

## Determinants of E-Government Assimilation in Indonesia: An Empirical Investigation Using a TOE Framework

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E-government needs to be successfully implemented and assimilated into organizations to take advantage of its potential values and benefits for organizations. This study examines factors for e-government assimilation in Indonesia and employs the TOE (Technology-Organization-Environment) framework to develop a theoretical model to explain e-government assimilation. It also investigates how organizational type (central vs. local) plays a role in the assimilation of e-government. One hundred eighteen respondents from the central and local governments in Indonesia participated in the survey and an in-depth analysis based on partial least squares (PLS) was carried out. The results show that ICT infrastructure has the strongest significant relationship with e-government assimilation. Top management support, regulatory environment, ICT expertise, and competitive environment are also significant factors to explain e-government assimilation in Indonesia. Central and local governments significantly differ in terms of e-government assimilation, so organizational type can be a moderator in the process of e-government assimilation. These findings present the efficacy of the proposed model for analyzing e-government assimilation and contribute additional insights for academia as well as practitioners and policy makers.

**Keywords :** IS Management, E-Government, Assimilation, TOE Framework, Indonesia, Partial Least Squares (PLS)

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## I. Introduction

The advent of Information and Communication Technology (ICT) has significantly changed organizations to conduct their activities and interact with their customers. Private sectors have been at the forefront of the ICT revolution, while government organizations followed to adopt the benefits of ICT to improve their internal processes and interact with their stakeholders. ICT is a significant factor for improving organizational performance [Henderson and Venkatraman, 1993; Reich and Benbasat, 1996]. The use of ICT has emerged in recent years as an instrument that can bring benefits to government organizations, such as cost savings, improved communications and coordination, expanded citizen participation by government initiatives and increased government accountability. Citizens and policy makers agree that governments can improve their services and operations by more effectively utilizing ICT at all levels [Sanchez *et al.*, 2003].

Research on utilizing ICT in the government sector is categorized as e-government. E-government is the process of enhancing the relationships that government has with its stakeholders (e.g., citizens, businesses and employees) through ICT to improve the efficiency, effectiveness, transparency, accountability, responsibility and service delivery of public governments [Kraemer and King, 2003; World Bank, 2000]. Numerous studies have examined e-government adoption, implementation and their impacts [Brown, 2007; Moon and Norris, 2005; West, 2004; Marche and McNiven, 2003]. Brudney and Selden [1995] found that ICT contributes to the modernization of public administrations. Previous studies on e-government are classified into three main areas including

e-government development and evolution [Kunstel and Vintar, 2004; Srivastava and Teo, 2006; Tan and Pan, 2003], e-government adoption and implementation [Koh *et al.*, 2005; Melitski *et al.*, 2005; Li, 2003], and the impact of e-government on citizens and businesses [Banerjee and Chau, 2004; West, 2004].

This study focuses on e-government assimilation in Indonesia which is consistent with previous research in the area of e-government adoption and implementation. Technology assimilation refers to the degree that technology use diffuses across organization projects or work process and becomes a part of the activities of those projects and process [Purvis *et al.*, 2001]. Fichman and Kemerer [1999] also describe assimilation as the process by which a new technology spreads within organizations stretching from initial awareness of the innovation to potentially formal adoption and full scale deployment. This is similar to the study of innovation assimilation grounded from Innovation Diffusion Theory [Rogers, 1995]. E-government assimilation is the process by which a new information technology innovation needs to be assimilated or ingrained into the value chain of government activities before it can generate significant business value for the organization. E-government assimilation is an important facet of e-government diffusion and has a significant impact on organizational improvement and performance. Policy makers need to understand the process how government organizations learn to initiate and adopt new information technologies in an effective and efficient manner to achieve successful e-government. This study empirically validates a research model to explain which factors have significant roles in e-government assimilation in Indonesia, and how

e-government assimilation is affected by its antecedent factors using the TOE (Technology-Organization-Environment) framework [Tomatzky and Fleischer, 1990]. This study also examines the effect of organizational type (central vs. local governments) as a moderating variable of the e-government assimilation process. The TOE framework, a useful theoretical lens for understanding technology adoption, has been mostly used in the context of e-business [Zhu *et al.*, 2003; Zhu *et al.*, 2006]. This study expands the TOE framework to the e-government domain.

Indonesia is a developing country and is undergoing major changes with respect to government reform. Indonesia is implementing a modern governance system and is developing e-government programs as a major issue and means for establishing good governance. Few empirical studies on e-government analyze a particular e-government adoption and implementation [Moon and Norris, 2005]. This study explores ICT diffusion with respect to its assimilation of e-government systems.

The rest of this paper is organized as follows. Section II presents the literature review of e-government assimilation and the TOE framework; Section III develops the theoretical model and hypotheses; the data collection method and research methodology are presented in Section IV; the results are presented in Section V; Section VI discusses the implications of this research and concludes with limitations and directions for future research.

## II. Literature Review

### 2.1 E-government Assimilation

Information System (IS) assimilation has been a

topic of interest in the IS domain for more than two decades [Fichman and Kemerer, 1997; Chatterjee *et al.*, 2002]. Assimilation has its theoretical roots from anthropology, which has been further utilized in several disciplines such as management science, marketing, organizational behavior, research and development. Assimilation refers to the process by which individuals from one cultural group become a part of or "blend" into a second group [Flanagin and Waldeck, 2004].

The studies on e-government assimilation are grounded in the innovation diffusion theory [Rogers, 1995]. Technology diffusion is the process by which a technology spreads across a population of organizations, while technology assimilation refers to the process by which a technology is adopted and routinized within an organization [Fichman and Kemerer, 1999]. Functional parallels exist between IS implementation in general and the diffusion of a technological innovation [Premkumar *et al.*, 1994; Fichman and Kemerer, 1997; Kwon and Zmud, 1987]. Armstrong and Sambamurthy [1999] argue that IS assimilation is a central objective and an essential outcome of adoption and implementation efforts. DeLone and McLean [1992] state that a new technology must be fully integrated or ingrained into a value chain before the technology can generate significant business value. This research examines the concept of assimilation in the e-government context integrating research from innovation diffusion and IS assimilation. This study defines e-government assimilation as a technology enabled process that can become routinized and embedded in an organization's work and value chain activities [Armstrong and Sambamurthy, 1999; Chatterjee *et al.*, 2002; Purvis *et al.*, 2001].

## 2.2 TOE Framework

This study employs the TOE framework to develop a comprehensive model to examine factors for e-government assimilation. Tornatzky and Fleischer [1990] developed the TOE framework to explain the decision to adopt a technological innovation by an organization based on the technological, organizational and environmental contexts. The TOE framework has been extensively used in technology adoption studies and provides a useful lens for e-business cases. This study extends the TOE framework to the domain of technology assimilation in an e-government context.

The TOE framework identifies three aspects, technological, organizational, and environmental contexts, which influence the process an organization adopts, implements, and uses technological innovation. The technological context describes the existing technologies in use as well as new technologies available for organizations and refers to both technological equipment and development processes. The organizational context alludes to organizational characteristics and resources including top management support, organizational compatibility, extent of coordination and other factors relevant to technology adoption. The environmental context consists of the environmental characteristics in which an organization conducts its business, such as industry structure, degree of competition, regulation. These three contexts influence an organization's decision to assimilate an innovation, which ultimately influences organizational performance.

