemporary Thailand. Theoretically, I seek to import insights from the sociology of science and technology to the highly relevant context of digital government reform efforts, while calling attention to the sometimes invisible artifacts, actors, and organizations that enable collaboration, coordination, and information flow across traditional organizational boundaries.

6.1 Boundary Objects, Agents, and Organizations

As Star and Griesemer [1989] argue, collaboration and coordination across complex fields of social and organizational practice depends on partially shared uses and understandings of material resources. Crucial to this work are *boundary objects*, or "objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites" [181, p. 393]. They emphasize that creating and managing boundary objects may be key to the work of developing and maintaining connections between intersecting social worlds. Although boundary objects have different specific meanings and details in different social structures, their structure is common enough among those worlds to make them recognizable and a means of translation. In their empirical research, Star and Griesemer use the boundary object concept as an analytical framework to discuss the history of the Museum of

Vertebrate Zoology at the University of California during 1907-1939. The museum administrators and scientists were concerned by the disappearance of the flora and fauna of California, which needed to be preserved and made available to the public. Accordingly, they provided a collection service for amateur collectors who brought in materials such as specimens, field notes, museums, and maps. The museum workers and scientists shared a common goal – preserving and documenting California's flora and fauna samples for conservation and study, while the amateurs' goal simply was preservation of animals [181]. These disparate needs and interests came together around the physical artifacts of the collection, which were able to serve as "boundary objects," bridging and aligning the different worlds of zoological research, museums, and amateur naturalists. [181].

Star and Griesemer define boundary objects as objects that serve as coordinating artifacts for members of what Strauss [1978] calls *social worlds* [185] or what Lave and Wenger [1991] call *communities of practice* [116]. Boundary objects inhabit several communities of practice and are able to travel across borders and maintain some sort of constant identity. As they are weakly structured in common use, and become strongly structured in local use, they can be tailored to meet the needs of any one community [181]. They are working arrangements that resolve interruptions of naturalization. Therefore, social structures with different protocols, structures, work practices can coordinate through boundary objects. Star [1989] points out that boundary objects contain sufficient information to be understandable by different groups in an organization, but neither group needs to understand the full detail of construct and use by the other [178]. The quality of boundary objects allows diverse groups of actors to maximize both the autonomy of local use and communication among themselves [181].

Star and Griesemer categorize boundary objects into at least four types: repositories, ideal type, coincident boundaries, and standardized forms. *Repositories* are ordered piles of objects that are indexed in a standardized fashion. Their main feature is modularity. People from different worlds can use or borrow from the pile for their own purposes without having to negotiate differences in purpose. Libraries and museums are examples of repositories. *Ideal type* is an object that carries a certain degree of abstraction. It is abstracted from all domains, and thus is adaptable to a local site. An example of an ideal type of boundary object is an animal species. The third type is *coincident boundaries*, which are common objects with the

same boundaries but different internal contents. These objects allow work in different sites and with different perspectives to be conducted autonomously while cooperating actors share a common reference. *Standardized forms* are the fourth type of boundary object. These objects are devised as methods of common communication across different work groups. Standardized forms may be identified as what Latour [1987] would call immutable mobiles [110].

For Bowker and Star [2000], moreover, information systems are boundary objects, as they contain information that resides in more than one context, and their information can have multiple interpretations across boundaries [20]. The design of an information system is not just about technical considerations, but is also about contextual considerations [20, p. 291]. To build a collaborative system, designers need to consider shared context in which to help users make sense of the information travelling across different contexts. Information going across localities creates tension over its interpretation and representation. As a result, databases have tended to be designed for customizability on the fly in different settings for different purposes, as opposed to traditional hierarchical databases [189].

The development of systems is an attempt to transmit and represent information across localities [20]. This process includes people, artifacts, previous representations, and information about its own structure. The tension in the process is itself collective, historical, and partially institutionalized. Star and Griesemer and Bowker and Star offer two potential solutions to this tension. Standardization is a common solution. But as pointed out earlier in chapter 5, standards can become problematic as they do not remain standard for very long; and one person's standard is another's confusion and nightmare [180]. As a result, boundary objects arise to manage the tension between divergent viewpoints. The creation and management of boundary objects (in this case, information systems) is a key process in developing and maintaining coherence across intersecting worlds [20]. Such a process is complex and simultaneously involves the technical and the political, the abstract and the concrete, the foreground and the background, the text and the context, and the subject and the object. Objects become natural in a particular community over a long period of time. Newcomers to the community become members through learning or naturalizing by interacting with the objects, not the people. Once an object is naturalized, it becomes invisible and sinks into the community's routinely forgotten memory. Bowker and Star

argue that infrastructural technologies are often naturalized in this way. Any working infrastructure serves multiple communities by allowing any given community to interface with the information system and pull out the kinds of information objects it needs. Thus, technologies replace the mess work, and become a form of collective forgetting.

Star and Griesemer's original boundary object concept has subsequently been taken up and applied in other fields such as CSCW, organizational studies, and project management. For instance, Ackerman and Halverson [1998, 2000, 2004] examine an organization's memory through the use of a variety of information systems and artifacts, including databases, electronic documents, paper documents, employee handbooks, notebooks, and post-it notes, as they are used as information sources among hotline representatives [2-4]. Each representative creates a boundary depending on his or her expertise, and thus a different contextualization from others. Boundary objects contain sufficient detail to be understandable by all parties, but at the same time, no party needs to understand the full context of use by the others. To create shared information artifacts for collective use, therefore, an individual agent is required to decontextualize the information before storing it for later use by the others. To reuse a memory, the representative needs to recontextualize that decontextualized information according to his or her purposes. The memories can be rearranged and reused in various organizational contexts. Therefore, the use and reuse of information in boundary objects as a memory involves the coexisting requirement for contextualization, decontextualization, and recontextualization [2].

Heath and Luff [1996] study paper medical records and computerized systems for health care in the United Kingdom and provide design implications for CSCW system to support asynchronous collaborative work [81]. Their study focuses on social practices embedded in boundary objects (here paper medical record cards). They argue that the paper medical record is a product of the socially organized practices surrounding the use of the records within medical practitioners' daily consultative work. Handwriting, specific writing styles, and stylistics devices in the paper record provide a rich array of resources to medical practitioners to help them make sense of the consultation. Doctors can recognize those characteristics of their colleagues in the cards, and thus who saw which patient for what. Practitioners can get a sense of a particular illness and the ways in which various

consultations featured in its development. The records also reflect the routine progression of particular problems, and how the problems have been treated.

Compared to paper records, however, Heath and Luff argue that computer systems inevitably standardize the information, hence limiting or removing the economy, gestalt, and tailorability of the paper medical cards, which is an essential part for practitioners in using the records within the consultation [81]. As a result, in their empirical study Heath and Luff find that many doctors continue to use the traditional medical record as they still depend on those aforementioned properties of the written entries and the records. Therefore, when designing a system to support collaborative work, it is important to take into account complex practice requirements embedded in and arrayed around traditional objects. Computerized systems need to provide capabilities which allow users to flexibly contribute and facilitate their (re)use of information holds in the system in the same ways paper record cards do. The concept of an object-oriented system emerges to provide such capabilities to support the exchange and sharing of objects, and to provide different views of the same object while maintaining a collection of static objects.

The notion of boundary objects has important implications for digital government scholarship as it calls attention to a close examination of physical records and other information artifacts shared and moved among different groups of government employees and agencies in intra- and inter-organizational operations. This examination provides implications for our understanding of what and how social and work practices in boundary objects are embedded and transferred across agency boundaries. It also helps researchers and practitioners create boundary objects to mitigate tensions attending information use and sharing, both physically and electronically across contexts. Furthermore, the understanding of information systems as boundary objects is useful for government information system designers and developers to carefully translate work practices associated with physical artifacts when transforming traditional manual procedures to electronic procedures.

As subsequent scholars have noted, however, this kind of mobile and translational capacity is neither a pure product of design nor a 'natural' affordance of the artifact. The use of objects across intra-organizational and inter-organizational boundaries in collaborative work requires a certain group of human actors to perform the actualization of object mobility

between intersecting worlds and facilitate their use by other people. These people may be referred to as "*boundary agents*" as introduced in organizational studies and information systems realms.

A few scholars have used the term boundary agents to discuss the role of individuals in connecting organizations with external environments. Separate work in organizational studies by Organ [1971], for instance, argues that individuals play a major role as boundary agents in organizations by helping them adapt to their environment in cross-organization interactions [140]. He emphasizes that organizations, themselves, do not interact with the environment Rather, individuals perform the interacting. These individuals are boundary agents acting as organizational linkages between their organizations and others, whose goals, values, and beliefs are different and sometimes contradictory. They need to prevent, mitigate, and solve inter-organizational conflicts. They also bring in knowledge, perceptions, and evaluations of changes in environment. The role of boundary agents is, therefore, to reduce the threats of uncertainty posed by the organization's dependence on the others. Examples of boundary agents include salesman, purchasing agent, labor negotiator, lobbyist, liaison personnel, and spokesperson [140]. These agents have to content with the expectations and pressures of organizational members and people outside the boundary. Within the organization, moreover, different groups of people or communities of practice also have different expectations of the role of boundary agents. Therefore, boundary agents require job-specific knowledge and skills to balance all conflicting demands and organizational issues both within and across organizational boundaries [140].

Merali [2002] uses the term boundary agent to refer to individuals who span organizational boundaries and regulate information flows in and out of the organization [130]. Similar to Organ, Merali argues that organizations are faced with issues of identity, integrity, and ownership as they undergo changes in novel forms of inter-organizational relationships, sharing resources, information, expertise, and processes across boundaries in new information communication technology environments. Organizations must be innovative and adaptive in the dynamic and interconnected environments. To achieve this goal, boundary agents are engaged in the enactment of the boundary relationship or network both within and across the organizational boundary. They enable inter-organizational information resource sharing such as know-how, which helps organizations to undergo

transformational change in emergent competitive contexts [130]. On one hand, boundary agents are potentially key actors in modifying organizational properties, such as values, beliefs, and perception. On the other hand, they isolate the inside from the outside by reinforcing ownership of organizational resources, preventing internal resources from leaking out, and keeping harmful external influences at bay [130 p., 57]. Boundary agents, such as customer representatives, filter information coming in and going out of the organizations. According to Merali, boundary agents perform a crucial role in which certain aspects cannot be replaced by technology. That is, jobs that require judgments about the quality of information cannot be automated; and those that require tacit knowledge cannot be transmitted without human connectivity either. Instead, human boundary agents may use technology to carry out their activities.

Scholars have discussed issues concerning the identity and integrity of boundary agents and the communities where they are members. Boundary agents, on the one hand, are members of their organizations. On the other hand, they belong to communities of practice that may be virtually located across the organizational boundaries. For example, salespersons are members of their firms while they are also members of sales professional associations. Oftentimes, the goals and values of the firms and communities of practice they belong to are conflicting. Applications of the boundary agent notion coming out of the boundary object tradition emphasize the role and nature of human 'marginals' in crossing between and connecting adjacent environments. Living in more than one social world, and sometimes in between intersecting worlds, boundary agents enable boundary objects to travel across those intersecting worlds. In the process, they play a major role in connecting intersecting communities within and across organizational boundaries by crafting, managing, and controlling common standards that all communities can comply with, while leaving some flexibility and transparency of communities' local practices and requirements.

Park [1928] argues that people who live in more than one social world often face tensions imposed by multiple memberships and problems of identity and loyalty [154]. Star and Griesemer extend the concept of marginality in their boundary notion and discuss the strategies that marginal people employ to manage their identities [181]. Those strategies include passing and shifting their identities into a single world. They, use the concept of marginal people and their strategies as a metaphor for their boundary objects with multiple

memberships [181] or what Organ calls role conflict [140]. Following this trajectory, we may also employ the problems of marginality to the tensions imposed on our boundary agents.

Other STS and organizational scholars have sought to extend the original boundary object concept in an explicitly organizational direction, emphasizing the role of boundary organizations in bridging between scientific and political institutions on science-related policies [33,34,36,76,77,132,138]. As discussed earlier, scientists need to maintain values and interests within their community boundaries that may be threatened by some intellectual activities outside the boundaries [67,68,77]. Researchers have pointed out the role of boundary objects, and what Fujimura calls *"standardized packages"* [63], in solving such tensions. However, to achieve boundary stabilization, boundary objects and standardized packages require the consent of actors on both sides of the boundary. It requires researchers to voluntarily engage in patenting and politicians to accept patents as a productivity measure. Therefore, scholars have discussed the potential of *"boundary organizations"* for linking the two domains in order to achieving both productive scientific research and political decision-making while maintaining each other's integrity, norms, and practices [77,91,135].

To address the stability problem, Guston [1999, 2001] characterizes boundary organizations as organizations that allow and provide incentives for the creation and use of boundary objects that reflect the participants' perspectives [76,77]. They mediate boundary negotiations in their routine work and stabilize the boundary by performing successfully as an agent for both scientists and politicians [76]. They will involve participants from both sides of the boundary and mediators who are professionals from other institutions [76,77]. Boundary organizations allow scientists to present themselves both as members of a knowledge community and as advocates. They may also incorporate representatives of external groups into their decision-making structure as a bridging strategy. Boundary organizations therefore serve as an interface between the social worlds, holding distinct lines of accountability to each [76,77]. An example of boundary organizations between scientists and politicians is the National Institutes of Health Office of Technology Transfer (OTT) [76]. In the 1970 economic crisis, policy-makers began attempting to move the intellectual and other products of research from the laboratory toward commercial users. They began to

provide incentives for their recruited agents to engage in research activities that the politicians hoped would be more productive for the economy. The OTT and other similar organizations manage these incentives, which include the redistribution of the royalties from licenses and other forms of intellectual property to the individual or institutional researchers. The OTT collaborates with scientists regarding the legal and marketing issues of innovations, and evaluates technologies for patent protection. The technology transfer specialists at the OTT educate and persuade researchers to produce more invention disclosures and patent applications favorable to public policy. In conclusion, the boundary organization enables both the policy-makers and the researchers to construct the boundary between their entities in a way favorable to their own perspectives. Politicians view the OTT as aiding their goal of increasing and documenting the productivity of sponsored research. Researchers view it as helping their pursuit of performing cooperative research, and demonstrating the productivity of their entity.

Boundary organizations facilitate collaboration between scientists and non-scientists, and create the combined scientific and social order (i.e., commercial innovations) through the generation of boundary objects and standardized packages [76]. At the same time, they act as agents of both parties, and are accountable and responsive to opposing, external authorities. Guston further argues that a successful boundary organization is the unit that remains stable to external forces astride the internal instability at the boundary [77].

While boundary actors and boundary organizations fulfill some of the same translational roles in aligning work and resources in complex and distributed organizational settings, they do so from significantly different positions; they are different kinds of marginal actors. While interacting with external environments, boundary agents are full-time members (or employees) of the organization they work for; depending on its salary, as well as existing under the influence of the organization's power arrangements and social statuses. They are constrained to maintain good relationships with their bosses and colleagues. Conversely, the interaction with outsiders is not formally organized, and the boundary agents may not benefit directly from such interaction. In circumstances of conflicting demands, beliefs, and goals of the organization and those of people outside the boundary, it is likely that boundary agents will choose to defend the benefits of the organization they belong to. The organization's dominant power arrangements and social statuses influence the agents'

decision in favor of the organization's will. On the other hand, boundary agents may exert their influence on the decision-making in the organization through both formal hierarchical arrangements and personal connections with their constituents.

In contrast, individuals residing in a boundary organization exist independently in a separate entity; performing the task of bridging and linking different domains to achieve the specific goals of everyone involved. Unlike individual boundary agents, members of the boundary organization are not part of any of the domains with which they work. Rather, they are in a separate unit with their own autonomy and resources. The success of their work in introducing and forcing change in goals, values, beliefs, or practices of other units depends on their relationships – power and influence – with other entities. With authority and resources in their hands, boundary organization members are more likely to force change in other entities than boundary agents do in their own entities. Conversely, boundary organizations and their members tend to face tensions and resistance to the change from entities if they lack authority or power over those entities.

Structurally, moreover, boundary organizations and their members sit outside of the standard hierarchical structures of the organizations they link. When interacting with other entities and exercising their authority, however, boundary organizations rely on other entities. Therefore, boundary organizations are not fully apart from those standard arrangements, although they seem to have their own autonomy.

Nevertheless, the boundary organization concept has become a recurring analytical framework for research in collaboration, management, and administration in several fields of study. For example, literature on collaborative management in the realm of public administration has discussed the utility of boundary organizations in governance [58,93,172]. In their formal or intentional sense, boundary organizations may be established by or between government agencies to bring together participants from multiple agencies to collaborate, plan, and take action on specific issues [172]. More informally, boundary organizations may arise organically, as natural evolutions from instances of sustained joint work and (partially) shared purpose between separate organizational entities or sub-units. In their ideal form, by bridging and straddling traditional agency boundaries, boundary organizations may become key moderators and mediators between otherwise separate

organizational contexts, interests, and cultures – though here, as with the original boundary objects concept, the overlap is always partial.

The role of boundary organizations in intra- and inter-organizational communication and coordination arises as a particular challenge for public administrative research. It connects to many of the novel forms of government organization often claimed as goals or outcomes of digital government reform efforts: cross-agency coordination and information integration that shifts the organizational forms of government away from traditional bureaucratic silos; functional fragmentation; and hierarchies that shift towards forms variously labeled as inter-organizational networks [153], joined-up government [95], and virtual agencies [59]. If we use the architectural metaphor of structure – a representation that Weber's description lends itself to – we can consider such forms as the connectors and expansion joints of government. Ironically, by violating Weberian principles of organization, boundary organizations make them possible.

6.2 Boundary Objects in Government Communication

In their formal guise, Thai government agencies are organized along classically Weberian lines. As discussed briefly in chapter 3, a politically-appointed minister is in charge of all policy-related decisions at the ministerial-level unit. Among civil servant officials, the permanent secretary is the highest ranked executive who performs organization-related administration work for the ministry. Intra- and inter-organizational communication of government agencies is conducted via various forms of documents and communication flow.

