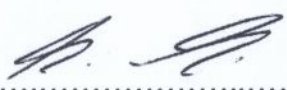# A MODEL OF FACTORS AFFECTING INFORMATION TECHNOLOGY ADOPTION AND REVENUE GENERATING PERFORMANCE IN THAI MUNICIPALITY

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A Dissertation Submitted in Partial

Fulfillment of the Requirements for the Degree of

Doctor of Philosophy (Development Administration)

School of Public Administration

National Institute of Development Administration

2016

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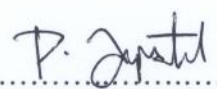
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ABSTRACT

Title of Dissertation	A Model of Factors Affecting Information Technology Adoption and Revenue Generating Performance in Thai Municipality
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The purpose of this study is to develop a model of the factors affecting information technology adoption and to determine the relationship between the adoption and revenue-generating performance of municipalities. Regarding to the level of IT adoption, in this study, municipalities were classified into four group which are laggard, reactive, active, and proactive. Based on an integration of institutional theory, resource dependence theory, innovation theory, and literature reviews, the study proposed that technological, organizational, and institutional factors are the main influencing factors. Ten hypotheses are presented describing the theorized relationship between the three factors and level of IT adoption. In addition, another hypothesis will explain the relationship between level of IT adoption and revenue-generating performance. Out of 800 questionnaires sent to the municipalities, there were 226 completed questionnaires replied. The findings indicated that, the factors affecting IT adoption are relative advantage, cost, management support and commitment, perceived importance by stakeholders, degree of interconnectedness and IT adopted by other. In addition, the finding also indicated that an increase in revenue of the municipality is related to the level of IT adoption.

This study makes many important managerial and policy contributions. First, the mayor and municipality clerk should realize that the adoption of IT systems will increase their municipalities' efficiency. Second, the central government should have a measure to ensure that the mayor should be more concerned about the IT adoption

in the municipality. Third, the central government and the policy makers should provide an appropriate level of IT support to different municipalities according to their current level of IT adoption (cluster classification) . Forth, the management should also provide more support and commitment toward training, such as setting up an IT training session in the municipalities in order to provide the necessary IT knowledge for the personnel.

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CHAPTER 1

INTRODUCTION

1.1 Statement of the Problem

The municipality is a form of local government currently used in Thailand. The history of this local government in Thailand dates back to 1932, when the Constitutional Revolution abolished absolute monarchy and introduced democracy. The Thesaban Act (Municipal Administration Act) came into effect in 1933. This municipal governance model is a decentralization tool regarding local government that allows a close relationship between the authorities and the local community. In addition, the municipal governance model was established to manage the public services at the local level because of the impracticality for the central government to govern every community in the country.

Currently, the municipalities in Thailand are classified into three types according to the population in the areas: 1) the sub-district municipality (fewer than 10,000 citizens), currently accounting for 2,233 sub-district municipalities; 2) the town municipality (more than 10,000 citizens) and currently accounting for 178 town municipalities; and 3) the city municipality (more than 50,000 citizens) and currently accounting for 30 city municipalities. All of the municipalities are under the control of the Department of Local Administration, the Ministry of Interior.

However, since the population is growing and more duties are needed to be done by the municipalities, the municipalities need to be more prepared and to work more effectively. Therefore, it is important that the municipalities acquire the "tools" necessary to help them be more efficient and to keep a close relationship between the related and/or governing authorities, such as the ministry of interior, and the local community.

At the moment, information technology is an important tool for most organizations to be more efficient and according to Thailand's central government

policy, the central government would like the local government organizations to implement information technology systems that will help to decentralize authority and increase the efficiency of service. In addition, this will help to reduce service time and increase transparency and encourage investment. As a result, there will be more development, which will improve the living standard of the people in the area.

Information technology (IT) is the application of technology to add value to information. This allows information to be more useful and more compatible. Information technology is being used in various ways, such as to collect, store, use, transmit or communicate, and it is directly related to such information management tools as computers and computer-related tools.

Information technology in various forms, as mentioned earlier, has been used in many organizations in different departments, such as accounting, inventory and human resource management, which enhances the efficiency of the organization. This is because such information can be used as a guideline for decision making and support the operation of the organization to achieve its goals. As a result, many organizations, including municipalities, are aware of the importance of information technology and are likely to implement it. However, different municipalities have implemented information technology at various levels. Some municipalities are using modern information technology systems for all of their tasks, whereas some municipalities use IT only partially for some tasks.

Many researchers and policy analysts are recognizing the importance of information technology. There is a great deal of research on information technology adoption, and on the relationship between information technology adoption and the revenue-generating performance of the organization, but very little information regarding the factors that influence organizations to adopt more information technology usage in order to enhance their efficiency. Hence, we cannot fully understand how information technology can either help or fail to support an organization's revenue-generating performance unless we understand the factors that influence the decision to adopt information technology. Thus, it is important to know what drives the adoption of information technology and how this adoption is related to the revenue-generating performance.

Revenue is an important resource for every organization in terms of development and growth. The ability to obtain more revenue leads to a higher chance to survive in the environment. Thai municipalities have many sources of revenue, for example the following: 1) local tax revenue; 2) non-tax revenue; 3) tax sharing; and 4) subsidies. These four sources of revenue are resources for the municipalities to manage and use to develop the local community. However, many Thai municipalities are unable to obtain sufficient revenue to stimulate growth and development of the controlled local communities. As a result, these communities with insufficient revenue may find it difficult to improve the people's living standard, which might lead to migration to another municipality. As a result, the municipalities with insufficient revenue have to improve their revenue-generating performance in order to have more resources to support communities' growth.

It has been proposed that the adoption and the extent of the adoption of information technology in the organization is related to how the organization responds to the demands, pressures, and normative expectations of the concerned parties. Unfortunately, not much research has been carried out to gain a better understanding of this proposition. In addition, the existing studies that analyze the determinants of information technology adoption fail to ground their assertions and observations in theory. Much of the research has used a diffusion of innovation theory as a primary theoretical model (Rogers, 1983; Rogers, 1995). However, the diffusion of innovation theory is increasingly limited in explaining the adoption process of advanced IT in a complex environment (Dutton & Thomas, 1985; Eveland & Tornatzky, 1990; Attewell, 1992). Meyer and Goes (1988) argued that the technology adoption process is a dynamic, multilevel, and lengthy decision process involving a host of actors and actions. Traditional communication theories may be deficient in their ability to explain the process of IT adoption by the organization in response to its environment. Thus, the suggestion has been made to apply existing social and organizational theories to the organizational setting where new IT is employed (Steinfield & Fulk, 1990). Therefore, this research integrates two complementary organizational theories, resource dependence and institutional theory, and innovation theory, to explain on how the organization adopts information technology in response to expectations and pressures, and consequently, and to identify what factors influence this adoption.

In conclusion, this study will strengthen the explicit integration of the two organization theories and innovation theory, which will help to explain the factors influencing information technology adoption in municipalities and the relationship of the adoption to their revenue-generating performance. The understanding of the empirical insights that will be gained from this study will assist researchers and policy makers in determining the relative efficacy of the mechanisms to support and encourage the municipalities to implement an appropriate level of information technology in order to increase their efficiency.

1.2 Objectives

1) To classify and identify municipalities in terms of the extent of their information technology adoption

2) To study and develop a model of the factors affecting the information technology adoption and the relationship between the adoption and revenue-generating performance of municipalities

3) To make recommendations for management and government policy makers to support and encourage municipalities to adopt an appropriate level of information technology use in order to enhance their revenue-generating performance and to increase their efficiency

1.3 Definitions

Information technology, IT, is the application of technology to add value to information, which will allow information to be more useful and enable it to be used further by a wider range of users

The municipality is a form of local government currently used in Thailand. The municipal governance model is a decentralization tool toward local government that allows a close relationship between the authority and the local community.

Revenue-generating performance is the ability of organizations to obtain needed resources. Sufficient revenue will lead to greater development of an organization.

1.4 Scope of the Study

The population of this research is the municipalities in Thailand. A sample will be drawn from the municipalities listed by the department of local administration, the Ministry of Interior, totaling 2,441 municipalities (Department of Local Administration, Ministry of Interior, 2015).

1.5 Significance of the Research

1) To realize the current state of information technology usage in the Thai municipality

2) To contribute to a better understanding of the factors that affects the information technology used in the Thai municipality

3) To use the data gathered from this study as a guideline for the development of information technology use in municipality organizations. This will allow government policy makers and any involved parties to have more information for promoting information technology usage in the Thai municipality.

CHAPTER 2

LITERATURE REVIEW

This chapter consists of a literature review, divided into 13 topics as follows.

2.1 Thailand's Administrative Structure

Prior to 1999, the government responsibilities in Thailand were divided into central, provincial, and local administration. However, the local administration (local self-government) had a narrow range of responsibilities with constrained autonomy, and was subject to strict control through the Ministry of Interior's Department of Local Administration for most activities, including finance, service provisions, and local public management. Decentralization reforms have sought to strengthen local administration by giving local authorities a broader mandate in service delivery and access to increased revenues to discharge these responsibilities. As a result of these

reforms, two parallel systems of public administration have emerged—central and local administration. The government view of these parallel systems is relatively straightforward in principle. The central administration has deconcentrated field offices-the so-called "provincial administration"-at provincial, district, and subdistrict levels and representatives (Kamnan or District Officer) at the subdistrict level (by voting among village headmen). These offices have a dual role of delivering centrally-administered services as well as providing coordination and oversight functions for local administration. In terms of local administration, Thailand is subdivided into 77 provinces, which constitute the highest order of local government. Urban population within each province is demarcated into city, town or sub-district municipalities depending on population size, density, level of revenue collected by local authorities and administrative capacity for municipal development. Rural population is assigned to a tambon administrative organization. All local governments have directly elected local councils, indirectly elected council chairs and directly elected chief executives. In Thai local administration there is a clear separation of legislative authority (vested in the elected Council) and the executive powers (vested in the elected chief executive).
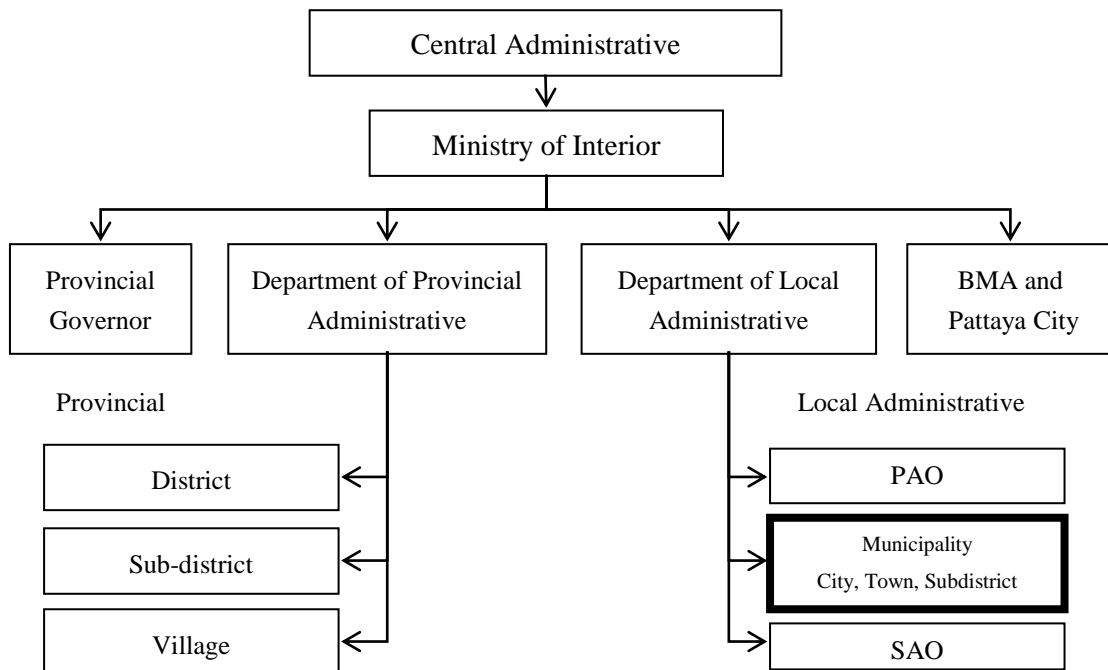
Figures 2.1 Thailand's Administrative Structure

2.2 Thailand's Local Administration

The local administration is under the control of the department of local administration (DLA), which is a government agency established by the ministry of interior. Its main responsibility is to promote and support the work of the local administrative organizations (LOAs) through the development and series of advice on the local development plan, personnel administration, finance, and administration in order to strengthen the capacity and efficiency of the local administrative organizations regarding public service provision. However, the structure, roles, and functions of the department of local administration have been specified in the Ministerial Regulations on the Organization of the Department of Local Administration, Ministry of Interior, B.E. 2551 (2008) as follows:

Roles and Functions

1) Develop the system, organization, and structure of local administrative organizations

2) Promote and support in formulating, cooperating, integrating the local plan, as well as design the system in monitoring and evaluating implementation of local development plan

3) Enact, revise, and amend the laws and regulations related the local administrative organizations, including consult, advise, and supervise the local administrative organizations to carry out roles and functions

4) Regulate the guidelines and standards concerning the local personnel management in accordance with local management laws and regulations

5) Promote, support, and cooperate with local administrative organizations on finance, treasury, budget, supplies, revenue collection, and commerce, as well as design the monitoring system on finance, accounting, and supplies of local administrative organizations

6) Promote, support, and cooperate with local administrative organization on public service provision and education according to the roles and functions of local administrative organizations

7) Regulate the guidelines, systems, and key performance indicators as the standards of functioning of local administrative organizations, along with supervise local administrative organizations to the standards

8) Promote the public participation in managing and monitoring the implementation of local administrative organizations

9) Develop the information technology system for the local administrative organizations' services

10) Improve the personnel of local administrative organizations and Department of local administration

11) Perform any other works as regulated by laws and regulations in relation to the roles and functions of Department of Local Administration, or as assigned by the Ministry of Interior or the cabinet

Hence, the DLA classifies local authorities as follows:

Table 2.1 Thailand's Local Authorities

Type	Number
Provincial Administrative Organizations (PAO)	76
Thesaban (Municipalities)	
1) City Municipalities	30
2) Town Municipalties	178
3) Sub-District Municipalities	2,233
Sub-District Administrative Organization (SAO)	5,335
Special Municipalities	
1) Bangkok Metropolitan Administration (BMA)	1
2) City of Pattaya	1
Total	7,854

2.3 Local Government Finance

The central government of Thailand is decentralizing and is redistributing the power and authority toward the local government. One of the duties that the central government is giving to the local government is finance-related duties. These duties are collecting taxes and fees in order to use those funds to develop the local community.

The local government finance administration covers many areas: 1) revenue generation, 2) expenditure control, 3) budget, 4) procurement, 5) accounting, and (6) account auditing

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2.3.1 Local Government Financing Structure
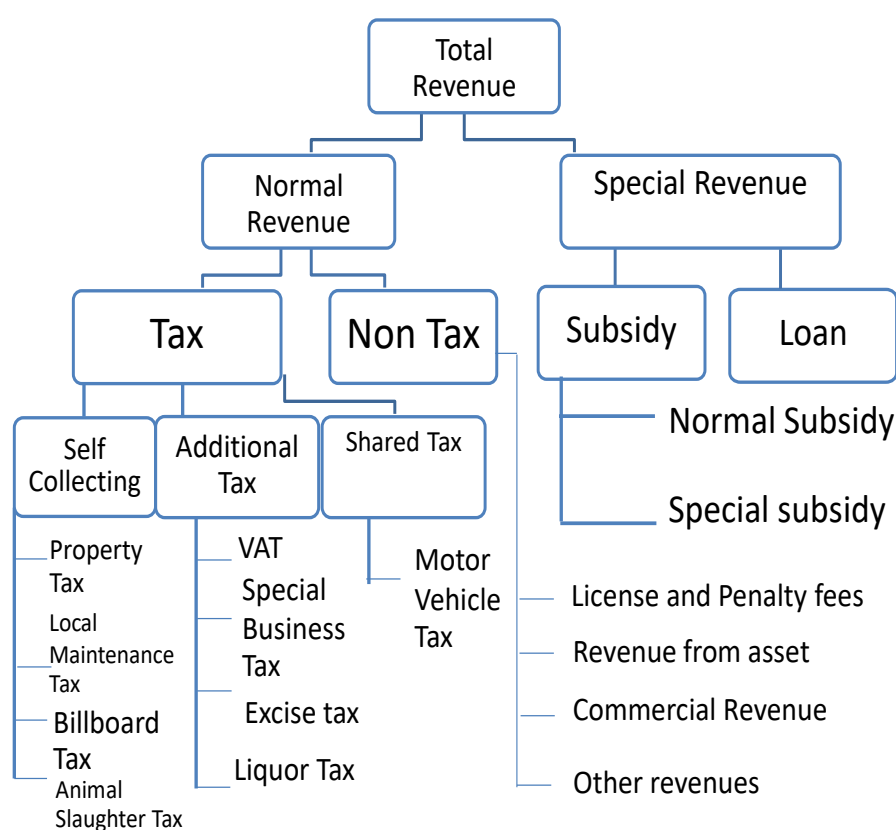
Figure 2.2 Local Government Financing Structure

In 2014, the self-collecting revenue of Thai municipalities was 20,473.89 million Baht compared to the addition and shared tax of 80,523.76 million Baht and subsidy from the central government of 86,367.54 million Baht. This means that the self-collecting revenue accounted for 10.93% of the total revenue. In addition, according to figure 2.2, it is clear that the municipality self-collecting revenue sources are limited. As a result, many municipalities have to request a higher subsidy from the central government in order to have sufficient resources to support the local

community needs. This can be implied that Thai municipalities still lack of revenue-collecting skills.