IS studies have utilized the TOE framework in different settings such as Electronic Data Interchange (EDI) [Kuan and Chau, 2001], e-procurement adoption [Teo and Ranganathan, 2009],

IT payoff in e-business [Zhu *et al.*, 2004], e-business diffusion [Lin and Lin, 2008], and e-commerce [Gibbs and Kenneth, 2004], among others. <Table 1> presents a literature review of research that has examined the TOE framework and indicates that this research has been mostly used to examine technology adoption and diffusion. Although the TOE framework has been adopted in various research contexts, this framework has not been extensively applied to the domain of e-government, particularly in the area of e-government assimilation. The TOE framework will be useful to identify the factors to examine the process of e-government assimilation.

## 2.3 E-government in Indonesia

The introduction of ICT for the public sector in Indonesia began in 2000 with the establishment of the coordinating team for ICT Development (TKTI). The TKTI was established through Presidential Instruction No. 50/2000 as a high-level task force to advance the use of electronic media and facilitate the government's communication, interaction and transactions. The TKTI was formed with coordination from government institutions, academia, private sectors and other social organizations to ensure a strong and effective coordinated leadership for national ICT development. The TKTI was also responsible for providing guidelines and recommendations on ICT development including e-government.

The term "E-government" in Indonesia was officially introduced to public administration through Presidential Instruction No. 6/2001, which mandated that the Indonesian government use ICT to support the practices of effective governance. A specific national policy on e-gov-

&lt;Table 1&gt; Previous Studies that Employ the TOE Framework

Reference	Research domain	Main constructs
Teo and Ranganathan [2009]	E-procurement Adoption	Perceived direct benefits, Indirect benefits, Perceived costs, Firm size, Top management support, information sharing culture, Business partner influence
Lin and Lin [2008]	E-business Diffusion	IS infrastructure, IS expertise, Competitive pressure, Organizational compatibility, Expected benefits of e-business, Trading partner readiness
Pan and Jang [2008]	ERP Adoption	IT infrastructure, Technology readiness, Perceived barriers, Competitive pressure, Regulatory policy, Size, Production and operations improvement, Enhancement of products and services
Zhang <i>et al.</i> [2007]	IT Diffusion	IT infrastructure, IT management, Government regulation and promotion
Srivastava and Teo [2007]	E-government Development	ICT infrastructure, Technology development, Human capital, Public institutions, Macro economy
Chang <i>et al.</i> [2007]	Electronic Signature Adoption	User involvement, Adequate resources, Hospital size, Internal need, Vendor support, Government policy, Security protection, System complexity
Lipper and Govindarajulu [2006]	Web Services Adoption	Security concerns, Reliability, Deployability, Firm size, Firm scope, Technological knowledge, Perceived benefits, Competitive pressure, Regulatory influence, Dependent partner readiness, Trust in web service provider
Zhu <i>et al.</i> [2006]	E-business Assimilation	Technology readiness, Technology integration, Size, Global scope, Managerial obstacles, Competition intensity, Regulatory Environment
Zhu and Kraemer [2005]	E-business	Technology competence, Size, International scope, Financial commitment, Competitive pressure, Regulatory support
Gibbs and Kenneth [2004]	E-commerce Use	Technology resources, Perceived benefit, Lack of organization compatibility, Financial resources, Firm size, External pressure, Government promotion, Legislation barriers
Kuan and Chau [2001]	EDI Adoption	Perceived direct benefits, Perceived financial cost, Perceived technical competence, Perceived industry pressure, Perceived government pressure

ernment was stipulated in Presidential Instruction No. 3/2003 concerning the national policy and strategy on e-government development. This directive was important for the development of e-government because it established a legal basis to implement e-government nationwide. This

Presidential Instruction contains several objectives pertaining to e-government development in Indonesia which supports the government's change towards a democratic governance practice (1) to facilitate communication between central and local governments, (2) to gain openness

and transparency, (3) to control and ensure accountability towards implementation of effective governance, and (4) to enable a transformation towards the information society era.

The Indonesian government developed a five-phased roadmap to achieve a successful deployment of e-government programs [Harijadi and Satriya, 2000]. This roadmap provided a direction towards achieving an e-government vision and sustaining the full benefits of a mature e-government environment in Indonesia. The roadmap included the following phases: (1) create e-leadership, (2) enable the environment for strengthening e-government legislation and cyber laws, (3) build out an ICT infrastructure that has a cross-cutting effect throughout the country, (4) implement national pilot projects, and (5) manage changes and business process reengineering which incorporates the best practices. The roadmap also adopted a series of e-government legislation that brought Indonesia more aligned with international practices. An e-government task force was formed in Indonesia to identify and prepare the policies and guidelines required for implementing e-government systems. One of the main tasks was to standardize the application and services of e-government for regional governments and other government institutions through various guidelines.

Some studies highlighted significant discrepancies in e-government implementation among governmental institutions in Indonesia. Furuholt and Wahid [2008] identify that the major disparity of e-government implementation was caused by several factors such as management obstacles, infrastructure problems, and inadequacy of human resources that vary across different institutions. Survey results from 2003, the most recent

data available, indicated that only 49.9% of local governments (province, district, and city governments) in Indonesia had implemented e-government, while 90% of the institutions at the central government had implemented e-government for various functions [Ahmadjayadi, 2003]. Consistent monitoring and measuring of e-government progress should be treated as a key tenant to deliver strong policies and recommendations for successful e-government assimilation.

## 2.4 E-government Implementation in Central and Local Governments of Indonesia

E-government lies at the heart of two global shifts: information revolution and governance revolution. Both shifts change the way society works and the way that society is governed [Heeks, 2001]. Regional autonomy was enacted in Indonesia through Law No. 22/1999 and was delegated to the regional/district level with Law No. 32/2004. Significant changes have occurred in government management, particularly in the relationship between local and central governments. Local governments must reform their internal structures to accommodate responsibilities that have been shifted from the central government.

The aim of regional autonomy is to emphasize the principles of democracy, community participation, equitable distribution and justice, and to take advantage of the regions' potential and diversity. Regional autonomy provides local governments with the freedom to regulate their internal and external affairs with consent from provincial governors. Regional autonomy in Indonesia has increased the public's ability to voice their

opinions and receive information. The demand for building effective, efficient, clean and transparent services to the public becomes an essential issue. E-government supports this reform and enables regional government administrations to be proactive in responding to a greater demand of social reforms. E-government also provides prompt and accurate information for both domestic and foreign investors and assists in resolving discrepancies between central and local governments.