6.2.1 Paper and electronic official documents

All formal communication between the minister and officials in the ministry takes place through documents between the minister and the permanent secretary. In addition, officials within the agency use memos to communicate and coordinate among themselves. Administrative staff members of sub-units ("divisions") within each agency act as document gateways, receiving memos from other divisions at the same horizontal level and forwarding them to the officials in their division, and vice versa. They also send and receive documents (containing reports or directives) upwards and downwards throughout the bureaucratic hierarchy, establishing the kinds of paper trails that Weber identifies as the key technology

and defining feature of modern bureaucratic authority and accountability [11,65,192,204]. All such communications are classed as "internal documents" or "memos."

In addition, agencies communicate with each other and the wider public through "external documents". The point unit for such activities is once again the agency's General Division, which classifies incoming external documents from other agencies, along with correspondence from outside individuals and organizations (e.g., businesses and individuals), and sends them to the corresponding divisions or officials within the agency.

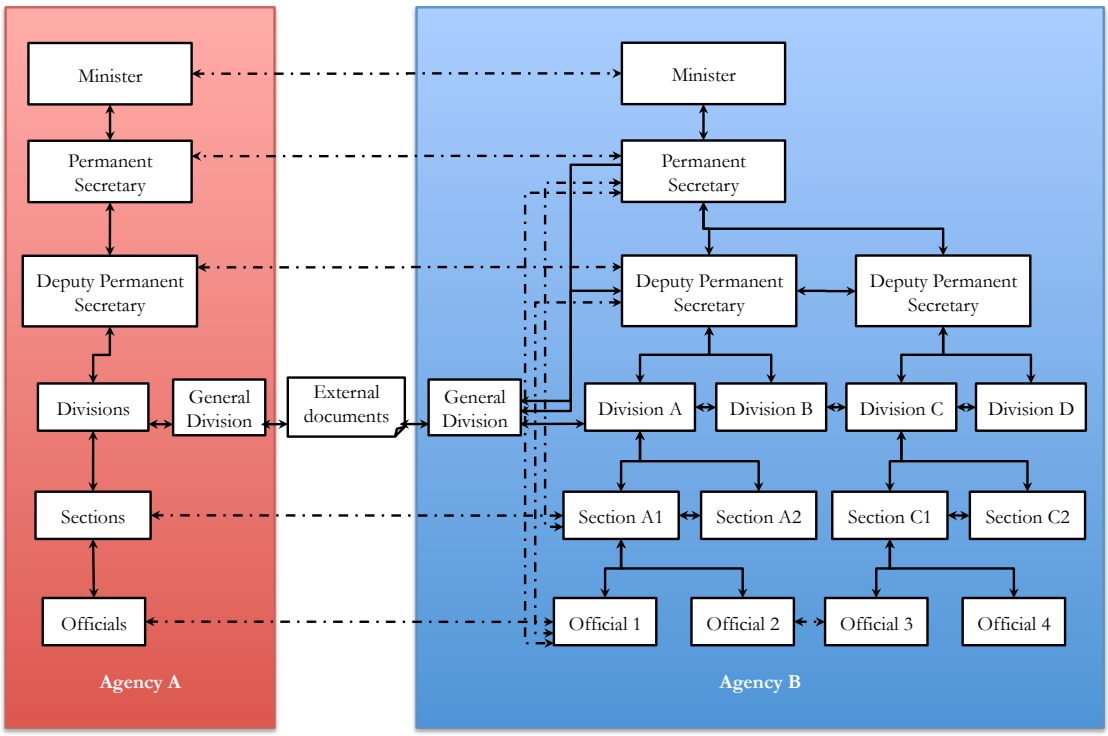


Figure 6 Communication flow within and across agencies

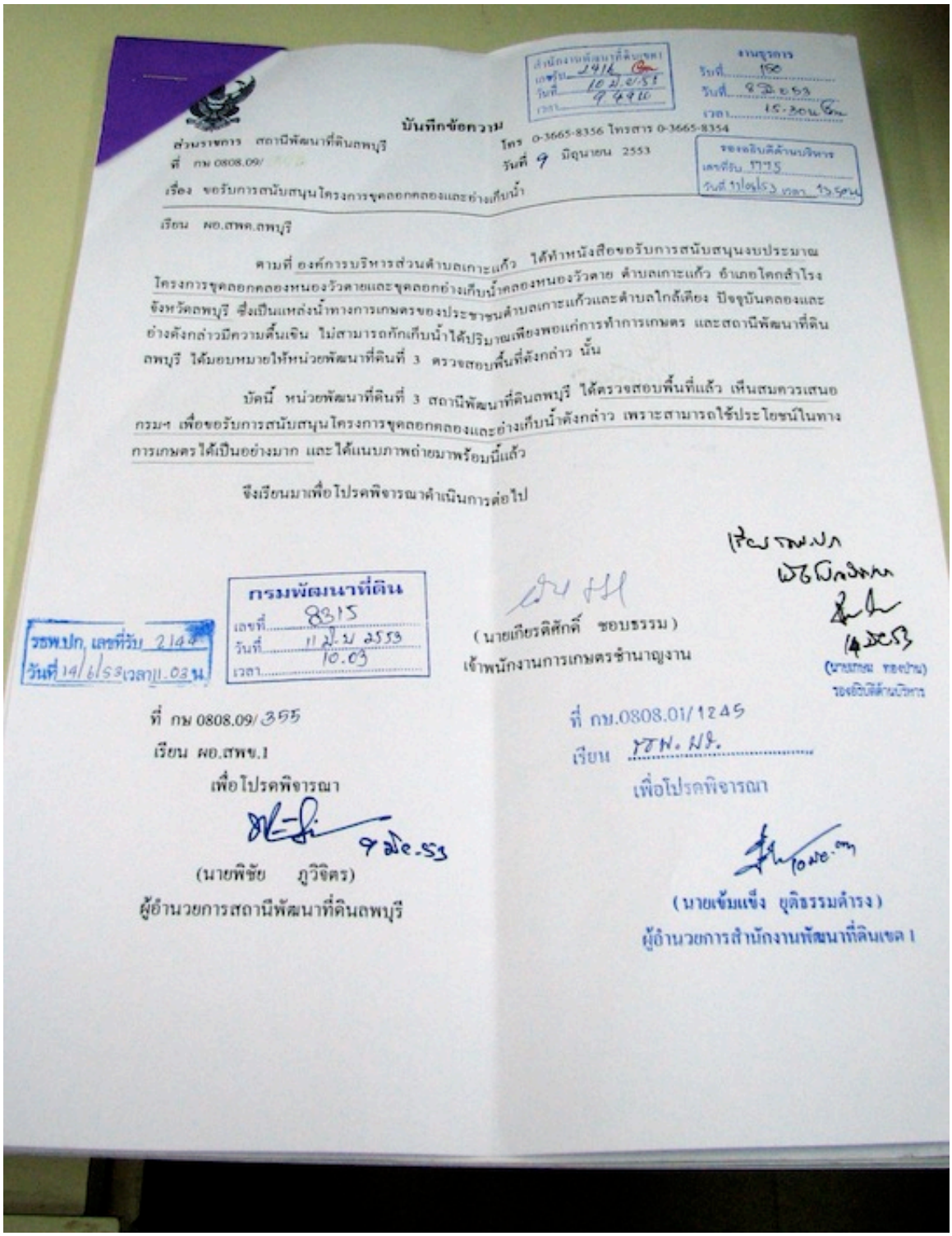
As Figure 6 illustrates, external documents requiring the permanent secretary's acknowledgement or decision are filtered through functionally assigned deputy permanent secretaries (DPS) who evaluate and designate responsibility on each incoming item. In some cases, the DPS is granted authority to act directly, including redirecting incoming matters 'downwards' to specific sub-units for action. More commonly, the DPS acts as filter and conduit to the permanent secretary, passing up reports with recommendations for action,

and passing directives from the permanent secretary down to agency sub-units for action. Alternatively, external documents not requiring the attention of the permanent secretary may be routed by the General Division directly to the relevant agency sub-units for action.

As actions are executed, a separate and generally 'upward' flow of documents is initiated. Completing officials report the results of actions in a memo, along with any comments on additional required tasks relating to other divisions or persons. The memo is sent to the official's supervisors hierarchically (i.e., section head, and division director). With each step, higher-ranked officials write comments and/or recommendations to their own superiors until it gets to the permanent secretary for further orders. In the memo in Figure 7, an official reports the outcomes of assigned tasks and recommends further actions for another division to his director. The director forwards this memo along with his written notes to his supervisor reporting the accomplishment and recommendations. At this point, an official response may be offered, whether in the form of inter-ministerial communication or correspondence with outside groups. This constitutes, in rough form, all official communication flows in the Thai government.

Due to authority-related restrictions on official communication, formal inter-organizational communication is limited to specific authorized officials such as the permanent secretary, the deputy, and a few other designated officials. Similarly, the restrictions apply to formal documentation-based communication within the agency. Memos sent upwards from officials at the low end of the structure to executives must go through the hierarchical communication flow. The solid lines in Figure 6 represent this formal communication. Such formal and documentation-based flows are supplemented by other less formal modes of communication (shown by dashes in the diagram), such as telephone calls, informal memos, conversations in meetings, conversations in less formalized settings, and so on. This in-person communication acts as a back-channel, or informal communication, that the officials use to fulfill and speed up both intra- and inter-organizational communication because it cuts through the organizational hierarchy. Within an agency, supervisors use informal channels to give verbal or informal orders to and receive reports from lower-level subordinates. Officials in different divisions within an agency often utilize informal communication flows to coordinate their work. At higher levels, top-level management may use personal connections and informal communication to seek common understandings

before or outside of official cross-agency agreements. Such informal flows tend to fall outside of formal document systems (paper-based or electronic) but are crucial to the work of coordination within and across formal bureaucratic hierarchies.



บันทึกข้อความ

ส่วนราชการ สถานีพัฒนาที่ดินลพบุรี โทร 0-3665-8356 โทรสาร 0-3665-8354

ที่ กษ 0808.09/

วันที่ 9 มิถุนายน 2553

เรื่อง ขอรับการสนับสนุนโครงการขุดลอกคลองและอ่างเก็บน้ำ

เรียน ผอ.สพข.ลพบุรี

ตามที่ องค์การบริหารส่วนตำบลเกาะแก้ว ได้ทำหนังสือขอรับการสนับสนุนงบประมาณโครงการขุดลอกคลองหนองวัวตายและขุดลอกอ่างเก็บน้ำคลองหนองวัวตาย ตำบลเกาะแก้ว อำเภอโคกสำโรง จังหวัดลพบุรี ซึ่งเป็นแหล่งน้ำทางการเกษตรของประชาชนตำบลเกาะแก้วและตำบลใกล้เคียง ปัจจุบันคลองและอ่างดังกล่าวมีความตื้นเขิน ไม่สามารถกักเก็บน้ำได้ปริมาณเพียงพอแก่การทำการเกษตร และสถานีพัฒนาที่ดินลพบุรี ได้มอบหมายให้หน่วยพัฒนาที่ดินที่ 3 ตรวจสอบพื้นที่ดังกล่าว นั้น

บัดนี้ หน่วยพัฒนาที่ดินที่ 3 สถานีพัฒนาที่ดินลพบุรี ได้ตรวจสอบพื้นที่แล้ว เห็นสมควรเสนอกรมฯ เพื่อขอรับการสนับสนุนโครงการขุดลอกคลองและอ่างเก็บน้ำดังกล่าว เพราะสามารถใช้ประโยชน์ในทางการเกษตรได้เป็นอย่างมาก และได้แนบภาพถ่ายมาพร้อมนี้แล้ว

จึงเรียนมาเพื่อโปรดพิจารณาดำเนินการต่อไป

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เพื่อโปรดพิจารณา

(นายเข้มแข็ง ยุติธรรมดำรง)
ผู้อำนวยการสำนักงานพัฒนาที่ดินเขต 1

Figure 7 An official memo used in intra-organizational communication

6.2.2 The e-Document systems

As documentation is one of the three major operational functions in Thai public organizations, along with financial and human resources management, the government has encouraged the agencies to use ICT for this work as one of the digital government initiatives. Many ministries and departments have developed their own e-Document system to serve the routine work procedures of their documentation operation. The systems capture the agency's manual process of documentation practices and procedures and transform it into an electronic process. They help the agencies deal with the flood of documents coming in, going out, and circulating internally on a daily basis, in addition to improving the speed and accuracy of organizational documentation work and formal communication flows.

As discussed in chapters 3 and 4, most agencies have outsourced the system development to as many as 25 different software vendors, resulting in stand-alone systems with little, if any, compatibility between departments. In 2005, therefore, the Prime Minister's Office embarked on a major effort to restructure public sector communication flows through adoption of a new government-wide standardized e-Document system throughout the Thai public sector. In the same year, the Ministry of ICT (MICT) officially launched its e-Document system development and interoperability effort – a government-wide initiative intended to bring the cacophony of agency- and department-level document formats and systems into some sort of workable alignment. Ultimately, the integrated e-Document system will enable electronic document sharing and communication and contain various electronic formats, such as word processing, spreadsheets, and PDFs. Also, the system will accept digital signatures and thus officials at any hierarchical level can electronically sign in and send documents throughout the system corresponding with the bureaucratic chain. Therefore, documents can be traced across agency's boundaries and inter-organizational communication will be faster and more seamless, as if it were intra-organizational government communication. These features of the integrated e-Document system are meant to improve the efficiency and reliability of government operations without sacrificing the core values of bureaucratic structure and accountability.

As illustrated here, documents (both physical and electronic) have been crucial communication media for government officials both within and across agency boundaries. Documents play a major role in connecting organizations and people for the purpose of

administration through one of the main elements of bureaucratic structure – organizational hierarchy [192]. Serving as boundary objects in formal government communication, documents travel back and forth between agencies, agencies' sub-units, and officials conveying information from one place to another. Parties at both ends of the communication coordinate their work through the same documents, but using different portions of them, for their own purposes, and to perform different actions, and thus they develop different practices surrounding the documents. The documents, hence, contain enough information for all the official groups who use the documents for their own specific work. For example, administrative staff merely use the documents' metadata: receiving document numbers along with date and time stamp (those rectangular boxes on the document shown in Figure 7) for their administrative work and usually ignore the content of the documents. On the same document, officials who work with the content of the documents rarely pay attention on those stamped numbers and tend to care only about the directions and orders their immediate supervisor gives on the documents.

In a similar vein, e-Document systems act as another form of boundary object between officials in different authority levels, positions, and divisions. The systems facilitate communication among officials within agencies, as well as cross-boundary communication across agencies. As explained below, individual officials and divisions use the systems in radically different ways and for different purposes.

Ideally, the systems are meant to replace the manual communication process, and the electronic documents will replace the physical documents in the agencies. In most of the agencies I studied, however, the use of the systems since the late 1990s has been limited to administrative staff and a small group of staff in the ICT Center. The executives and most senior officials prefer physical documents and writing to the electronic version. Besides limited computer literacy, the executives and senior officials' work habits and nature are not aligned with the premises underlying the e-Document systems. As a senior official noted,

> *"The executives are always either in meetings or commuting from one place to another. Physical documents can go with the executives anywhere. Their assistants classify those documents, put them in folders and bring them to the meetings and in their car, waiting for them to read, think, and take action on the way. In contrast, electronic documents require mobile devices to facilitate the access. And those senior people are not usually familiar with using computers anyway. Not to mention such small devices."*

(Informant interview, June 2011)

The mobility of physical papers and the help from the administrative staff allow the executives to work with the documents anytime. Similarly, officials work with physical documents; they bring documents to their bosses' offices to ask for opinions, to their co-workers' desks for discussion and brainstorming, and to meetings. The e-Document systems require networked equipment with the application installed. The systems, thus, lack mobility to accommodate the executives and officials' routines. On the contrary, the administrative staff works with both forms of documents in bulk for a short period of time – checking in the documents and forwarding them to the proper destinations.

Furthermore, other officials in the agencies do not use the systems as part of their routine tasks. Due to the limited number of computers shared among themselves, the officials cannot access and work through the e-Document systems, and so have to rely on physical documents. Most importantly, the systems were originally designed to be a tool for administrative staff, not as a common tool for officials performing other organizational functions. The major functions of the systems include registering and initiating document numbers. They are a checkpoint when documents come to each individual unit. The administrative staff relies on the e-Document systems as a crucial application to generate document numbers, track the document trails live, keep document transaction logs, and scan and store electronic copies of all kinds of documents as backup to the physical documents and for future reference. The only input to the systems is by scanning the documents; the systems do not allow documents generated by word processors or other applications to be put in directly. Therefore, the systems had been intended as a document tracking and repository tool for administrative staff, rather than as a collaboration application for everyone in the agency. Hence, officials performing other functions in the agency perceive the e-Document systems as a tool exclusively for the administrative staff, not for themselves. However, officials are fully aware of the existence of the systems and know how to benefit from them. An administrative staffer explained that:

> *"They (officials) ask me to search for particular documents. Mostly these are their own documents, but they cannot find the original copies. So, they come to get an electronic version."*
>
> *(Informant interview, July 2010)*

This implies that e-Document systems are a working infrastructure for administrative staff and disconnected from officials' daily working environment. Meanwhile, physical documents are a primary medium for officials.

The distinguishing interaction with documents between administrative staff and officials is that the staff *"work on"* both physical and electronic documents as they register, enter metadata, and distribute them. Officials do not work directly on the documents. Rather they *"work with"* the documents as they use the content in the documents to make decisions and take actions. For this reason, system deployment and adoption have been limited primarily to the administrative staff. For other officials, electronic documents and systems remain completely invisible in their work. In either physical or electronic form, officials simply expect that the documentation will be seamless and rely on its reliability, availability, and timeliness.

Not only do e-Document systems and electronic documents lack physical and mobile affordances for officials, they also do not accommodate the associated practices of officials working with them. As officials maintain their traditional practice of using physical documents, they report their work, add comments, or give orders by writing on the documents. Most officials recognize the executives, their supervisors, and their colleagues' handwriting. Handwriting provides a sense of authority, as well as a personal appeal, to officials who work with particular documents. Documents containing executives' handwriting often catch the attention of officials first, whereas documents without the superiors' handwriting, such as internal memos from other divisions or sections asking for cooperation, do not usually get priority. E-Document systems and electronic documents do not provide the same affordance around social practices for officials. In order to enter additional orders and comments into electronic (scanned) documents, administrative staff at every document checkpoint and/or the executives' assistants need to either type them in or scan the documents with new orders and comments to append the original scanned ones. This obviously would take too much time and effort as the staff would have to hold the documents until they are scanned, and then would forward them to the destination. With their current documentation practice, once the documents leave the executive's room, the staff quickly records the forwarding destination into the system, and delivers the physical documents to the destination. They do not record any written commands or comments from

the executive. For time-sensitive documents, staff writes down the document registration numbers and the destination on scratch paper and delivers the documents right away, before coming back and entering the information into the system.