2.3.2 Problem of Local Government Financing

The problem can be classified as follows.

2.3.2.1 External Factors

Economic and social factors: economic growth and development will lead to higher income of the local citizen. This leads the community to be urbanized, which encourages more commercial, employment, and tax responsibility on the part of local citizens.

Political factor: 1) local government financing is being interfered with by the politicians of the central government since there are a lot of benefits; 2) even though the central government wants to decentralize power and authority, the necessary power and authority related to the financing are still under the central government; 3) there is a lack of knowledge and responsibility on the part of politicians.

2.3.2.2 Internal Factors

The employees, managers, and council in the municipalities lack knowledge and responsibility and do not truly understand the problem of the municipalities. In addition, the available revenue is also being used in an inefficient way.

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2.4 Municipality

The municipality is a form of local government currently used in Thailand. It is a decentralization "tool" of the central government. The local government allows a close relationship between the related and/or governing authorities, such as the ministry of interior, and the local community. The municipalities are classified into three types according to the population in the areas: 1) sub-district municipality (fewer than 10,000 citizens) and currently accounting for 2,233 sub-district municipalities; 2) the town municipality (more than 10,000 citizens) and currently accounting for 178 town municipalities; and 3) the city municipality (more than 50,000 citizens).

2.4.1 Overall Duty of the Municipality

The duties and authority of the municipalities are as follows.

1) Prepare local development plan

2) Provide and maintain land, water, and sewers

3) Provide and manage the market, harbor, and parking spaces

4) Provide utilities and other construction

5) Promote career coaching

6) Promote local business and investment

7) Promote tourism

8) Provide education

9) Provide social welfare and improve the living standard of children, women, and elderly

10) Maintain local traditions and culture

11) Improve slums and manage the housing system

12) Provide and maintain recreation areas

13) Promote sports

14) Promote democracy, equality, and freedom of the people

15) Promote the participation of citizens in local development.

16) Maintain order and public morality in the controlled region

17) Dispose of waste and sewage

18) Provide healthcare

19) Provide a cemetery and crematorium

20) Provide animal control

21) Provide animal killing

22) Provide security, order, and hygiene in public areas

23) Manage, maintain, and utilize forests, resources, and the environment

24) Provide city planning

25) Manage transportation and all other related traffic engineering

26) Maintain public areas

27) Provide building control

28) Prevent and mitigate public danger

29) Maintain order while encouraging and supporting the prevention of danger toward life and property

30) Any other activities that benefit the local communities according to the local commission

2.4.2 Municipality Organization Structure

The organizational structure of the municipality units can be divided into the internal control division, the healthcare division, the permanent secretary division, the treasury division, the planning council affairs division, the social welfare division, the education division, the civil engineering division, and the healthcare and environment division.

Municipality Organization Structure
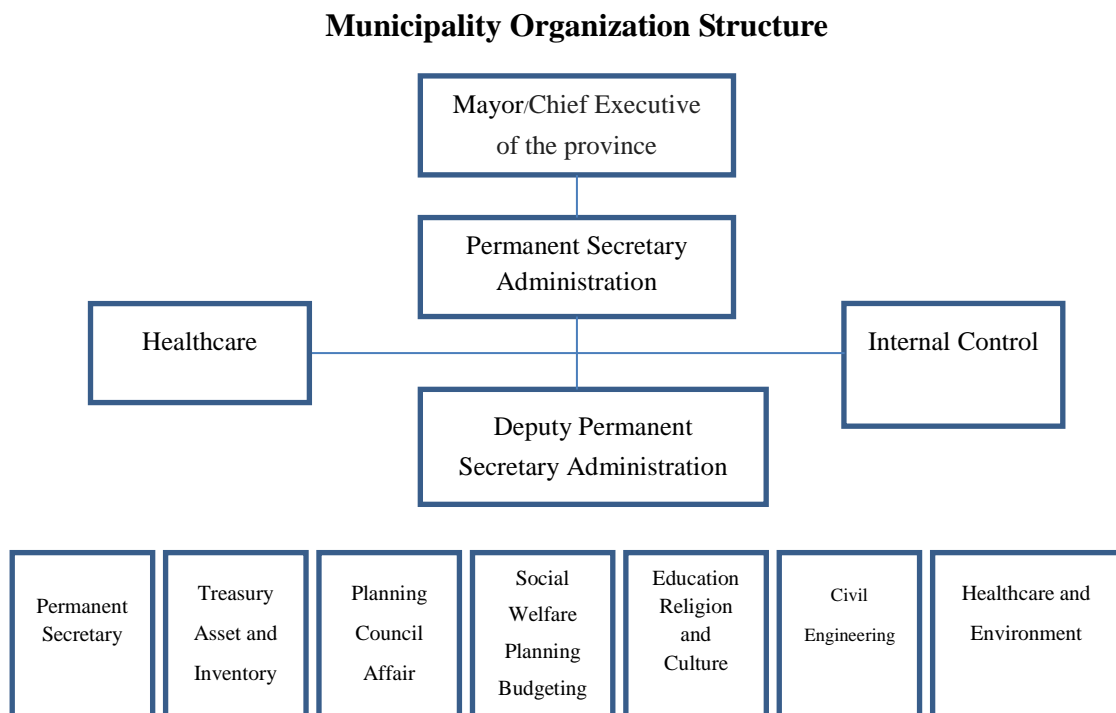
Figure 2.3 Municipality Administrative Structure

2.4.3 Environmental Condition of the Municipality

The SWOT analysis of the municipality is as follows

1) Strength

    (1) Self-budgeting

    (2) Knowledgeable staff

    (3) Sufficient resources and machinery

    (4) Freedom to operate

The strength of the municipality is its location over the center of transportation route.

2) Weakness

    (1) The management lacks knowledge and vision.

    (2) The budget is not being used worthy ways.

    (3) There is insufficient IT knowledge.

The weakness of the provincial administration is different from the municipality and sub-district administration in the sense that the provincial administration has control over a large area resulting in difficulty in management coordination and many duties to do.

The weakness of the sub-district administration is that the willingness of the citizens to participate is low, and there is a lack of human resources and insufficient basic infrastructure.

3) Opportunities

    (1) Central government funding

    (2) Tourism destination, local knowledge, and local products

    (3) Citizen participation and involvement

4) Threats

    (1) The politicians have uncertain policies while there is a lack of coordination between the politicians and government officials.

    (2) People lack knowledge of the duties of the local government organization.

Table 2.2 Municipality SWOT Analysis

SWOT	Strength	Weakness	Opportunity	Threat
Municipality	1) Self-funding Highly skillful and knowledgeable personnel 2) Most of the citizen are well educated 3) Local knowledge 4) Sufficient resources 5) Clear organizational structure 6) Tradition and culture 7) Watershed area and cultivatable land with accessible route 8) Center of transportation route	1) Management lacks vision 2) Management lacks leadership 3) Unskillful personnel and they are underpaid 4) Reduced funding and being used in an unworthy way 5) Lot of complaints from citizens 6) IT system keeps changing and is costly 7) Not attractive tourist spot 8) Citizens' lifestyle	1) Being support by the central government (funding and policies) 2) Have local knowledge and strong tradition 3) Decentralization of power to local government 4) Modern machinery 5) Support the local citizens 6) Provide human development 7) Natural resources and tourism	1) Managed under unclear policies on the part of the politicians 2) Local citizens have minimal knowledge about the duties of municipalities 3) Limited funding from central government 4) Unclear law and order 5) Local citizens may resist change and new policies 6) Latent citizen 7) Natural disaster

2.5 Information Technology

2.5.1 Definition of Technology and Information Technology

Technology refers to the application of scientific knowledge, and the truth about nature and the environment that create a benefit for humanity. Therefore, the application of technology is a process that creates value and increased benefit..

Information refers to the data that are beneficial to human beings. Such data must be collected, stored, and checked for accuracy. The classification of data and the conclusions regarding the data will be processed so that people can use them in everyday life, for example in various news reports and in research.

Information technology or IT refer to the application of technology to information in order to make this information more useful and so that it can be used in a wider scope. Information technology includes various technologies for collecting information, systematic storage, recalling information, information processing, the display of information, and presenting the information in an effective way for various users. Information technology is directly related to the equipment used in information management, including computers and related software.

2.5.2 The importance of Information Technology Adoption in the
Organization

Currently, information technology, directly and indirectly, plays an important role in running an organization. This is because IT minimizes the constraints of time, location, personnel, and the accessibility to news and knowledge. IT also helps to create a close relationship between related parties. The development of IT allow globalization to be more prominent, which means that every organization has to be more prepared to face new challenges. As a result, every organization is being forced to reorganize and capture new opportunities while guarding against any upcoming threat in the future. The reasons why organizations are required to adopt information technology usage are as follows.

1) Changes in communication technology, including computer networks, allow organizations to be more closely linked through the sharing of

information. Any organization that decides not to join the link may find it is difficult to perform its task. However, there might be some enforcement from the authority in order to control the activities, such as revenue collection and the bidding for a government concession.

2) As competition gets more intense, every organization has to approach consumers with differentiated products combined with high quality at cheaper prices. As a result, information technology with such capability allows the organization to gain a competitive edge over others.

3) Organizations have to adapt and reorganize due to many pressures, such as technological changes, social changes, and consumer behavioral changes. As a result, information technology will allow the organizations to adapt quickly through these changes while allowing the reorganization to happen smoothly.

4) The modern organization has to follow change in the world and seek new opportunities. The use of IT will help with the ability to follow those changes and catch up with new opportunities.

5) Organizations have to use IT in many areas such as research and development, human resources, and marketing in order to increase their competitiveness.

6) Organizations have to coordinate and share needed information, both within the organization and among themselves, in order to keep the concerned parties at the same level and aware of the current situation.

At the moment, the information and computer networks of many organizations are closely connected in many dimensions. As a result, those organizations that are not connected to this network may feel lonely and find it difficult to function normally. In addition, pressure from both internal and external environments on the organizations will also persuade them to adopt more IT usage voluntarily or legally by law.

2.5.3 The Impact of IT on the Structure of the Organization

The use of IT in the organization will change the structure of the organization from the traditional organization to the modern organization as follows.

1) The communications and the flow of information through the network will be made faster, more accurate, and simpler to operate. This can help to reduce some of the workload of the organization.

2) Effective information systems will help to reduce the hierarchy of the management and expand the span of control. This creates a "flat" organization structure, which allows communication within the organization and human resource management to be more efficient.

3) Advanced telecommunications systems allow individuals to work from various locations. This will possibly minimize conflict from direct communication. In addition, this creates a decentralized organization which empowers and encourages the decision-making of each individual.

4) The application of IT in the organizations helps every individual within the organization to be more efficient. This is because from the information that the individual receives, he or she will have more knowledge to do his/her routine job more efficiently.

5) The application of IT will have an impact on the reduction of resource usage such as communication internally through email (paperless office).

6) The evolution of the information network through computer systems will create greater collaboration between two or more organizations from different locations. This means that more information will be shared via the application of IT usage.

2.5.4 The Benefits of IT

The benefits of IT for the organization are as follows.

1) The direct benefit from IT usage is the improvement of job efficiency. This is because prior to any IT application, the organization will only take the direct benefit and cost into consideration.

2) Operation flexibility enhancement; this is because IT will help the organization develop and adapt appropriately to different situations. In addition, the application of IT will help the decision maker make any decision faster and more accurately since IT helps to process the information and present it in a user-friendly form.

3) IT will help to increase the competitiveness of the organizations. This is because IT can be used to respond to the customer's needs. Hence, better understanding and a faster response will result in a more positive reaction to the organization.

4) IT can help to increase profit, both directly and indirectly. The example of direct revenue is providing IT service to other organizations and indirect revenue is minimizing the time consumption of any service operation.

5) IT can help to minimize cost. This is because better IT application will allow every concerned party have the same level of information at the same time. As a result, duplicated work will be minimized and the workload for each individual will be lowered.

6) IT will help to improve the quality of the service of the organization. This is because IT applications will enhance better quality control through evaluation by the facilitator. As a result, the organization can use this information to improve their services and better serve the facilitator.

2.5.5 The Application of IT in the Organization

The application of IT can be helped to support the operation of the organizations in many dimensions as follows.

1) IT is being used as a tool for data and information storage, such as the relation database management system, RDBMS, which is a program that helps to control and manage backup information.

2) IT is being used as a tool for applications that are further applied for the preparation of databases and large data storage warehouses (data warehouse) , which helps to process data in various formats. As a result, data and information storage in paper form will be minimized.

3) IT is being used as a tool for communication via the Internet, intranet, and the World Wide Web

2.5.6 Management Roles Toward the Application of IT in the Organization

Management personnel are an important factor in the application of IT in the organization. In order to maximize the efficiency, the management should play a role in various areas as followed.

1) Manufacturing and service providing: management should seek an appropriate IT which can be adopted to enhance manufacturing and service provision, such as concurrent engineering, which will help to develop products and services that ensure a high quality standard. In addition, the management should structure the organization so that many resources can be shared among different departments.

2) Efficient communication is important to ensure the smooth operation of the organization. Management has to encourage IT application for communication, both inside and outside the organization. This will minimize any miscommunication and allow everyone inside and outside the organization to be able to work together effectively.

3) The process of IT application will help to minimize the work process by eliminating any ineffective processes, resulting in the improvement of the organization revenue-generating performance. In addition, this can also increase the competitiveness of the organization, which can be done via a partial change in the work process or a total change in the work process

4) The successful planning of IT applications for the organization's activities are mostly created from the development of IT infrastructure, which is related to the current situation and the organization's strategies. In order to achieve this, strong commitment from the management personnel is required. In addition, there can be many strategies for these IT applications for different departments in the organization. Hence, the most important decision for the management personnel is to find the best fitting integration of these IT applications for every department in the organization.

2.5.7 Environmental Pressure Regarding the Application of IT

For many organizations, the most common reasons for IT adoption are to provide a means for enhancing survival and/or growth, staying competitive, and/or enhancing innovation abilities (Bridge & Peel, 1999; Burca, Fynes, & Marshall, 2005; Bruque, & Moyano, 2007). However, different organizations have decided to adopt IT for different reasons depending on their environment and have been pressured and impacted differently by the environment (Oakley & Cooper, 1991). Organizations will adopt IT in order to adapt themselves to the changes in the internal and external environments (Andries & Debackere, 2006).

The internal environmental changes that influence the adoption of IT are organization cycle and organization growth. Hence, organizations will adopt IT at an appropriate level according to their current status (Siggelkow & Levinthal, 2003) in order to maintain continuous growth and survival (Andries & Debackere, 2006). In addition, the adoption of IT also depends on the absorption capability of the organization (Phelps, Adams, & Bessant, 2007). This means that if organizations can adopt the new IT system according to the environment, they are likely to gain a competitive edge over their competitors (Zahra & George, 2002).

The external environmental changes will influence IT adoption in 2 ways, which are technology push and market pull (Andries & Debackere, 2006; Henderson & Clark, 1990).

The technology push happens when there is a sudden advancement in technology that pressures the organization to learn and capture this change in order to seek new opportunities and to gain competitiveness, such as increasing management efficiency, reducing costs or developing new products and services. Market pull happens when there is a demand from the market that forces the organization to adopt the new technology in order to serve the new demand. From an IT application point of view, technology push can be classified as a push for innovativeness, and meanwhile market pull can be classified as the ability to compete.

However, in reality, these pressures cannot be clearly separated. Organizations have to combine these two pressures because by only considering one pressure it might misrepresent the information. For instance, if only the market push is considered, this may lead to an innovation problem in the future. Meanwhile, if only the technology pull is considered, this may lead to a misunderstanding of the new demand created. As a result, every organization has to consider these two pressures carefully.

2.6 IT Usage in Thailand's Local Government

According to the IT roadmap for local government, hardware, software and the IT network factor, the current IT usage condition, personnel factor, budgeting factor and management factor are as follows.

2.6.1 Hardware, Software, and the IT Network Factor

About 97.4% of local government organizations have computers, with an average of 7 computers in the provincial administration organization, 11 computers in the municipality, and 6 computers in sub-district administrations. In addition, the ratio between the number of computers and the number of personnel is 1:10 in the provincial administration organization, 1:6 in the municipality, and 1:3 in the sub-district organization. The majority of the ages of the computers are 2-3 years (27.40%) in the provincial administration organization and 1-2 years for the municipality and sub-district organization (24.90% and 26.10% accordingly). Meanwhile 93.70% of local government organizations are connected to the Internet (provincial administration organization 84.80%, municipality 95.40%, and sub-district organization 93.50%). However, only 13.30% of them have a website (provincial administration organization 60.60%, municipality 22.20%, and sub-district organization 11.10%).