### III. Research Model and Hypotheses

#### 3.1 Research Model

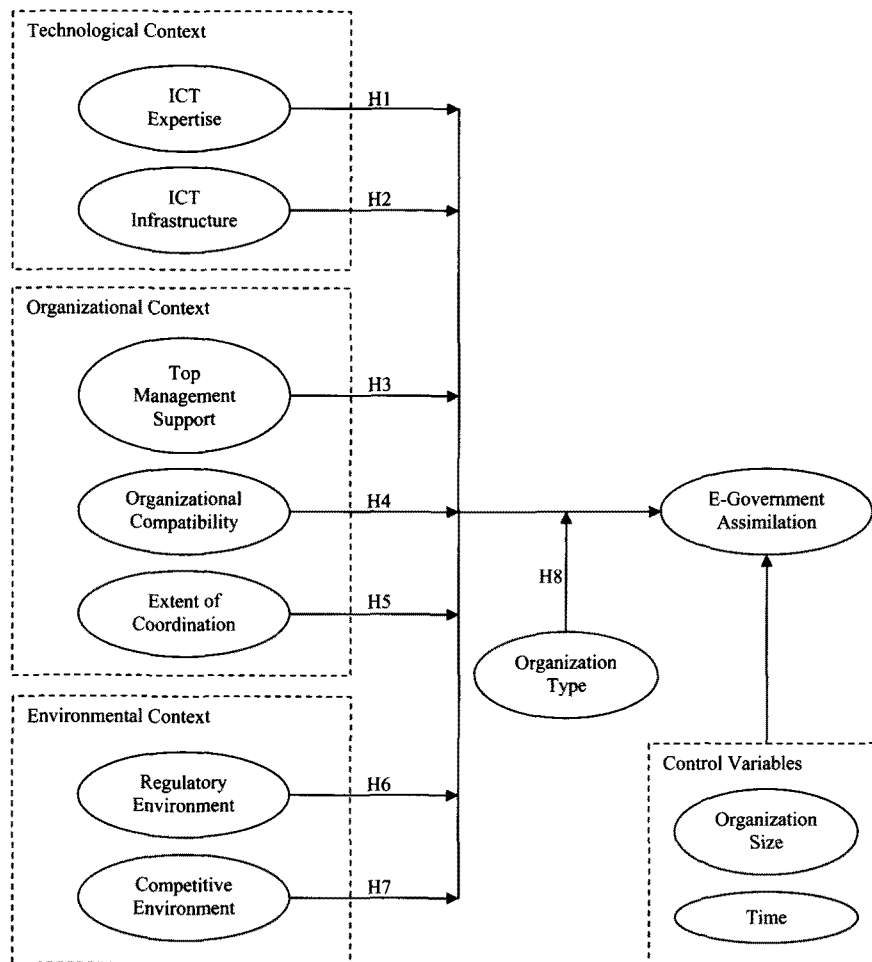
The TOE framework serves as a primary theoretical perspective for identifying contextual factors for e-government assimilation because the TOE framework is consistent with the theory of innovation diffusion in organizations [Rogers, 1995]. The theory of innovation diffusion identified three groups of adoption predictors: leader characteristics (leader's attitude toward change), internal characteristics of the organization (centralization, complexity, formalization, interconnectedness, organizational slack, and size), and external characteristics of the organization (system openness and environment). In addition, it emphasized the impact of technological characteristics (innovation attributes) on potential adopters. Since leader characteristics are specific internal organizational properties, this theory (technological characteristics, internal characteristics of the organization and external environment characteristics) is consistent with the TOE framework. A theoretical model for e-government assimilation needs to take into account fac-

tors that affect the tendency to use e-government, which is rooted to the specific technological, organizational, and environmental circumstances of an organization.

The main objective of this study is to identify factors which influence e-government assimilation by using the technology-organization-environment lens. In addition, organization type (central vs. local government) is included as a moderating factor to determine the level of influence of the TOE factors to e-government assimilation. To identify specific factors within the TOE framework, this study conducted a literature review of major IS and e-government journals and found sixty-seven articles investigating factors shaping organizational usage of IT. Technology infrastructure, human resources, management support, regulatory and competitive environment are the most commonly studied independent variables.

E-government refers to the use of ICT by government organizations to transform the full range of government processes, services, and transactions through electronic or Internet-based technology. Many previous studies indicate that ICT infrastructure and ICT expertise play as an important role for successful e-government assimilation as a component of technology competence [Srivastava and Teo, 2007; Koh *et al.*, 2005; Zhu and Kraemer, 2005]. ICT infrastructure and ICT expertise are included as key independent variables within the technological context.

For the organizational context, several variables are selected to examine e-government assimilation. Top management support, organizational compatibility, and the extent of coordination are three major organizational variables that may influence e-government assimilation [Chatterjee *et*



<Figure 1> Research Model

al., 2002; Grandon and Pearson, 2004]. Top management support is one of the most significant factors to influence ICT adoption and diffusion, so top management support should also be significant for e-government assimilation. Organizational compatibility measures e-government assimilation by fitting e-government systems with organizational needs and preferences. A lack of fit between e-government systems and organizational business processes may hinder organizational goals. The extent of coordination is a mechanism to reduce misinterpretations about con-

sensus, which has been shown in studies on IS assimilation to have a significant role in integrating knowledge and partnerships across different implementation processes. This study includes top management support, organizational compatibility, and the extent of coordination as explanatory variables for e-government assimilation within the organizational context.

The environmental context presents opportunities and challenges on ICT adoption and diffusion. This study adopts a regulatory environment and competitive environment as ex-



planatory variables for e-government assimilation. These variables are recognized in the innovation diffusion literature as important drivers for technology adoption and diffusion [Zhu and Kraemer, 2005].

E-government systems are being assimilated in central and local governments. Differences between central and local governments in terms of regional autonomy are expected [Rose, 2004], which may lead to gaps between central and local governments in the assimilation process of e-government systems. Organization type is employed as a moderating variable for the influence of the TOE factors on e-government assimilation.

Relevant information about IT innovation is collected and its potential benefits are evaluated to measure the level of e-government assimilation. Three indicators including usage volume, diversity, and depth are utilized to measure the level of e-government assimilation [Masseti and Zmud, 1996]. Usage volume measures the types of organizational processes and extent these processes are executed through e-government systems. Diversity represents the functional areas that have been automated by e-government systems within organizations. Usage depth indicates the vertical impact of e-government systems on their organizational activities, ranging from operational functions to decision making process. <Figure 1> presents the research model of this study.

## 3.2 Hypotheses

### 3.2.1 Technological Context

Technological context is defined as the existing technologies in use and new technologies avail-

able to the organization. Technological context also includes knowledge and processes to develop and adopt technologies. Previous literature suggests that ICT infrastructure and ICT expertise are critical variables to explain the assimilation of e-government [Srivastava and Teo, 2006; Koh *et al.*, 2005]. Without the availability of technological infrastructure and expertise, e-government systems cannot be implemented. The level of ICT expertise and the availability of ICT infrastructure in an organization are expected to be associated with the level of e-government assimilation.

#### *ICT Expertise*

ICT expertise in e-government is defined as the organizational level of specialized ICT knowledge and skills in e-government to provide reliable support and continuously refine and adjust organization needs. Organizations are more likely to adopt e-government when ICT expertise is available because ICT expertise can increase an opportunity to implement technological innovation [Crook and Kumar, 1998]. Chau and Tam [1997] found that the lack of ICT expertise becomes a key factor for reducing ICT implementation. In addition, empirical evidences suggest that an organization whose employees have necessary skills and technical knowledge are more likely to implement e-government applications [Lin and Lee, 2005]. This study hypothesizes that:

**Hypothesis 1:** *ICT expertise is positively related to the level of e-government assimilation.*

#### *ICT infrastructure*

This study defines ICT infrastructure as a col-

lection of physical technology resources, including shared technology and technology services across organizations, which provide a foundation for ICT-related services. Previous IS literature indicates that organizations with a sophisticated ICT infrastructure tends to increase their opportunities in implementing IS [Zhu and Kraemer, 2005]. Kowtha and Choon [2001] found that IT innovation depends on complementary resources and existing ICT infrastructure. Organizations that are already familiar with IT have a positive attitude towards further IT assimilation. This study hypothesizes that:

**Hypothesis 2:** *ICT infrastructure is positively related to the level of e-government assimilation.*

### 3.2.2 Organizational Context

Pertinent organizational context factors include tangible and intangible resources needed by the organization [Zhu *et al.*, 2006]. This study focuses on the need of an integrated capability of resources for stimulating e-government assimilation. Three factors, including top management support, organizational compatibility, and the extent of coordination, tend to be relevant to the context of e-government assimilation [Chatterjee *et al.*, 2002]. Human resources are also a major enabler for IT assimilation [Bogaert *et al.*, 1994]. Since human resources are too generic and are essential for most business activities, this study focuses on top management support, organizational compatibility, and the extent of coordination.

