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Fall 10-12-2012

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# Enhancing Trust through IT Risk Management to Achieve E-Government Success

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**Abstract:** E-government is a concept which requires management in order to implement successfully. This research presents the factors of IT risk management and level of trust for e-government success. It aims to examine the components of IT risk management and their impacts on creating integrated trust. In addition, the relationships of the integrated trust to e-government success are tested. A survey was conducted with Thai government officers. There are five IT risk management factors which are IT infrastructure risk, economic risk, legal and regulation risk, change management risk and performance risk. Integrated trust includes individual based trust and institutional based trust.

**Keywords:** E-Government, IT risk management, Individual based trust and Institutional based trust

## 1. Introduction

Many organizations have adopted information technology (IT) to enhance operational efficiency, cost reduction, quality of services, convenience, innovation and learning [25]. In government sector, e-Government has been implemented to transform the traditional processes of providing information and services to citizens and businesses [21]. As spending on IT increases sharply, technology is increasingly taken part in organizations, for this reason, they become highly vulnerable to the risks of IT failure [2]. Risk factors are conditions that can cause a serious threat to implementation e-Government successfully

[5]. In the past ten years, Thai government has implemented e-Government to encourage the web usage of citizens interacting with the government agencies [26]. However, e-Government in Thailand is still ineffective and inefficient in present. Moreover, an investment for the e-Government is not critical issues in the Thai Government Agencies. Therefore, we focus on study in field of e-Government success in Thailand. E-Government contains several risks of implementing failure, e.g. IT infrastructure risk, change management risk, performance risk [16]. Information technology risk management plays an important role in e-Government implementation success [34, 35]. IT is significant constituent to provide more government efficiency and better service, particularly increasing citizen trust in management of government [21]. The important type of trust is frequently labelled institution based trust. Institution based trust refers to an individual's perceptions of the institutional environment [19]. This research, therefore, aims to develop the systematic framework of IT risk management to enhance integrated trust for achieving e-Government implementation success.

## 2. Literature Review

E-government has been conceptualized as the use of information technologies in government for the public services, and managerial effectiveness [12]. Because of the increased complication, IT management of government agencies is confronted with risks [31]. E-Government implementation in some countries has faced problems to develop a basic infrastructure to

take advantage of new technologies tools. Many developing countries do not have the infrastructure necessary to implement e-Government infrastructure and services throughout their country [25]. Therefore, IT risk management has become an important issue for IT implementation success. Simultaneously, government practitioners have worked to improve their chances for success by reducing IT Risk Management for responding to challenges to their IT initiatives [11]. Specific to e-Government, government agencies have to concern of IT risk management, such as IT infrastructure risk, economic risk, legal and regulation risk, change management risk, and performance risk [4]. Risk factors are conditions that can pose a serious threat to the successful completion or accomplishment of e-Government [5]. Research focused on managing of IT Risk Management dimensions have all contributed to integrated trust [30]. Government practitioners have worked to improve their chances for success by reducing IT Risk Management for responding to challenges to their IT initiatives [11].

### **2.1 IT infrastructure risk**

IT infrastructure is defined as a set of shared IT resources which is a foundation for both communication across the organization and the implementation of present/future business applications. IT Infrastructure composes of computer, communicating technology, database, shared technology platform and so on. IT infrastructure more precisely is through the qualities of scalability, connectivity, compatibility, modularity, rapidity, modularity, facility and Modernity. Briefly, IT infrastructure is the ability of the hardware and software to make internal and external electronic linkages [7]. In the e-Government domain, the fundamental IT infrastructure must be integrated with the front-end applications that are implemented for users (Esteves and Joseph, 2007). Therefore, IT infrastructure becomes an increasingly important factor that

affects organization competitiveness (Weill and Broadbent, 1998). All countries implementing e-Government have struggled to develop a basic infrastructure to take advantage of new technologies tools. Many developing countries do not have the infrastructure necessary to implement e-Government services throughout their country (Reffat 2003).

### **2.2 Economic risk**

Prior research shows that there are risks emerging from the financial operations and management of the business. From an internal perspective on operating costs are reduced by carrying out assessments while agencies can optimize operating and maintenance costs (Pollard, Strutt, Macgillivray, Hamilton and Hruvey, 2004). Economic risk is defined as risk related to economic issues, e.g. financial issues cause to supply interruptions and possibly insolvency, failure to comply with legal regulations, and strategic issues that ensure competition and strategy implementation (Matook, Lasch and Tamaschke, 2009). Financial risk is the potential loss of benefit or money because a product or service does not satisfy the customer's expectation (Rotchanakitumnuai 2007). The internet application cannot effectively ensure the certainty and reliability of transactions. Therefore, such transaction sectors must endure a certain level of risk. There may be a number of fraud and unreliable service. It seems that wrong decisions may result in transaction failure, and cause some economic losses (Ruizhong, Xiaoxue and Zixian, 2010). The current financial services research context expands this facet to include the recurring potential for financial loss due to fraud (Featherman and Pavlou, 2003).