Dealing with a lot of documents, also, the staff sometimes works with e-Document system as a batch process. At the General Division of an agency, the staff develops their own work practices to increase the speed of their work. As shown in Figure 8, the staff create spreadsheets to record the document numbers and the destination by hand. Then, they record the data into the system all at once, before or after the physical documents are forwarded, depending on their work schedule. And these sheets are also used for other purposes. They are used as a tracking device as well as performance records. A staff member reported that she keeps these sheets for one month in case anyone wants to see the trace of particular documents, and as proof of her work. At the end of every month, she summarizes how many documents she has worked on and reports the number in her performance report.

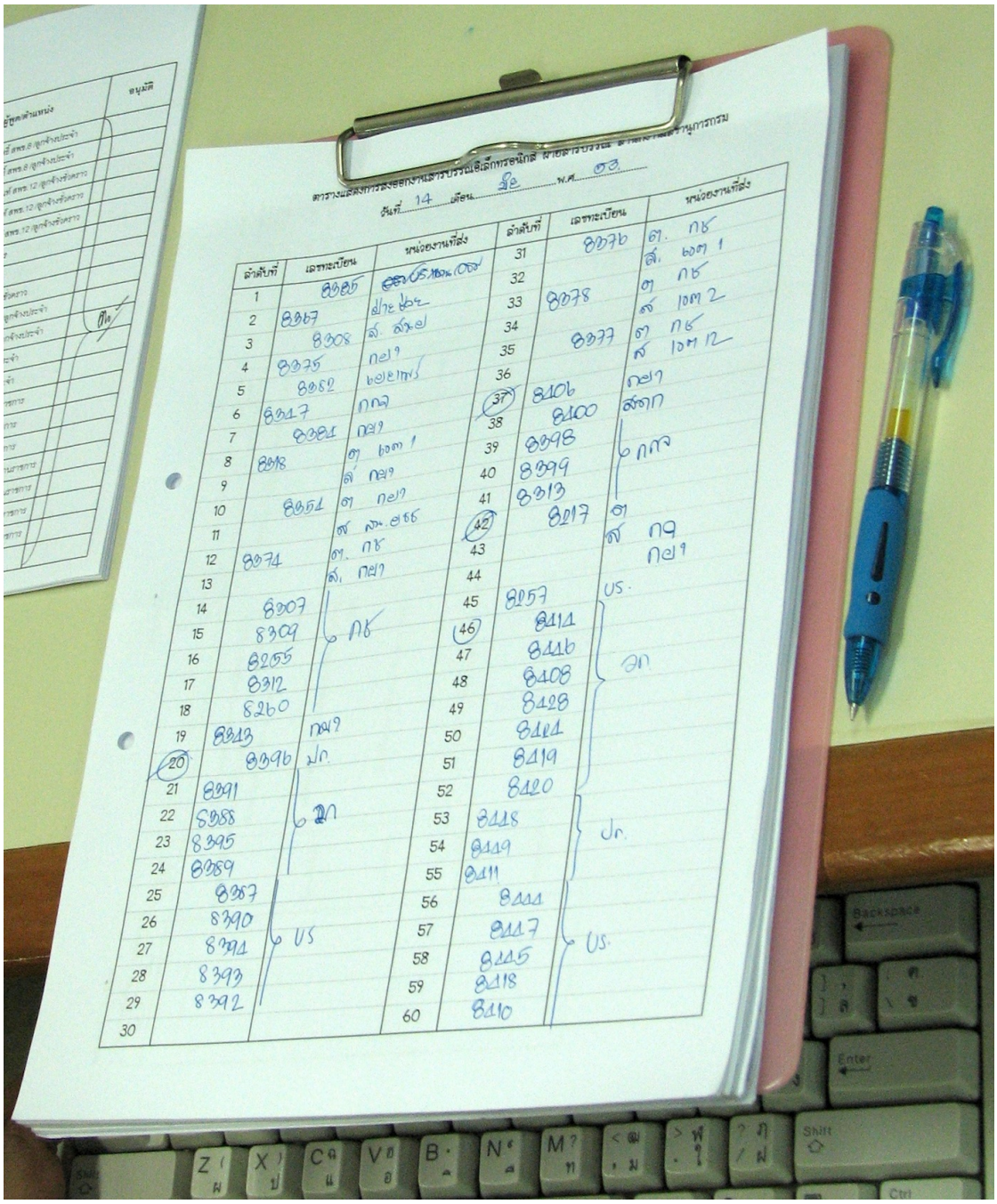

Figure 8 Batch process in e-Document system

Interviews with several ICT officials at two ministerial agencies revealed that executives had tried to enforce the adoption of e-Document system in the agency. However, the adoption was not very successful; officials quickly stopped using the systems and returned to their traditional practice of manual documentation. Even the ICT officials, who were familiar with and worked on computers most of the time, did not institutionalize, or what Bowker

and Star call naturalize [20], e-Document systems, electronic documents, or new documentation practices into their work. The failure of the system could be rooted in the training and mentoring program of agencies. In most cases, when a junior official is recruited, she has to attend an orientation session introducing her to the agency. Then, she goes into a weeklong training on official document writing. In this course, she learns the different types of official documents and their purposes, the structure and format of each document type, and how to begin and end the documents addressing her superiors and colleagues at different levels of hierarchy. The official becomes familiar with the pertinent documents and associated practices. However, the training does not include use of e-Document system. The system may be briefly introduced to the class, but not as a tool for officials.

During on-the-job training and mentoring, the official learns that she sends and receives physical documents to and from administrative staff. Staff, not officials, performs the tasks of document preparation, including structure and format verification (e.g., whether the Garuda is in the right position, checking spacing between lines and paragraphs, and so on) and arranging documents in order so that the executives can read them easily. Because documentation practices have long been institutionalized in the agency, senior officials, including her mentor, have been used to working with physical documents and associated practices. When the junior official joins the agency, she is taught and coached based on this highly organized practice. As a result, the practice remains sticky and is passed on through generations of officials.

Traditional relationships of hierarchy built around bureaucracy have resulted in hidden hierarchical classes and status differences among government officials. Besides the seniority system in the government, each line of work in a particular agency is valued differently. The major line of work tends to be ranked highest, whereas administrative work and documentation are consistently ranked as one of the lowest priorities. At the Ministry of Commerce, for instance, economists would be considered the most superior officials as the permanent secretary has to have an economics background, and is often promoted from among those economists. Along the same lines, case officials at the Administrative Court would be viewed as doing the highest priority work and possibly having a more successful career path at the agency. Among government officials, in contrast, documentation-related

tasks, including preparing documents and working on e-Document systems, have an image of secretarial work attached to them. This work is inferior to their technical work. Furthermore, the executives and senior officials rarely prepare the documents by themselves. They may draft their memos and have someone, who may be their assistant or any subordinate official, type them up in a proper format. They just have to sign the typed-up documents.

Having assistants reflects the greater power and hierarchical status of a certain official over others. Perceiving documentary work as low-grade work, officials tend to delegate it to their subordinates or lower-level staff in order to emphasize their power in the hierarchy and to focus only on what they view as more important tasks. A senior official expressed his concern regarding the relationships between the hierarchical structure and division of work in the government.

> *"Only 50% of the officials do the actual work of the agency while the other half just do whatever to support and please the executives. This cascading relationship has been going on, and on, and on. Newly hired officials will then be expected to serve their higher-level officials both for professionally and personally… We do not need all of the people here. But this is the way the bureaucracy works."*
>
> *(Informant interview, June 2011)*

The above interview concurred with the following one regarding the hierarchical relationship in the government. In her 25 years of working experience with the government, the ICT director of a ministry also finds that higher-level officials have tended to use computers less as they are promoted to higher positions in the agency. As she noted,

> *"I noticed that senior officials, when they were in middle ranking positions, were eager to learn and use computers. They always raised their concerns about the insufficient number of computers and lack of such and such systems. But when they become senior or even executives, they just do not use computers anymore. The systems that they requested in the past have been implemented. But they don't seem to use them. They have their staff work on those systems for them… How can we expect full IT adoption if the senior folks only pay lip service to computers?"*
>
> *(Informant interview, July 2010)*

Furthermore, government employees' perception of documentation and computerized work also affects the hierarchical status of administrative staff and ICT officials in the bureaucracy.

The subordinate social status of these employees will be discussed empirically in the boundary agents section later.

Although the director of the ICT Center of a ministry required all officials in the Center to check and read internal circulars in the system, and terminated the use of physical copies, junior ICT officials reported that they rarely logged on the system, and hence were missing a lot of important matters the director wanted them to know. When there was a negligence issue, both ICT officials and administrative staff were held responsible for the problem. Therefore, the administrative staff tried to avoid being blamed for the officials' negligence by feeding information through physical channels and requiring officials' signatures so they could make sure that the officials acknowledged important announcements. As a junior ICT official explained,

> *"We know that if there is a document that specifically addresses us, or requires our actions, the director will send it directly to us both physically and electronically… As to circulating news that the administrative staff puts up on the systems, we normally do not pay attention to it. If there are very important matters, the staff will print it out, put it in a binder, circulate it around the division, and ask us to sign and date it to make sure those pieces of news reach us."*
>
> *(Informant interview, June 2011)*

The interview with the director emphasized that the physical information channel is still the primary one, as she reasons that it is almost impossible to rely merely upon the electronic systems since not everyone has institutionalized the new document practice on electronic media. She cannot afford to have anyone in her division miss crucial assignments or information.

As e-Document systems do not provide the same level of accommodations and affordances to everyone, officials and administrative staff develop work practices around the systems differently, according to their routine tasks. Traditionally, officials worked with physical documents from the origin of the documents – creating them using a word processor, printing them out, and signing them before sending them to the administrative staff in their divisions who then send them to their destinations. This practice has continued since the period prior to the development of e-Document systems. The administrative staff registers and scans the documents, then sends both physical and electronic copies to the destination. While the introduction of the systems adds new documentation procedures and changes

current practices of the administrative staff, it does not modify or replace the officials' practice due to their limited access and use of the system. Moreover, the government has not yet widely recognized and adopted digital signatures for use in government business, including documentation procedures.

Even among the administrative staff, most of them do not work with the electronic documents until the physical documents are present on their desks. They also have to maintain their traditional documentation practices to serve other officials' communication and coordination. Their traditional practice around physical documents thus remains their primary procedure. As the e-Document systems are their secondary working artifacts and they have to give priority to other officials in their documentation service, the administrative staffers cannot and often times do not fully exploit the systems. The interview with a staff member emphasized the higher level of mobility of physical documents over electronic documents in the documentation practice. As she noted,

> *"Sometimes physical documents travel faster than their electronic counterparts because the director's assistant usually asks the cleaning lady to deliver the documents to us (administrative staff at the General Section) while she is busy with something else and cannot record the director's orders and release the documents in the system right away."*
>
> *(Informant interview, July 2010)*

Moreover, the administrative staff views the computerized procedures in the e-Document systems as additional steps to their existing manual work practices. To maintain the speed of their service, the staffers use their judgment on what documents they will scan into the system for future retrieval. The staff restrict themselves to scanning only the official documents, not relevant attachments or supplements which are often over 50 pages (Figure 9). Therefore, the attachments and supplements, which appear to be significant documents for officials working on a particular matter, are exclusively sent manually.

Figure 9 The in-agency delivery method of physical official documents with a lot of supplementary material.

For this reason, files contained in the e-Document system may be less essential to individual officials and their work than physical ones. The General Division director in a departmental agency justified the scanning restriction that:

> *"We scan only important incoming documents such as seminar and meeting invitations addressing the executives. There are 200-300 documents coming to the department daily. Due to the limited number of scanners and staff members, we cannot scan all those documents. Besides, the servers' capacity will not be able to store all the scanned papers."*
>
> *(Informant interview, June 2010)*

The ICT Center directors are not satisfied with the justification that is commonly used when a system is not fully adopted, as it pins the blame on their estimation of effort and resources. A director responded to such claims, and expressed her disagreement:

> *"They (system users) usually blame it on ICTs – there is not enough disc space. There are not enough computers and scanners, or systems are slow and unreliable. Those are their conveniently classic excuses for not wanting to use the systems or do additional work. OK, I admit that those problems used to occur in the past. But that was years ago."*
>
> *(Informant interview, June 2011)*

As a result, even in the presence of functional e-Document systems, physical documents and traditional handwritten signatures remain the dominant mode of communication for both officials and administrative staff in all of the agencies I studied, with e- documents used as a supplementary method by the administrative staff and as a tracking tool for a small number of other officials. In either physical or electronic form, officials simply expect that the documentation will be seamless, and rely on its reliability, availability, and timeliness.

Both physical and electronic documents and systems function as boundary objects in bureaucratic organizational communication. While documents flow between officials at all levels in the organizational hierarchy, e-Document systems and electronic documents may limit their functionalities and properties as boundary objects to specific groups of workers. Whereas physical documents are widely used as communication artifacts containing necessary information for every group of workers throughout the agency, the systems and electronic documents carry out the functions of boundary objects only as points of reference, information repositories, information carriers exclusively for the administrative staff, or as topic for system administrators. Although both physical and electronic documents contain the same information and travel between the same actors, electronic documents and e-Document systems do not have coordinating properties among officials other than administrative staff. Despite their limited coordinating properties, electronic documents and systems are perceived and used as information repositories by the agencies. Other officials rely on the systems and stored electronic documents when they refer to old documents. They ask the administrative staff to search and retrieve retired documents in the system using specific keywords in the metadata of the documents.

Thus, on the one hand, physical documents fully perform functions as boundary objects across the whole government arena. On the other hand, electronic documents' boundaries are limited in their communication function to groups of administrative staff within and across agencies, yet they carry out an organizational memory repository function for wider groups of users. Essentially, they are unable to replace how officials conduct formal and informal communication through physical forms of documents. The manual documentation system is still the main practice for government formal communication while the electronic system acts as a supplementary practice for specific groups of officials. Nevertheless, the systems and electronic papers perform as coordinating and collective artifacts used by all groups of officials to achieve the common goals in documentation – tracking and retrieving – although certain groups do not use or interact directly with them.

6.3 Boundary Agents in Government Communication

Documents, as boundary objects, connect officials in various agencies and divisions through horizontal and vertical flows of communication. They perform certain kinds of government coordination work within and across agencies in a communication channel through specific hierarchical orders. In addition, e-Document systems link agencies and divisions through an electronic channel for faster and more accurate communication flows. However, these boundary objects cannot perform their mobile and translational functions without the assistance of specific actors, or boundary agents. The boundary agents make boundary objects travel between official communities within and between agencies' boundaries. They also serve as a bridge between intersecting social structures with different norms and practices. The boundary agents create a gateway, or standardized practice, that translates local practices and norms of individual social worlds to allow cross communication, coordination, and interoperability. Each social world, thus, can focus on only their own work practices and norms when coordinating with each other.

6.3.1 The administrative staff

To make the mobility and coordination properties of documents possible, administrative staff in the General Division and General Sections of the agencies carry out the information translation and carrier functions for government documentation. The documentation work requires the administrative staff's knowledge and experience in classifying and determining where the documents should go when external documents come to the agency. The staff

need to have knowledge of the organization's internal structures and enough understanding of job functions within divisions to know who is responsible for a particular matter addressed in incoming documents in order to determine the destination and its associated hierarchical channel.

In my interviews at the General Division of four ministries and departments, experienced administrative staff members reported having to memorize the organizational structures and the executives who oversaw those divisions, as well as understanding functions of each division throughout the agency. They also had to understand the nature of the issues addressed in the documents in order to map them with the scope of work that each division performs when deciding who should be receiving and taking action on particular incoming documents. An administrative staffer with over ten years of experience in documentation work stated that:

> *"My job requires me to memorize the organizational structure, each division's document number, and which deputies supervise what divisions... I have always gotten requests from officials asking for a particular document. They want to know with whom it currently is; or they need a copy of it. But they do not know the exact subject title of the document. So, I ask them what the document is about, approximate date when it was initiated, or some keywords in the content of the document."*
>
> *(Informant interview, June 2010)*

The administrative staff uses the metadata of the documents, e.g., from, to, date, or subject, when receiving and forwarding them to their destination. They do not need to know in detail how each division uses the documents to carry out their task, nor other agencies' local documentation procedures or work practices when sending or receiving the documents. They are not concerned about what action the division or person needs to perform as requested or directed by the senders. Rather, they need to translate other agencies' document practices into their own local practices when dealing with inter-organizational communication. Another staffer in the same agency explained:

> *"Each department within the ministry has its own document procedures, like whether or not they scan the outgoing documents sent to the ministry. Here we scan all incoming documents into the system because the permanent secretary wants it that way. And although we, and all departments under the ministry's supervision, are now using the same e-Document system, we still do not use the same document numbers. Individual departments customize the systems to fit our own document procedures."*

(Informant interview, July 2010)

As the staff has seen many documents coming in and going out of the agency, they can identify immediately where they should send the incoming documents. In addition, the administrative staff would memorize the documents previously sent from other agencies on the same issues in order for them to send the follow-up documents to the appropriate recipients. Because it takes time to gain this necessary experience, the longer they work at the Division, the more valuable their experience is to the agency. Therefore, the administrative staff at the General Division has usually been assigned to work on the same task for a long period of time, and has a much lower turnover rate than other agency staff, for example, financial officials in the study of the Government Fiscal Management Information System (GFMIS) discussed in chapter 4.