#### *Top Management Support*

Top management support is defined as managerial beliefs and support for initiatives and participation in IT adoption and diffusion within the organization [Chatterjee *et al.*, 2002]. Top management support and commitment are critical factors in most initiation and adoption processes. Top management has the power to influence employees' behaviors within the organization and can motivate the entire organization to participate in the process of e-government assimilation. Necessary resources can also be appropriately allocated to e-government projects by strong support from top management. This study hypothesizes that:

**Hypothesis 3:** *Top management support is positively related to the level of e-government assimilation.*

#### *Organizational Compatibility*

Organizational compatibility refers to the degree to which a technological innovation is perceived as being consistent with existing operating practices, beliefs and values, past experiences, and needs. Greater compatibility between organizational policy and technological innovation is a positive relationship because this compatibility permits innovation to be interpreted in more familiar contexts [Rogers, 1995]. Grandon and Pearson [2004] indicate that organizational compatibility is the most effective discriminator between adopters and non-adopters of technology innovations. When organizations perceive e-government systems as compatible with existing beliefs and work practices, they are more likely to promote its successful assimilation. This study hypothesizes that:

**Hypothesis 4:** *Organizational compatibility is positively related to the level of e-government assimilation.*

#### *Extent of Coordination*

Top management influences e-government projects and they dictate interpretations about the roles, responsibilities, and value of ICT [Chatterjee *et al.*, 2002]. Coordination must be shaped within the organization to support an organization's priorities and goals as well as strategic missions. Coordination theory states that top management judgments and actions across organizations can be linked through the use of a variety of coordination mechanisms ranging from standard operating procedures, liaison roles, and task force teams. Each one of these mechanisms has its unique strengths and organizations use a combination of formal and informal coordination mechanisms to manage their work. Coordination is required to integrate business processes and ICT knowledge in different functional units of the organization. The integration of knowledge with business processes is essential to achieve successful technology assimilation. This study hypothesizes that:

**Hypothesis 5:** *The use of coordination mechanisms is positively related to the level of e-government assimilation.*

### 3.2.3 Environmental Context

Previous literature in technology adoption and diffusion has found that environmental factors are significantly associated with IT assimilation [Zhu *et al.*, 2004; Zhu *et al.*, 2006]. Moon and

Norris [2005] found that e-government adoption and diffusion are associated with institutional factors. Gibbs and Kraemer [2004] argue that organizations tend to be induced to adopt and use IS due to external and internal preferences. This study employs regulatory environment and competitive environment as the antecedent variables of e-government assimilation within the environment context.

#### *Regulatory Environment*

Regulatory environment refers to an environment comprised of government regulations, policies, and laws that organizations must comply with. Hart and Saunders [1997] found that regulatory environment is a significant factor in innovation adoption. In the e-government context, new policies and regulations are needed to promote e-government assimilation. Without the appropriate regulatory framework, organizations may abuse or discourage the use of e-government systems. Regulatory environment indicates the role of government to encourage the use of e-government systems and services by establishing laws and providing incentives. This study hypothesizes that:

**Hypothesis 6:** *A supportive regulatory environment is positively related to the level of e-government assimilation.*

#### *Competitive Environment*

Researchers have found that the competitive environment can accelerate e-government adoption and assimilation [Iacovou *et al.*, 1995; Zhu *et al.*, 2003]. Competition may drive organizations to initiate and adopt innovations to maintain their competitive edge. Organizations can im-

prove service responsiveness and information transparency, increase operational efficiencies, and achieve user satisfaction by adopting innovations. The competitive pressure tends to make governmental organizations replicate the IT adoption behavior of other successful institutions. This study hypothesizes that:

**Hypothesis 7:** *The competitive environment is positively related to the level of e-government assimilation.*

### 3.2.4 Moderating Variable and Control Variables

Organization type (central vs. local governments) is an important variable to measure the moderating effects in e-government assimilation. Previous studies indicate differences in the level of IT diffusion and assimilation between central and local government organizations. Technology diffusion studies have found that diffusion occurs unevenly across countries with different environments. The extent of diffusion depends on a variety of economic, social, and political factors, including income, education, technology policies, cultural norms, and access to formal and informal communication networks [Rogers, 1983; Tornatzky and Fleisher, 1990]. Significant changes have occurred in government management in Indonesia, particularly in the relationships between central and local governments [Rose, 2004], due to regional autonomy enacted by law No. 22/1999 and updated in law No. 32/2004. This study examines whether the relationships between the TOE factors and e-government assimilation differ based on organization type. This study hypothesizes that:

**Hypothesis 8:** *Organization type moderates the relationships between the TOE factors and e-government assimilation.*

This study includes the control variables organization size and the time elapsed. These variables are selected because their potential impacts on e-government assimilation have been identified in previous studies. Organization size has been employed in previous research as an important predictor of IT adoption [Rogers, 1995]. Larger organizations adopt e-government systems more rapidly than their smaller counterparts due to a greater need for staying at the forefront of technology. Large organizations have benefited as they possess greater resources and knowledge to invest and implement technology effectively, as well as economies of scale to leverage such investments [Iacovou *et al.*, 1995; Kuan and Chau, 2001; Tornatzky and Fleischer, 1990; Zhu *et al.*, 2003]. The time elapsed since e-government system implementation is included because assimilation is a time-sensitive process. This study takes into account the accumulated organizational learning and experience that facilitates assimilation [Fichman, 1997; Chatterjee *et al.*, 2002].

## IV. Research Method

### 4.1 Data

This study used a survey methodology to test and analyze the theoretical model. A survey instrument was developed from a literature review to identify appropriate and valid measurement indicators. Some modifications were made to the measurement items to adapt the items to the con-

&lt;Table 2&gt; Number of Governments and Respondents

Government Type	Organization Type	Number	No. of Respondents	Percentage
Central government	Ministry/Department	33	56	47%
	Agency	25		
Local government	Province	33	62	53%
	Regency	399		
	Municipality	97		
Total		587	118	100%

text of e-government assimilation. Some items were revised and refined after the completion of a pretest experiment. Since the target organization of the survey is government institutions that have implemented e-government systems in Indonesia, the questionnaire was translated into the Indonesian language. The back-translation method was used for translating the English version of the survey items to Indonesian language [Brislin, 1970; Brislin, 1986]. Every effort was made to present the items in a way that could be understood by the Indonesian respondents while preserving the original meaning of the items until both versions converged [Werner and Campbell, 1970]. After the questionnaire was finalized, the survey was conducted in an online environment.

To broadly represent both central and local governmental organizations, all government institutions in Indonesia were elicited. The sampling was stratified by the scope of the organization's central and local governments that represent their institutions. The unit of analysis of this study is the organization-level, which includes ministries, government agencies, and local governments. The survey was conducted for organizations that already have used the Internet in managing and providing their services. Eligible

respondents were individuals at each organization best qualified to talk about their e-government programs and implementation. Respondents were represented by the Chairman, GCIO (Government CIO) or representative staff members from the ICT division of the organization.

The questionnaire was distributed to 587 institutions in central and local governments which have implemented e-government systems. Out of 129 received responses, 11 responses were dropped due to inconsistency and the incompleteness of the responses. The final dataset contained 118 valid responses, resulting in a response rate of approximately 20%. <Table 2> presents the number of institutions and the number of respondents in central and local governments.

## 4.2 Survey Instrument

Previous studies [Iacovou *et al.*, 1995; Massetti and Zmud, 1996; Zhu *et al.*, 2006] were used as references for developing measurement items. The measurement items were adopted from previous research as much as possible, but specific items were added after carefully exploring the context of e-government assimilation. A five-point Likert scale anchored by strongly disagree and strongly agree was employed to measure

items. The measurement items included in the final survey are listed in Appendix A.