### **2.3 Legal and regulation risk**

There are the importance of changing relationship between government and its stakeholders and the difference of new structure of communication and

interaction between traditional government and e-Government. One of the major differences of e-Government includes the legal structure of the activities in government from the need of the compliance of the Constitution and other laws in order to assure social performance (Montagna 2005). Previously developing laws and regulations or in ignorance of technologies related to e-government have an impact on the success of projects. Investing in changes of the regulatory is one of responses for these challenges that consider or enable for adoption of technologies (Gil-Garcia and Pardo, 2005). The legal risk refers to the likelihood of loss owing to violation of the rights of citizens through the use of IT [2]. When reviewing of risk management, it can be considered between risk analysis and techniques used by law enforcement. The potential for lawsuits or other legal action in the information leaks can also be considered an important barrier or challenges that must be overcome [28]. The law and policy limitation requests the action conducts with relevant laws, regulations, and policies within the power of government. Regulations may limit government powers to institute and complete e-Government projects [8, 4].

#### **2.4 Change management risk**

E-Government consists of various problems from technical aspects to organizational problems such as implementation, process change. Deeper changes cause larger resistance. Governmental activities require changes through information technology. Change management involves effectively balancing forces in a change of resistance [20]. The organization is arranged to manage the change and its cultural impact. Moreover, it plans to reduce the general opposition to change and facilitate the use and consolidation of new technologies and systems [15]. Risk is a relatively new facet to be explored within the scope of IT change management [3]. Prior researches con-

sider that change management concerns all human and social related to changes and cultural improvement techniques required by management to the implementation of newly-designed processes and structures into working practice and to cope effectively with a resistance [1]. For the level of organizational and official competences required for an effective and efficient e-Government implementation, it shows how the organization is arranged to manage the change and its cultural impact. Moreover, it plans to reduce the general opposition to change and facilitate the use and consolidation of new technologies and systems [15].

#### **2.5 Performance risk**

The term "performance risk" is used to consider for the possibility and consequences. Performance risk is defined as the possibility of the product malfunctioning and not performing. It was designed and failed to deliver the desired benefits [10]. It is the possibility that a product or service will not work as expected by the customer [26]. Therefore, performance risk has to do with failure of the performance objectives [24]. The performance is considered in the process performance by operational efficiency, responsiveness and flexibility. When environmental uncertainty is high, it seem to occur from likely adverse government regulations, market volatility and a lack of stakeholder competence, thus managers will perceive that performance risk is high. However, when performance risk is low, output controls will monitor overall performance (Langfield-Smith 2008).

Risk management is a systematic process of identifying and assessing company risks to protect agencies. However, agencies need risk management to analyse risks for balancing potential gains against potential losses and avoid mistakes. It is the best use as a preventive measure rather than as a reactive measure. In this study, we present the IT risk man-

agement regarding systematic process in five dimensions. We use this process systematic approach in order to manage and reduce all five factors risks in electronically government service. (Figure 1)



Figure 1: IT risk management for e-government implementation success

## 2.6 Integrated trust

Institutional trust is defined as the “subjective beliefs with which organizational members jointly assess that are contributed to transaction success” (Pavlou, 2002). The perceived effectiveness of institutional mechanisms engenders trust. The positive aspects of governance mechanisms cannot be ignored in factors risk and generating a positive trust response (Bannister and Connolly, 2011). The interested part of institutional focus is a primary construct contained in the multifaceted trust model, as institution-based trust has developed into the first indicator of on-line transactions (McKnight and Chervany, 2002). Institutional trust refers to confidence in institutions under conditions of risk. It means that in a situation where one does not have full information about the intentions and outcomes of governance, the one is still confident that the government would not misuse its power and would not willingly harm one.

We consider an individual employees’ attitude based on their perception that operates on the individual level. Therefore, the level of an individual’s trust may cover with the level of governmental performance and with the interpretation of the information about government performance by the individual. An individual who is frustrated and disappointed with governmental services is seem to report a low level of confidence in governmental services, while the opposite is true of those who are satisfied [33]. The con-

cept, based on the work as “an individual employee’s expectations with regard to the employer organization’s capability and fairness” [29].

## 2.7 E-government success

[36] suggests that e-Government can be defined as “the method for governments to use the innovative ICT; web-based Internet applications in order to provide citizens and businesses for more convenient access and improve the quality of the services moreover, it can be provided greater opportunities to participate in democratic institutions and processes”. Successful e-Government makes approach citizens who connected to the Internet however they are able to move people online. To achieve this situation, the important key is the ability to provide value added services to citizens and businesses, hosted on the e-Government infrastructure [25].

## 3. The Methodology and Model

The survey research was conducted with e-government officers who have ever involved in e-government implementation. Judgment sampling was used to select the respondents. Measurement items of the questionnaire measured by a five-point Likert type scales, ranging from 1=strongly disagree to 5=strongly agree.