However, around 67.40% of the computers in the local government organization are standalone (are not connected as a network between one another). Hence, there are also insufficient computers for the current usage by the officers, however most of the computers do not perform as expected and they are not regularly maintained.

2.6.2 Current IT usage conditions

About 99.00% of local government organizations use computers for documents and report typing, followed by searching for information and e-mail. The most commonly-used software is Microsoft Office and Internet Explorer.

However, only 19.70% of local government organizations use information technology (IT) (provincial administration organization 34.20%, municipality 33.20%, and sub-district organization 16.90%) with most of the IT systems developed by outsiders (provincial administration organization 45.50%, municipality 62.40%, and sub-district organization 79.00%). The most commonly-used IT systems are for taxation, property, payroll, human resource management, and social welfare. In addition, the IT systems being used in local government organizations are sophisticated, and their personnel have insufficient knowledge to operate IT.

2.6.3 Personnel Factors

The average number of workers in the provincial administration organization, municipality, and sub-district organization is 167, 68, and 18 respectively. In addition, the ratio between permanent and temporary personnel is 2:1 in the provincial administration organization, 9:1 in the municipality, and 5:1 in the sub-district organization, with most of the personnel, both permanent and temporary, having an education level lower than a bachelor degree (provincial administration organization 53.00%, municipality 60.00% and sub-district organization 53.00%).

2.6.4 Budgeting Factors

All local government organizations have their own budgeting, both from self-collection and central government subsidy. The local government organizations should have a sufficient budget for development. However, the budgets are being used in an unworthy way.

2.6.5 Management Factor

Many management positions in every local government organization is being chose from the election. In addition, every local government organization has the freedom to manage freely especially on the IT issue. This is because there is no department taking care of the IT system, the local government organizations have to seek advice from specialists outside the organization. In addition, the provincial administrative organization only has an average of 3.2 IT personnel in the organization with only an average of 2.1 personnel with an IT background. Meanwhile, the municipality and sub-district organization only have an average of 2.5 and 2.4 IT personnel in the organization with only an average of 0.6 personnel with an IT background.

2.6.6 Conclusion

The conclusions of IT usage regarding local government organizations are as follows.

Table 2.3 IT Usage in Local Government

Factor	Strength	Weakness
Hardware, software, and IT network	1) Have sufficient computers and related equipment 2) Have basic software for general office use 3) Main IT system is for taxation	1) Only use computers and related equipment for normal office tasks 2) Outdated computers 3) Some places do not have enough computers. 4) IT resources are not being shared within the organization. 5) Lack of maintenance 6) Current IT system is not being used as expected or at maximum capability 7) Lack of other necessary IT systems for operation
Personnel	Enthusiastic about using computer	1) Lack of knowledge 2) Not trained in a systematic way
Budget	1) Self-collecting budget 2) Government subsidy	1) Insufficient budget 2) Mainly invest in hardware 3) Influenced by outsiders
Management	Management sees the importance of IT	1) Lack of policy, mission, and planning 2) Lack of skilled personnel to integrate IT system
IT sharing between inside/outside the organization	1) Have Internet and e-mail 2) Some organizations have webpage	1) Minimal IT sharing within the organization 2) Minimal IT sharing with other local government organizations 3) Current system is closed and difficult to share with other organizations 4) No common standard 5) High expense and every organization has to separately seek IT consultant

2.7 IT System Demand in Thailand's Local Government

According to the IT roadmap for local government (Thammasat University, 2014), the demand for IT systems in local government organizations can be concluded as follows.

2.7.1 System Requirements

The most demanded systems in the local government organization are document sorting systems (73.00%), followed by the accounting/finance/treasury system and the taxation system (45.30% and 41.20%).

Table 2.4 IT System Requirement in Local Government According to Their Duties

System	Demand (%)			Total
	Province	Municipality	Sub-district	
Document Sorting	54.80	69.10	70.90	73.00
Account/Finance/Treasury	32.20	42.70	44.10	45.30
Taxation	19.40	43.60	39.30	41.20
Database	45.40	25.50	19.50	21.60
Revenue	16.10	15.20	20.60	20.40
Construction/City Planning	22.60	15.50	13.70	14.60
Citizenship Registration	48.40	25.20	6.90	10.70
Internet/Intranet	16.10	12.00	8.90	9.80
Budgeting	35.50	14.90	8.00	9.80
Complete Software	25.80	6.90	9.40	9.60
Website	9.70	4.90	2.50	3.10
Social Welfare/Healthcare	9.70	11.50	1.20	3.00
Geographical Map	-	2.60	2.70	2.80
Education/Economy	3.20	5.70	1.60	2.30
Water/Irrigation	-	4.60	1.30	1.80
Prevent and Mitigate Danger	-	1.20	-	0.20
Other	19.40	9.50	4.10	5.30

2.7.2 The Demand for Computers and Computer Networks

More than half of the local government organizations would like to have a local area network (LAN) (64.50%) followed by computers and high speed Internet (40.70% and 26.70%).

Table 2.5 Local government Demand for IT

Demand	Type of Organization			Total
	Province	Municipality	Sub-district	
Local area network	68.20%	66.70%	64.10%	64.50%
Computer and communication equipment	40.90%	39.80%	40.80%	40.70%
High speed Internet	50.00%	25.50%	26.50%	26.70%
Geographic information system	4.50%	6.50%	3.40%	3.90%
Personnel training	9.10%	2.60%	3.20%	3.20%
Phone hub and Internet channel	-	2.20%	1.50%	1.60%
Webpage	-	2.20%	0.80%	1.00%
Budgeting/coordination and maintenance	-	-	0.50%	0.50%
Total	22	231	1,298	1,551
	66.70%	50.30%	52.30%	52.10%

2.7.3 The Expectation from the Information Technology Strategy

The local government organization expects to have better and modern information systems (33.00%), followed by a user-friendly system, a systematically-developed system, a successfully-implemented system, a human resource development system, and a system that can support local citizens' demand (17.90%, 13.20%, 12.30%, 11.90% and 11.40%).

Table 2.6 Local Government Expectations

Expectation	Type of Organization			Total
	Province	Municipality	Sub-district	
Modern system	40.90%	33.30%	32.80%	33.00%
User-friendly system	9.10%	12.00%	19.20%	17.90%
Systematically-developed system	13.60%	17.20%	12.50%	13.20%
Successfully-implemented system	22.70%	12.50%	12.10%	12.30%
Human resource development system	4.50%	9.90%	12.50%	11.90%
System that can support local citizens' demand	-	12.00%	11.50%	11.40%
Streamlined administration	18.20%	6.80%	9.20%	9.00%
Large area Internet coverage	4.50%	7.30%	5.00%	5.30%
Common work standard	13.60%	8.30%	4.20%	5.00%
Appropriate budget allocation	9.10%	2.10%	3.00%	3.00%
Checks and balances	-	1.00%	1.10%	1.00%
Document storage system	-	0.50	0.20%	0.20%
Total	22	192	1,028	1,242
	66.70%	41.80%	41.40%	41.70%

2.7.4 Current Status of Information Technology Strategy

About 40.10% of the local government organizations suggest that in-charge personnel are needed to be trained and need to develop the necessary skills to handle IT tasks. Around 27.80 believe that the current IT equipment in the local government administration is inefficient and 11.60% think that the local government organization has to recruit skilled personnel.

Table 2.7 Current Status of IT in Local Government

Opinion	Type of Organization			Total
	Province	**Municipality**	**Sub-district**	
Personnel development	50.00%	35.40%	40.60%	40.10%
Inefficient IT equipment	21.40%	28.00%	27.90%	27.80%
Find the right personnel for the task	7.10%	11.00%	11.80%	11.60%
Appropriately allocate the budget	-	6.10%	5.70%	5.60%
Promote the program	7.10%	11.10%	2.70%	4.00%
Insufficient number of IT equipment	7.10%	-	4.20%	3.70%
Complete computer software package	-	4.90%	2.50%	2.80%
Improve data backup	-	2.40%	2.10%	2.10%
Website development	7.10%	-	1.30%	1.20%
Common development in the same direction	-	1.20%	1.10%	1.10%
Total	14	82	473	569
	42.40%	17.90%	19.00%	19.10%

2.8 Innovation Theory

2.8.1 Technology Acceptance Theory

The study of IT or the acceptance of it is the study of human behavior in terms of explaining the process related to human behavior, including individual reasoning, either accepting or denying new IT (Venkatesh, Morns, & Davis, 2003, pp. 425-478); the study has developed into theory or a means to predict human behavior or the organization in accepting IT (Hevner, March, Park, & Ram, 2004, pp. 75-105). The prediction, which has influenced the acceptance of IT for the individual or the organization, are as followed.

2.8.1.1 Theory of Reasoned Action or TRA

The theory of reasoned action is a researched model under the perspective of social psychology, which aims to determine purposively-intended behaviors (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). This theory consists of attitude, social influence, and intention variables in order to predict behavior.

According to TRA, it is assumed that the individual's behavioral intention (BI) to perform an actual behavior is influenced by his or her attitude toward performing the behavior (ATB) and subjective norm (SN), which is the perception of what others think the person will or will not do. Meanwhile, ATB and SN are influenced by the behavioral domain. In situations where attitudinal or personnel-based influences are stronger, ATB is considered as the dominant predictor of BI, and SN has little or no predictive power (Pham, et al., 2011). However, in situations where normative implications are dominant, SN might be a strong predictor of BI, and ATB is likely to be lesser prominent (Ajzen & Fishbein, 1980).

According to Fishbein and Ajzen (1975), BI is believed to correctly predict AB if 1) "the degree to which the measure of intention and the behavioral criterion correspond with respect to their levels of specificity of action, target, context, and time frame" (Ajzen, 1991, p. 2) "the stability of intentions between time of measurement and performance of the behavior" (Ajzen, 1991); and 3) "the degree to which carrying out the intention is under the volitional control of the individual" (Ajzen, 1991).

TRA has been successfully applied to a variety of situations to predict the performance of behavior and intentions. For instance, TRA is utilized to predict turnover (Prestholdt, Lane, & Mathews, 1987) and breast cancer examination (Timko, 1987). In addition, a meta-analysis of research on TRA was implemented by Sheppard, Hartwick, and Warshaw (1988) and the authors contended that the power of TRA regarding its predictive ability is very strong in various situations (Pham, Pham, & Nguyen, 2011).
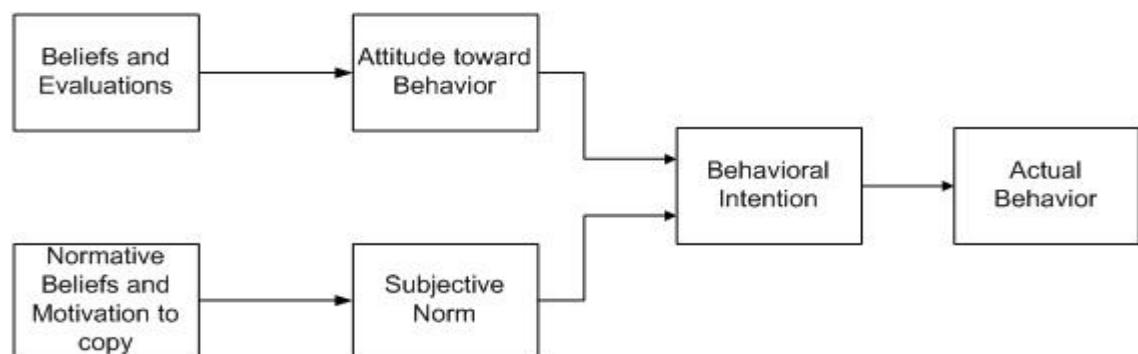
Figure 2.4 Theory of Reasoned Action

Sources: Adapted from Fishbein & Ajzen, 1975.

2.8.1.2 Theory of Planned Behavior or TPB

Although TRA's predicting ability is strong in variety of studies, there are still some problems in situations where the behavior is not controlled in a fully-intentional manner. Two problems of TRA were mentioned by Sheppard et al. (1988). The first problem is that one must differentiate behaviors from intention. This is difficult because there are many factors besides one's intentions that are likely to determine the individual's action. The second problem is that provisions are not specified in the model in order to examine if the probability of failure to perform is due to one's behavior or due to one's intentions. Therefore, Ajzen (1985) extended TRA to solve these problems by adding another construct to the model, which is called perceived behavioral control which will help to better predict behavioral intentions and behavior

Hence, TRA and TPB share many common ideas things. In both models, actual behavior can mainly predicted by intention. In addition, both theories assume that individuals are rational and able to use available information to make their decisions (Fishbein & Ajzen, 1975). By taking related factors into consideration, it is assumed by TRA that the action that is being investigated is under the total conscious control of the performer (Madden, Ellen, & Ajzen, 1992).

However, there is a primary difference between these two theories in the way that TPB has added perceived behavioral control (PBC) as the determinant of behavioral intention, as well as the control beliefs that affect PBC. Although it is difficult to evaluate actual control before behavior, it can be assumed that TPB can measure PBC (people's perception of the ease in performing the action of interest) (Ajzen, 1991). PBC is viewed as a function of control beliefs and perceived facilitation (Panagopoulos, 2010). Control beliefs are viewed as the perception of the absence or presence of needed resources and opportunities in order to implement the action. Perceived facilitation is rooted in one's evaluation about the importance of such resources and opportunities towards gaining the outcomes (Ajzen & Madden, 1986).

An exogenous variable, PBC, is added as it has the potential to have a direct and/or indirect impact on actual behavior through intention. Moreover, the indirect impact is based on the assumption that PBC strongly influences the behavior

intention. This proves why those individual who lack of needed resources and opportunities is likely to assume they do not have control when implementing behavior. Therefore, even if they have favorable attitudes and/or subjective norms towards implementing the behavior, their behavior intention tends to be low. In an empirical study, Bandura (1977) argued that an individual's ability to implement behavior is highly influenced by his or her behavior. The structural causal relationship from PBC to BI shows the actual behavior is driven by the motivation through intentions.

An assumption can be made that the direct connection from PBC to AB proves that an individual has control over his/her own behavior implementation (Ajzen, 1985). Moreover, the study also concluded that, first, as it stated that if intention remains the same, PBC could be evaluated based on the individual's confidence. For instance, if there are two individuals those have strong intention to learn how to ride a bike. The one with greater confidence in wanting to master this activity is believed to be able to learn how to ride the bike faster and better than another one who may seem suspect in his/her own ability to ride. Second, PBC often works as an alternative for actual control, and the perceived control is assumed to be a realistic approximation of the actual control; therefore, PBC is thought to predict AB.

Like TRA, BI predictors'relative significance varies with the behavioral domain (Pham et al., 2011). It might be recognized that only ATB has a high effect on BI in some applications while in others, PBA and ATB are significant, while others, ATB, SN, and PBD, make contributions to the conjecture of BI (Ajzen, 1985). It is contended that both BI and PBC may make significant contributions to the conjecture of goal-oriented actions. However, one predictor may be more significant than another in a particular situation and only one may be found significant.

Additionally, in many situations, TPB is a very successful predictor of both behavior and intentions; for example, to predict users' intentions to implement breast self-examination (Young, Lierman, Powell-Cope, Kasprzyk, & Benoliel, 1991), to utilize a new software (Mathieson, 1991), to stop using caffeine (Madden et al., 1992), to implement wastepaper recycling (Cheung, Chan, & Wong 1999), and to implement unethical behavior (Man, 1998). Furthermore, many of the studies indicated above have demonstrated that TPB has better power to predict behavior than TRA.
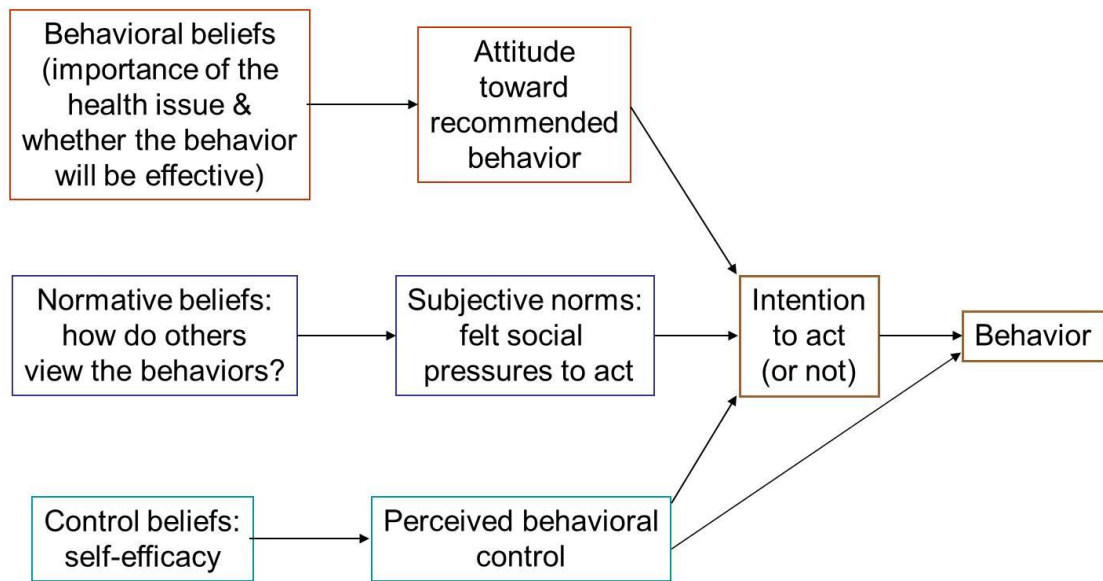
Figure 2.5 Theory of Planned Behavior

Sources: Adapted from Ajzen, 1991.