As mentioned earlier, different work practices in different agencies and divisions do not automatically travel across the organizational boundaries. The administrative staff bridges those different practices when moving documents from one place to another. Although the administrative staff plays a critical role in enabling cross-division and cross–agency translation and in accomplishing the major operational function of the agency, they unfortunately seem to be invisible to other officials in the agency. In the interviews, a number of members of the administrative staff mentioned that they tend to be ignored by other officials as they perform organizational tasks, though document transition is expected to be seamless, timely, and uninterrupted. *"Our (administrative staff's) work is just like Cinderella's. No one has ever recognized us or our work" (Informant interview, July 2010).* This point is well portrayed in my fieldwork during the government crisis of 2010, when prolonged anti-government protests shut down much of central Bangkok, including most centrally-located government ministries and departments. All other officials could leave the office, while the General Division had to have staff on duty to take documents coming from other agencies or by mail. The staff at the General Division of an agency located in the protest zone reported:

> *"Even during the protest, we were the only division in the agency that had to come to work until the executives said otherwise while the others were relocated or worked at home. We had to be here because other agencies did not know our situation and assumed that we were operating as usual. They still needed to communicate with us – by mail and carriers. So we were here getting the postal documents, sorting them, and sending them to the relocated officials through the e-Doc system and our delivery guys."*

(Informant interview, July 2010)

When there is a power outage, or the communication network or e-Document system is down, moreover, the General Division needs to immediately deploy manual procedures so that the communication between divisions and agencies is not disrupted. In addition, as officials still prefer working with physical documents to typing their comments directly into the e-Document system, administrative staff are often required to carry out an additional set of tasks – scanning incoming documents and entering the hand-written comments of government officials - before forwarding them to another division.

In addition, the administrative staff's hierarchical and social status is arguably inferior to other positions in the government. The staffers at the General Division are expected to perform a housekeeping function of the agency, and the staff at the General Section in other divisions is supposed to be general assistants to everyone else in the division. Other officials view the administrative staff as their personal assistants, for example, expecting staff to deliver personal packages to their desk, even though there are mailboxes for the officials at the General Division. Feeling outclassed, a staffer who delivers documents within the agency complained that:

> *"Those letters and packages are personal stuff. But we are expected to deliver them to the officials upstairs. The officials are always too busy with their work to come down here. They just do not want to come to the General Division."*
>
> *(Informant interview, July 2010)*

When officials have documents to send to the director, moreover, the administrative staff has to prepare and organize the documents in a preferred order. The document organization preference varies from person to person. Some directors may require documents to be organized by section in their division; others may prefer them by urgency level; yet others may demand that each document needs to have proper message flags taped to it to help them go through documents easily (Figure 10). These flags include "Please sign," "Attachment 1," "Attachment 2," "Original document," and so on. Again, having someone prepare her documents with message flags and put them in the folder for her to read and sign is another representation of the higher hierarchical status of a particular official. Although it is not written in any Document Procedures, this practice seemed to be institutionalized across all the agencies I studied. However, there are differences in the specific details of the flags.

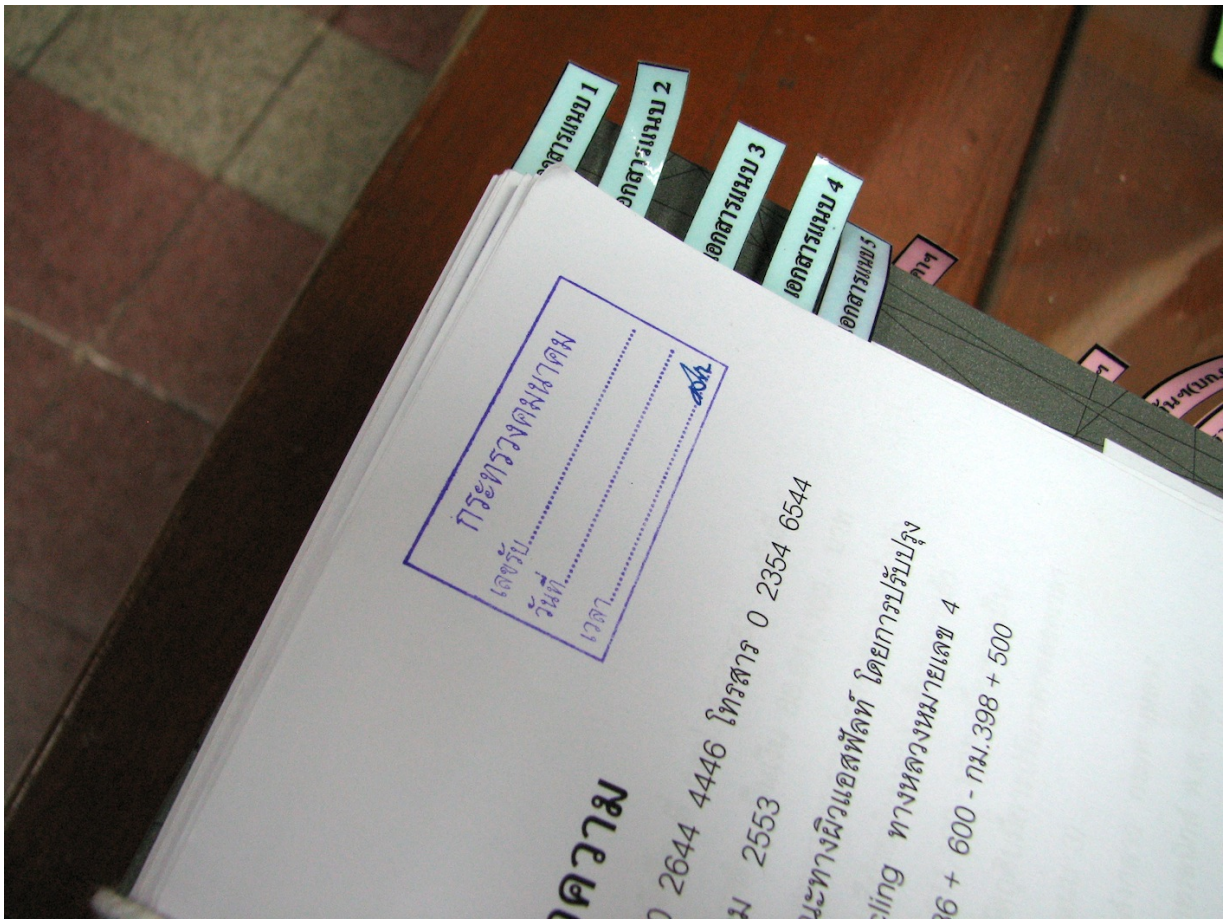

Figure 10 Message flags (attachments 1-5) are attached to the memo for easy access

The administrative staff usually prepares these flags by printing messages on pieces of paper, putting transparent tape over the flags for durability, and cutting them into proper-sized pieces (Figure 11). Officials may ask the staff for these flags if they want to prepare the documents for their supervisor. However, instead of doing it themselves, they usually just ask the administrative staff to prepare the documents for their boss.

Figure 11 Message flags ready to be used in document preparation and organization

In their documentation work, experienced staff have adopted a variety of local workarounds to tailor standardized systems to their and their agency's needs: for example, the development of spreadsheets (Figure 8) or the use of logbooks (Figures 12, and 13) to register and track incoming documents. The logbooks are generally separated by division and there is a logbook specifically for the most urgent documents. These workarounds help the staff efficiently manage and track document flow in the agency. As one of the administrative staffers noted,

> *"Although the ICT Center told us to stop using these printed logbooks, we still print them out and hand them to the recipients because we need them to confirm that they have received the documents. When original documents are missing, everyone points fingers at each other. Their signatures on our reports help us point the finger at them saying that it is definitely their fault… The records in the system do not help us to get away from this loop because many users do not check out the documents, leaving them as unread documents although they actually received the physical documents. We need some hard records outside the system to prove that it is no longer our responsibility."*
>
> *(Informant interview, June 2011)*

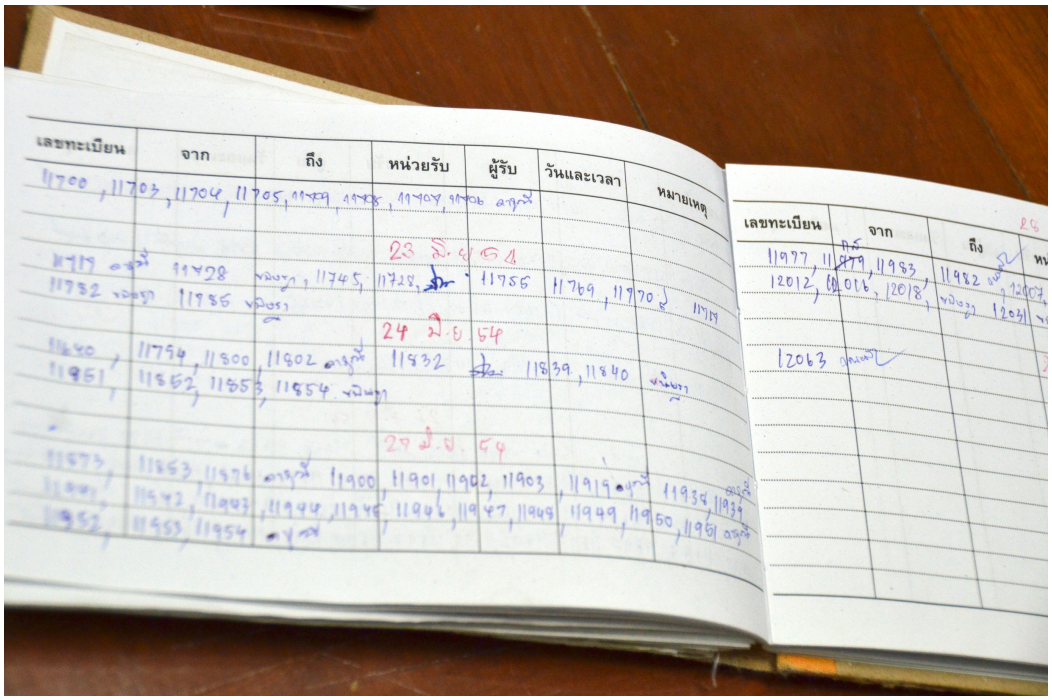

Figure 12 A document logbook with recipient signatures to keep track of documents passing through the General Division of an agency

Figure 13 When delivering documents, the administrative staff brings the logbooks to the destination divisions and asks for the recipients' signature

Another agency has similar documentation practices relying on physical document logs. A staff member also noted:

> *"We (administrative staff at the General Division) create our own logbooks to keep track of all documents passing through the division, and where they are sent. We keep these logs for a month in case officials ask about the documents' whereabouts. Logbooks that have their signatures when we deliver the documents are kept for ten years. Officials can't claim that they have not received the documents as long as we have their signatures to prove otherwise. These signed logbooks are determined as official records that we need to maintain for a certain period of time… But if it happens to be that the executives have lost the document, we will ask the director of the Division that issued the document to issue a new copy and sign it to replace the missing one."*
>
> *(Informant interview, July 2010)*

The knowledge and skills are tacit, yet can be informally transferred among staff sharing similar duties. When a staffer comes by to deliver physical documents, she sees and learns how other people use the system, and may then adapt such workarounds to his/her own practice. This sort of informal borrowing becomes an important site of coordination across traditional agency lines, and a track through which loosely standardized forms of documentary practice may emerge.

6.3.2 The ICT officials

Another crucial group of boundary agents in digital government development for public organizational communication is ICT officials in the agencies. Local ICT officials act as boundary agents in two ways: first, within their own agencies by introducing e-Document systems to individual divisions; and second, in inter-agency interoperable e-Document system efforts by coordinating with the MICT and bridging local procedures and practices with government-wide systems and protocols. In the first case, the e-Document system translates shared local document procedures of every division into a standardized digital process. Again, the system itself, as another kind of boundary object, does not have translational capacity without being actualized by the boundary agents, i.e., the ICT officials. The ICT officials standardize mutual practices and allow the system enough flexibility for individual divisions to use it corresponding with their local practices while still being able to share documents and information among themselves. For instance, some divisions require their administrative staff to scan every document passing through to the General Section

while others do not due to the limitation of scanners. Thus the system cannot make scan function a mandatory step in the procedure.

From the system administrators' perspective, they maintain the system's availability and ensure that the document flow reflects the actual organizational hierarchy, though the practices and routines of the documentation in the system may be abstract for them and they may not know how each individual user uses the system.

More broadly, local ICT officials act as boundary agents between their own agencies and others, bridging their e-Document system and others' in the cross-agency e-Document system integration. As discussed earlier, the systems were developed by different vendors, so many of them are not compatible with each other. Hence, the local agencies' ICT Centers collaborate with the Ministry of ICT (MICT) in an attempt at integrating the e-Document systems. The staff members at each ICT Center translate their agency's documentation routines, requirements, and their system' structures and formats into the integrated system while implementing national information and procedure standards, identified by the MICT, into their local system and practices. On the one hand, the ICT staff is working for and physically living in their local agency's boundary, which makes them members of the agency. They provide the system that facilitates and accommodates local procedures and practices. On the other hand, the officials are also members of the national integration and interoperability effort task force organized and led by the MICT. The task force aims to standardize the procedures and accommodate only common routine functions in the e-Document system. Therefore, the ICT officials act as the interface between the agency's and the task force's boundaries. Their goal is to minimize change in local documentation procedures and practices, meanwhile making them interoperable with those of other agencies. Hence, they need to bridge the gap between national technical capabilities and local requirements by crafting and managing national information standards, and offering some informal workarounds and adjustments, such as supplementary systems and practices, for their local staff.

Both administrative staff and ICT officials serve as boundary agents for their own local organization, performing tasks of moving and translating boundary objects between their agency and others. The administrative staff enables communication and coordination within

and across agencies through their hierarchical arrangements. They act as a sort of glue within the formal communication structures of complex bureaucratic orders. They also bridge different documentation practices of individual agencies and sub-units to make communication flows seamless for other officials. However, their role and contributions have always been under-recognized and taken for granted by other officials.

ICT officials at local agencies act as boundary agents by making possible large-scale integrative boundary objects, e.g., e-Document systems, and by creating and managing standardized procedures for the integrated system in their local agency. The creating and managing process is crucial to developing and maintaining the compatibility of documentation practices across agencies. In the meantime, the ICT officials need to minimize the impact of the shared standards on their local staff's practices. More specifically, they have to maintain the current work practices of their local staff. Therefore, they are boundary agents in the form of a translator of shared standardized and local practices.

6.4 Boundary Organizations: The MICT and Government-wide e-Document Integration Efforts

In government communication and coordination, boundary objects (here, documents and e-Document systems) play a major role in bridging the separate worlds of organizational practice. Boundary actors (here, administrative staff and local system administrators) also help these objects to 'travel' across division and agency boundaries. But some of this work is performed at a higher level of aggregation and formalization, in the form of boundary organizations. Boundary organizations bridge agencies and link boundary objects (here, e-documents and e-Document systems) that previously had remained within individual agency boundaries, allowing them to travel across these boundaries while still maintaining their distinct local uses. To achieve the government's goal of a fully interoperable e-Document system, there must be an organization that spearheads action in bringing collaboration across geographically and functionally dispersed agencies, as well as across their fragmented systems. To date, this role has been performed by the MICT. It plays a collective role in cross-agency information sharing and integrating e-Document systems among agencies. It acts as a bridge for formal communication and cooperation between over 100 agencies, each with varying documentation flows and procedures. Those procedures and practices are

embedded in the e-Document systems, which are, themselves, different in technological platforms, data structures, and detailed functions.

The boundary organization role of the MICT is constrained by its organizational structures and managerial elements. Established in 2002, the MICT is one of the newest ministries. National ICT policies and most digital government initiatives have been relatively unstable due to repeated changes in political appointees heading the ministry. Since the establishment of the ministry, nine ministers have held the position. In consequence partly because of this, many ICT policies and projects initiated by the MICT have been discontinued or altered. When asked about the role of the ICT in digital government development, an executive official at the MICT mentioned a hidden agenda of the establishment of the MICT:

> *"The MICT was established specifically to facilitate Thaksin and his family's telecommunication business. During the Thaksin government, the MICT and the minister were assigned to take care of the Thai Telecommunication Act of 2006 revision (which raises the limit on foreign holding in telecom companies from 25% to 49% -- the author). This law facilitates Thaksin's selling his corporation to the Singaporean company. After the transaction was successfully made, there has been a suggestion of abolishing the MICT. So, the role of MICT has been always unclear in the national ICT and e-Government development…*
>
> *There is the NBTC,[15] which regulates national ICT policies and laws. This commission's roles are very similar to the MICT's. Yet the commission has its own independent financial resources by collecting fees from broadcasting- and telecommunications-related auctions and license issuing, while the MICT has to get money from the government."*
>
> *(Informant interview, August 2010)*

Moreover, the ministry is a small agency with a limited number of ICT officials, most of whom work on ICT policies rather than system development or administration, or are newly recruited and inexperienced graduates. Technical matters, thus, are outsourced to vendors

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[15] NBTC, standing for the National Broadcasting and Telecommunications Commission, is an independent convergent regulator. Regulating the national broadcasting- and telecommunications-related policies and laws, the NBTC is divided into two sub-commissions: telecoms and broadcasting commissions. Retrieved from http://nbtc.nbtc.go.th/, and *"Current Development in Thai Telecommunications Laws"* http://www.aseanlawassociation.org/Thai_telecomm_law.pdf on April 15, 2012.

Interestingly, six out of 11 NBTC commissioners, including the chair, are either current or former members of the military. The media criticize the strong military role in the NBTC, suggesting that the Commission may focus more on broadcasting than on telecommunications, as the Royal Thai Army has owned many broadcasting spectra, and has granted concessions to private firms to operate radio and TV businesses on its frequencies. Retrieved from *"Strong military role in NBTC"* http://www.thaivisa.com/forum/topic/495973-strong-military-role-in-thai-nbtc/ on April 15, 2012.

or consultants in academic institutions. When the MICT implements its projects and policies, these vendors and consultants interact with users and ICT officials at local agencies. Users and local ICT officials have closer contact with the vendor and consultant teams than with the MICT officials. These constraints impose and are imposed by the MICT's approach to the system and network integration efforts.