**Dependent Variable (ASSI):** Previous research measures IT assimilation in Enterprise Resource Planning (ERP) system usage in terms of usage volume, usage diversity, and usage depth [Liang *et al.*, 2007]. These three assimilation measures have been widely used in various IS contexts such as EDI and e-commerce [Masseti and Zmud, 1996]. The three-item formative scale is consistent with e-government assimilation so this study adopts the same measurement. Volume indicates the percentage of a subset of business processes that were conducted using e-government systems. Diversity represents the percentage of business functional areas automated by e-government systems. Depth refers to the vertical impact of e-government systems on their activities, ranging from planning to decision making.

**ICT Expertise (EXP):** ICT expertise was measured by three items adopted from Lin and Lee [2005] to reflect the organization level of specialized ICT expertise on e-government. The items include (1) awareness of e-government functions, (2) training for employees, and (3) specialized ICT support personnel. These items correspond to the area in which ICT expertise can contribute to e-government assimilation.

**ICT Infrastructure (INFR):** ICT infrastructure was measured with (1) the infrastructure availability and condition, (2) integrated system encompassing different functional areas, and (3) integrated database for various e-government systems [Premkumar and Ramamurthy, 1995].

**Top Management Support (TOP):** Top manage-

ment support refers to the extent to which top management actively supports in the management of e-government initiatives. Top management support is measured by (1) articulating a vision for the organizational use of the e-government, (2) formulating a strategy for the organizational use of the e-government, and (3) establishing goals and standards to monitor e-government programs [Chatterjee *et al.*, 2002].

**Organizational Compatibility (COMP):** Organizational compatibility indicates the perceived alignment between the IT innovation and the culture, values, and preferred work practices of the assimilating organization [Beatty *et al.*, 2001; Jones and Beatty, 1998]. Organizational compatibility is measured by a three-item reflective scale adapted from Jones and Beatty [1998].

**Extent of Coordination (COOR):** The extent of coordination measures the use of different types of coordination mechanisms while managing e-government initiatives. These mechanisms can be a form of processes, roles, or structural arrangements to manage the e-government initiatives. Organizations can also establish a formal group such as a steering committee to monitor e-government related activities. Goals, plans and procedures are also set by the senior executives to facilitate monitoring efforts. Informal linking roles can be effective in securing organization-wide support and cooperation in the diffusion of innovation [Rogers, 1995]. Brown and Sambamurthy [2001] suggest that higher levels of coordination are related to the use of many coordination mechanisms in conjunction with each other. Individual mechanisms possess strengths and weaknesses in facilitating knowl-

edge integration such that the use of a variety of mechanisms together is reflective of higher levels of coordination. Respondents were exposed to the descriptions of different types of formal and informal coordination mechanisms and asked to rate the extent to which each one of these types was used to manage e-government initiatives [Chatterjee *et al.*, 2002].

**Regulatory Environment (RENV):** The regulatory environment was represented by (1) laws and regulations that support e-government initiatives and implementations, (2) incentives provided by governments, and (3) organizational needs that require e-government. These items correspond to the three key variables in which government regulations and policies can encourage e-business assimilation in Zhu *et al.* [2006].

**Competitive Environment (CENV):** The competitive environment was measured by three items including (1) the degree of rivalry among existing governmental organizations to provide the upmost services and achievement, (2) the degree of competitive disadvantage if e-government systems had not been adopted, and (3) the effects from e-government award competitions.

Similar operationalization has been used in the context of e-business and other IS researches [Lin and Lin, 2008].

**Marker Variable (MARK):** This study employed the marker variable technique to avoid common method bias. This study carefully identified variables that would not relate to the phenomena under investigation. Fantasizing, which indicates the extent to which one has a vivid imagination, was selected as a marker variable in this study [O'Guinn and Faber, 1989].

## V. Results

This study used the Partial Least Squares (PLS) method to analyze and examine the theoretical model and the hypotheses. PLS is a Structured Equation Modeling (SEM) technique that can analyze multi-item constructs with direct and indirect paths [Gefen and Straub, 2005]. PLS allows for constructs to be modeled as either formative or reflective indicators [Chin, 1998]. This study employed PLS-Graph Version 3.0 to examine the theoretical model. <Table 3> presents the descriptive statistics of the constructs.

<Table 3> Descriptive Statistics of Constructs

Construct	Code	Number of Indicators	Mean	Standard Deviation
Assimilation	ASSI	3	3.178	1.045
ICT Expertise	EXP	3	3.257	1.126
ICT Infrastructure	INFR	3	3.556	0.989
Top Management Support	TOP	3	3.534	0.990
Organizational Compatibility	COMP	3	3.367	1.041
Extent of Coordination	COOR	4	3.989	0.721
Regulatory Environment	RENV	3	3.827	0.875
Competitive Environment	CENV	3	3.048	1.164
Marker Variable	MARK	3	3.017	0.975

## 5.1 Measurement Model

A confirmatory factor analysis (CFA) was conducted to test the measurement model. The CFA results show that the loading values of the four indicators, including COMP3, RENV2, CENV1, and MARK1, are too low to meet the threshold; these four indicators were removed from further analyses.

The construct reliability test ensures the internal consistency within a construct which is examined by using Cronbach's alpha and Composite Reliability (CR). The results show that most reliability coefficients including Cronbach's alpha and CR values of the constructs are greater than .7, which means that the measurement indicators are reliable. The values of Cronbach's alpha for CENV and MARK are slightly less than .7, but the values are still acceptable [Werts *et al.*, 1974] (See Appendix B).

Convergent validity measures the extent to which multiple indicators within a construct have high correlation and is assessed by factor loading, CR, and AVE (Average Variance Extracted). Convergent validity is acceptable if individual factor loadings and CR are greater than the threshold of .7 and if AVE exceeds .5 [Sethi and King, 1994]. The results in Appendix B indicate that all the factor loading and CR values are greater than .7 and AVE values exceed .5, which satisfies all the criteria of convergent validity.

Discriminant validity describes the extent to which one construct diverges from other constructs. For measuring the discriminant validity of reflective constructs, a cross loading table is used to examine the correlations among measurement items. A cross loading table needs to

show an appropriate pattern of loadings, one in which the measurement items load highly on their theoretically assigned factor and not highly on other factors. The cross loading table in Appendix C indicates that the loadings of the measurement items on its assigned construct are higher than with other constructs, which suggests adequate discriminant validity. Fornell and Larcker's [1981] criteria can also be used to examine discriminant validity. Fornell and Larcker [1981] recommend that the square root of the AVE (Average Variance Extracted) be greater than the absolute value of inter-construct correlations (off-diagonal elements) to exhibit sufficient discriminant validity. This indicates that the items share more variance with their respective constructs than with other constructs. <Table 4> shows that all of the constructs meet this criterion and demonstrate sufficient discriminant validity.

Covariance based estimates such as reliability and AVE are not applicable for evaluating formative constructs [Chin, 1998]. The path weights of indicators need to be examined to verify their *t*-value. E-government assimilation was assessed by examining the significance of three path weights. The table in Appendix B shows that all three path weights are significant, suggesting that they form the construct of e-government assimilation.