2.8.1.3 Technology Acceptance Model or TAM

The theory of reasoned action was modified into the technology acceptance model. Davis (1989) stated that the two main factors that influence people's intention to use technology, ease of use and usefulness, determine the individual's IT (information technology) adoption behavior. "Ease of use" is identified as the level to which an individual expects the system to consume low level of effort to reach the targeted result. "Usefulness" is defined in terms of the technology increasing one's output though performing the job correctly and as expected.

Initially the TAM, figure 2.6, captured the correlation between beliefs, attitudes, and intended behavior predicting the individual's IT adoption process. Unlike the TRA, the TAM concluded that an individual's attitude together with the perceived usefulness (PU) of IT directly affect behavioral intention. Not only does both "ease of use" and "usefulness" have a significant effect on intention, but perceived usefulness can influence the perceived ease of use (PEOU) as well. This indicates that "usefulness" is a mediator variable between "ease of use" and intention. Additionally, the TAM affirms that external factors could also have an influence on

one's behavioral intention and actual use through the mediated effects on perceived "usefulness" and "ease of use" (David, Bagozzi, & Warshaw, 1989; Davis, 1989). It is believed that IT acceptance will increase to the level where it is recognized to be useful and easy to use.
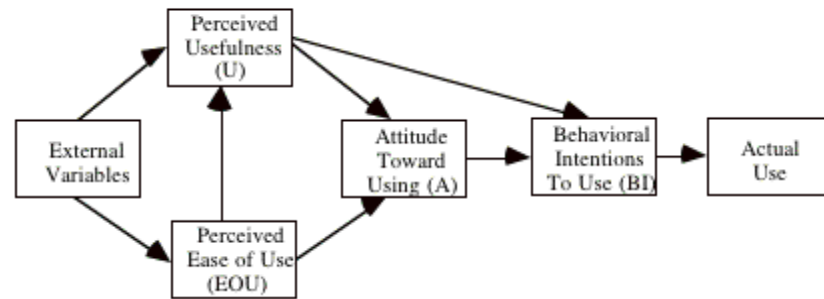
Figure 2.6 Theory Acceptance Model (TAM)
Sources: Adapted from Davis, 1989.

In order to compare the TRA and TAM, Davis (1989) carried out a study with a word processing program with 107 MBA students as the research population. The research concluded that subjective norm, TRA, has no control over behavioral intention; however, the PU had a significant effect on the user's intention to use the technology/program (over 50% of the variance in intention can be attributed to PU), while PEOU does have some force over the intention to a certain extent. Attitude appeared to mediate the control of beliefs regarding intention. Hence, David et al. (1989) asserted that the TAM is more vigorous and accurately predict the "actual use" with only 3 theoretical constructs: PU, PEOU, and behavioral intention (David et al., 1989).

Although the TAM has gained acceptance and support in IT studies (Taylor & Todd, 1995a, 1995b), Venkatash and Davis (2000) also realized that there are other determinants that have an effect on an individual's intention to accept different technologies. They did an extended research on the TAM which included additional factors, social influences, and the cognitive instrumental process in the model, as shown in figure 2.7, TAM2. For the study, the "social influence" factor included subjective norm, voluntariness, and image) and the "cognitive instrument

process" factor considered job relevance, output quality, result demonstrability, and PEOU. The research results supported TAM2, where both additional factors, social influences and the cognitive instrumental process, had a significant effect on the individual's usage intention. Additionally, TAM2 further improve TAM by proving that the subjective norm had a significant direct effect on behavioral intention on PU. Although the study obviously showed a significant impact on the individual's behavioral intention for mandatory systems, it may not be true for voluntary systems.
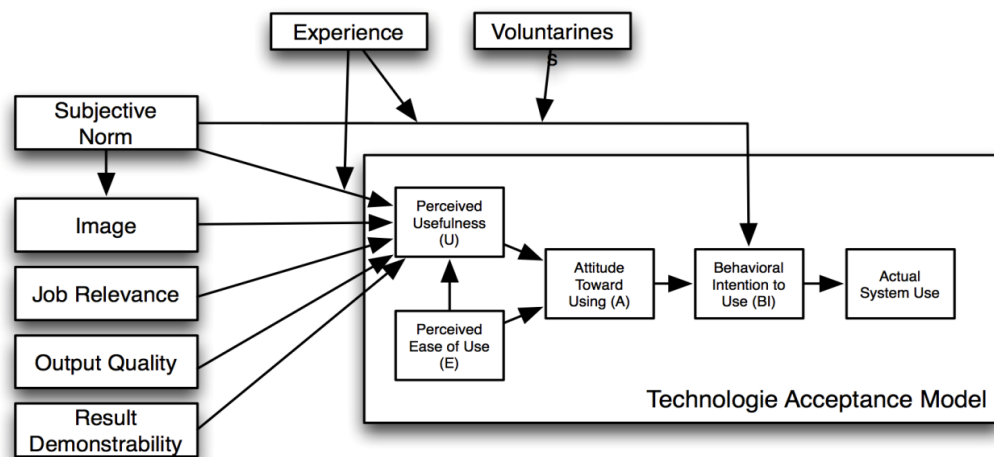
Figure 2.7 Technology Acceptance Model 2
Sources: Adapted from Venkatesh & Davis, 2000.

Even though TAM and TAM2 have been validated in various IT adoption-related researches, Wu and Lederer (2009) further examined the social influence factor and context variable (voluntariness) for its impact among the four main constructs of the TAM (PU, PEOU, behavioral intention, and usage). Wu's and Lederer (2009) meta-analysis, including 71 empirical studies, validated the core assumption of TAM and gave strong support for the assertion that environment-based voluntariness (social norm) moderates the effects of PU and PEOU on behavioral intention. Thus, the impact of PEOU on PU was not significant. The possible reasons for such an unexpected outcome may be because of the small sample size, the measurement system that may have been used in previous studies, and/or the presence of other factors.

Sukkar and Hasan (2005) suggested further study using TAM specifically for the Internet banking adoption process. The research used seventy-five Jordanian students that were studying in Australia. The purpose of the study was to come up with additional key determinants (other than PU and PEOU from the original TAM) by including external variables, such as the financial institution factor (company technology quality), and the factor influencing bank consumers (such as trustworthy institutes and users' cultural background). The research results showed that there was a significant correlation between the traditional TAM and this extended TAM study, which proposed that the model gives a meaningful explanation of the individual variable in the Jordanian context. Particularly where "trust" (a trustworthy bank and its adopted technology) and service quality (conveniences/accuracy, feedback management, management efficiency, and security/privacy system) have a high impact on PU and PEOU. However, the cultural construct did not have a significant impact on PU or PEOU, but its subset of uncertainty avoidance and power distance were significantly related to PU and PEOU, which proves that decomposed multi-dimensional construct should give fuller reasonable power relative to the uni-dimensional variable. All in all, it could be concluded that their extended TAM was quite similar to the traditional TAM, where external variables were expected to have an impact on the key determinants, PEOU and PU.

Kim, Mannino, and Nieschwietz (2009) empirically tested the TAM using 185 internal auditors as the research sample. It is believed that internal auditors tend to have high PEOU and PU, especially when the technology features are simple, which leads to high usage of the technology system. Additionally, it was found that PEOU has a high impact on the usage of technology when its features are more complex. The research outcomes showed that internal auditors perceived that both usefulness and ease of use positively affected technology acceptance while only ease of use had a positive influence on PU. In addition, Amin (2007) empirically examined TAM's key assumptions by adding the perceived credibility, enjoyment, and social norms into the Internet banking domain. The research consisted of 240 Malaysia Bank customers. The purpose of this study on extended TAM was to ascertain the factors that influenced Internet banking adoption. The research concluded that PEOU, PU, perceived credibility, and social norm had a positive influence on Internet banking adoption, while perceived enjoyment did not.

2.8.1.4 Diffusion of Innovation Theory or DOI

The innovation and diffusion concept came from developed economics as researchers wanted to identify how, why, and at what rate the new ideas, practices, objects, and technologies were accepted in the community. German anthropologist Friedrich Ratzel, French Sociologist Gabriel Tarde, and Austrian anthropologist Leo Frobenius were among the initiators in such area of studies in the late 1890s and early 1900s (Roger, 1983). Everett Rogers further studied Tarde's "laws of imitation" in his most influential book "The Diffusion of Innovations," where the adoption process was identified as the individual's decision whether to integrate an innovation into life (Rogers, 1983).

Additionally, Rogers extended his studied and analyzed various researches and came up with more innovation theories as follows.

1) The innovation decision process theory by Rogers (1995) explains that the spreading process of innovation occurs through 5 stages, which are as follows.

(1) Knowledge - The individual is first exposed to an innovation, but lacks information about it. During this stage the individual has not yet been inspired to find out more information about the innovation.

(2) Persuasion - The individual is interested in the innovation and actively seeks related information/details.

(3) Decision - The individual takes the concept of the change and weighs the advantages/disadvantages of using the innovation and decides whether to adopt or reject the innovation. Due to the individualistic nature of this stage, Rogers (1995) notes that it is the most difficult stage for acquiring empirical evidence.

(4) Implementation - The individual employs the innovation to a varying degree depending on the situation. During this stage the individual also determines the usefulness of the innovation and may search for further information about it.

(5) Confirmation - The individual finalizes his/her decision to continue using the innovation. This stage is both intrapersonal (may cause cognitive dissonance) and interpersonal, confirmation the group has made the right decision.

This theory begins with a well-versed individual that has a sound understanding of innovation and is persuaded to believe in the usefulness of innovation; he decides to accept this innovation and puts it in practice; and the final stage is confirmation (or denial).

2) The individual innovativeness theory by Rogers (1995) explains that an individual that has been taught about innovation is willing to accept IT more rapidly than those that have not, as shown in Figure 2.8. The dispersal of innovation in innovativeness and the percentage of the potential group in accepting can be classified as below.
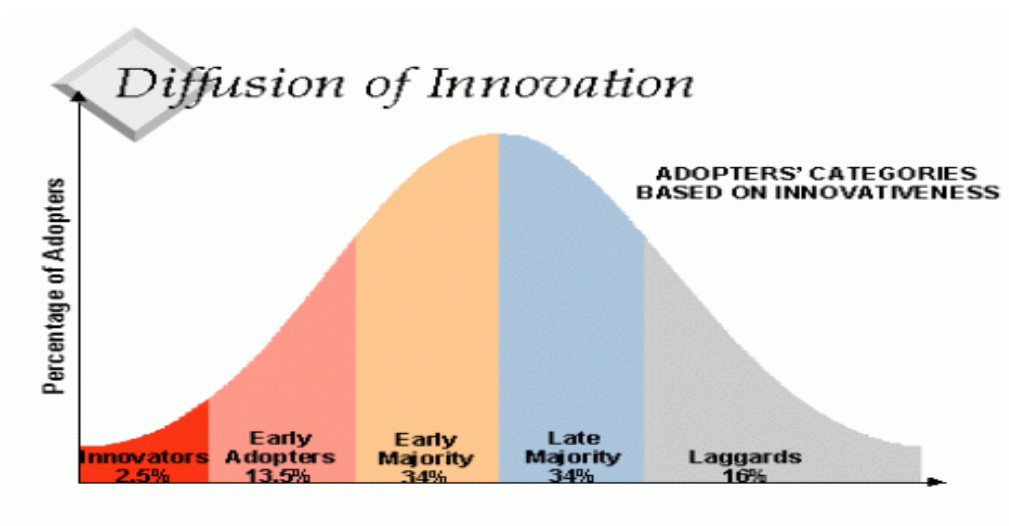
Figure 2.8 Diffusion of Innovation

(1) Innovators show only 2.5% of immediate acceptance overall. The distinction of this group is that they are prominent, which is to say that they love taking chances, and are ready to experience new things; these groups are distinguished from others in the same society and seem to be "weird" in the society.

(2) Early adopters are sluggish in adopting innovation, but are quick to embrace it once adopted, which shows about 13.5%.

(3) The early majority is the group that accepts innovation before others, for a short period of time, which consisted of about 34%.Generally, this group has accepted and adopted innovation, but has not explicitly decided to adopt IT as early as the early adopters.

(4) The late majority is the group that accepts innovation slightly late. As a push from society to take up innovation, this group accepts with suspicion and doubt, after noticing other groups of 34%.

(5) Laggards are against innovation. They cling to tradition and the culture of the deep-rooted society; 16% are interested in the past and follow die-hard culture.

3) Theory of perceibutes by Rogers (1995) identifies five characteristics of an innovation which can influence the rate of diffusion of an innovation as follows.

(1) Tradability: the degree to which an innovation may be experienced on a limited basis.

(2) Observability: the degree to which the results of an innovation are visible to others.

(3) Relative advantage: the degree to which an innovation is perceived to be better than the idea it supersedes.

(4) Complexity: the degree to which an innovation is perceived as relatively difficult to understand and use.

(5) Compatibility: the degree to which an innovation is perceived as consistent with the existing values, past experience, and need of potential adopters.

It should be noted that among the aforementioned attributes, only relative advantage, complexity, and compatibility are consistently related to innovation adoption (Chen, 2003). Wyner (1974) and Holloway (1977) found that relative advantage and compatibility have an influence on potential groups in accepting technology. Eads (1984) found that the quality of relative advantage, complexity, and compatibility have a great influence on the decision to accept innovation training through computers for weather forecast officers.

In addition, according to the technology acceptance model, Rogers (1995) also suggested that security is another factor affecting the decision to adopt new innovation. In this context, security will act as a tool to enhance the confidence of the new IT system user that it is safe and secure to use. However, if users do not accept the new security measures and systems, the systems will not yield

the maximum utility of the technology to the organization (Venkatesh & Davis, 2000).

2.9 Institutional Theory

As generally used in institutional theory, an institution is a rule or meaning system. However, Scott (1995) proposed a definition of institutions as "symbolic and behavioral systems containing representational, constitutive, and normative rules together with regulatory mechanisms that define a common meaning system and give rise to distinctive actors and action routines." Institutional theory studies organizational responses to institutional pressures. Institutions exerting institutional pressures include regulatory and governmental agencies, laws, courts, professions, interest groups, consultants, and other organizations (DiMaggio & Powell, 1983, pp. 147-160; Oliver, 1991, pp. 145-179; Scott, 1987, pp. 493-511).

As complex open systems, organizations interact with many environmental forces. In traditional studies, environmental forces focused almost exclusively on the organization's technical environment. Institutional theorists have added a new dimension to the concept of organizational environment by distinguishing between the organization's technical and institutional environment (Meyer & Rowan, 1977, pp. 340-363; Scott & Meyer, 1983, pp. 129-155). According to these theorists, the technical environment provides for the exchange of products and rewards based on effectiveness and efficiency. In contrast, the institutional environment provides the rules and requirements within which individual organizations must agree to gain the desired rewards of external support and legitimacy (Scott & Meyer, 1983, pp. 129-155).

Institutional and technical pressures on an organization are not dichotomous or mutually exclusive. In fact, all organizations face some degree of both technical and institutional pressures (Tolbert, 1985, pp. 1-13). However, exposure and reactions to these pressures will vary. Some sectors, such as educational organizations, are more strongly influenced by institutional factors, while facing fewer technical pressures. In other sectors, organizations are faced with higher technical pressures and less institutional environment influence. There are some sectors, such as medical care or

banking, which must manage strong pressures from both institutional and technical factors. Finally, some sectors, such as the personal services sector, experience only weak pressures from institutional and technical factors.

The distinction between institutional and technical factors is important because it determines why different organizations may respond differently to environmental influences.

2.9.1 Institutionalization Mechanisms

Selznick (1957, p. 17) defined institutionalization as the infusion of "value beyond the technical requirements of the task at hand" The institutionalization processes can be described in terms of their pace and stability and can be related to institutional mechanisms. The speed of institutionalization is defined as "the length of time taken for an innovation to become diffused throughout an organizational field and stability is defined as the length of time over which an institution remains highly diffused and legitimated" (Lawrence, Winn, & Jennings, 2001, pp. 624-644). However many studies of institutionalization suggested that there is a common pattern of events and relationships among them that explain the process of institutionalization: objects are first recognized, then accepted by relatively few actors, and then widely diffused and broadly accepted within a field (Meyer & Rowan, 1977, pp. 340-363; Zucker, 1987, pp. 443-464). Selznick (1957) posited that institutionalization is much more likely to occur in organizations with diffuse goals and weak technologies than in organizations with clearly-defined goals, because there is no obvious basis to determine efficiency and effectiveness in these organizations.