At the beginning, the MICT developed a national centralized e-Document system aiming for every agency to adopt the system. The new system standardized the documentation flows and procedures. As the agencies were required to change practices and procedures that had long been in use, the agencies were not willing to switch systems. The MICT has subsequently moved to a gateway strategy, promoting the Thailand e-Government Interoperability Framework (TH e-GIF) information exchange framework to build interoperability between the legacy local systems. The system relies on web services that retrieve information from a given system and transfer it to the recipients. In developing the gateway framework, as discussed in detail in chapter 5, the MICT has adopted a bridging strategy, incorporating representatives of other agencies and experts in academic institutions into its TH e-GIF standards committee and holding public hearings to gather feedback and comments from the agencies' ICT officials, ensuring shared goals and meaning among agencies. The MICT manages, crafts, and controls information sharing standards that the various local systems should comply with. The standardized information gateway, in theory, acts as a bridge that makes connections between agencies seamless and the translation and flow of information across agencies' systems transparent to most officials in the agencies. As intended by the MICT, this translation process is meant to be invisible to end users, including the administrative staff working most directly with the systems. Indeed, some staff members I interviewed were not even aware of the integration efforts.

During the framework development, the MICT has established communication and coordination with other agencies through national ICT standardization task force meetings and public hearings. As there are 25 different e-Document systems with various technologies, platforms, information structures, and formats, most agencies do not share information standards, and so the cross-agency cooperation has not necessarily been successful. Also, the MICT provides the Government Information Network (GIN) as a centralized high-speed network linking all ministries and departments in the public sector.

The GIN is intended as the primary backbone supporting information exchange for common back-office applications, including the interoperable e-Document system. To promote switching from the agencies' existing networks to the GIN, all costs are borne by the MICT for an initial three-year period. After that, agencies will be billed on the basis of network utilization. But such switching can entail serious costs in efficiency and control. As one senior ICT official of a ministry explained,

> *"Each individual agency has already set up its own networks, applications, and data structures. No one, us included, is willing to change the system and work configuration to fit with one another for government integration because it would affect the whole system and the staff's practices."*
>
> *(Informant interview, July 2010)*

Therefore, the MICT has initiated negotiations with each individual agency. It works with local ICT officials to put their data elements in the e-Document system in an XML schema meeting TH e-GIF standards. The MICT provides information repositories for agencies to send and retrieve data elements with one another, without having to be compatible with others' information standards.

As empirically shown in this account, the MICT acts as a boundary organization for inter-organizational information integration efforts linking agencies and their different information structures and data elements in a hub-and-spoke fashion. Involvement and collaboration among government agencies mostly depends on the MICT's connective role. The MICT works with ICT officials at individual agencies to translate the national information standards into their local e-Document systems, while gathering local practices and standards from all relevant agencies to make sure that each of the systems is interoperable with the others through the established information gateway.

The degree of freedom of local agencies (through their boundary agents) in developing adjustments around and negotiating with the systems depends on their relative power to the boundary organizations that develop the systems. In the e-Document system integration effort, as discussed previously in chapter 5, the MICT does not have any power or authority over other agencies. Local ICT officials and administrative staff (or the boundary agents) have more negotiating power with their agency than does the boundary organization (here,

the MICT), and so are able to maintain their documentation practice and current system, information structures, and procedures.

Unlike the MICT, the CGD has budgetary power over all individual agencies, and so can enforce the adoption of the GFMIS and associated new financial and accounting procedures and practice. A MICT executive official stated that:

> *"The MICT is a policy regulator, and trying to be an implementer unit as well, with no authority to enforce other agencies. We do not control agencies' ICT budget either. It is almost impossible to get cooperation from other agencies. Look at the CGD. It has successfully enforced from top to bottom, from central to regional units of all agencies to use the system. Although the system is not perfect yet, the CGD eventually manages to create one single centralized financial database of the public sector. But the e-Government development projects like the large information networks are duplicate among the MICT, the Ministry of Transport, and the Ministry of Interior. Therefore, the MICT tends to build new systems over existing systems because we cannot achieve integration"*
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> *(Informant interview, August 2010)*

6.5 Challenges and Tensions Attending Boundary Work

As the discussion above has shown, boundary objects, agents, and organizations play crucial and underappreciated roles in the e-Document system development in Thailand, and intra- and inter-organizational coordination more generally. They bridge agencies, and their actors, in complex bureaucratic organizational communication. They mediate artifacts that consist of enough content for the needs of various actors in the coordination work within and across agencies. By creating and managing shared standards, they are able to translate otherwise incompatible local practices into formats through which sharing can, at least in principle, be achieved. In this sense, the boundary objects, agents, and organizations involved in digital government development in Thailand have blurred traditional agency boundaries and enabled innovative forms of inter-organizational coordination which cross and connect traditional bureaucratic silos, hierarchy, and fragmentation.

But this sort of boundary work also imposes certain kinds of costs and tensions.

6.5.1 Problems of multiple memberships

In the interoperable e-Document system efforts, the ICT staff – the boundary agents – at local agencies live in two communities and hold multiple roles across the overlapping communities – as ICT persons of their local agency and as national ICT staff of the national

digital government development, thus encountering identity and loyalty problems. Work requirements of both communities may be mutually exclusive. Many ICT officials mentioned in the interviews that the ICT staff always gives priority to their local agency and its routine work, as well as other internal development projects, over the national government ICT community, led and organized by the MICT, as they create a stronger identity in the agency than they do in the task force, which they perceive as an ad-hoc community.

Consequently, the problems of membership, identity, and loyalty in local ICT officials become a major challenge for the MICT in collaboration attempts at standardizing and integrating e-Document systems and other government ICT applications. The MICT has to minimize the impact caused by changes that the integrating efforts may bring about in local practices and systems, and diminish additional work requirements for the local ICT staff to maintain the cooperation from the agencies. A senior ICT official at a departmental agency reported that:

> *"We (the ICT Center) have to be 100% sure that the MICT can link its national centralized databases across different e-Document systems before we connect our networks and e-Document system to the interoperable ones. We have to make sure that the transition is seamless and the users are not at all affected by this transition. If we are not absolutely certain, it is better to delay the national project than to have problems on our end. The internal operation is our priority. The reliability and continuity of the system are more critical here than connecting the system with other agencies. If the users report any problems with the system to the Director-General, we will be dead."*
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> *(Personal Communication, July 2010)*

6.5.2 Problems of invisibility

The administrative staff and their tasks have always been under-recognized, if not invisible, to most of the officials in the agency. While officials, including executives, value documents as an intra- and inter-organizational communication tool, they perceive the e-Document systems and electronic documents in a narrower scope in terms of its functionality and the numbers of relevant organizational actors. To them, the systems and electronic documents serve as tools for the administrative staff, not for them. The systems, thus, tend to be invisible to them and their role as important boundary objects less emphasized in organizational communication. As a result, the adoption of the systems seems to be limited in a small group of actors, i.e., the administrative staff, while the majority of officials are not

widely involved in its adoption and use. Therefore, the government's hope to transform the communication forms from physical documents to electronic formats remains frustrated.

6.5.3 Problems of authority

With their status as the agency's officials, ICT officials often find themselves in the difficult situation of fulfilling their users' requirements while meeting criteria for national integrated or standardized systems. Also, many interviews with ICT officials revealed a problematic implication for the authority of the ICT Center, suggesting that other officials who are computer and system users in the agencies perceive ICT officials as technicians rather than professionals. Like administrative staff, ICT officials usually have an inferior hierarchical status to the ministerial line of work. The underemphasized status of the ICT officials in the government is also reflected in the officials' limited career advancement. Their career path hits the ceiling when they are in the middle ranking (or what is referred to as Class or C6-C7) or early senior ranking (C8), as opposed to that of those working in the main functional line which can go to the executive level (C10-C11) in the agency. The highest possible position for ICT officials is director of the ICT Center (i.e., C8 or C9 depending on the agency's organizational structure).

The CIO position in a particular ministry is formally attached to one of the deputy permanent secretaries or senior consultants (C10) by default. The way in which CIO positions are attached to the executive position implies that the government doesn't recognize the importance of having an official with qualified ICT expertise or experience in the government as the agency CIO. Rather, the government tends to emphasize the management skill and decision power of the CIOs. Among the six agencies in my study, the CIOs of all except one are the deputy permanent secretary, and do not have any ICT-related educational background. Not having knowledge about ICT, the CIO (or the deputy permanent secretary) usually appoints the ICT Center director as her assistant on CIO-related work.

In the users' view, ICT officials are supposed to provide technical support when requested, as opposed to enforcing new systems and associated practices. Unless additional procedures or new practices are requested by the users or demanded by the executives, the ICT Center barely succeeds in introducing new systems that require a change in procedures or practices.

Although information and technology infrastructure is practically feasible for a fully computerized documentation process, many manual practices with physical documents remain the primary ones in government agencies. Among the six agencies in which I conducted interviews and observation, the Ministry of Transport was the only one where most officials in the ministry checked incoming documents through the e-Document system. The director of the ICT Center explained that the permanent secretary was engaged in ICT development and use in the organization. Therefore, he issued an official order determining that every official was required to check his or her email and document inbox every day through the agency Intranet system. The ICT Center's effort at deploying the e-Document system as a part of integrated internal communication system thus went relatively smoothly, though physical documents are still the main artifacts in the intra- and inter-agency communication at the Ministry.

In contrast, the ICT Centers of other agencies, such as the Ministry of Commerce, have faced barriers and challenges attending the e-Document system implementation effort both within and across the ministries. In interoperable e-Document system development, the ICT Center of the ministry as a whole (that is, the ICT Center for the Office of Permanent Secretary) serves as the de facto ICT Center for each of the ministry's departments. However, each department is still legally required to have an ICT Center of its own with equal authority as its counterparts in the other departments. The supervising ministry does not have any directive authority to enforce changes in internal documentation practices of its supervised departments. Perhaps a simple explanation to the structural difficulties and barriers in any information system initiated by a ministry ICT Center lies in the interview with a senior ICT official of the ministry:

> *"The major cause of failure of deploying new technologies is that the Ministry's ICT director is outranked by the department director-generals and the deputies. We (the Ministry ICT Center) cannot ask or order the department ICT Centers directly to do such and such. We have to go through hierarchical communication channels – asking the department director-generals for permission and cooperation. If the director-generals agree with the ideas, they will order their ICT Center to adopt and implement the technologies. But if not, that is the end. The decision power is theirs. Unless it is an order from the permanent secretary, other departments' ICT Center will never listen to us."*
>
> *(Informant interview, August 2010)*

At the national level, collaboration and cooperation in large-scale interoperability efforts among agencies are formally centralized through the connection between individual agencies and the MICT. Therefore, the MICT links and leads other agencies in the digital government development initiatives. As a boundary organization, however, it has encountered issues of authority. In this relationship, the MICT is perceived as an organization that identifies national information and other technological standards, which typically require other agencies to do additional tasks in order to comply with those standards. Authority-wise, as a ministry-level agency, the MICT does not have authoritative directives or budgetary power over any agencies to enforce compliance and coordination. The collaboration is purely based on the consent of other agencies through the Memorandum of Understanding (MOU) between the MICT and each agency, rather than directives. Inter-agency collaboration is thus limited in both the number of agencies and the specific types of collaboration. The MICT gains such collaboration mostly through the implementation of inter-organizational integrated systems that do not require changes in the current systems or practices of local agencies. Therefore, the systems that go through the gateway development trajectory for interoperability tend to gain more cooperation from agencies than those that are forced as a new standardized system on the agencies.

Furthermore, there were also ICT-related commissions and agencies established prior to the MICT, and that still perform jobs similar to the MICT's. Consequently, the MICT has never had a clear job description or role in digital government development in Thailand.

6.5.4 Problems of trust

The MICT encounters trust issues among other agencies due to the political structures in the ministry. Not only linking local ICT staff and applications, the MICT also has special characteristics in its boundary organization role, i.e., providing information and technological resources and assistance for other agencies. The availability and reliability of its resources are critical for other agencies. As a new ministry with uncertain administrative policies and organizational practices, however, it performs the function of boundary organization with some uncertainties and discontinuity. Often, many development projects were initiated and then terminated, or forced to undergo a major revision. Thus, other agencies' ICT Centers are not confident about the long-term availability of the technological assistance that the MICT provides, such as information repositories for the interoperable e-

Document system. As one of the directors of ICT Center questioned the continuity of the MICT's operations that:

> *"They (the MICT) never guarantee that they will keep the applications running forever. They can't promise us anything. Then who will want to give a shot using their applications? How can I trust them? If they can answer these questions, I am pretty sure that everyone will want to use the systems."*
>
> *(Informant interview, February 2010)*

Besides the uncertainty as to whether or not the ministry will remain in existence, the internal organizational structure of the MICT has been problematic. The division responsible for the Government Information Network (GIN) is the Bureau of e-Government Development, whereas the division in charge of the e-Document system integration and TH e-GIF is the Ministry's ICT Center. These two divisions report to different deputy permanent secretaries. Although both divisions are supposed to coordinate in the effort to integrate the e-Document systems running on the GIN, the separation of authority and reporting structures makes it difficult for them to coordinate horizontally. This problem results in confusion at the end-user agencies and local ICT officials who have coordinated with both divisions separately. An ICT official reported that:

> *"The other day, the MICT contacted us saying that they would come by to update the database configuration. I told them that the GIN was not working, and asked them to contact the network team to check the problem for us. They promised they would. But I did not hear back from either team for a while. When the network came here for scheduled maintenance, I asked why didn't they come to fix the problem. They claimed that they did not get any request from the TH e-GIF team. I guess they never talk to each other."*
>
> *(Informant interview, July 2010)*

The MICT senior official whom I interviewed also admitted to having internal communication and management problems, which results in a failure to earn trust from other agencies. Human resources-wise, additionally, the MICT lacks skillful, experienced, and knowledgeable staff. Most of the officials at the ministry are policy analysts rather than computer or ICT specialists or experienced technicians. All ICT-related projects initiated by the MICT have to be outsourced to academic institutions or private-sector system vendors. Thus, the MICT is heavily dependent on outsourcing expertise, becoming just a project coordinator between the outsourcing parties and the user agencies. This issue tends to raise

questions among individual agencies about the MICT staff's knowledge and expertise in large-scale ICT initiatives.

6.6 Summary

In this chapter, I have sought to apply lessons from STS, including elaborating boundary objects, agents, and organizations, to bear on the empirical case of intra- and inter-organizational communication and cross-agency coordination efforts in the Thai public sector. As the above discussion has shown, boundary objects, agents, and organizations play crucial and underappreciated roles in e-Document system development in Thailand, and intra- and inter-organizational coordination more generally. They bridge and link between agencies and actors in complex bureaucratic organizations. They mediate among organizationally disparate actors by producing and circulating artifacts used to coordinate work within and across agencies. They create and manage shared standards while translating otherwise incompatible local practices into formats in which sharing can, at least in principle, be achieved. In this sense, the boundary objects, agents, and organizations involved in interoperable e-Document system development in Thailand have blurred traditional agency boundaries and enabled innovative forms of inter-organizational coordination which cross and connect traditional bureaucratic divisions, silos, and hierarchies.

But as the case of e-Document system development in Thailand also shows, this sort of boundary work faces distinctive challenges and limits. A series of common problems, including those of multiple memberships, invisibility, and incompatibility and asymmetries, attend the boundary work and the agents who perform it. Boundary agents in Thai e-Document development have, for the most part, been organizationally subordinate to the groups with which they interface and connect. This has limited their power to compel change in norms and practices among many of the groups that digital government reform efforts are ostensibly targeting; although the administrative staff has adopted the electronic-based documentation, their practice has not had significant impact on other officials' documentation practice. As a consequence of the invisibility and authority issues of the boundary agents, e-Document system adoption has proceeded slowly, and where it has moved forward it has tended to operate as a shadow system with limited reach outside of

administrative staff – a minor augmentation, but hardly a replacement, for document flows of the paper type.

In this regard the work of boundary agents, by holding together an otherwise untenable situation, may enable a certain kind of organizational conservatism that preempts rather than encourages change. It also poses new and often severe burdens of work, as failures in the more widespread adoption of the new digital systems leave boundary agents tasked with effectively running two systems in parallel.

The MICT, as a relatively recent and consciously integrative agency, also faces some crippling problems of its own – problems of authority and of trust. These problems have become barriers in coordinating between worlds and integrating systems and practices across agencies empirically seen in the efforts at e-Document interoperability in this chapter, and the efforts at information infrastructure standardization and integration of Government Information Networks (GIN) and the Thailand e-Government Information Framework (TH e-GIF) in chapter 5.

A possible implication of this study is that when introducing new information systems and associated practices, boundary agents and organizations may require additional authority and visibility for their work, including new authoritative or budgetary powers to persuade or compel more thorough changes in practice. This point is illustrated well in the comparison between the development and deployment of the integrated e-Document system and the GFMIS (discussed in chapter 4). But this in turn may undermine their ability to bridge and connect between worlds, undermining their boundary-spanning functions and turning them instead into new tools and instruments of centralization and control, just, as the GFMIS now has managerial and financial control over individual agencies.

Chapter 7
Conclusion

Since the early 1990s, computerized systems have become part of Thai government operations, varying from common internal functions, such as financial management, personnel management, and document management; to more specific tasks like case management; and to online public service delivery, such as vehicle registration service, e-Customs, and trade- and logistics-related services. The fundamental goals of the stand-alone system include automating some work processes; increasing the speed, accuracy, and efficiency of operational procedures; collecting and storing information; and reducing the use of physical documents. Computerization efforts so far have made important contributions to government goals, such as developing the organizational repositories of information and digitizing fundamental work procedures of the main government operations.

But as shown throughout my thesis, the development and implementation of the government ICTs is not a simple process. On the one hand, the design of information systems involves, and is a result of, a struggle over political and bureaucratic power and control among government officials and elected politicians. Information systems developed and used within an agency usually represent and emphasize top-down hierarchical control and decision-making structures. They are a consequence of the executives' decisions regarding the work procedures, oversight, and approval processes. The case tracking system, for example, allowed executive judges to track the status of pending cases, and the performance of individual judges. Similarly, the inter-agency information systems have enabled politicians to gain oversight and control over the government's main resources, including budget and expenditures and the workforce, through line agencies, such as the Bureau of the Budget, the Comptroller General's Department, and the Civil Service Commission.