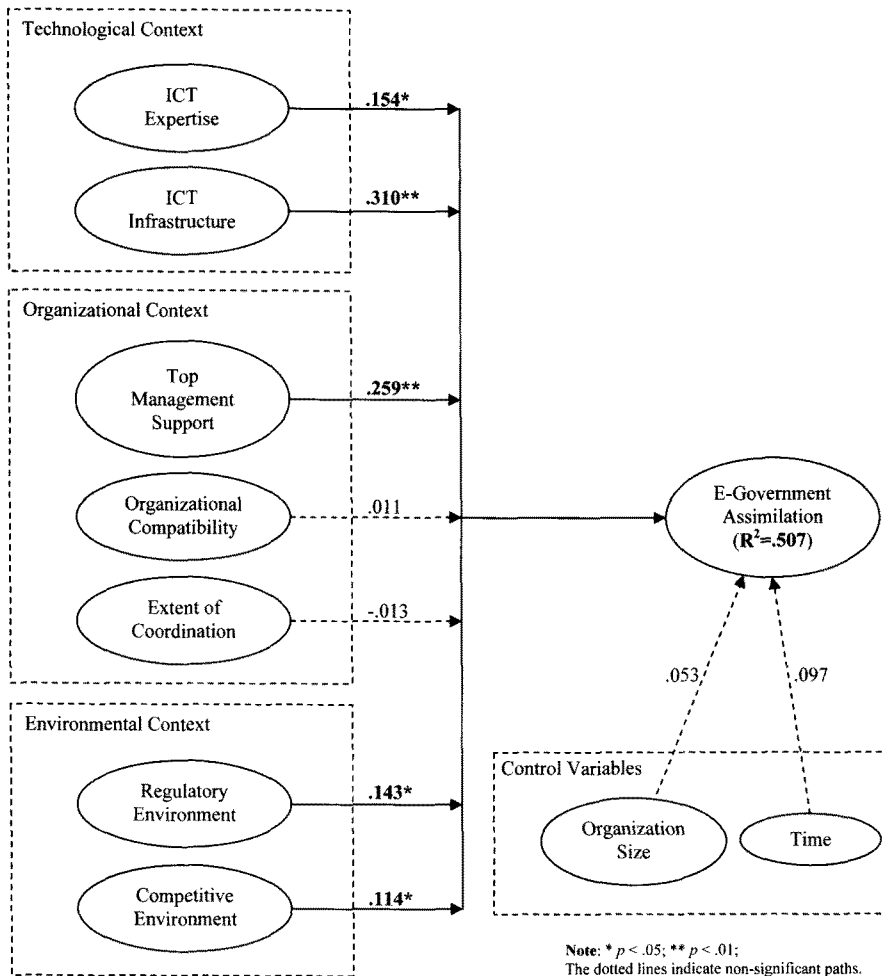
Common method biases must be addressed since this study uses self-reported data [Podsakoff *et al.*, 2003]. This study employed a marker variable technique to avoid the problem and analyzed common method variance (CMV). A marker variable technique was implemented by applying a marker variable that is theoretically unrelated to at least one variable in the study. Because the marker variable is assumed to have no relation-



<Table 4> Correlations of the Constructs and Square Root of AVE

	EXP	INFR	TOP	COMP	COOR	RENV	CENV	MARK	ASSI
EXP	<b>.853</b>								
INFR	.487**	<b>.842</b>							
TOP	.418**	.402**	<b>.917</b>						
COMP	-.105	-.153	-.318**	<b>.909</b>					
COOR	.275**	.135	.281**	-.046	<b>.850</b>				
RENV	.143	.227*	.405**	-.276**	.266**	<b>.915</b>			
CENV	.178	.205*	.234*	-.102	.204*	.165	<b>.819</b>		
MARK	-.039	.063	-.101	.167	.097	-.160	.140	<b>.864</b>	
ASSI	.465**	.569**	.541**	-.192*	.212*	.376**	.307**	.073	n/a

Note) \*\* p < 0.01; \* p < .05; AVEs are in bold.



<Figure 2> PLS Results with Full Sample

ship with one or more variables in the study, CMV can be assessed based on the correlation between the marker variable and the theoretically unrelated variables. A marker variable should be carefully identified to acquire a reliable estimate of CMV before collecting data [Malhotra, 2006]. This study carefully identified variables that would not relate to the phenomena under investigation. Fantasizing, which refers to the extent to which one has a vivid imagination, was selected as a marker variable. <Table 4> shows that the correlations of the marker variable (MARK) with the other predictor variables are low and not significant. This result indicates no significant biases from the dataset.

In summary, the measurement model satisfies reliability and validity criteria. The constructs employed in this study can be used to test the research model and the hypotheses.

## 5.2 Test of Structural Model

### 5.2.1 Hypotheses Testing with Full Sample

This study examined whether the TOE variables in the research model influence the assimilation of e-government. <Figure 2> presents the results of the PLS analysis without the moderating effect of organization type. The results show that 50.7% of the variance in e-government assimilation is explained by the independent variables with the full sample. The variables in the research model have significantly explained the variations of e-government assimilation. Five out of seven hypotheses are significant at the .05 or .01 level while the remaining two hypotheses are not significant. Two technological variables (ICT

expertise and ICT infrastructure), one organizational variable (top management support) and two environmental variables (regulatory environment and competitive environment) have significant paths to e-government assimilation. These significant paths have positive values to e-government assimilation. ICT infrastructure is the strongest factor, followed by top management support, regulatory environment, ICT expertise and competitive environment respectively. Organization compatibility (H4) and extent of coordination (H5) show no significant influence on e-government assimilation. The control variables (organization size and time elapsed) are not significantly related to e-government assimilation.

### 5.2.2 Moderating Effect of Organization Type

This study separated the dataset into two sub-samples (central government and local government) to examine the moderating effect of organizational type on e-government assimilation (H8). The results of the PLS analysis from the two sub-samples were compared. This approach is consistent with previous research [Keil *et al.*, 2000; Ahuja and Thatcher, 2005; Zhu and Kraemer, 2005; Zhu *et al.*, 2006] that estimates two separate sub-models in PLS. This study tested the differences of path coefficients across the two sub-models by computing *t*-statistics to evaluate the differences of path coefficients across the sub-models [Chin, 1998].

<Table 5> indicates that five out of seven path coefficients from statistical comparisons have significant relationships with e-government assimilation. These results provide sufficient evidence that organizational type is a significant moder-

<Table 5> Hypotheses Testing with the Moderation Effect of Organization Type

Hypothesis	Central Government(n = 56)			Local Government(n = 62)			Comparison of Paths		
	Path Coeff.	t-value		Path Coeff.	t-value		Hypothesis	t-value	
H1	0.075	0.494	ns	<b>0.246</b>	<b>2.061</b>	*	H8-1	<b>6.829</b>	**
H2	0.230	1.185	ns	<b>0.325</b>	<b>2.186</b>	*	H8-2	<b>3.001</b>	**
H3	<b>0.419</b>	<b>2.813</b>	**	0.189	1.249	ns	H8-3	<b>8.306</b>	**
H4	-0.014	0.101	ns	-0.048	0.398	ns	H8-4	1.424	ns
H5	0.044	0.313	ns	0.013	0.095	ns	H8-5	1.213	ns
H6	0.017	0.136	ns	<b>0.259</b>	<b>1.819</b>	*	H8-6	<b>9.762</b>	**
H7	<b>0.293</b>	<b>2.188</b>	*	-0.048	0.305	ns	H8-7	<b>8.606</b>	**
Org. Size	0.100	0.810	ns	0.129	1.351	ns			
Time	0.037	0.294	ns	0.038	0.363	ns			
R <sup>2</sup>	55.6%			59.3%					

Note: \*  $p < .05$ ; \*\*  $p < .01$ ;  
 ns: not significant.

ator between the TOE factors and e-government assimilation. Organization type does not have a moderating role between organization compatibility and e-government assimilation as well as between extent of coordination and e-government assimilation. The PLS results from the central government sub-model show that top management support (H3) and competitive environment (H7) have a significant relationship with e-government assimilation. The results from the local government sub-sample indicate that ICT infrastructure (H1), ICT expertise (H2), and regulatory environment (H6) are significant. Organization type (central and local government) significantly moderates the relations between the TOE factors and e-government assimilation.