DiMaggio and Powell (1983, pp. 147-160) suggest three kinds of institutional isomorphism as mechanisms that lead to institutionalization. Isomorphism is " a constraining process that force one unit in a population to resemble other units that face the same set of environmental conditions" DiMaggio and Powell (1983, p. 159). The underpinning of the institutional-isomorphism perspective is that there are forces in the institutional context that pressure organization to be similar. These forces are classified as coercive, normative, and mimetic isomorphic.

Coercive isomorphism refers to demands and pressures that are exerted on an organization by other organizations upon which it is dependent (Siegel, 2003).

Coercive force consists primarily of pressures from formally-established agencies which derives from political influence and the problem of legitimacy (for example, legitimated rules and regulations, pressures from the industry).

Mimetic isomorphism is a response to uncertainty in which organizations model their structures and processes on those of other organizations that are perceived to be legitimate or successful (Boswell, 2009). Mimetic forces are evident when decision-makers in an organization are influenced by the perceived efficacy of an observed set of decisions taken by another organization. The observing decision maker(s) believe that these actions are effective because they have been observed to be effective by other, presumably similar, circumstances. DiMaggio and Powell (1983, pp. 147-160, 1991, pp. 183-203) described mimetic forces as imitation. Organizations imitating other organizations that have already implemented successful information technology reflect this type of isomorphism. Organizations are uncertain regarding the information technology, but do not want to risk their legitimacy; therefore, many organizations imitate the information technology developed by other organizations.

The third institutional force is characterized as normative. DiMaggio and Powell (1983, pp. 147-160) describe this force originating from professional norms and standards within a field. For example, in fields such as accounting, law, medicine, or engineering, the institutions which train and educate professional members define an acceptable range of action which is perpetuated through professional apprenticeship and training. In the process of making a diagnosis, a physician would tend to use procedures or approaches learned in medical school or a residency. Medical training then becomes an important factor in shaping the range of analytical or diagnostic procedures considered for a given medical problem. Because most accountants must pass the CPA exam, training in the profession is relatively homogenous as to content and form. This homogeneity would shape the future professional behavior of accountants. There is some empirical evidence that functional background has a significant influence on managerial action (Prahalad & Bettis, 1986, pp. 465-501). However, isomorphism is not equally adopted across all organizations. Conflicting institutional forces may motivate organizations to seek methods that partially conform to multiple forces rather than fully conforming to any

one of the three isomorphic forces. In addition, isomorphism is predicted by the interconnectedness of organizations (Oliver, 1988, pp. 543-561). Interconnectedness refers to the presence of inter-organizational relationships in an organizational field. Goodstein (1994, pp. 350-382) defined the term interconnectedness in his study as the number of business, professional, and membership organizations present.

Within the organization theory literature, two primary streams of institutional research literature have addressed the process of institutionalization. One stream views the organization as an institutional form and focuses on the process of institutionalization within the organization based on shared common understandings (Tolbert & Zucker, 1983, pp. 22-39). Institutional forces develop from within the organization, by imitating similar organizations, or through network ties, but not from coercive influences (Zucker, 1987, pp. 443-464). The second stream, initiated by Meyer and Rowan (1977, pp. 340-363), viewed the environment as an institution. Much of the institutional research in this area has addressed the issue of how institutionalization from forces outside the organization provides explanations for the "non-rational' motives of organizations to become isomorphic or similar in their methods of compliance to institutional forces.

2.10 Resource Dependence Theory

Resource dependence theory argues that organizations are externally constrained through their dependence on the environment for resources. Despite this limitation, organizations strategically adapt to their environment; they do not merely respond to external constraints and controls through compliance to environmental demands. Instead, a variety of strategies are adopted in order to suit an organization's objectives. Resource dependence theory is founded on the assumption that organizations are dependent on their environment for the resources and services they need for survival and focuses particularly on interdependency (Pfeffer & Salancik, 1978). The assumptions in resource dependence theory have been classified into three types in order to explain how the dependence of an organization on the external environment for resources influences organizational adaptation. The first assumption is that organizational survival is a function of an organization's ability to obtain

resources from the environment (Hannan & Freeman, 1977, pp. 929-964). Even when an organization produces a high-quality product, if it cannot obtain resources from the environment, it will be unable to satisfy customer demand for the product. Over time, the organization will be selected out by the environment for this inability to respond. Consequently, it is believed that organizational survival depends on the ability of the organization to acquire and maintain resources. In the second assumption, in order to be able to maintain themselves within their environment, organizations must: 1) have the ability to acquire information from the environment; 2) know how to react to the environment, based on this acquired information; and 3) have the ability to develop future responses based on past experiences with the environment (Pfeffer & Salancik, 1978). Organizational survival depends on the organization's ability to acquire vital resources, and the acquisition of vital resources depends on the organization's ability to learn from its environment. Therefore, organizational survival depends on the organization's ability to learn from its environment. A third assumption is that since all organizations depend on the external environment for resources, therefore, if one could control or constrain the flow of resources into an organization, one could influence the behavior of that organization.

The theory also specifies three factors that determine the dependence of one organization on another (Pfeffer & Salanick, 1978). First, the dependence is determined by "the extent to which the organization requires the resource for continued operation and survival" (Pfeffer & Salancik, 1978, p. 45). Second, the dependency is determined by "the extent to which the interest group have discretion control over the resource allocation and use" (Pfeffer & Salancik, 1978, p. 45). Finally, the dependency is determined by "the extent to which there are few alternatives or the extent of control over the resource by the interest group" (Pfeffer & Salancik, 1978, p. 45).

Resource dependence theory defines a resource as essentially anything an actor perceives as valuable, whereas dependence is a state in which one actor relies on the actions of another to achieve particular outcomes (Emerson, 1962, pp. 31-41). Central to resource dependence theory is the notion that the need for resources of an organization creates dependencies among organizations, and the dependence of the resource initiates a form of social control over organizational behavior. Resource

dependence exists when one actor is supplying another with a resource (Matthews & Shulman, 2000). Pfeffer and Salancik (1978) and Hall (1982) support the idea that the interdependence among organizations may be in the form of exchanges and transactions of money, people, and social legitimacy. According to Pfeffer and Salancik (1978), the dependence of one organization on another organization may be measured by: 1) concentration of resources, 2) controllability of resources (the amount of the resources controlled), 3) no mobility of resources, 4) no substitutability of resources, or 5) essentiality of resources.

The essentiality of a resource is a function of two factors: 1) relative magnitude of exchange and 2) criticality. The relative magnitude of exchange could be based on the percent of inputs/outputs accounted for by an exchange. In other words, if organization A supplies a large proportion of inputs to organization B, or absorbs a large proportion of outputs from B, then B will be dependent on A (Frooman, 1999). The criticality of a resource could be based on whether an organization can exist without it, if the resource is an input, or whether the organization can exist without a market for it, if the resource is an output (Jacobs, 1974, pp. 45-59; Pfeffer & Salancik, 1978).

Power can arise from the dependencies of two organizations on one another; in other words, power is structural in nature, arising from the relationship between the two organizations. Power in resource dependence theory is structurally determined in the sense that the nature of the relationship-that is, who is dependent on whom and how much-determines who has power. In order to know if A has power over B, one must verify both that B is dependent on A and that A is not dependent on B (Frooman, 1999). Power, thus, is defined in relative terms-that is, A has power over B if B is more dependent on A relative to A's dependence on B (Lawler and Yoon, 1995). Resource dependence theory suggests that power accrues to those that control the resources needed by the organization. Accordingly, those that possess resource power are important to organizations and their importance is a function of the attribute of the resources they possess. In addition, control over resources is critical in maintaining power and is therefore pursued by organizations. For instance, the stakeholders of an organization and creditors are likely to be the primary sources of critical funds, and customers are likely to be the primary source of revenue.

Consequently, shareholders, creditors, and customers are likely to have potential to influence organizational survival. Therefore, based on resource dependence theory, it can be proposed that organizations will actively address the issues of shareholders, creditors, and customers, including environmental issues.

Resource dependence theory also suggests that power relations among organizations in the pursuit of resources are commonly asymmetrical and that organizations strive to obtain power, maintain autonomy, and reduce uncertainty in the context of external pressures and demands (Huang & Wang, 2008). That is, this power can lead to constraints or contingencies. Therefore, the challenge for organizations is to avoid becoming subservient to elements of the environment, while still adapting when necessary (Thompson, 1967, p. 31; Pfeffer & Salancik, 1978).

Since resource dependence is influenced by environmental factors, it is important to understand the kind of task environment that surrounds the organizations. Dess and Beard (1984) synthesized various concepts of the environmental dimension and codified them into three dimension of the task environment. First, environmental munificence refers to an environment that can support sustained growth (Mangal and Karmarkar, 2012). Second, environmental dynamism refers to an environment that provides the organization with great unpredictability and uncertainty (Dess & Beard, 1984). Third, environmental complexity refers to the degree of the heterogeneity of and range of an organization's activities (Minniti, 2005).

Resource dependence theory has suggested a number of organizational responses to environmental constraints. Pfeffer and Salancik (1978) identified two contingent adaptive organizational responses. The organization can adapt and change its structures and processes to better fit environmental contingencies, or the organization can attempt to modify the environment in which it operates so that it better fits the organization's capabilities (Siegel, 2003). In sum, organizations actively manage environmental constraints by adopting structures that ensure the flow of resources.

2.11 Integration of Innovation Theory, Institutional Theory, and Resource Dependence Theory

2.11.1 Concept of Integration

The institution theory and resource dependence theory are open theory systems, which have been developed and applied extensively to explain environment pressure outside the organization. Although these two theories have a different basis, they have some points in common to clearly respond to outside pressure. Both theories have common main principals, as they are under environment pressure from stakeholders. In order to survive, an organization has to respond as fast as they can (Oliver, 1991, pp. 145-179) According to the institution theorists, stakeholders have influence to stipulate rules, regulations to be enforced in the organization. The organization acts passively in order to comply with and gain acceptance, so as to obtain resources and to survive. (Meyer & Rowan, 1977, pp. 340-363). In the context of applying IT, in compliance with institution theory, an organization will respond to government office pressure, bringing up IT to control or meet consumers' satisfaction or trading partners for convenience in getting in touch or taking sales orders. On the other hand, the resource dependence theorist deems that stakeholders are in control of rare resources. An organization will respond to the environment actively and adapt rationally, trying to be less dependent on other organizations and dominating resources. Moreover, the organization has to consider pressures from the environment whether which pressure is more important; then the organization will find ways to deal with such pressure. It will make bargains or seek co-operation, or eventually has to comply with the pressure, without questions. (Pfeffer & Salancik, 1978). The suggestions for the restoration of these theories aim at the complexity of environment pressure. Since stakeholders have different need and demand, the organizations have to act differently toward the differences of stakeholders (Scott, 1995, p. 125). In other words, an organization may apply different strategies in response to the pressures or demands from stakeholders.

Some organizations may agree with such pressure, hoping to gain social legitimacy. On the other hand, some organizations evaluate the pros and cons to comply under pressure, or estimate the dependence on other organizations, before

adapting necessary measures. It is acceptable to apply IT in many instances, such as attitude toward IT, knowing its usefulness and ease of use. The wide spread of innovation is due to technology, which is not complex and in accordance with compatibility.

It can be concluded that the level of IT adoption which an organizations respond to environment pressure, will depend on the terms of force, their imitation, and social norm or social legitimacy. On the other hand, an organization weights the necessity to be self-dependent and self-capable, and at the same time, an organization will also consider the attitude of their personnel toward technology.

2.11.2 Response to Technology Pressures

Through the Restoration of Institution Theory and Resource Dependence Theory by Oliver (1991, pp. 145-179), it was suggested that there are five strategies, ranging from admitting to resisting and dominating; 1) acquiescence: to acquiesce or fully conform to institutional processes; 2) compromise: to compromise by partially complying with institutional demands; 3) avoidance: to avoid institutional pressures; 4) defiance: to reject institutional norms or expectation; and 5) manipulation: to actively change or exert power over the institutional pressure. In applying IT, according to the context of Oliver (1991), an organization can choose any of these strategies to combat pressure.

1) Innovators: People in this group loves taking risks and always has inventive ideas or is well-versed in technology; they love experiencing new things, take the initiative, or are the first to apply innovation. The difference makes this group seem " weird. " According to Oliver (1991), the application of IT strategy in this respect consists of the so-called offensive strategy.

2) Early adopters: People in this group are extremely sensitive to innovation and loves experiencing new things. They will accept new innovation immediately.

3) Early majority: People in this group will carefully considers before adopting new innovation. Even though they have previous knowledge about this new innovation, they still decline to accept unless they have full confidence on using this new innovation.

4) Late majority: People in this group are skeptical, cautious, and doubtful. They will adopt IT only at necessary level.

5) Laggards: People in this group are resisted to any innovation, cling to old culture and tradition, interested in the past, and follow past footsteps.

Table 2.8 IT Rate of Adoption Classification and Characteristics

Group of people according to Roger's theory	Behavior	Individuality of the personnel or administrator of an organization	Strategy according to Institutional and resource dependence theory
Innovators	Initiative	Risk-taker, inventor, comfortable with technology	Proactive
Early adopters	Willing to try new stuff	Leadership, enjoys trying new stuff	Acquiescence
Early majority	Hesitate	Discreet	Compromise
Late majority	Necessity	Cautious	Avoidance
Laggards	Conservative	Against, only follows a well-proven path	Defiance

2.12 Related Articles and Research

There is a great deal of research related to IT, which were mentioned as follows.

1) The study " A case study of local e-government performance in South Korean: Do leadership and management for results matters?" (Kim, 2009) revealed the following:

(1) Local e-government leaders should make a commitment to management for results and performance of e-government.

(2) The mayor's e-government leadership, which demonstrated a clear vision of e-government innovation and encouraged employees' innovative ideas for e-government, is positively associated with the perceptions of e-government performance in terms of service quality, transparency, and cost-efficiency.

(3) Visionary e-government leadership, joined with thoughtful planning and monitoring, can make e-government a useful vehicle for government services and information. As emphasized by several scholars of the transformational leadership model (Avolio, Bass, & Jung, 1999; Bass & Avolio, 1993), the study revealed that executive e-government leaders should pay attention to inspirational motivation and to the level of organizational commitment among their organization's employees, as these are significant factors in the successful implementation of e-government innovations.

(4) The perceived performance of an e-government innovation depends on the government's ability to develop IT capacity, including IT resources, financial resources, and know-how to implement e-government services.

2) The study "Local Government Information Technology Capacity: An Exploratory Theory (Kim & Bretschneider, 2004) revealed the following:

(1) The influence of state government on IT capacity is not just made through the interaction with IT managerial capability, but its influence can be viewed positively or negatively depending on the current level of IT capacity.

(2) The varying level of IT capacity may be more likely to be explained by financial support (organization size) and administrative support.

3) The study "eGovernment Network: The Role of Information Technology in Managing Networks (Chen, 2003) revealed that "[t]he result of management activities is reflected in the network structure and institutional characteristics. These changes will be translated to network performance." This means that the IT adoption by others is likely to influence others to follow.

4) The study "Repositioning Nigerian local governments for better performance: what potential does the e-government option hold?" (Achimugu, Chukwurah, & Ochala, 2013) revealed that "[t]he possible impediments to the adoption of e-government in Ofu local government is indicated the lack of an ICT policy framework; 6.5% of respondents support this item, low computer literacy

which is supported by 18% of the respondents. It is made clear that 92% of the respondents are not computer literate." This means that the complexity of computers or IT plays an important role in IT adoption and usage. In addition, the cost of IT and the available funding also.

5) The study "Innovation in local government open data and information technology" (McKinsey & Company Public Sector Practice, 2014) revealed that the following should be carried out:

(1) Engage stakeholders with what they value: 1) use 2) go digital to improve citizens' experience; 3) open up the data to spark innovation and create new and better services.

(2) Adopt best practice from the private sector: 1) rethink IT procurement to improve service quality, timeline, and outcomes; 2) pursue service that delivers immediate results.

(3) Strengthen core assets: 1) address the risks; 2) improve the IT knowledge of the employee through training; and 3) improve IT securities.

(4) Pursue innovation structures: 1) explore private and public share relationships; 2) partner with other public government to tackle common problems.

6) The study "Assessing the Adoption of e-Government Services by Teachers in Greece" (Zafiropoulos, Karavasilis, & Vrana, 2012) revealed that "[t]raining programs should stress the potential of e-Governnment systems and should help users to understand the relative advantage, job relevance and generally the value of them over existing bureaucratic systems".

7) The study "The critical factors affecting E-Government adoption: A Conceptual Framework in Vietnam" (Khanh, 2015) revealed that IT adoption will lead to better service quality for citizens. This means that every aspect of the performance of government is likely to be improved.