On the other hand, the adoption and use of the systems also involves a contest for power and autonomy between the executives and lower-level officials. It reveals the work processes that are captured and encoded into the systems. It also demonstrates how the systems are designed and supposed to be used, and how agencies and officials actually use or *do not* use them, which may deviate from the design goals, in response to managerial directives, work requirements, and control from top agencies and higher-level officials. For instance, most officials in the studied agencies avoided updating their task progress in the performance management information systems because they did not want their superiors to know how much they were running behind schedule. They also did not want to use the systems as their supervisors appeared to reap benefits from their achievements whereas they perceived that the monetary bonus they would receive for their achievements was not worth the effort they had to devote.

Interestingly, the implementation of information systems in the government has resulted in informal job allocations between supervisors and subordinates around the systems. Most system users were junior officials who interacted with the systems on behalf of themselves to prepare information for their supervisors: acknowledging, reviewing, and approving documents and transactions. A few junior officials were also assigned to use the systems on behalf of their supervisors, as high-ranking officials tended to delegate their computer-related tasks to middle managers or junior officials due to their busy schedules and/or limited computer proficiency. Therefore, a number of junior officials were given access to their bosses' accounts to acknowledge documents or approve transaction requests, as required by the systems hierarchical levels in order to proceed further. This common practice was seen in several cases, including the use of GFMIS, DPIS, e-Document systems, the performance management information systems, and the case tracking system, across the studied agencies. In the e-Document systems, for example, the administrative staff would acknowledge incoming documents addressing executives and enter executive orders using the executives' user accounts. In the GFMIS, financial section heads approved budget requests on behalf of the financial director, using the director's access card. And in the case tracking system, the case officials logged in to the system as their supervising judge to print out case progress reports for their boss upon request. Although the design of government information systems emphasized the hierarchical structure of the bureaucracy, the actual practice of government officials in the systems was misaligned with the structure of the

computerized systems. Therefore, system adoption has mostly been limited to the lower levels of the agencies.

Task allocation and the supervisors' dependence on the lower levels for the work around information systems have also led to changes in the relationships among the government officials within agencies, and in specific practices around computerization. As their computer-related work has been delegated to their subordinates, the executives and high ranking officials still maintained or invented other means inside and outside the systems to retain their supervision and control authority over the junior staff. As a consequence, the executives usually required physical records, such as official forms and documents or printout reports, that could have simply been viewed and approved electronically. For instance, the approval authorization for budget requests and money transfers had to be granted on paper by the financial director before the corresponding electronic transactions in the GFMIS could be made. The financial staff also needed to make a copy of every transaction submitted electronically through the GFMIS and registered those documents with the agency's document numbers for their internal reference and auditing purpose. Likewise, the General Division director signed and had a small note on every document as an endorsement that she had reviewed the content of the documents and had ensured his/her staff's accuracy in addressing the document to the appropriate destination before the document would be forwarded to the executives for directives, while the junior administrative staff may have already sent the electronic information of that document to the executives and its appropriate destination.

The empirical findings show that physical documents have remained the preferred media, over electronic records, in most operations across agencies. Administrative staff still carried registration books and logbooks when delivering official documents; case officials heavily relied on their personal case docket logbooks; and HR officials kept the personnel information in the OCSC#7 more up-to-date than in the electronic systems. One may even argue that physical documents have not yet lost their significance in government operations to any extent and that the manual practices associated with physical documents around the computerized systems will remain active for a long period of time, and might prevent full ICT adoption. New information systems are likely to operate in parallel to, rather than replace, traditional manual routines and paperwork. Physical documents may not be

eliminated unless higher-level officials use the systems themselves, and/or higher-level agencies officially require the termination of the documents. On a larger scale, inter-organizational information systems like the GFMIS, DPIS, and the Customs Department's National Single Window underline the government's efforts at standardizing work practices and procedures across government agencies, and decreasing the redundancy of information infrastructure development. These systems were designed with the goal of replacing the stand-alone systems developed and used by individual agencies and eliminating duplicate information resources by allowing agencies to share with others. Nonetheless, rarely have the legacy versions of such systems been retired from individual agencies. Agencies found that the government-provided information systems were too limited to accommodate work procedures and practices at the local level. Thus, they kept their existing systems running to serve their internal operations while using the national systems to comply with the government requirements as they were forced to adopt them. Most agencies in my study still maintained their legacy financial management information systems in order to manage the agency's internal bookkeeping and budget allocation because the GFMIS did not provide such functions at the micro level. Similarly, all agencies have used their legacy personnel record management systems and spreadsheets, alongside the DPIS, to manage their internal organizational structures and informal job allocations, which are different from the official ones in the DPIS.

Moreover, the inter-agency systems were not designed to allow any connection with the agencies' individual systems and databases due to the differences of information structures and work procedures among agencies, as well as concerns about information security. Therefore, the inter-agency systems and the legacy systems have been coexisting in the ICT development efforts.

For numerous reasons, the duplication and accumulation of information systems and databases have resulted in the persistence of two system problems [195], and electronic red tape [155] discussed earlier in chapters 4 and 5. The electronic red tape in interoperable system development efforts accurately fits the development trajectory of the National Single Window development, as seen in my study, where the system required only one data entry point for businesses but it duplicated the data to all the databases of individual agencies needing it. In other systems using a gateway strategy for interoperability, such as the

interoperable e-Document systems, the same data had at least two copies – one was at the agency of origin, the other was at the gateway database.

Additionally, the problems of electronic red tape and two systems have remained true in government agencies. Physical documents associated with manual practices still represent the primary process and infrastructure among the officials. Although they imitate the fundamental manual procedures, and have gradually become part of their routine work, information systems have not been fully embedded into officials' operations. Specifically, senior officials who were trained to conduct their work with physical documents have found that computer-related work procedures and the associated practices add additional tasks to the existing manual work they are familiar with. As discussed in chapter 5, a systems' invisibility or transparency of use, and its embeddedness into the officials' work practices, reflect the relational quality of information infrastructure [183]. Although documents, as artifacts, are physically visible to every official, their use and functionality provide invisible support to the work and goals of the officials. They provide objectives and instructions allowing the individual officials who approach them to recognize related work and practices. In contrast, officials are less aware of the work associated with electronic documents and systems, as e-Document systems are primary used for tracking and back-up purposes. Therefore, paper documents remain the primary medium.

Moreover, computers and information systems have barely become embedded in the existing work of the officials. That is, officials can fully perform their work through manual practices and documents when the systems are down. In contrast, computerized processes still require a fair amount of manual tasks and information outside of the systems. Computerized processes could be interrupted or discontinued as long as the manual practices and documents are still in use. The officials, whether consciously or not, tend to work and rely on the physical documents unless they are required to perform their tasks with the information systems as empirically seen in the cases of document preparation versus e-Document systems, and case docket management versus the case tracking system. Much like governments all over the world, these two-system and electronic red tape problems have remained in ICT development and use patterns in the Thai public sector.

Nevertheless, I do not argue that the delay in ICT development, the limited and slow adoption of systems, the continuous use of physical documents and their associated manual practice, and the redundancy of information infrastructure development represent the failure of digital government development efforts in Thai bureaucracy. Rather, they emphasize the tensions and challenges of the efforts resulting from particular organizational dynamics and socio-political factors in the Thai government, in addition to the technological difficulties. In this chapter, therefore, I want to draw practical and policy lessons for digital government development efforts concerning limits, tensions, and challenges of ICT development and deployment, especially in Thailand, as well as in a wider government context. These lessons may be useful for both practitioners and scholars in the digital government community to anticipate and minimize, or even overcome, such difficulties in their efforts at ICT development, adoption, and use in bureaucracy.

Throughout the three main thematic chapters in my thesis, I have compiled a comprehensive list of limits, barriers, tensions, and challenges facing efforts at digital government development both at the local and national levels. Suggested by the analysis thus far, this series of problems can be classified into five interconnected elements: people factors, organizational and bureaucratic factors, political factors, legal factors, and technological factors.

7.1 People Factors

The people factors involve two main components that contribute to the challenges and resistance to computerized systems. The *first* component involves long-established practices and old habits of the government officials. For over two decades, digital government efforts have led to officials adopting and using information technologies and computerized systems as part of their routine operations. As pointed out earlier, though, the information systems in the early computerization period did not redesign the existing work process, transform government operations to eliminate unnecessary processes and forms, or fully automate work with electronic documents. Instead, the systems merely imitated manual procedures and duplicated corresponding documents into electronic form. Additionally, the deployment of information systems has been an incremental process, as opposed to one of radical change, to allow the officials to adapt and adjust. In my study, senior officials, who were then junior or middle ranked, reported that they were forced to learn and use computers and

information systems in the middle of their career while they were used to traditional manual procedures and not at all comfortable with the new technologies. Therefore, they tended to hang on to physical documents and maintain their manual practices, outside the new systems, in case there was a technological or human error. Thus their work has been a mixture of manual and electronic practices with paper and digital documents, but with a strong emphasis on paper documents.

Government officials have been notorious for their slow adaptation and inflexibility to change. Their work has been based on a rule-driven basis, rather than a results- or goal-driven basis, regardless of the government's administrative or performance reform efforts. Although computerized systems promised to increase the speed of operations, the actual work associated with the systems did not do much in this regard because most officials have maintained the manual practices to which they were accustomed. These manual practices have been passed down from generation to generation of officials through on-the-job training and mentorship. Consequently, most officials in my study stated that computerized practice actually slowed down their work as it duplicated their primary practice – manual work – as shown in the documentary work and performance evaluation across the agencies, as well as case status tracking at the Court.

The *second* component is related to the officials' perception of computerized systems versus physical artifacts. The officials, particularly those in senior groups, tended to have more trust in physical records than their electronic counterparts. Compared with electronic records, physical artifacts provide greater flexibility for officials in that they are accessible from anywhere and can be transported easily. They also were seen as a more reliable repository. The officials had a sense of ownership over physical records, while feeling that they owned virtually nothing of the electronic records. As some officials reported, they were concerned about losing specific pieces of information or entire records in the system without their knowledge. They would never be able to track or retrieve the lost information by themselves, and would not know where the information had gone. According to the officials, it was beyond their knowledge and power to control information access and security in the computerized systems as opposed to physical documents and files, which were kept in a secure room in their sight. They were concerned that electronic records, such as personnel records in the DPIS, may be not valid, and human resources officials were likely to be found

liable if the incorrect information resulted in a wrong decision made on a particular employee. Therefore, they tended to depend on physical evidence for their own protection from any liability from information loss and invalidity. For them, hard-copy records were more visible and accessible, yet more secure and reliable than soft-copy ones. Paper records were also traceable with proper logging methods. The administrative staff created official logbooks or personal log sheets requiring the recipients' physical signatures and timestamps in order to keep track of documents passing through them. Similar incidents occurred at the Administrative Court where the great concern among case officials was losing a case docket. Therefore, they had to strictly keep track of the dockets' whereabouts on their personal logbooks, which were always accessible and never left their presence. They required officials who took the dockets away from them to sign and date their personal logbooks. The logbooks enabled them to identify the persons or divisions responsible in the case of missing documents. In addition, the use of logbooks has de-emphasized the necessity of using the corresponding systems (i.e., the e-Document systems and the case tracking system), which provide identical information for tracking purposes and managerial control, hence requiring the officials to input the information they already had on hand.

Another benefit of the physical records is to prevent the officials from being blamed for poor performance. Officials have often avoided or misused the tracking mechanism for performance monitoring and evaluation purposes in several of the computerized systems. For example, most administrative staff members tended to avoid using the e-Document systems to check out the incoming documents, so the senders had trouble tracking their outgoing documents. They could not depend on the checkout time in the system to assess the senders' performance because the receiving staff did not pick up the correspondence in the system until they had the physical copies on their desk. This misleading information may have caused the senders to fail their performance evaluation because the system indicated that the correspondence was still in process. Officials thus perceived that the information that was recorded and shown in the electronic systems was completed, and out of the staff's capability to control or modify it. In contrast, it was easier for the staff to negotiate among themselves and with their bosses to edit or omit any information on physical records. As a consequence, the staff had to maintain the physical logbooks, and have the recipients sign and date in their logbooks to reflect the actual document flows and the delivery date and time.

The underlying premises of the systems were misaligned with officials' perceptions and practices. The officials' old habits around physical records and manual practice, and the lower level of affordances concerning accessibility, reliability, and protection mechanisms of electronic documents in comparison with physical documents, have put the electronic systems and associated practices in an inferior position. Government work, thus, has remained a paper-dominant practice.

7.2 Organizational and Bureaucratic Factors

The second element of the tensions and challenges of ICT development and adoption is related to bureaucracy's organizational culture, values, and traditional work practices. *First*, it has to do with a misconception about the values given to computer and technology work in bureaucracy. Among Thai government officials, computer and computer-related tasks have been considered supporting work. Computers were first introduced to non-computer officials as a replacement for typewriters, to be used in data entry and documentation work, in addition to data processing. Prior to the computerization period, this type of work involved lower-level staff, i.e., data entry clerks. Superiors and management officials would hand their written drafts to the data entry clerk, now referred to as administrative staff, to type and prepare them in an official form. Because computers were very expensive in the early computerization age, individual agencies could only afford a limited number so they pooled them among the administrative staff to help other officials by typing their written documents. Thus, computer-related work became associated with data entry work, and unfortunately gained a poor impression as secretarial work, as opposed to technical work carried out by officials in the main lines of work in an agency. To maintain their crucial image as important personnel, the non-administrative officials tended not to do that kind of secretarial work themselves. Yet, computers had a certain cultural value attached to them as modern, cutting-edge tools. Management-level officials usually demanded to have computers installed in their office for such symbolic associations, even though they may not have known how to use them in any functional way, hence allowing their subordinates to use the computers in their office.

Second, the findings from my study suggest that officials were likely to be distant from computers as they advanced in their career, although most officials had access to a computer. Government organizations highly value hierarchical class systems. Ranks, the number of

subordinates, and personal assistants, among other perks, represent the class and career advancement of a particular official. Senior officials, with high ranking and management positions in particular, had their subordinates and assistants do the work requiring preparation and redundant tasks, such as documentation, reporting, and making presentations, while they performed the thinking or planning tasks. Those tasks assigned to the subordinates usually involved the use of computer and information systems on behalf of the ranking officials. It was not unusual to see subordinates in their boss's office working at the computer. Again, the bosses still retained their close supervision outside of the electronic world through official documents and physical records. Bureaucratic values, priorities, and work practices resulted in the delegation of tasks and the limited patterns of ICT adoption, resulting in most users being junior officials, as empirically shown in the use of the systems in the study.

The distance between senior officials and computer-related work is also a consequence of the system development not taking into account the management-level use of the systems in the design. Knowing that executive and senior officials rarely used computers, system developers tended to focus the design of the systems for use by officials at the lower hierarchical levels, aiming at daily operations such as data entry or transaction processing, rather than executive decision support. The design was thus packed with immensely detailed input screens to serve entry-level functions. During the implementation, the management-level officials were only briefed on how the systems worked, and what information the systems would provide them. They were never trained on how to use the systems. Rather, the training programs for junior officials, who were the target user groups, focused on how to use the systems screen by screen. Given little understanding of how to use the systems and provided only small benefits for using them, the senior officials were even more unlikely to work with the systems.

Third, as emphasized in chapter 5, collaboration among government agencies has always been a challenge. This is partly due to the localistic attitudes of officials [114], and partly because of political instability and struggle in Thailand. In the infrastructure development and standardization efforts, agencies were not willing to share their information or information infrastructure with other agencies, as much as they did not want to piggyback on other agencies' existing information and systems. Even within the same ministry, each

department wanted to collect their own data, and develop their own databases and systems. Owning information and infrastructure allowed the agencies to gain exclusive sources of incoming budget for system development, procurement, and maintenance; autonomy over the collection and use of their own data; as well as credit and a better reputation with the public.

Furthermore, individual agencies were not willing to relinquish their existing information resources and rely on other agencies' information and systems because they could never be sure whether the development agencies would allow the use of the information and systems forever. Requests and offers to share information resources were usually made based on informal and personal, yet strong, connections between executives among the agencies through memorandums of understanding (MOU). This sort of relationship might last as long as these officials were in their positions, but any change in management positions was likely to affect prior arrangements between the agencies, as policies of the new executives may be different and could jeopardize the previous connections and MOUs. The transition of the politicians overseeing the agencies often resulted in subsequent changes in the bureaucrats in managerial positions. Agreements on sharing and exchanging information made between former officials were likely to be dropped.

7.3 Political Factors

The state of Thai politics may intensify the issues arising from organizational and bureaucratic forces. *Firstly*, ministers from different political parties are not usually in agreement, especially when it involves power and benefits from the projects. An example of such tensions is the conflict between the Ministries of Interior and ICT over ownership of citizen ID cards procurement, including the purchase of over 60 million microchip-embedded smart cards. The ministries were each overseen by ministers from different parties both tried to claim relevance to, and expertise on, the cards. The Ministry of Interior (MOI) claimed responsibility of the citizen registration database and the ID cards issuing units. Thus, it wanted to take care of the smart cards procurement. The Ministry of ICT, on the other hand, claimed its expertise on smart card technology. Although the cabinet demanded that the MICT acquire the ID cards, the MOI dragged its heels raising issues concerning the cards' compliance with the MOI's regulations and specifying the colors and some small details on the cards, ultimately rejecting the whole batch of ID cards from the

MICT. The conflict and contest over the procurement prevented the MOI from being able to issue the cards to citizens, thus requiring the issue of temporary documents until the problem was resolved months later when the cabinet determined that the MOI should revise its regulations so that the acquired cards could be accepted.[16] The solution also brought transitions, demotions, and punishments to some management-level officials at the MOI who did not obey the politicians' wills. This incident illustrates the great dependence of the bureaucracy on political struggles, and the subsequent difficulty and uncertainty around ICT-related policies and projects, particularly cross-agency ones.

Anticipating political tensions and contests, therefore, each government agency tended to acquire and develop their own systems to ensure the permanent availability of information and systems for their operations, and the accessibility and control of financial and technological resources.