## 4. The findings

An exploratory factor analysis with varimax rotation was conducted to determine the five IT risk management factors including change management risk, IT infrastructure risk, performance risk, legal and regulation risk and economic risk, and integrated trust factors including individual based trust and institutional based trust. Three measurement items of IT risk management with factor loading lower than 0.5 are dropped. All constructs of IT risk management factors and integrated trust have the high level of reliability

with the value of Cronbach Alpha from 0.682 - 0.874.

#### 4.1 IT risk management

Firstly, change management risk factor includes the items: No reform processes by simplifying regulations and procedures, No plans to reduce opposition to change the use of new systems, No responsibility to change effort, No analysis impact of change program, and No benefit from changing traditional process to e-Government. These items had the average mean between 2.99 and 3.34. The lowest mean score was 2.99 on 'No benefit from changing traditional process to e-Government'; while item 'Lower performance-to-price ratio' had the highest mean score of 3.34.

Secondly, IT infrastructure risk factor comprises the items: No security from using database management systems, No electronic linkages among departments or external, No design IT infrastructure to handle an increase in users, workload and transactions, and User-unfriendly applications. These items had the average mean between 2.99 and 3.12. The lowest mean score was 2.99 on 'No securities from using database management systems', while item 'No design IT infrastructure to handle an increase in users, workload and transactions' had the highest mean score of 3.12.

Thirdly, performance risk factor is composed of the items: Slow response time, Difficult to access service, No security to protect privacy, and No accuracy information. These items had the average mean between 2.98 and 3.27. The lowest mean score was 2.98 on 'Difficult to access service', while item 'Slow response time' had the highest mean score of 3.27.

Fourthly, legal and regulation risk factor includes the items: No procedure to enforce law and regulation, Lower compliance level with internal and external law and procedure, and No legal structure to protect from problems on internet. These items had

the average mean between 3.00 and 3.12. The lowest mean score was 3.00 on 'Lower compliance levels with internal and external law and procedure', while item 'No legal structure to protect from problems on internet' had the highest mean score of 3.12

Finally, economic risk factor constitutes the items: Over maintenance costs, Uncertainty of future funding to sustainability, and No control of IT costs and cost predictability. These items had the average mean between 3.24 and 3.42. The lowest mean score was 3.24 on 'No control of IT costs and cost predictability', while item 'Over maintenance costs' had the highest mean score of 3.42.

#### 4.2 Integrated trust

Firstly, individual based trust factor includes the items: Trust in data from electronic system, Trust in electronic system, and Trust in electronic system for benefit of user. These items had the average mean between 3.20 and 3.32. The lowest mean score was 3.20 on 'Trust in electronic system'; while item 'Trust in electronic system for benefit of user' had the highest mean score of 3.32.

Secondly, institutional based trust factor includes the items: Trust in agency for security of electronic system, Trust in agency for efficiency management electronic system, Trust in management of agency for reliable and accurate information systems, Trust in internet protection, Trust in management of agency for benefit of user, and Trust in management of agency for reliable and accurate information systems. These items had the average mean between 3.30 and 3.58. The lowest mean score was 3.30 on 'Trust in internet protection'; while item 'Trust in agency for security of electronic system' had the highest mean score of 3.58.

### 5. Summary and Conclusions

This study develops IT risk management as a deter-

minant of e-Government implementation success. The components of IT risk management consist of change management risk, IT infrastructure risk, performance risk, legal and regulation risk and economic risk. The result of five variables is assessed by mean scores. Firstly, change management risk factor shows that item on 'no analysis impact of change program' is ranked as first. This suggested that respondents viewed the analysis impact of change program as most important impact on change management risk. Secondly, IT infrastructure risk factor presents that item on 'no design IT infrastructure to handle an increase in users, workload and transactions' is ranked as first. This suggested that respondents viewed the design IT infrastructure to handle an increase in users, workload and transactions as most essential impact on IT infrastructure risk. Thirdly, performance risk factor explains that item on 'slow response time' is ranked as first. This suggested that respondents viewed the slow response time as most significant impact on performance risk. Fourthly, legal and regulation risk factor shows that item on 'no legal structure to protect from problems on internet' is ranked as first. This suggested that respondents viewed the legal structure to protect from problems on internet as most important impact on legal and regulation risk. Finally, economic risk factor explains that item on 'over maintenance costs' is ranked as first. This suggested that respondents viewed the over maintenance costs as most significant impact on economic risk. This study shows IT risk management is most important problem of e-government. Implementation problems of e-government are resolved by managing IT risk in all factors. Trust is a fundamental element to the development process associated with computerization. The relationship between e-government success and trust was empirically tested in this study. Individual based Trust and Institutional based Trust was found to significantly affect the e-Government Success in Thai

Government. Moreover, this study can assist government agencies to prioritize important risk factors for achieving e-government success. The limitation of the research is that it focused on the government agencies involved with government to citizen (G2C) and government to business (G2B). Future research can expand to other group of respondents such as government to government (G2G) for analyzing the full range of Thai government agencies.

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