2.13 Hypotheses

The conceptual framework of this study is shown in Figure 2. 9: 1) the adoption of an information technology system in the local government organization depends on ten factors in three areas: technological context, organizational context,

and institutional context; and 2) the relationship between the level of IT adoption and increased revenue.

The concept of this research was developed based on the concept of the integration of two organizational theories (resource dependence theory and institutional theory) and innovation theory (technological acceptance model) . In addition, other concepts are also reviewed as mentioned earlier in this chapter. Hence, each hypothesis shows the relationship between each independent variable with the dependent variable.

Conceptual Framework and Research Assumptions
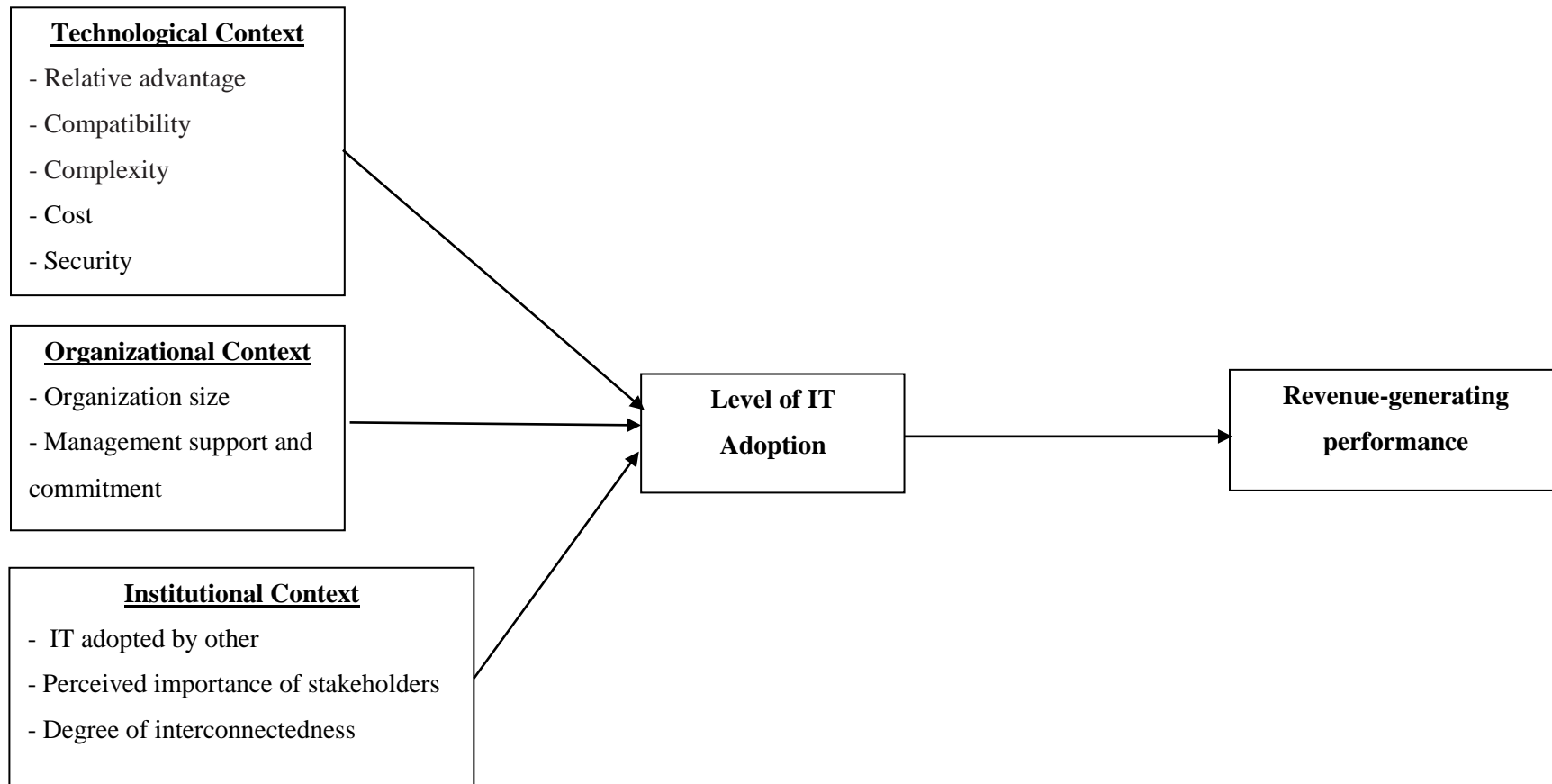
Figure 2.9 Conceptual Framework

2.13.1 Technological Context

1) Relative Advantage

Based on the concept of Rogers (1983), individuals believe that the recognition of the relative advantage, or a perception that there will be more benefit from using information technology, is a key factor affecting the decision to adopt new innovation. In addition, relative advantage also show the degree to which an innovation is viewed as superior to the idea it supersedes (Rijsdijk & Hultink, 2009) This is similar to the technology acceptance model of Davis (1989), which mentioned that the perceived usefulness of IT is one of the two factors affecting the adoption of new IT innovation. Hence, if the management personnel realize the usefulness of IT and feel that there is relative advantage, the organization will adopt the new IT innovation system (Thong & Yap, 1995; Holak, 1988) has suggested that relative advantage has a positive influence on the rate of adoption. As a result, the following hypothesis is offered:

Hypothesis #1: Relative advantage positively affects the level of information technology adoption in the local government organization.

2) Compatibility

According to the diffusion of innovations theory (Rogers, 1983) and the technology acceptance model (Rogers, 1995) the compatibility of the IT system is another factor influencing individuals to adopt new IT innovations. The compatibility also concerns the degree to which an innovation is perceived as consistent with existing values, past experiences, and the needs of potential adopters (Rogers, 1995). This means that a product that is more compatible is more familiar to the potential adopter and fits more closely with the individual's way of living (Rijsdijk & Huktink, 2009). There are many studies in the past on this issue that revealed that the compatibility of information technology is one of the factors affecting the adoption of information technology in organizations (Hong & Zhu, 2006; Saffu, Walker, & Hinson, 2008) and that innovations with superior compatibility have a higher rate of adoption than low compatibility innovations (Plouffe, Hulland, & Vandenbosch, 2001). As a result, the following hypothesis is offered:

Hypothesis #2: Compatibility positively affects the level of information technology adoption in the local government organization.

3) Complexity

Complexity is determined to be the degree to which an innovation is perceived as relatively difficult to understand and use (Rijsdijk & Huktink, 2009) According to the technology acceptance model (Rogers, 1995), complexity is another factor affecting the decision to adopt new innovation. In this context, complexity means the difficulty to adopt an innovation and the requirement for the personnel in charge of the transition. There have been many studies in the past on this issue and they have revealed that the complexity of innovation is one of the factors affecting the adoption of new innovation in organizations (Tan, Chong, & Eze, 2009; Thong, 1999). As a result, the following hypothesis is suggested:

Hypothesis #3: Complexity negatively affects the level of information technology adoption in the local government organization.

4) Cost

The cost of IT adoption is another important factor affecting the decision to implement IT in the local government organization (Tan, Chong, & Eze, 2009). Many organizations have limited resources (Welsh, White, & Dowell, 1981). As a result, organizations have to carefully calculate the expense or investment and only the organization with sufficient resources will invest in the new IT system (Thong & Yap, 1995). The initial investment is not the only expense; maintenance costs, personnel salary, and training are also factors affecting the IT adoption in the organization (Thong & Yap, 1995). As a result, the following hypothesis is offered:

Hypothesis #4: Cost negatively affects the level of information technology adoption in the local government organization.

5) Security

According to the technology acceptance model (Rogers, 1995), security is another factor affecting the decision to adopt an innovation. In this context, security will act as a tool to enhance the confidence of the new IT system user-that it is safe and secure to use. However, if users are unwilling to accept the security measures and systems, the systems will not bring the full benefits of the technology to the organization (Venkatesh & Davis, 2000). As a result, the following hypothesis is suggested:

Hypothesis #5: Security positively affects the level of information technology adoption in the local government organization.

2.13.2 Organizational Context

1) Organization Size

Large organizations can better respond to the organizational pressure compared to smaller organizations (Goodstein, 1994, p. 370). In addition, large organizations are likely to have more resources and have excess resources to adopt new innovations (Greening & Gray, 1994, pp. 467-498; Russo & Fouts, 1997, pp. 534-559). As a result, the following hypothesis is offered:

Hypothesis #6: Organization size positively affects the level of information technology adoption in the local government organization.

2) Management Support and Commitment

The resource dependence theory suggests that organizations will carefully design their structures in response to the pressure of the external environment (Oliver, 1991, pp. 145-179). Although the organizations may be in the same environment, they might react differently because of the external environmental pressure (Bhambri & Sonnenfeld, 1988, pp. 642-662; Marcus, 1988, pp. 387-402; Miles, 1987). One of the factors that influence the type of response to the external environmental pressure is management support and commitment. This is because management support and commitment strongly influence any decision made by the organization (Wever & Vorhauer, 1993, pp. 19-30). Hence, the management tends to give priority to what they committed previously. Therefore, management plays an important role in deciding many internal matters, both at present and in the future (Thong, 1999). As a result, the following hypothesis is suggested:

Hypothesis #7: Management support and commitment positively affect the level of information technology adoption in the local government organization.

2.13.3 Institutional Context

1) Perceived Importance of Stakeholders

Stakeholders refer to persons those will be affected by the organization's actions, objectives, and policies. These people have the right to

complain and insert pressure on the organization. As a result, the organization has to respond to those complaints and pressures in order to survive.

As there can be many complaints and pressures from many stakeholders, the organization will decide to give response to those stakeholders according to the organization's dependency on the stakeholder (Jawahar & McLaughlin, 2001, pp. 397-414), which is similar to the resources dependence theory (Pfeffer, 1981).

The perceived importance of the organization for the stakeholder is another influential factor affecting the decision of the organization. Hence, the organizations might only perform in order to respond to the complaint or pressure from the high-priority stakeholder (Harvey & Schaefer, 2001, pp. 243-261). In this context, if the stakeholder demands that the organization implement an IT system, the organization is more likely to implement it if the demand comes from stakeholders that hold the organization's needed resources. As a result, the following hypothesis is offered:

Hypothesis #8: The perceived importance of stakeholders positively affects the level of information technology adoption in the local government organization.

2) Information Technology Adoption By Others

The organization might perform similarly to other organizations in order to respond to institutional pressure. This action is called voluntary diffusion (DiMaggio & Powell, 1983, pp. 147-160; Oliver, 1991, pp. 145-179; Scott, 1987, pp. 493-511). If the organizations in the same environment perform a task similarly to one another, the action will be followed by the rest of the organizations in the same environment (diffuse) and later become a norm or rule-like (Covaleski & Dirsmith, 1988, p. 562). If the organization cannot perform the same action, it will not be accepted by the society (DiMaggio & Powell, 1983, pp. 147-160). In this context, if the organization foresees that many organizations in the same environment are implementing the IT system, the IT system implementation will be viewed as a norm and shall be followed. As a result, the following hypothesis is offered:

Hypothesis #9: Information technology adoption by others positively affects the level of information technology adoption in the local government organization.

3) Degree of Interconnectedness

In an environment, there are many groups or organizations that tend to perform similarly (DiMaggio & Powell, 1991, pp. 183-203). According to institutional theory, the more interaction there is among the organizations within the same environment, the greater will be the collaboration and knowledge sharing, which later will lead to the self-development of the organization (DiMaggio & Powell, 1983, pp. 147-160; Pfeffer & Salancik, 1978). In this context, if there is a high degree of interconnectedness among the organizations, they are more likely to share IT knowledge among themselves. Therefore, more organizations will perceive the usefulness and understand the importance of implementing the IT system. As a result, the following hypothesis is offered:

Hypothesis #10: The degree of interconnectedness positively affects the level of information technology adoption in the local government organization.

Conclusion

The conceptual framework for the research and hypotheses developed in this chapter is based on the concept of the integration of two organizational theories (institutional and resource dependence theory) and innovation theory. The conceptual framework suggests that three factors affect the level of IT adoption by the organization:

1) Technological factor: relative advantage, compatibility, complexity, cost and security

2) Organizational factor: organizational size and management support and commitment

3) Environmental factor: importance perceived by stakeholders; IT adoption by others and degree of interconnectedness

2.13.4 Municipality Revenue Increase

Several studies have investigated the relationship between IT adoption and organizational revenue-generating performance. The results from those studies

revealed that there was a significant revenue-generating performance difference between organizations adopting different levels of information technology (Sirirak, Islam, & Ba Khang, 2011). As a result, the following hypothesis is offered:

Hypothesis # 11 The level of information technology adoption in the local government organization is related to its revenue-generating performance.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter is organized into four main sections. The first section describes the research instruments of the study. The second section defines the variables. The third section describes the instrument validation method, and finally the forth section contains the data analysis.

1) Research Design

This dissertation employed a mixed-method design, which is the combination of qualitative and quantitative approaches (survey and focus group) to collect and analyze data (Creswell & Tashakkori, 2007). In recent years, integrating qualitative and quantitative methods has become common in research (Bryman, 2007) because the mixed-method design can provide detailed and comprehensive data in order to achieve the research objectives and answer the research questions in a study. A focus group was conducted after the survey results were analyzed with an aim to corroborate the findings, in greater depth, with the relationship suggested by the quantitative analysis.

2) Population and Sample

The population of this research was the municipalities in Thailand. For the survey method, a sample was drawn from the municipalities listed in the department of local administration, Ministry of Interior, which accounted for 2,441 municipalities (Department of Local Administration, Ministry of Interior, 2015). This research used regression analysis as a method of determining the factors affecting information technology. The number of samples adequate for this technique should be 15 times the number of parameters (Hair, Anderson, Tatham, & Black, 1995, p. 661). This study included 11 parameters. As a result, the sample size should be not less than 165 samples and they were selected using the simple random method.

Focus group results cannot usually be used to explain how an entire population would react to the same questions, so the type of sampling used in studies

designed to describe whole populations is not really necessary (Smith & Morrow, 1991). The common method for selecting participants for focus groups is called "purposive" or "convenience" sampling (Dawson, Manderson, & Tallo, 1993). So, this study purposively selected those members of the population as a sampling who could provide the best knowledge. The ten participants were administrative staff members selected from the municipalities that had different amounts and levels of IT adoption.

3) Questionnaire

A mail questionnaire survey of administrators was used to collect the data. The questionnaire was developed in a three-stage process. First, the questionnaire was initially theory-based designed. This version was reviewed by information technology experts. Second, the initial questionnaire was modified to accommodate the experts' comments and suggestions. The new version was reviewed by a municipal clerk. Third, a final version of the questionnaire was designed, drawing on their feedback, and mailed to the sample municipalities.

3.1 Research Instrument

The instruments for this research were a questionnaire and a focus group.

The questionnaire was designed and developed into 4 parts:

1) General questions regarding the person that completed the questionnaire

2) General questions regarding the organization

3) Questions regarding the IT adoption in the organization and its performance

4) Opinion of the person that completed the questionnaire regarding the difficulty of adopting an IT system in the organization

3.2 Variable Definition

This section explains how the studied variables were measured. However, the latent variables will be explained in terms of their conceptual definition or operational definition.

3.2.1 Extend of IT Usage in the Organization's Activities

The extend of IT usage in the organizational activities in this study was the level of IT systems usage in the organization, with 15 observed variables.

This was to the extent that the organizations is using IT in their operation which was divided into a Likert scale with the range ascending from level 1 to 7; 1 meant "do not use" and 7 meant "the highest levels." This is further explained in table 3.1.

Table 3.1 Variables and Their Measurement

Name	Definition	Measurement/Observed Variables
Level of IT systems usage in the organization	Extent of IT usage in the organization's activities	The average level of IT usage for managing various internal activities across different departments 1) Document sorting system 2) Accounting/finance/treasury system 3) Taxation planning system 4) Database system 5) Tax revenue system 6) Construction and city planning system 7) Citizen registration system 8) Internet/intranet system 9) Website management system 10) Budget planning system 11) Social welfare system 12) Geographic information system 13) Education/economic/social system 14) Water and irrigation system 15) Prevention and mitigation of danger system

3.2.2 Technological Context

1) Relative Advantage

Relative advantage means the new IT system's perceived benefit compared to the existing IT system, which includes 12 observed variables. The measurement was of the classification of the opinion regarding the expected benefit from implementing the new IT system in the organization at different levels. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning "least benefit" and 7 meaning "most benefit".

2) Compatibility

Compatibility means that the new IT system is consistent with the fundamentals character, culture, values, and practices of the organization (Beatty et al., 2001), which includes 4 observed variables. The measure will provide comments on whether or not to agree with any consensus concerning the level of information technology being used in the organization. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7; 1 meant "Strongly disagree" and 7 meant "Strongly agree".