Secondly, there is a hierarchy and class system among the agencies, which affects the deployment and adoption of ICTs in the public sector. Among politicians and officials, government agencies may be informally classified by their size, funding amount, and their impact on national and governmental policies. For example, the Ministry of Transport and its dependent Department of Land Transport are considered A-grade agencies because they are in charge of several mega-projects, generate large income through their service fees, and have regional offices throughout the country. The Ministry of Interior is one of the oldest and largest ministries, holding the national citizen registration databases and overseeing local municipal offices, hence it is listed as one of the top agencies, as well. The Ministry of Finance (and its Comptroller General's Department) is another first-class agency, formulating the country's financial policies and holding budgetary power over other agencies. These top agencies tend to develop their own information infrastructure as they can access large amounts of funding. Both MOT and MOI are the first and only ministries to have their own physical networked infrastructure.

Lower-status ministries include the Ministry of Agriculture and Cooperatives, the Ministry of Labor, and the Ministry of Culture. They are considered second-class agencies because

[16] "Yongyut proposing to Cabinet for smart cards purchase," Komchadluek newspaper (April 10, 2011). http://www.komchadluek.net/detail/๒๐๑๑๐๐๔/๑๑๐๘๕๕/ยงยุทชงครม.ซื้อสมาร์ทการ์ด.html Retrieved from on August 18, 2012.

their public policies and programs have little impact on other agencies and/or their annual budget plans are smaller than those of the top agencies. Other lower-status agencies are relatively new and small, like the Ministry of ICT, which has been established for less than 10 years and has only two dependent departments.

My study suggests that the MICT suffered from its low status and lack of power over other agencies. While it was supposed to be the government ICT development spearhead and the boundary organization in the inter-organizational integration system development efforts, the Ministry was faced with challenges of information standardization and integration efforts. It did not have any budgetary power or directive authority over other agencies. In addition, the staff of the MICT was not system developers or system engineers. Rather, they were policy-oriented officials with little technical skill or expertise. Therefore, the MICT had to outsource its integration system development to government-owned companies or private firms, and its staff only performed the roles of project manager or coordinator. Given the little knowledge and expertise the MICT staff had, computer officials in the other agencies did not have confidence in the MICT, and thus hesitated to give up their own information systems and resources and switch to the MICT-operated infrastructure.

Besides the technical limitations of its staff, the MICT also suffered an inferior status within the government agency community. As a relatively junior and small-scale agency, the MICT failed to force or convince other agencies to adopt and use the Government Information Network (GIN) it provided and originally planned for the information integration initiative. In my interviews with officials at the MICT, the MICT had to propose its plan to the Cabinet for its authoritative directives and to the Finance Ministry for its budgetary power to force the adoption of the GIN. The Cabinet issued a resolution to forcibly seize the infrastructure budget of particular agencies dedicated to network leasing from private companies and bypass that budget to the GIN lease instead, so that the agencies would have to switch to the GIN. In the e-Document system interoperability effort, the MICT developed a new version of the e-Document system for full cross-agency information exchange and information format standardization, hoping that most agencies would adopt it. But without any incentives or power to force the adoption, the MICT encountered a major barrier in that no agencies would voluntarily relinquish their existing systems. As a consequence, the MICT had to adopt the gateway strategy for interoperability with limited

functions and information retrieved, converted, and passed on across different e-Document systems of individual agencies.

Lastly, ICT officials across the government have been in doubt about the long-term existence of the MICT and the continuity of its policies and associated ICT initiatives. As reported in chapter 6, an MICT official pointed out that one of the actual goals of establishing the MICT was to favor the former prime minister's telecommunication business. The Ministry's roles and responsibilities were very similar and oftentimes overlapped with those of other agencies and commissions, like the National Broadcasting and Telecommunications Commission. ICT officials in the other agencies were skeptical and hesitant to adopt the systems developed and provided by the MICT partly because they were uncertain about the future of the MICT; they did not trust the MICT's capacity to operate such sophisticated information systems; and because they had to give up exclusive control of their network utility, system configurations, and information access management. The agencies that could afford their own physical information networks, for instance, adopted the GIN as a backup system without giving up their primary networks. Most agencies did not give priority to the e-Document system integration and information standardization efforts over their in-agency projects.

The combination of organization, bureaucratic, and political tensions and challenges has created a redundancy of information and systems throughout the government, leading to problems of information incompatibility for the government as a whole. This also makes it even harder for agencies to collaborate and share information.

7.4 Legal Factors

Another serious impediment to computerization efforts comes in the form of the legislative process and numerous legal restrictions. The Thai public sector has long been widely criticized for its slowness, inefficiency and resistance to innovation – a kind of general organizational plodding captured in the Thai phrase 'meal in the morning, meal in the evening' indicating a kind of generalized monotony, complacency, and lack of imagination on the part of government officials. Critics also charge public sector organizations with excessive rules and regulations, and slow and redundant procedures. Digitizing work process required change in many relevant laws and formalized procedures. In order for

electronic documents to have a legal effect equivalent to that of physical documents, the government needed to revise the current Government Document and Archives Procedure, which had not been updated since 1983, to recognize electronic documents and digital signatures. In addition, each individual agency had to update their document procedures to comply with the new government procedures.

Although the Act of Electronic Transactions was enacted in 2001, agencies lacked interest in revising procedures to accommodate their internal processes or cross-agency transactions, and thus continued their work with traditional practices. A few transactions and processes have been digitized, though, as a result of external pressure from citizens and the private sector, or to be competitive in world markets. These include government interactions with external entities like e-Tax filing, or the Customs' trade-related transactions and the implementation of the National Single Window (NSW).

Reducing paperwork and promoting electronic transactions required the revision of many laws and procedures that were issued and enforced by different agencies, who were not necessarily willing to put high priority on such work. The Department of Land Transport (DLT) reported that they could not implement their electronic vehicle registration renewal through an automated kiosk service because the relevant procedures did not facilitate the process. The renewal service involved the revision of the Ministry of Finance's procedures on payments: when a payment was received, two copies of a receipt with an authorized official's signature were issued at the same time – one was given to the payer, the other to the agency for auditing. This requirement made it almost impossible for the DLT to deploy the automated kiosk service, but the Finance Ministry did not give priority to the revision that would have solved it. Therefore, the DLT had to put the project on hold. Also, department-level agencies were subject to laws and regulations by their supervising ministry. Their operational procedures were thus constrained by ministerial regulations. To modify their existing work process might require change that was beyond the agencies' autonomy. The amendment of ministerial-level laws involved an even more complicated process because the revised laws had to be approved by the Council of State and then the Cabinet. According to an interviewed senior official at the DLT, this process took at least six months.

Consequently, legal restrictions have impeded the innovation of public service delivery and information systems, as traditional laws and regulations did not usually facilitate or authorize new practices or channels of communication within the public sector or between the government and citizens. These restrictions, along with the other aforementioned factors, have also given rise to the slowness and delay of information standardization and integration efforts across the agencies, because all relevant organizations had to modify their internal procedures and associated practices to comply with the government ones.

The legislation revision also needed commitment and a big push from the top of the bureaucratic hierarchy, or even higher. For instance, information system development projects initiated and forced by the minister or the permanent secretary were likely to be carried out more successfully and the systems more likely to be adopted than those initiated by a department or mid-level officials. Similarly, the cross-agency legislation revision may require political power from the elected government, as seen in the deployment of national-level projects like the GFMIS or the NSW. As computerization usually involved complicated legal procedures and regulatory amendments, officials were inclined to use this difficulty as an excuse to delay the system development of a particular system that would affect and/or was not aligned with their existing work procedures and practice, autonomy, and power structures.

7.5 Technological Factors

Technological factors are the last category of limitations and barriers that impede efforts at standardization and integration of information and services in digital government development, such as the development of NSW for agencies engaged in trade- and logistics-related functions and the interoperable e-Document systems in this study. These technological limitations and barriers include issues of technological resource asymmetries, concerns about information security and privacy among the agencies, and the rigidity of integrated systems.

Technological resources for ICT development include ICT personnel, skills, and expertise; current technologies; and system development and maintenance funding. The government has encountered the issue of resource asymmetries among individual agencies. Information integration or interoperability projects usually required more advanced hardware and

software, but small agencies tended to have less updated technologies and a small number of ICT officials, and so found it hard to keep up with the larger agencies whose technological resources were more advanced and abundant. The integration efforts, therefore, were constrained by the resource asymmetries.

Among many others, an effort that suffered from resource asymmetry is the e-Customs and NSW implementation. Each individual agency in the effort operated different functions for trade and logistics services, but they needed to share and exchange information across the agencies. Therefore, there were heterogeneous systems performing specific functions at individual agencies that needed to be interoperable. Customs was thus unable to provide a new centralized system or technical aids for individual agencies. Yet, it had to develop an information gateway for all of those systems to exchange their information that complied with the information standards using the government information framework (TH e-GIF). The effort crucially depended on the collaboration among local agencies, and the technological readiness of each agency. It was prone to slowness and delay as the deployment had to wait until every agency was able to catch up technologically and operationally.

Alternatively, the agencies responsible for or leading the efforts could employ different strategies subject to their system deployment plans and available resources. The leading agencies could provide all agencies with technological infrastructure, including information networks and equipment, application servers, computers to connect to the centralized databases, and client systems at local agencies, as well as technical support through their own technical staff and service centers. With this provision, the spearhead agencies would reduce the workload and involvement of ICT officials at the local agencies, and thus not require any local resources. It would also ensure the standardization of information and practices, as well as symmetrical technological resources because each agency would use the same system developed by one agency on the same infrastructure. However, this strategy requires sophisticated system configurations and substantial financial and technical resources. The agencies that could adopt this strategy needed to have some power or authority over other agencies to enforce the system adoption. The Comptroller General's Department (CGD) used this strategy to deploy the GFMIS. The CGD and its outsourcing system development firms were responsible for the development and implementation of the

GFMIS. As empirically shown in chapter 5, the ICT officials at local agencies had very little involvement with the processes before or after its deployment.

Another alternative strategy is to provide the standardized system for all agencies, but deploy it on the local agency's infrastructure. The Civil Service Commission (OCSC) developed and deployed its DPIS to all agencies, but individual agencies could choose to adopt the systems only if they had appropriate infrastructure – network and hardware – at their offices. The ICT officials at local agencies installed the system on their servers, and configured the connection with the OCSC's remote servers. Once the system was operating, though, they tended to be bypassed for technical support from the OCSC. Similar to the development process of the GFMIS, the ICT officials were barely engaged in the system design, development, or operation of the DPIS.

Although these two system deployment strategies seemed to mitigate the problems of resource asymmetries across agencies, they have given rise to the problems of ownership, commitment, and control of the local ICT officials over the centralized and standardized systems discussed in chapter 5. In addition, lacking ownership and control of the government-provided systems also has led to users losing trust in their local ICT staff, as they perceived that the ICT division was not capable of solving technical issues. Consequently, the issue has reinforced the distance and created tensions between users and ICT officials in agencies.

Furthermore, inter-organizational system development has raised concerns over information security and privacy. As explained earlier, officials, particularly senior officials, relied on physical documents since they were more confident of controlling the access to and modification of those documents than of electronic records. This perception has impacted the concerns even more in the inter-agency context. The officials were concerned that the information that was shared and exchanged across the agency boundaries was beyond their control, but may still be their responsibility if misused. With the lack of trust in the MICT's technical capability of information system management and security policies, individual agencies were not willing to switch their existing information network to the centralized government network (GIN) provided by the MICT. In the cases of inter-agency integrated systems such as the NSW or the interoperable e-Document systems, most agencies in my

study were hesitant to allow the exchange or sharing of information related to their internal operations. For example, Customs had to make sure that other agencies that were not relevant to the logistics business did not have authorization to access the business registration information of the Ministry of Commerce, which was shared only for logistic purposes through the NSW gateway. Individual agencies also allowed the MICT's gateway to retrieve only specific information about the outgoing documents, without accessing their internal e-Document systems.

Such access limitations hampered the efforts of seamlessly interoperating into one large system, with full functionality, the different systems across the agencies. Additionally, they also led to rigidity in the integrated systems. The integrated systems could only share specific functions across the heterogeneous systems due to the limited amount of information allowed to be shared. The integrated systems were developed mostly to achieve the government and/or the leading agency's goals of information integration at the national level. They could not meet all requirements of the individual agencies; the systems would be cumbersome and overly complicated in their development, use, and maintenance. As a result, individual agencies still had to maintain their systems to fulfill internal operations. Local staff also needed to develop workarounds and adjustments, or even supplementary systems, including paper systems, to satisfy the agency's operational and managerial requirements that the integrated systems could not. Ultimately, this led to constant redundancy and two-system problems.

These five non-mutually exclusive elements have explained the socio-political and technological limitations, challenges, and tensions in the digital government development of Thai bureaucracy. Such complications have caused delay, redundancy, and barriers to system adoption and desirable practices. But these difficulties are not always unsatisfactory or excessive. As Lindblom [120] discusses, incremental change allows the officials to adjust to a new work environment. The traditional practices around paper and legacy systems that have been carried into the digital and inter-organizational environments provided a bridge in the transition from legacy systems and old practices to new technology and more desirable practices.

7.6 Implications and Contributions

Throughout my thesis, I have tried to map patterns, tensions, and dynamics in digital government development in Thailand, identifying a series of social and political factors that affect and are affected by the adoption and use of ICT in the Thai public sector.

The development and design of ICT is related to political agendas. Such agendas involve administrative reforms, organizational structure rearrangements, and control and political power reinforcement. Struggles over political power and organizational and information resources among politicians and officials, specific attitudes and characteristics (e.g., localistics) of the officials, and the management approaches (e.g., traditional rule-based, goal-driven, and functional-silos approaches) of government operations have shaped the distinctive design and development of the government's information systems and infrastructures.

In bureaucratic contexts where hierarchical norms and traditional seniority systems are very rigid, ICT adoption and use patterns are likely to be aligned with the long-established hierarchical rankings and statuses of the officials in the organizations. As a particular official moves up to higher positions and statuses, his/her practices around ICTs also change to align with the practices of the new group to which he/she now belongs. For example, the arm's length relationship to technology and the delegation patterns among senior officials to their subordinates are the consequences of bureaucratic culture and norms. Such patterns, however, also develop a covertly upward relationship between the supervisors and their subordinates in which the supervisors depend on their junior staff for ICT-related work. This relationship is parallel to the formal downward flows of command through the bureaucratic hierarchy between senior and junior officials.

Also, political contests, the officials' attitudes, the inflexibility to change of the bureaucratic organizations and their members, and the misalignment of existing work practices and requirements to the new ones have resulted in the challenges, limits, and tensions attending the development and adoption of ICT in the government. In many cases, officials invent practical adjustments and workarounds to facilitate their needs and soften the tensions and challenges. In the cases of more serious clashes between the new and traditional practices, the issues may lead to resistance to the technology.

In this final section of the dissertation, I want to bring together the findings and analysis from chapters 4, 5, and 6, and consider the larger implications for technology development and adoption. Drawn from associated concepts from the literature reviewed in the thesis, these three analytical implications extend the understanding of ICT development and use in the public sector for digital government scholarship and the broader field of information science

7.6.1 Organizational hierarchy

Technology development and deployment is highly associated with hierarchy in organizations. Design of information systems reflects hierarchical chain of command and communication in the organizations despite the fact that the systems either reinforce centralization or promote decentralization. The systems underline the hierarchy in the organizations by centralizing information upwards (e.g., the DPIS), monitoring and auditing operations through hierarchical supervision and control (e.g., the GFMIS, the performance management information systems, and the case tracking system), and facilitating communication through the hierarchical flow of authority (e.g., the e-Document systems). Specifically, bureaucratic organizations, which have long established strict authority orders and traditional seniority systems, are inclined to develop and deploy information systems that emphasize such arrangements, and discourage the use of computerized technologies that do not have, or violate traditional hierarchy in bureaucratic organizations.

The information systems in Thai bureaucracy are designed to support the vertical line of control and communication although some systems decentralize a certain level of decision-making power to mid- and lower-level staff, and allow local database management and information access. For instance, the GFMIS authorizes mid-level officials to approve some financial transactions. Yet, the hierarchical monitoring and auditing functions of the financial director and the permanent secretary are executed through users and authorization levels. The design of e-Document systems also strictly follows hierarchical flow of document-based coordination and communication. In contrast, email for internal communication is a non-hierarchical communication technology as opposed to e-Document systems. Email communication can break the chain of command as messages can be sent to anyone without following the vertical flow of authority, while long-established communication in the government is strictly rigid through hierarchical orders with very

specific formats and protocols. As a result, officials are discouraged to communicate via email with their supervisors or the executive. Email, rather, is mostly used for informal communication among colleagues horizontally with similar ranks.

The implications of organizational hierarchy also play an important role in technology adoption and use, as it plays a role in determining work practices associated with technology. The executives and senior staff rarely use any of the systems due to their limited computer proficiency or the misalignment of their work practices and the systems' affordances. Nevertheless, they still exert their decision-making power and control authority through hierarchical monitoring and reporting tools. This authority is often exercised outside of the systems in a paper form used in parallel to its electronic counterparts. The executives and supervisors may give up their control and supervision authority in the system by delegating the tasks to middle managers and their lower-ranked assistants. But they maintain their decision-making and control power through manual work, hence requiring the paper-based documents to be processed along with the electronic process. Consequently, the mixture of paper-based dominant and computer-based work practices has remained the main ICT adoption and use patterns in the Thai public sector.

7.6.2 ICT and organizational change: Organizational structures

The technology development and adoption patterns, and ICT-related practices discussed above carry consequential implications regarding the relationship between ICT and organizational change. Computerization efforts in Thai bureaucracy of which organizational structures are strictly based on hierarchy reflect and enhance the existing decision authority structures, which is top-down dominant approach. One of the primary goals that are common among the studied systems (i.e., GFMIS, DPIS, performance management information system, and case tracking system) is to tighten the management's oversight and control power, and to provide information supporting decision-making.

On a national scale, the prime minister determines the development of the GFMIS to monitor the budget spending of individual agencies and the government as a whole, and to exercise his/her decision power regarding real-time budget allocation through the system. Similarly, DPIS is designed to allow the Civil Service Commission, under the prime minister's supervision, to oversee the government workforce of each individual agency for

planning. These systems underline the top-down management approach and centralization of decision-making power and structures of the government. Exerting their budgetary and personnel power over other agencies, these line agencies successfully deploy the GFMIS and DPIS although individual agencies may face challenges and tensions attending the system adoption and use. Conclusively, hierarchy reinforces managerial control through technology.