## VI. Discussions and Conclusion

The main goal of this study is to examine the determinants of e-government assimilation in Indonesia and the moderating effect of organiza-

tional type (central and local government). The findings of this research are consistent with the proposed theoretical foundation in the context of Indonesia, and provide empirical evidence for the e-government research domain. This study investigated the relationships between the TOE factors and e-government assimilation, and the study revealed a number of new insights and implications for e-government assimilation for developing countries.

### 6.1 Key Findings

This study found that ICT infrastructure has the strongest significant relationship with e-government assimilation. Top management support, regulatory environment, ICT expertise, and competition environment are also significant factors on e-government assimilation. The findings indicate that organizations with better ICT infrastructure and greater support from top management are more likely to assimilate e-government systems, which is consistent with previous re-

search. Schware and Deane [2003] state that access to adequate information infrastructure, proper legal and regulatory frameworks, and strong support from top management are essential to make e-government programs work properly. A lack of ICT infrastructure also becomes a significant barrier to the government's capabilities to provide e-government services and transactions as an unreliable ICT infrastructure in public sector organizations degrades e-government performance. Governments should focus on developing ICT infrastructure as a prerequisite to build e-government systems, which is known as the 'I before E' strategy.

Top management support has the second strongest relationship with e-government assimilation in this study. Top management support for ICT initiatives is essential in determining e-government programs, as expressed by vision and commitment from top leaders. Top management support fosters collaboration between employees and functional managers within organizations. The assimilation of e-government or any other of ICT implementations needs to be carried out with strong support from top leaders. Management and employees have to realize how ICT can improve organizational performance and provide better services so that they can be supportive of its use. Employees will be more convinced and supportive of using the system once the e-government assimilation becomes a necessity. Liang *et al.* [2007], argue that top management support correlates significantly with the success of ICT adoption. Teo and Ranganathan [2004] found that B2B commerce that receives a higher level of support from top management and functional managers significantly correlates to its successful adoption. The findings from this study

are consistent with previous research.

The results of this study show that regulatory environment also has a significant relationship with e-government assimilation. Building proper legal and regulatory frameworks is essential to make an e-government program run successfully. All initiatives and decisions on the implementation of e-government should be covered by integrated and holistic laws, policies and strategic directions with the purpose to strengthen its movement, and to eliminate possible discrepancy during implementation. A lack of a supportive regulatory environment on e-government will result in a negative effect on assimilation.

ICT expertise also has a significant relationship with e-government assimilation. Previous studies on ICT assimilation suggest that the technological context plays a critical role in e-government. Heeks [1999] and Moon [2002] identify that the shortage of ICT expertise becomes a potential barrier to confront demanding challenges concerning the government's ability to provide e-government services. Government organizations have difficulties to attract highly skilled ICT expertise resulting in a lack of skilled ICT staff in government organizations. Government organizations must progress toward a higher level of e-government development, which will require more and highly trained technical staff. Government organizations need to develop their staff capabilities by providing ICT training and tools for their jobs.

Competitive environment is also found to have a significant relationship with e-government assimilation. Previous literature shows that a competitive environment is an essential factor for government organizations to adopt e-government systems [Gibbs *et al.*, 2004; Zhu *et al.*, 2005, 2006; Lin *et al.*, 2008]. Government organizations

are competing to deliver their services in a perfect manner to increase transparency and avoid mistrust from the public. Competition among government organizations may drive bandwagon effects as has been illustrated in several countries.

The relationships between organizational compatibility and extent of coordination were not significantly supported with the assimilation of e-government. Organizations use the value of collaboration, sharing of risks, and partnering to reach their target with respect to extent of coordination. These mechanisms are vital to the sharing and integration of distributed knowledge and cognition across organizations. In addition, these mechanisms are a specific capability that can only be achieved by mature organizations. A similar explanation can be made for organizational compatibility. Since mature organizations tend to have less variance in organizational compatibility, e-government will be integrated in a more familiar way. Organizational compatibility and extent of coordination play an important role in the adoption and assimilation of IT in more mature organizations. E-government's maturity in developing countries like Indonesia is relatively low. Organizational compatibility and the extent of coordination are not significant in the context of e-government assimilation in developing countries.

## 6.2 Discussions for Moderating effect of Organization Type

This study showed that the effects of the TOE factors on e-government assimilation vary across different organizational types, particularly in central and local government. Top management support and competitive environment are sig-

nificant factors for central government, which indicates that top management plays an important role in orchestrating e-government programs, including policy making and implementing projects. Top management support also acts as a motivator to stimulate and drive toward successful e-government programs. The external pressure to perform better services for organizations in central government tends to be tied to the competitive environment. This demonstrates differences in the level of e-government development in central and local government. The value of e-government development in central government has shifted from fulfilling the internal needs to leverage public services (citizen centric services).

The results demonstrate ICT infrastructure, ICT expertise and regulatory environment are far more important in local governments than in central government. In local governments, the technological context is the primary concern for e-government assimilation. Local governments with inadequate ICT infrastructure are a significant issue. Insufficient ICT expertise in local governments indicates the shortage of capable human resources. The central government tends to have advantages over local government since ICT infrastructure and ICT expertise are more available. Regulatory environment has a significant impact on e-government assimilation in local government rather than in central government. The enactment of the regional government law has shifted the authority from the central government to provinces, regencies and cities which require a substantial reform in the regulatory environment of local governments. These findings confirm that attention is needed when analyzing and stipulating different policies on e-government assimilation in central and

local government.

### 6.3 Implications

This study has several important implications for academic researchers, policy makers, and practitioners. The TOE framework has been utilized in various research contexts, but has not been extensively applied to the domain of e-government, particularly in the area of e-government assimilation. This study provides a useful framework for academics to assess the technological, organizational and environmental factors in which e-government programs will be implemented. Measurement items adopted from previous research are refined along with some additional measures that take into account the unique context of e-government assimilation. Academics are encouraged to use these items as the measurement model examined satisfies both reliability and validity criteria.

A significant development towards the reliable and effective assessment of an e-government innovation results from the insights gleaned from e-government assimilation in the public sector. Examining the factors related to e-government assimilation reveals e-government regulation and promotion policy directions for decision makers in government organizations. Policy makers need to prepare a priority list of the TOE factors to implement e-government programs based upon the actual capacity and capability of their organizations. Technological factors, such as ICT infrastructure and ICT expertise, lead to a greater degree of success on e-government assimilation.

Senior managers or executives in organizations need to assess their technological resources before they start implementing e-government pro-

grams. The technological context consists of both physical infrastructure and intangible expertise, so senior managers must ensure that both tangible and intangible technological resources exist. Top management also has a significant role in e-government assimilation. Top management should have a strong commitment to implement e-government programs to achieve successful assimilation. Once the commitment of top management is made, other factors may become less salient in the use of e-government systems.

This study demonstrates that organizational type (central vs. local government) moderates the relationships between the TOE factors and e-government assimilation. Policy makers need to be proactive to identify the differences and unique policies that may affect e-government assimilation in central and local governments. This perspective is reflected in creating government policies to establish e-government programs at the central and local level. Different strategies for e-government implementation must be prepared by policy makers to motivate top management to achieve successful e-government implementation, depending on organization type.