3) Complexity

Complexity means the level of difficulty in adopting the new IT system and the requirement for the personnel in charge of the transition which includes 4 observed variables. The measure will provide comments on whether or not to agree with the complexity of the information technology being used in the organization. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning "Strongly disagree" and 7 meaning "Strongly agree".

4) Cost

New IT system adoption cost means the level of realization that there is cost related to the acquisition of new IT-related machines and systems, and this included 3 observed variables. The measure provided comments on whether or not to agree to the cost of IT adoption in the organization. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning "Strongly disagree" and 7 meaning "Strongly agree".

5) Security

The IT security system means the extent of confidence of related parties in the transactions carried out in the organization, and this included 6 observed

variables. The measure provided comments on whether or not to agree with the security of using IT in the organization. The measurement done using a Likert scale with the range ascending from level 1 to 7, 1 meaning " Strongly disagree" and 7 meaning "Strongly agree".

3.2.3 Municipality Organization Context

1) Municipality Size

The size of the municipality was measured in terms of its average annual revenue, which was 1) local tax revenue, 2) non tax revenue, 3) tax sharing, and 4) subsidy from 2011 until 20015.

2) Management Support and Commitment

Management support and commitment mean the level of the management allocation of resources regarding the IT adoption in the organization, including 3 observed variables. The measure provided comments on whether or not the level of management support and commitment will have an influence on the IT adoption in the organization. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning " Strongly disagree" and 7 meaning "Strongly agree".

3.2.4 Institutional Context

1) Perceived Importance of Stakeholders

The perceived importance of stakeholders means the level of realization of the organization regarding the stakeholders' willingness to pressure the organization to adopt the IT system, and this included 6 observed variables. The measure provided comments on whether or not the level of importance of stakeholder will have an influence on the decision of the organization to adopt IT system. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning "Strongly not important" and 7 which meaning "Strongly important".

2) Information Technology Adoption by Others

Information technology adoption by others means the level of interest in adopting an IT system by other municipalities in the same area and this included 3

observed variables. The measure provided comments on whether or not the level of IT adoption by other organizations will have an influence on the decision to adopt IT. The measurement was done using a Likert scale with the range ascending from level 1 to 7, 1 meaning "Strongly disagree" and 7 meaning "Strongly agree".

    3) Degree of Interconnectedness

    The degree of interconnectedness means the level of interaction among the organizations in terms of knowledge sharing, including 6 observed variables. The measure concerned the level of IT knowledge sharing with other organizations. The measurement was carried out using a Likert scale with the range ascending from level 1 to 7, 1 meaning "Least sharing" and 7 meaning "Most sharing".

Table 3.2 Variables and Their Measurement

Independent Variables		
Name	**Definition**	**Measurement/Observed Variables**
Relative advantage	Expected benefit from implementing IT	The average scores for the opinions 1) Will help to improve the efficiency of the organization 2) Will help to create more opportunity for the organization 3) Will help to create a better image for the organization 4) Will help to better follow up and control the service quality of the organization 5) Will help the organization access up-to-date information 6) Will help the related parties be more comfortable in contacting the organization

Table 3.2 (Continued)

Independent Variables		
Name	**Definition**	**Measurement/Observed Variables**
		7) Will help service receivers be more satisfied
		8) Will receive a worthwhile benefit compared to the investment cost
		9) Will create a better relationship between the organization and the service receivers
		10) Will help the organization collect more revenue
		11) Will help to minimize the communication costs of the organization
		12) Will help to minimize the overall cost of the organization
Compatibility	IT system is consistent with the fundamental character, culture, values, and practices of the organization.	The average scores for the opinions 1) The current IT systems are compatible with the service receiver. 2) The current IT systems are compatible with current duties. 3) The current IT systems are compatible with the organization's structure. 4) The current IT systems are not in conflict with the practices or procedures of the employees in the organization.

Table 3.2 (Continued)

Independent Variables		
Name	**Definition**	**Measurement/Observed Variables**
Complexity	The difficulty in adopting IT and the requirement for the personnel in charge	The average scores for the opinions 1) Most of the personnel in the organization have difficulty using IT in their duties. 2) The current IT systems used in the organization are complex and difficult to use. 3) The current employees lack IT knowledge. 4) The organization lacks the tools to support IT usage in efficient ways.
Cost	Cost of acquisition of IT-related machines and use of IT	The average scores for the opinions 1) IT service costs such as Internet fees are expensive. 2) IT software related to the organization is expensive. 3) IT hardware and equipment are expensive.
Security	The extent of confidence of related parties in using IT through the IT system provided by the municipalities	The average scores for the opinions 1) The organization believes that the current IT system could provide safe and secure financial transactions. 2) Service receivers believe that the organization IT systems could provide safe and secure financial transactions.

Table 3.2 (Continued)

Independent Variables		
Name	**Definition**	**Measurement/Observed Variables**
		3) The counter parties believe that the organization IT systems could provide safe and secure financial transactions.
		4) Service receivers believe that the organization's IT systems could provide safe and secure information.
		5) The organization believes that the current IT systems could provide safe and secure information to perform duties.
		6) The counter parties believe that the organization IT systems could provide safe and secure information.
Organization size	Organization size	The average annual revenue
Management support and commitment	The level of the management allocation of resources in terms of the IT adoption in the organization	The average scores of the opinion
		1) The management of the municipality financially supports the use of IT.
		2) The management of the municipality has good IT knowledge.
		3) The management of the municipality does not give priority to the IT budget.

Table 3.2 (Continued)

Independent Variables		
Name	**Definition**	**Measurement/Observed Variables**
Perceived importance of stakeholders	The level of realization of the organization regarding the stakeholders' pressure on the organization to adopt an IT system	The average scores for the opinions 1) Service receivers 2) personnel within the municipality 3) Other municipalities nearby 4) Other related parties 5) Governing organization 6) Other government organizations
Information technology adoption by others	The level of IT adopting by other municipalities in the same area	The average scores for the opinions 1) Many municipalities nearby widely use an IT system. 2) Many municipalities nearby perceive the importance of IT and invest a lot of money in IT. 3) Many municipalities nearby have successfully adopted an IT system.
Degree of interconnectedness	The level of interaction among the municipalities in terms of knowledge sharing	The average scores for the opinions 1) IT suppliers 2) Direct governing organizations 3) Indirect governing organization 4) Related journals and magazines 5) Related seminars 6) Other related government organizations
Revenue-generating performance	Increasing revenue	Increasing revenue means the average revenue increase during the past 5 years (2011-2015).

3.3 Instrument Validation

3.3.1 Reliability or Internal Consistency

Reliability means the degree of dependability, consistency or stability of a scale. This reflects the scale's potential to consistently yield the same answer. Testing for the reliability of the measures is an important consideration in any study. The measurement of a variable must be reliable in order to be useful and to yield stable results. Cronbach's coefficient alpha is a widely-used measure of scale reliability. Typically, an alpha coefficient of 0.7 or above is considered to be acceptable (Cronbach, 1951, pp. 297-334; Nunnally, 1967).

Table 3.3 Coefficient Alphas for Scales

Scale	Coefficient Alphas
Level of IT Adoption	.898
Relative Advantage	.959
Compatibility	.878
Complexity	.757
Cost	.835
IT adopted by others	.815
Perceived importance of stakeholders	.856
Degree of Connectedness	.918
Management support and commitment	.749
Security	.933

As shown in Table 3.3, Cronbach's alpha for each scale in this study was above the recommended value of .70, indicating that the scales had sufficient internal reliability.

3.3.2 Construct Validity

Besides being reliable, the measurement of a variable must be valid. That is, it must measure what it is intended to measure. Construct validity is the extent to which a particular item relates to other items consistent with theoretically-derived hypotheses concerning the variables that are being measured. The construct validity of the research variables was examined using factor analysis.

Because the critical assumptions underlying factor analysis are more conceptual than statistical, two measures must be considered to ensure that the data matrix has sufficient correlations to justify the application of factor analysis (Hair, Anderson, Tatham, & Black, 1995, p. 374). The first measure is the analysis of measures of sampling adequacy (MSA). The measure quantifies the degree of intercorrelation among the variables and the appropriateness of the factor analysis. Generally, the index ranges from zero to one. Table 3.4 shows that the measure of sampling adequacy reached one (0.818) which indicated that each variable was perfectly predicted without error by the other variables (Hair et al., 1995, p. 374). A second measure is the Bartlett test of sphericity. It is a measure for testing the presence of correlations among variables. Table 3.4 also shows a chi-square of 8467.553 and this indicates that the correlation matrix had significant ($p = 0.000$) correlations among at least some of the variables (Hair et al., 1995, p. 374). Therefore, the factor analysis could be appropriately used.

As shown in Table 3.4, a factor analysis with varimax rotation on the 47 items used to measure research variables, as expected, revealed nine factors with an eigenvalue greater than 1.0 (12.436, 4.903, 4.023, 2.973, 2.628, 1.828, 1.797, 1.439, and 1.333). All of the factor loadings were also greater than the cutoff point of 0.5, as recommended by Nunnally (1967).

Table 3.4 A Factor Analysis with Varimax Rotation on the 47 Items

	Component								
	Relative Advantage	Security	Intercon-nectedness	Perceived Importance by Stakeholders	Com-patibility	Com-plexity	Cost	IT Adopted by Others	Management Support and Commitment
Will help to improve the efficiency of the organization	.878								
Will help to create more opportunity for the organization	.875								
Will help to create a better image for the organization	.864								
Will help to better follow up and control the service quality of the organization	.851								
Will help to organization access up-to-date information	.834								
Will help the related parties be more comfortable in contacting your organization	.809								

Table 3.4 (Continued)

	Component								
	Relative Advantage	Security	Intercon-nectedness	Perceived Importance by Stakeholders	Com-patibility	Com-plexity	Cost	IT Adopted by Others	Management Support and Commitment
Will help the service receiver be more satisfied	.782								
Will receive a worthwhile benefit compared to the investment cost	.778								
Will create a better relationship between your organization and the service receivers	.771								
Will help your organization collect more revenue	.692								
Will help to minimize the communication cost of your organization	.645								
Will help to minimize the overall cost of your organization	.605								

Table 3.4 (Continued)

	Component								
	Relative Advantage	**Security**	**Intercon-nectedness**	**Perceived Importance by Stakeholders**	**Com-patibility**	**Com-plexity**	**Cost**	**IT Adopted by Others**	**Management Support and Commitment**
Your organization believes your IT system could provide safe and secure financial transactions.		.816							
The service receiver believes that your IT systems could provide safe and secure financial transactions.		.815							
The counter parties believe that your IT systems could provide safe and secure financial transactions.		.811							
The service receiver believes that your IT systems could provide safe and secure information.		.768							

Table 3.4 (Continued)

	Component								
	Relative Advantage	**Security**	**Intercon-nectedness**	**Perceived Importance by Stakeholders**	**Com-patibility**	**Com-plexity**	**Cost**	**IT Adopted by Others**	**Management Support and Commitment**
Your organization believes that your IT system could provide safe and secure information to perform duties.		.750							
The counter parties believe that your IT systems could provide safe and secure information.		.739							
Receive IT information from other related government organizations			.877						
Receive IT information from IT supplier organizations			.876						
Receive IT information from indirect governing organizations			.837						

Table 3.4 (Continued)

	Component								
	Relative Advantage	**Security**	**Intercon- nectedness**	**Perceived Importance by Stakeholders**	**Com- patibility**	**Com- plexity**	**Cost**	**IT Adopted by Others**	**Management Support and Commitment**
Receive IT information from IT-related journals and magazines			.834						
Receive IT information from IT-related seminars			.827						
Receive IT information from direct governing organizations			.771						
IT adoption is influenced by other municipalities nearby.				.746					
IT adoption is influenced by other related parties.				.728					
IT adoption is influenced by the personnel within your organization.				.726					

Table 3.4 (Continued)

	Component								
	Relative Advantage	Security	Intercon-nectedness	Perceived Importance by Stakeholders	Com-patibility	Com-plexity	Cost	IT Adopted by Others	Management Support and Commitment
IT adoption in influenced by other government organizations.				.709					
IT adoption is influenced by governing organizations.				.669					
IT adoption is influenced by service receivers.				.663					
The current IT systems are compatible with your service receiver.					.817				
The current IT systems are compatible with your current duties.					.798				
The current IT systems are compatible with your organization's structure.					.792				

Table 3.4 (Continued)

	Component								
	Relative Advantage	Security	Intercon-nectedness	Perceived Importance by Stakeholders	Com-patibility	Com-plexity	Cost	IT Adopted by Others	Management Support and Commitment
The current IT systems are not in conflict with the practice or procedures of the employees in your organization.					.760				
Most of the personnel in your organization have difficulty using IT in their duties.						.783			
The current IT systems used in your organization are complex and difficult to use.						.770			
The current employees lack IT knowledge.						.710			
Your organization lack the tools to support IT usage in an efficient way.						.633			

Table 3.4 (Continued)

	Component								
	Relative Advantage	Security	Intercon- nectedness	Perceived Importance by Stakeholders	Com- patibility	Com- plexity	Cost	IT Adopted by Others	Management Support and Commitment
IT service costs such as Internet fees are expensive.							.815		
IT software related to your organization is expensive.							.799		
IT hardware and equipment are expensive.							.799		
Other municipalities nearby perceive the importance of IT and invest a lot of money in IT.								.791	
Other municipalities nearby widely use an IT system.								.749	
Other municipalities nearby have successfully adopted an IT system.								.643	

Table 3.4 (Continued)

	Component								
	Relative Advantage	**Security**	**Intercon-nectedness**	**Perceived Importance by Stakeholders**	**Com-patibility**	**Com-plexity**	**Cost**	**IT Adopted by Others**	**Management Support and Commitment**
The management of your municipality financially supports the use of IT.									.826
The management of your municipality has good IT knowledge.									.818
The management of your municipality does not give priority to an IT budget.									.725

Note: Kaiser-Meyer-Olkin Measure of Sampling Adequacy. = 0.818

Bartlett's Test of Sphericity: Approx. Chi-Square 8467.553, df = 1081,Sig. = .000

3.4 Data Analysis

First, the descriptive statistics on the characteristics of the respondent municipalities are reported. Next, cluster analysis was used to classify the municipalities regarding their information technology usage, and discriminant analysis was used to test the validity of the cluster. Lastly, regression analysis was used to determine the factors affecting IT adoption, and correlation analysis was used to determine the relationship between the level of IT adoption and increasing revenue. However, prior to the multiple regression analysis, the correlation matrix and the variance inflation factor was assessed in order to assess the multicollinearity problem.

Scale items were graded according to a seven point Likert scale as follows:

6.16 - 7.00   means strongly agree or very high

5.30 - 6.15   means agree or high

4.44 - 5.29   means somewhat agree or quite high

3.58 - 4.43   means do not agree or moderate

2.72 - 3.57   means somewhat disagree or quite low

1.86 - 2.71   means disagree or low

1.00 - 1-85   means strongly disagree or very low

CHAPTER 4

DATA ANALYSIS AND RESEARCH RESULTS

This chapter is organized into five main sections. The first section describes the characteristics of the respondents of the survey. The second section describes the general conditions of IT adoption in municipalities. The third section classifies and identifies groups of respondent municipalities with similar patterns of environmental management practices by cluster analysis. The fourth section explains the hypothesis testing results and finally, the fifth section describes the findings from the focus group session.

4.1 Characteristics of Respondents

Table 4.1 describes the respondents' profiles. Most of the respondents were male (72.60%), held master degrees (72.60%), were aged 50 or above (60.20%), were municipal clerks (71.20%), and most of them were in the position for more than 5 years.

Table 4.2 describes the municipalities' profiles. Most of the respondent municipalities were from central Thailand (31.00%) followed by northern, southern, northwestern, and eastern Thailand at 24.30%, 17.70%, 15.50% and 11.50% accordingly. Most the respondent municipalities had 20-49 computer (43.30%), followed by less than 20 computers and more than 50 computers at 29.20% and 27.50% respectively. Hence, most of them had their own website (97.30%).

Table 4.1 Describes the Respondents' Profiles

Characteristics of the Respondents		Number	%
Gender	Male	164	72.6
	Female	62	27.4
	Total	226	100.0
Education	Bachelor Degree	58	25.7
	Master Degree	164	72.6
	Doctoral Degree	4	1.8
	Total	226	100.0
Age	Below 40 years old	26	11.5
	Forty to 49 years old	64	28.3
	More than 50 years old	136	60.2
	Total	226	100.0
Position	Municipal Clerk	161	71.2
	Deputy municipal clerk	16	7.1
	Management personnel	43	19.0
	Other	6	2.7
	Total	226	100.0
Number of year in the current position	Less than 5 years	74	32.7
	5 to 15 years	78	34.5
	More than 15 years	74	32.8
	Total	226	100.0

Table 4.2 Describes the Municipalities' Profiles

Characteristics of the municipality		Number	%
Location	Central	78	31.0
	Northern	55	24.3
	Southern	40	17.7
	Northeast	35	15.5

Table 4.2 (Continued)

Characteristics of the municipality		Number	%
	Eastern	26	11.5
	Total	226	100.0
Number of Computer	Less than 20 computers	66	29.2
	20 - 49 computers	98	43.3
	More than 50 computers	62	27.5
	Total	226	100.0
Website	Have a website	220	97.3
	Do not have a website	6	2.7
	Total	226	100.0

4.2 General Situation of IT Adoption in Municipality

Table 4.3 describes the average and standard deviation of the opinions of the respondents regarding the IT adoption in the municipality, and it was found that the municipality adopted IT at a moderate level (X=4.25 and SD 1.15) with the citizenship registration system being the most used, with an average of 5.99 and a standard deviation of 1.48, followed by Internet/intranet, and an accounting/ finance/treasury and budgeting system with an average of 5.35, 5.35 and 5.06 respectively, while having a standard deviation of 1.63, 1.49 and 1.73 respectively. The lowest system was the irrigation system with an average of 2.37 and a standard deviation of 1.88.