These findings and implications support previous literature discussing the correlation between ICTs and organizational structures. My study substantiates the findings that existing organizations' power structures shape computing technological development rather than the other way around [96,103,105,106,160].

7.6.3 ICT and organizational change: Work practices, and roles and relationships among individuals

Another implication relates to change in the roles and relationships among government officials. According to the findings, such change takes place at particular levels among limited groups of actors in the organizations. ICT in the Thai public sector is considered as a tool to support daily operations and secretariat work, rather than a critical tool for decision-making and planning. This perception has implications that ICT-related skills and competency are only required for lower-level staff, while high-ranking officials can perform their work in a non-ICT work environment.

Supervisors often have to depend their ICT-related work on their subordinates, or rely on the information provided in electronic systems from their staff. The dependency on their subordinates may undermine the superiority of the senior-ranked staff. However, the symbolic association and social status gaining from the ICT-related task delegation and arm's length ICT adoption underscore the values of hierarchy, authority, and seniority that have been deeply rooted in the bureaucracy, hence outclassing the professional advantages of ICT proficiency. Although ICT competency is required for junior officials, it adds very little value to career advancement of the officials to the management level. While ICT adoption and use is required for junior officials, it becomes less relevant as the officials proceed to higher positions. This superiority of bureaucratic status suggests the adoption and use distinction between the group of junior and middle-ranked officials, and the senior staff. Consequently, the officials' common perception and attitude towards computer use in the

government have inevitably become a barrier to ICT adoption generally and digital government development efforts specifically.

Accordingly, changes in work practices resulting from the implementation of new ICT merely affect the junior up to mid-level staff, as they are required to adopt and use the systems, and have to deal with subsequent changes in the associated tasks. The changes may be involved adopting new practices associated with the technology, maintaining the existing ones, and inventing new practices as a bridge in the transition from the legacy to the new technology. Such changes barely affect the work of the higher-ranked officials or the executives. Similarly, changes in the relationships between supervisors and junior staff in which the superiors have to rely on their subordinates' performance regarding ICT-related work are likely to occur between the lower and middle levels of the bureaucratic hierarchy, as opposed to between the middle and high rankings.

7.6.4 ICT and government efficiency

The final point I would like to make is relevant to public sector efficiency. Although computerization promises to increase the speed and efficiency of public administration and service provision, it does not necessarily expedite government operations. Rather, the speed of computerized work essentially depends on and is equivalent to the speed of its corresponding paper-based work. The Thai public sector has maintained its long-established paper-based documenting practice running in parallel with the electronic process, hence resulting in the mixed paper-electronic ecology of information and communication practice today. Electronic documents can be delivered to the destination division or department instantly through the e-Document systems. In practice, however, the registration process and subsequent work do not begin until the corresponding paper documents arrive at the administrative staff's workstation.

Besides the speed and efficiency of government work, computerization efforts do not seem to improve the accuracy of government information either. In the case of integrated information systems like the DPIS, electronic information transfer and exchange across agencies is possible in theory, but quite limited practically. Personnel officials rely on the accuracy of information on the physical artifacts (OCSC#7), as the OCSC#7 is updated immediately when there is a change in the information about a particular official whereas the

information on the DPIS may not be updated until the Commission requests the information from the system. When an official moves from one agency to another, the human resources division of the new agency always refers to the information on the OCSC#7 rather than that transferred electronically.

In addition to sticky practices, traditional norms, and legal restrictions in the bureaucracy, the impediment to public administration improvement is due to the insufficiency of work process transformation. The design of computerized systems is inclined to duplicate existing manual process rather than transforming the work process to cut down unnecessary steps in the manual work that can be automatically processed in the systems. Also, electronic system is designed based on the reliance on physical documents. The government has stalled the termination of physical artifacts such as correspondence documents in government communication, and the OCSC#7s in personnel work, even though there are electronic copies of the same documents. The mixed paper-computer work ecology naturally impedes the improvement of public administration speed and efficiency.

Last but not least, I would argue that some socio-political characteristics of Thai bureaucracy will persistently remain challenges and barriers to ICT development efforts. Hierarchy has been strictly enforced in the Thai public sector, and does not appear to be lessened through generations of government officials. Hierarchical patterns play a crucial role in determining the design of information technologies, and how the technologies are actually used in the organizations. At the national level, the deep-seated individualistic and bureaucratic- and functional-silos characteristics of government agencies have impeded efforts at information and system integration and interoperability. Individual agencies compete to gain and retain information infrastructures because information ownership means autonomy, authority, and financial resources. Inter-agency information sharing and interoperability threaten the agencies' control over the infrastructures, and often cause change in work processes and practices at individual agencies. Therefore, efforts at information and system interoperability usually invoke tensions and resistance at the local level.

These socio-political and technological conditions substantially contribute to the description of ICT development and adoption trajectories of particular bureaucracy. My hope is that my

work will inform researchers and practitioners in the communities of information science, organizational studies, digital government, and public administration of the need to understand and account for those factors when designing, developing, and implementing government information technology in the specific national context of Thailand, and a wider government bureaucratic context. Such factors, drawn from organizational and bureaucratic history and contexts, have resulted in distinctive ICT development trajectories in Thai bureaucracy. They also yield work practices around technology development and adoption in Thai public sector organizations that are different from those of other organizations in different bureaucratic contexts although the technologies are similar functionally. This work may also present a useful case study for international comparative studies in digital government development efforts among countries whose organizational and bureaucratic histories and contexts are similar to Thailand's, though they may result in different ICT development and deployment approaches.

Appendix

Interview Protocol

In the preliminary study and the first round of fieldwork, I wanted to gain a better understanding of how IT is developed, adopted, and used in a government setting. I was also interested in what government officials perceive and how they interact with the IT in their organization.

The format of the interview was a one-hour long, semi-structured interview. The interview was conducted in Thai to be later recorded, transcribed, and translated to English by the researcher (me). During the interview, I also took notes.

There were three groups of interviewees: 1) IT staffers who work in the ICT Center; 2) non-IT, junior officials who have worked at the agency for less than 5 years; and 3) non-IT, senior officials who have worked at the agency for over eight (8) years.

The following questions were asked of all subjects:

1. Could you walk me through your computer use on a daily basis?
    a. What do you use a computer for?
    b. What types of systems do you use?
2. How often or how long do you need to use a computer in your daily work? What types of software or systems do you use?
3. When a system is broken, what do you do? How do you cope with the problem?
4. When a computer or a system breaks down, can you diagnose the symptom? Can you identify it as a hardware, software, or network problem?
5. Who are the main people responsible for IT adoption and use? Who (such as initiators, decision makers, influencers) is involved in the processes of budget allowance, selection, procurement, development, implementation, adoption, use, and maintenance of IT projects?

6. Currently, what are the major parts of departments/tasks of the organization that IT is supporting?

7. What types of IT services do you think the organization is lacking or needs improvements?

8. When you find a need for improvement of a system you are using, do you inform anyone such as your colleagues, your boss, or IT personnel?

9. Do you or your co-workers ever develop any application or tool such as an Excel or Access application to facilitate your own work functions?

10. Are there any collaborative projects such as integrated services between your organization with other departments or ministers?

    a. If so, what is the type of project? How do people in the taskforce or the committee meet and communicate? How do you share information among each other? Is there any physical office or location for this particular project in order to deliver service to the public or to host the computer equipment?

The following questions are intended for non-IT, senior officials:

1. When were the first IT system (hardware and/or software) initiatives established? For what purposes? In which departments/tasks of the organization?

2. Who or what initiated the ideas of using IT in the organization?

3. How were those initiatives developed and implemented?

4. Did you use the system the same way it was initially proposed?

    a. If not, why not? How did you use it differently?

5. Did you encounter any barriers and limitations in the early stages of IT adoption in the organization?

6. Are those barriers and limitations still ongoing issues these days?

    a. If yes, have there been any attempts to solve those issues? And why did those attempts not work?

    b. If no, how has the organization resolved those issues?

The following questions focus on IT personnel:

1. Could you tell me the process of getting an IT project approved starting from initiating the project until the implementation of the system?

2. What are the purposes of the systems/projects currently used in the organization?

a. Do the officials actually use the system in the way it is intended to be used? How do people use it differently?

b. Do you need to readjust (alignment and resistance issues)?

3. Regarding system development, does the ICT Center develop the system, and maintain the services itself? Or does it hire or outsource the projects?

4. Who is involved in the system development process?

5. Who owns the license over the application and source code?

6. What do you do when you need to modify the application after implementing the system?

7. Have you noticed any changes in IT adoption and use among the non-IT staff members? In what way?

8. Do the officials in this agency know how to use IT and the systems you provide correctly and is their use actually aligned with the underlying premises of the systems?

    a. If not, do you provide any additional services/training programs to help them augment their perception and ability regarding IT adoption and use?

9. What is the annual budget for this project? Is it increasing or decreasing each year? How do you allocate the budget?

10. Are there any IT services or systems that your organization collaboratively develops with other agencies within the same ministry and/or outside the ministry?

11. What are the differences between the IT development, adoption, and use trajectories for the projects developed and used within your own organization and the collaborative projects?

12. As to the hardware and software problems, how do you deal with these issues? How do you help the users when their computers or applications break down?

13. What are the most common problems you encounter when the users call for help?

For the second round of fieldwork, I explored the roles, responsibilities, and authority of the MICT and/or the E-Government Agency (EGA) in Thai digital government development – information and network integration and interoperability efforts, particularly in interoperable e-Document systems, and the TH e-GIF (Government information interoperability standards framework) development and implementation. This would provide policy implications for the Thai government regarding boundary organizations in digital government development.

Questions for the MICT and EGA staff:

1. What are the purposes of transferring the Division of E-Government Development and Support from the MICT and establishing the EGA?
2. What are the organizational and reporting structures of the EGA to the government, e.g., the Prime Minister, the Cabinet, the Ministries, and the MICT?
    a. Are there any government officials physically working at the EGA?
    b. What is the status of the EGA staff in relation to government officials?
    c. What are the EGA staffers' qualifications (i.e., computer specialists, programmers, engineers, etc.)?
    d. What are the EGA staffers' job specifications?
        i. Do they offer technical advice to government agencies? Or do they outsource the consulting task to education institutions?
        ii. Do they develop and/or provide any software to government agencies?
    e. Does the EGA have any authoritative power over government agencies?
    f. What happens with the Government Information Technology Services (GITS)[17] after the establishment of the EGA and the transfer of GITS' staff?
3. Is or will (and how) the MICT be involved in digital government development after the establishment of the EGA?

[17] GITS is an organization under the supervision of the National Science and Technology Development Agency (NSTDA), which is under the supervision of the Ministry of Science and Technology.

a. Is the MICT still practically working with any digital government development projects?

b. How do both organizations divide the responsibilities in digital government development?

c. How do both organizations coordinate?

4. What are the roles of the MICT and the E-Government Agency (EGA) in the e-Document system integration efforts?

Questions for local government agencies (CIOs, Directors of ICT, and ICT officials):

1. Did you expect any changes in the way your agency and your ICT officials coordinate with the EGA, compared with the MICT?

2. Do you (CIOs/ICT directors, agency officials) notice any change in working and coordinating with the EGA, compared with the MICT regarding information integration and interoperability efforts?

    a. Are you more cooperative with the EGA than with the MICT or vice versa? Or about the same?

    b. Do you think the establishment of the EGA creates higher level of trustworthiness and reliability of the boundary organizations and long-term government-provided infrastructures?

    c. Does the EGA's performance look promising to you so far?

3. From your perspective, what is not working at the MICT (and the EGA)?

4. How would you change the roles, responsibilities, and authority of the MICT, the EGA, or other agencies that perform similar tasks in national digital government development?

Furthermore, I wanted to investigate the adoption of e-Document systems and the implications for hierarchical structures of Thai government. I wanted to explore the implications for roles of administrative staff and the General Division. Example empirical questions:

Questions for officials who create or receive documents:

1. When you are to write a memo to someone in your agency, do you talk to that person discussing or explaining what you are doing or needing first?

a. If you are to write a memo to someone in another division who is in a similar position/rank as you, do you contact him/her in person first? Do you discuss what you are to write in your memo with your boss?

b. If you are to write a memo to someone in another division, who is in a higher position, do you contact him/her in person first? Do you discuss what you are to write in your memo with your boss?

c. If you are to write a memo to someone in another division, who is in a lower position, do you contact him/her in person first? Do you discuss what you are to write in your memo with your boss?

d. If you are to write a memo to your immediate supervisor, do you contact him/her in person first?

e. If you are to write a memo to the permanent secretary or the deputy, do you contact him/her in person first? Or do you discuss the purposes of your memo to your immediate boss before writing it?

2. When you receive or expect a document from someone within your agency, does the document owner talk to you in person before sending the document to you?

3. Do you use the e-Document system? For what purpose: retrieving documents, sending documents, tracking your documents, reading agency circulating announcements, etc.?

4. How often are you logged in to the e-Document system, compared to other electronic media like Facebook, email, news sites, etc.?

5. Do you work with documents in physical or electronic form? For example, do you wait for physical documents to arrive at your desk to start working with them or do you view and/or print them out from the system?

6. Have you ever thought of using the e-Document system regularly just like you use other electronic media?

   a. If so, but you do not use it regularly, what constrains the use? How do you wish to use the system?

   b. What feature would you wish the e-Document systems to have in order to help your daily work?

Additional questions for higher-position officials (e.g., division directors, deputies, and permanent secretaries):

1. Do you prepare your own document drafts (whether by writing or typing) or let your subordinate prepare them for you?

2. Do you prefer working with physical or electronic documents? Why?

    a. What types of documents (i.e., memos, external documents, and circulating announcements) do you think should be digitized and used in electronic format only? Why?

    b. What types of documents can be digitized and used in electronic format only? Why?

    c. Do you encourage the use of the e-Document system? How?

3. Do you think it is possible that all government documents will be used electronically? Why or why not? What facilitates and/or constrains the use of electronic documents?

4. In what way do you think the e-Document system helps the agency's documentation? (e.g., speed, traceability, track-ability)

5. Have you ever been logged in to the system? How often? Or do you have someone log in to the system on your behalf?

    a. If you have someone use your account and password, why do you do so?

Questions for administrative staff:

- **For those who <u>previously worked</u> with a manual system** (i.e., who have worked in General Division or documentation work for over 10 years)

1. Do you notice any change in document flows compared between the manual system and the electronic system? What has changed?

2. Do you (your agency) still work with the same number of documents in terms of the number of copies of each document?

3. Do officials rely on your work as a documentation worker more or less after the adoption of the e-Document system?

- **For <u>all</u> administrative staff**

4. What are major pet peeves you have found working with the e-Document system?

5. What are problems you have encountered such as miscommunication, loss of physical documents or electronic documents, different data element standards among divisions, etc.?

    a. How do you solve these problems?

6. In the effort at integrating e-Document systems within your ministry (among departments) and with other ministers,

a. What are the major concerns for you?

b. What are the major problems you are facing?

c. Do the integrated systems reduce or increase your workload? In what way?

7. Do you think it is possible that the e-Document system will be used by all officials, and all documents will be sent electronically without physical papers?

    a. If not, why not?

    b. If so, how do you think your roles in documentation work would change?

8. Do you think current document practices should or could cut down some steps, procedures, or people involved in the documentation process? If you could change the practices and procedures, for example, when you receive an incoming document from another agency, would it be possible to bypass documents from your immediate supervisor (section head) to the Director of General Division or even send the document directly to the Deputy?

- **For middle managers**, e.g., section head, and General Division Director:

9. Do you think it is possible that the e-Document system will be used by all officials, and all documents will be sent electronically without physical papers?

    a. If not, why not?

    b. If so, do you think there will still be a need for administrative staff for documentation work? And what roles would the administrative staff shift to?

Lastly, I investigated change in work, professional roles, and career paths of government officials. I was looking at how computing-related Key Performance Index (KPI) system, Performance Management Quality Award (PMQA), work agreements, and work evaluation have changed government officials' work, roles, and the relationships among them.

Questions for non-ICT officials:

1. How do you use computers in your daily work?

2. How does computerization help your work?

3. Without a computer, would you be able to perform your work manually? What would change in your existing practices?

4. What are computer-based skills that you were required to develop in order to work with tasks that need such skills?

    a. How did you develop those skills?

b. Were you afraid that you might lose your job or get transferred to other positions if you did not have or develop those skills?

c. Were there any officials who had to leave because of lacking those skills?

5. What is your strategy to select what tasks you list in the agreement forms?

6. Do the tasks listed in your agreement and evaluation forms involve any computerization? If so, what are they?

7. Does the KPI system require you to change the way you worked previously? How?

8. Does the PMQA and KPI systems facilitate or constrain your and your Division's work and goals? How?

9. How would you perform the same tasks you are currently performing 20 years ago (before computerization)?

10. Do you think in the next 10 years, your job might be fully computerized?

a. What do you see yourself in the next 10 years? Next 20 years?

b. What if your job was to be fully computerized, what would you do?

Questions for the Office of Civil Service Commission (OCSC) and the Office of the Public Sector Development Commission (OPDC) staff:

1. What are the objectives of the implementation of KPI, PMQA, agreement, and evaluation systems? (e.g., manpower, structures, downsizing, efficiency, etc.)

2. What are the short-term and long-term objectives of the implementation of these agreement and evaluation systems related to government computerization?

a. Is one of the objectives related to downsizing?

i. If so, what does the OCSC/OPDC plan to do with the human resources in individual positions (lower, middle, and higher positions)?

b. Is the OCSC/OPDC trying to computerize government tasks?

i. Will some of government tasks be fully computerized in the future, say in the next 10 years?

ii. What kinds of tasks would that be?

3. What are the goals of adding computerization requirements such as databases, knowledge-based systems, and decision-support systems into government agencies' PMQA measurements?

    a. Has the OCSC/OPDC achieved its objectives?

    b. Do you think government agencies meet those computerization requirements and really make use of the systems they create for the requirements? Or do they develop the systems just for passing the evaluation, and then ignore them?

    c. If agencies develop the systems to meet the evaluation, but never use them, do you think the KPI and PMQA measurements are effective tools? How can you prevent this? And how can you encourage the agency to make use of those systems?

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