Practitioners in the public sector can use the insights from examining the factors related to e-government assimilation to identify key determinants for their own assimilation of the technology. Practitioners will need to seize upon the governance established by policy makers. Top management support has consistently been found to be an important factor influencing successful implementations and is relevant for policy makers and practitioners alike. Taking advantage of opportunities that are available requires top management to gauge the relative maturity of their country's e-government assimilation and

assess whether they would be on either the leading or bleeding edge of the technology. E-government presents opportunities for practitioners through better decision making from having information that is of a higher quality and is more transparent. E-government also creates the prospect of more efficient business processes enabled through disintermediation. Practitioners which are able to successfully leverage e-government technologies will become industry leaders and will be able to gain a competitive advantage.

#### 6.4 Limitations and Future Research

This study has several limitations. This study collected data from Indonesia that is just one of several developing countries. The results of this study may not be replicable in other developing countries. The sample size of this study may also be a concern due to the low response rate from local governments of Indonesia. A larger sample size could produce more robust results. This study also did not explicitly distinguish among the different levels of e-government adoption and diffusion, types of technology, and e-govern-

ment performance in the research model.

The limitations of this study offer directions for future research. The research model of e-government assimilation can be applied to other developing countries. General trends of e-government assimilation in developing countries could be drawn with additional empirical evidence. Future research can be extended to explore other e-government's phenomena in developing countries to find its differences and implications. Conducting a comparative study on e-government assimilation in several other developing countries by including various factors to capture wider characteristics on heterogeneous domains may lead to additional insights. Future research could examine other factors related to e-government assimilation by combining the TOE factors with other theoretical lenses such as cultural dimension theory, institutional theory or financial context. This study can also be extended for further exploratory analyses of multistage assimilation including initiation, adoption, and routinization to become a useful reference for developing e-government strategies.

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## ⟨Appendix A⟩ Measurement Items

### *E-Government Assimilation*

1. Percentage of the organization's processes that are using the e-government system (1-5)\*.
2. Percentage of functional areas that are using the e-government system (1-5)\*.
3. Level at which e-government system is used in operation, management, and decision making (1-5).

\* 1: 0~20%; 2: 21~40%; 3: 41~60%; 4: 61~80%; 5: 81~100%

### *Marker Variable* (1: strongly disagree; 5: strongly agree)

1. I daydream a lot.
2. When I go to the movies I find it easy to lose myself in the film.
3. I often think of what might have been.

### *ICT Expertise* (1: strongly disagree; 5: strongly agree)

1. Government employees are generally aware of the functions of e-government.
2. Government employees are well trained in e-government.
3. Our institution is supported by specialized or knowledgeable personnel for e-government.

### *ICT Infrastructure* (1: strongly disagree; 5: strongly agree)

1. Our institution has a good ICT infrastructure.
2. There are integrated portal/web/applications encompassing different functional areas.
3. Our institution shares the databases for various applications.

### *Top Management Support* (1: strongly disagree; 5: strongly agree)

The senior management of our organization actively:

1. Articulates a vision for the organizational use of e-government.
2. Formulated a strategy for the organizational use of e-government.
3. Established goals and standards to monitor the e-government program.

### *Organizational Compatibility* (1: strongly disagree; 5: strongly agree)

Using e-government in our organization:

1. Created a disruption in the workplace at first.

2. Decreased productivity at first due to time to learn.
3. Required an overall change in the values, norms and culture within the organization.

***Extent of Coordination*** (1: strongly disagree; 5: strongly agree)

Please indicate the extent to which existing coordination mechanisms of the following types are used and useful to manage e-government:

1. Guidelines/Standard operating procedures (e.g., goals, policies, and plans).
2. Task forces.
3. Oversight teams (e.g., e-Gov advisory council).
4. Liaison roles (e.g., Gov CIO).

***Regulatory environment*** (1: strongly disagree; 5: strongly agree)

1. The government laws and regulations support e-government initiative and implementation.
2. The use of the e-government was driven by incentives provided by the government.
3. The use of the e-government was required by organization needs (integrated portal, e-proc, etc.).

***Competitive environment*** (1: not at all affected; 5: strongly affected)

1. Degree affected by implementation of e-government in other organizations.
2. Degree affected by competitive disadvantage if e-government had not been adopted.
3. Degree affected by e-government award competition.

**⟨Appendix B⟩ Loadings of Indicator Variables**

Construct	Indicator	Loading	t-value	Cronbach's $\alpha$	CR	AVE
Assimilation	Volume	n/a	19.520	n/a	n/a	n/a
	Diversity	n/a	18.090			
	Depth	n/a	11.742			
ICT Expertise	EXP1	.945	57.731	.816	.886	.728
	EXP2	.642	5.401			
	EXP3	.937	41.624			
ICT Infrastructure	INFR1	.750	10.061	.796	.879	.709
	INFR2	.891	43.536			
	INFR3	.878	36.019			
Top Management Support	TOP1	.891	41.416	.905	.941	.841
	TOP2	.950	84.213			
	TOP3	.910	31.969			
Organizational Compatibility	COMP1	.867	5.190	.801	.905	.827
	COMP2	.950	17.039			
Extent of Coordination	COOR1	.887	5.859	.875	.912	.723
	COOR2	.896	10.016			
	COOR3	.828	12.090			
	COOR4	.784	5.487			
Regulatory Environment	RENV1	.880	21.470	.812	.911	.837
	RENV3	.949	62.056			
Competitive Environment	CENV2	.954	22.831	.634	.797	.670
	CENV3	.656	4.201			
Marker Variable	MARK2	.805	2.291	.668	.854	.746
	MARK3	.832	3.241			

**⟨Appendix C⟩ Cross Loading Table for the Reflective Constructs**

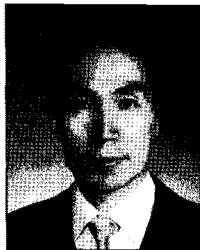
	EXP	INFR	TOP	COMP	COOR	RENV	CENV	MARK
EXP1	.945	.461	.376	-.118	.258	.110	.143	-.057
EXP2	.642	.089	.324	-.090	.146	.066	.189	-.045
EXP3	.937	.547	.386	-.073	.272	.166	.158	-.024
INFR1	.393	.750	.257	-.050	.211	.089	.156	.051
INFR2	.415	.891	.414	-.193	.105	.299	.177	.011
INFR3	.429	.878	.325	-.119	.062	.154	.186	.065
TOP1	.435	.341	.891	-.343	.254	.249	.224	-.151
TOP2	.333	.381	.950	-.297	.233	.454	.186	-.140
TOP3	.390	.381	.910	-.242	.287	.400	.234	-.052
COMP1	-.023	-.062	-.244	.867	.001	-.212	-.135	.196
COMP2	-.142	-.189	-.322	.950	-.069	-.279	-.068	.192
COOR1	.297	.164	.276	-.029	.887	.241	.269	.142
COOR2	.222	.144	.326	-.095	.896	.255	.202	.150
COOR3	.223	.024	.116	.000	.828	.190	.054	.184
COOR4	.188	.131	.199	.011	.784	.211	.160	.142
RENV1	.142	.143	.377	-.217	.147	.880	.130	-.160
RENV3	.125	.253	.372	-.279	.309	.949	.166	-.150
CENV2	.195	.234	.263	-.159	.235	.234	.954	.073
CENV3	.055	.038	.052	.087	.033	-.086	.656	.236
MARK2	.052	.089	-.111	.123	.039	-.180	.100	.805
MARK3	-.095	.030	-.071	.192	.116	-.110	.138	.832

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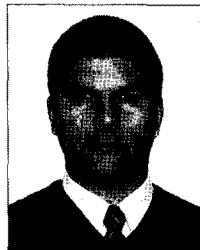
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