Table 4.3 Describes the IT Adoption in Various Duties of the Municipality

IT SYSTEM	Average	Standard Deviation	Definition
1) Citizenship Registration	5.96	1.48	High
2) Internet/Intranet	5.35	1.63	High
3) Account/Finance/Treasury	5.35	1.49	High
4) Budgeting	5.06	1.73	Quite High
5) Website	5.02	1.55	Quite High
6) Revenue	4.75	1.64	Quite High
7) Taxation	4.72	1.58	Quite High
8) Database	4.46	1.82	Quite High
9) Social welfare/healthcare	4.08	2.12	Moderate
10) Geographical map	3.58	1.95	Moderate
11) Construction/city planning	3.52	1.92	Quite Low
12) Document Sorting	3.36	1.92	Quite Low
13) Education/Economic	3.12	2.00	Quite Low
14) Prevent and mitigate danger	3.03	2.02	Quite Low
15) Water/Irrigation	2.37	1.88	Low
Total	4.25	1.15	Moderate

Table 4.4 describes the average and standard deviation of the perception of the respondents toward the independent variables as follows.

The technological context factors revealed that the IT systems that were currently being used were compatible with the basic structure of the municipality with an average score of 5.64 and a standard deviation of 0.79. The relative advantage of the new IT system compared to the previous system have an average of 5.38 and a standard deviation of 0.99. Hence, the complexity of IT system had an average of 3.76 and a standard deviation of 1.22. Finally, the cost of the IT system had an average score of 4.15 and a standard deviation of 1.36.

The organizational context factors revealed that management support and commitment were crucial for IT adoption with an average of 4.56 and a standard deviation of 1.12. Finally, the organization size had an average 113.69 and a standard deviation of 101.24.

The institutional context factor revealed that the perceived importance by stakeholders highly influenced IT adoption with an average of 4.91 and a standard deviation of 1.08. In addition, the IT adopted other also had an average of 4.56 and a standard deviation of 1.13. Finally, interconnectedness had an average of 2.49 and a standard deviation of 1.39.

Table 4.4 The Average and Standard Deviation of the Studied Variables

Variable	Average	Standard Deviation	Definition
Level of IT Adoption	4.25	1.15	Moderate
Relative Advantage	5.38	.99	High
Compatibility	5.65	.79	High
Complexity	3.76	1.22	Moderate
Cost	4.15	1.36	Moderate
Security	4.89	1.13	Quite High
Organization Size	113.69	101.24	
Management support and commitment	4.56	1.12	Quite High
IT adopted by others	4.55	1.13	Quite High
Perceived importance of stakeholders	4.91	1.08	Quite High
Degree of interconnectedness	2.48	1.39	Low

4.3 Respondent Municipality Classification

An increasingly important stream of literature on advanced manufacturing systems suggests that municipalities tend to adopt related bundles of organizational practices, and further that such practices are more effective when they are adopted and

utilized as a system (Ichniowski, Shaw, & Prennushi, 1997, pp. 291-313). This is consistent with literature discussed in the previous chapter, where it was indicated that the information technology used in the municipalities was comprised of bundles of related information technology systems. The number of municipalities adopting the systems, then, would identify how well the municipalities perform roles involving information technology. Therefore, the purpose of this study is to assess and classify the municipalities regarding their efforts related to their IT adoption.

In order to systematically identify and classify the respondent municipalities, this study proceeded in three steps. First, cluster analysis was used to identify the groups of respondent municipalities with similar patterns of use of information technology systems. Second, the validity of the clusters was tested by discriminant analysis. Finally, the group clusters were characterized using one-way analysis of variance. Then each group was characterized regarding the extent of its information technology system usage.

Step 1: Cluster analysis was used to explore the adoption of the information technology system by the municipalities in the survey. The cluster analysis included 15 items for the information technology systems. K-means that clustering was used. The cluster solution that was most appropriate for these data generated four distinct clusters. The first cluster consisted of 33 municipalities, the second cluster consisted of 74 municipalities, the third cluster consisted of 67 municipalities, while the fourth cluster consisted of 38 municipalities,

Step 2: The validity of the clusters in step 1 was tested using discriminant analysis. The results indicated a 93.9 percent classification accuracy (see table 4.5), which indicated that the classification of the four groups was acceptable because an acceptable level of predictive accuracy for the discriminant function, generally, should not be lower than 90 percent (Suchart Prasithrathsint, 1986).

Table 4.5 Cluster Analysis

	Predicted Group Membership: Count (%)					Correlative
Cluster	1.00	2.00	3.00	4.00	Total	Classification
1.00	31 (93.9)	2 (6.1)	0	0	33	93.9
2.00	3 (4.1)	69 (93.2)	2 (2.7)	0	74	
3.00	0	4 (6.0)	61 (91.0)	2 (3.0)	67	
4.00	0	0	0	38 (100)	38	

Step 3: One-way analysis of variance (ANOVA) with Duncan's multiple range test was used to review the differences in each practice among the four clusters. The results of the analyses of variance indicated that the four clusters differed significantly ($p < 0.01$) regarding all of the information technology systems as shown in table 4.5.

Respondent municipalities were asked to identify their agreement with the information technology systems implemented in their municipalities. The level of agreement was scored on a seven-point rating scale ranging from 1 to 7, which represented a range from "strongly disagree" to "strongly agree." Table 4.5 summarizes the mean values and standard deviation of the scores of practices concerning the information technology systems of the municipalities for each cluster.

An interesting trend was evident when collectively considering these values—the first cluster had a lower mean value for each item than the second cluster, which in turn was lower than the third cluster and fourth cluster. The mean value for the information technology systems implemented in the first cluster, second cluster, third cluster, and fourth cluster was 2.86, 3.66, 4.71 and 6.04 respectively.

Group 1 consisted of 33 municipalities. The municipalities in this group adopted a low level of IT. They only fully used IT in the citizenship registration system and partially in the accounting/finance/treasury, taxing, and database system. This group was classified as "laggard."

Group 2 consisted of 74 municipalities. The municipalities in this group adopted a moderate level of IT. They fully used IT in the citizenship registration and Internet/intranet systems and partially with an average usage of IT in their websites, and account/finance/treasury and budgeting systems. However, there were still many systems those do not use IT. This group was classified as "reactive."

Group 3 consisted of 67 municipalities. The municipalities in this group adopted IT in every system but not completely, except for water/irrigation duty, which does not use IT at all. This group was classified as "active."

Group 4 consisted of 38 municipalities. The municipalities in this group adopted IT at a high level where all of them were complete or almost complete. In addition, there was also information sharing among them in some duties. This group was classified as "proactive."

Table 4.6 Mean and Standard Deviation of Cluster Analysis on Different Task

IT SYSTEM	Laggard N= 33 (15.6%)		Reactive N= 74 (35.0%)		Adaptive N= 67 (31.6%)		Proactive N= 38 (18.0%)			
	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	F	Sig.
Document Sorting	1.70	0.92	2.50	1.32	4.07	1.76	5.63	1.10	64.55	0.00
Accounting/Finance Treasury	3.94	2.00	4.81	1.27	6.09	0.90	6.37	0.75	35.42	0.00
Taxation	3.79	1.78	4.01	1.16	5.16	1.26	6.47	0.69	41.80	0.00
Database	3.64	2.28	3.39	1.21	5.13	1.50	6.26	0.72	41.02	0.00
Revenue	3.30	1.88	3.96	1.27	5.52	0.96	6.37	0.67	57.43	0.00
Construction and City planning	2.55	1.68	2.31	1.20	4.04	1.74	6.00	0.87	64.17	.000
Citizenship Registration	5.24	2.24	6.01	1.09	5.96	1.58	6.68	0.57	6.03	0.00
Internet/Intranet	3.33	2.25	5.42	1.16	5.99	0.88	6.37	0.67	42.20	0.00
Budgeting	3.36	2.04	4.64	1.50	5.85	1.28	6.21	0.91	31.70	0.00
Website	2.88	1.87	4.93	0.93	5.76	0.92	6.16	0.82	64.26	0.00
Social welfare/Healthcare	2.42	1.95	3.38	1.94	4.87	1.77	5.84	1.37	29.52	0.00
Geographical map	2.00	1.48	2.53	1.21	4.31	1.63	6.11	0.92	80.08	0.00
Education/Economic	1.45	0.83	2.34	1.25	3.31	1.97	6.00	0.81	75.47	0.00
Water/Irrigation	1.21	0.48	2.23	1.68	1.87	1.48	4.47	2.21	29.65	0.00
Prevent and mitigate danger	2.06	1.60	2.39	1.44	2.78	1.76	5.68	1.61	43.30	0.00
Total	2.86	1.68	3.66	1.31	4.71	1.42	6.04	0.98		

4.4 Hypothesis Testing

4.4.1 The Factors Influencing the Adoption of IT

In the interpretation of the independent variables used to predict the dependent variable regression analysis, it was suggested that the researcher must be aware of the impact of multicollinearity because highly collinear variables can misrepresent the findings substantially or make them quite unstable and thus not generalizable (Hair, Anderson, Tatham, & Black, 1995, p. 146). There are two common measures suggested to be used to assess both pairwise and multiple variable collinearity. They are the tolerance value and the variance inflation factor (VIF) (Hair et al., 1995, p. 127). These measures indicate the degree to which each independent variable is explained by the other independent variables. Tolerance refers to the amount of variability of the selected independent variable not elaborated by the other independent variables (Stamatis, 2001). Generally, very small tolerance values and large VIF values indicate high collinearity. A common benchmark for the tolerance value is 0.10, which corresponds to VIF values above 10 (Hair et al., 1995, p. 127). The tolerance values and variance inflation factors, as shown in table 4.7,, indicated that there was not a multicollinearlity problem.

Table 4.7 Tolerance Values and Variance Inflation Factors for the Independent
Variables

Model	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Compatibility	.760	1.316
Complexity	.812	1.231
Cost	.768	1.302
Management support and commitment	.737	1.357
Adopted by others	.625	1.650
Security	.611	1.638

Table 4.7 (Continued)

Model	Collinearity Statistics	
	Tolerance	VIF
Relative advantage	.605	1.652
Degree of connectedness	.835	1.198
Perceived importance of stakeholders	.668	1.497
Organization size	914	1.094

The regression analysis results in table 4.8 revealed that there were 6 independent variables that influenced the IT adoption in the municipality: complexity, management support and commitment, IT adoption by others, relative advantage, degree of interconnectedness, and perceived importance of stakeholders. These six independent variables could explain the IT adoption in the municipality at 48.4% and the equation derived from the regression analysis had $F = 19.455$ (p-value = .000).

Table 4.8 Regression Analysis Results

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.970	.570		1.703	.090
Compatibility	-.021	.085	-0.14	-.246	.806
Complexity	-.064	.054	-.067	-1.191	.235
Cost	-.173	.049	-.205	-3.519	.001
Management Commitment	.247	.061	.240	4.039	.000
Adopted by Others	.141	.066	.139	2.150	.033
Security	.065	.067	.063	.969	.334
Relative Advantage	.181	.076	.156	2.372	.019
Degree of Connectedness	.102	.046	.122	2.188	.030
Perceived Importance of Stakeholders	.218	.067	.204	3.269	.001
Size	.000	.001	-0.22	-.413	.680

The following section will describe the results of individual hypothesis tests

Hypothesis 1 result

From the regression analysis, relative advantage did positively affect the IT adoption in the municipality with $t = 2.372$ (p-value = .019).

Hypothesis 2 result

From the regression analysis, compatibility does not affecting the IT adoption in municipality.

Hypothesis 3 result

From the regression analysis, complexity does not affecting the IT adoption in municipality.

Hypothesis 4 result

From the regression analysis, cost does negatively affecting the IT adoption in municipality with $t = -3.519$ (p-value = .001).

Hypothesis 5 result

From the regression analysis, security does not affecting the IT adoption in municipality.

Hypothesis 6 result

From the regression analysis, size does not affecting the IT adoption in municipality.

Hypothesis 7 result

From the regression analysis, management support and commitment does positively affecting the IT adoption in municipality with $t = 4.039$ (p-value = .000).

Hypothesis 8 result

From the regression analysis, perceived importance by stakeholders does positively affecting the IT adoption in municipality with $t = 3.269$ (p-value = .001).

Hypothesis 9 result

From the regression analysis, IT adopted by other does positively affecting the IT adoption in municipality with $t = 2.150$ (p-value = .033).

Hypothesis 10 result

From the regression analysis, degree of interconnectedness does positively affecting the IT adoption in municipality with $t = 2.188$ (p-value = .030).

4.4.2 The Relationship between Level of IT Adoption and the Revenue-generating Performance of Municipality

Hypothesis 11 result

Level of information technology adoption in local government organization is positively affecting its revenue-generating performance (r = .162 and p-value = .015) (See Appendix 2).

4.5 Focus Group

This section elaborates on the results of the information gathered during the focus group session, which was divided into four parts as follows.

4.5.1 General Situation of IT Use in the Municipality

All of the focus group participants agreed that every organization under the department of the local administrative was adopting more IT usage. However, these municipalities were using IT at different levels depending on many factors and the situation of their IT use was as follows.

1) In general, IT covered three areas: hardware, software, and people ware. In the context of the municipality, people ware seemed to be the most prominent issue, for example: resisted to change and doing the same practice especially from those who are not ready for IT adoption due to limited knowledge.

One of the focus group participants stated the following:

The main problem of IT adoption in municipality is the lack of support and personnel do not realize the usefulness of IT adoption. This is because many employees in the municipality are not IT ready and resisted to change. In addition, high employee turnover is also another big issue.

Another focus group participant also stated the following:

If the central government change format of any report or system, the municipality has to outsource to adapt to the new requirement. In addition, all

the system should also be integrated where information can be shared among various departments within the municipality. However, the cost of integration can be very high, it is worthwhile in a long run and help to eliminate any duplicate work in the municipality. For example, Citizen registration, treasury and municipality development department are using the same data base and information, but there is no information sharing among them.

This was also further elaborated by another focus group participant in the following statement:

The municipal law report format is set by the provincial authority. For the past 3 years, the format is being changed every year which make it difficult to comply. In addition, last year when the personnel in charge of this is report was resigned, the municipality find it difficult to follow these changes.

2) Hardware

The hardware acquisition very much depended on the policy and size of the organization, including the budget, according to one of the focus group participants in the following statement:

All hardware is subject to write off after 5 years, this is because all hardware after 5 years is costly to maintain. This policy will help to minimize maintenance cost.

Most of the municipalities are still using old hardware due to the limited budget. For example, one of the focus group participants stated the following in this connection:

Most of the computer using in the municipality was brought since 1999. This is because they only using basic program such as Microsoft Word or Excel which do not require intense processing process. However, some hardware is being change in order to comply with the new system requirement such as e-

LAAS system (Electronic Local Administrative Accounting System) which require faster hardware to process.

The e-plan system of the central government was still uncertain with the reporting format and there is no seminar or training to train employee of the municipality to use the system. This was mentioned by one of the focus group participants:

Personnel responsible for E-plan system has to be self-learning and this system is not stable. As a result, he/she has to always call the department local administrative to check whether the submitted report has reached or not.

The bad Internet signal issue was raised by one of the focus group participants:

Although all employees have computer in the municipality, the computer is old and Internet congestion is an issue since everyone is connected to the Internet at the same time.

Another focus group participant added the following:

Their computer is old with an average age of around 13 years. They only allow to upgrade their computer as a part only. Most of the computer is also outdated and cannot comply with new system such as e-plan or e-LAAS. The computer will not be write off and new employee will get the computer from the retired personnel.

This was also further elaborated on by another focus group participant:

Internet congestion is big issue during the report submitting period when every municipality in Thailand has to submit the report to the department of local administrative. In addition, private Internet service provider provides Internet

access at faster speed comparing to state own enterprise Internet service provider but faster speed come with higher price.

3) Different departments in different municipalities use different software. This limited the information sharing among them. However, there were some programs and systems being used in common such as e-plans and e-LAAS. Hence, these program had no fixed format from the central government. As a result, the IT personnel in every municipality have to design their own format, which can be difficult to use.

This was indicated by one of the focus group participants:

The systems from the department of local administrative are being change every three years. In addition, these systems do not come with common format. As a result, IT personnel in a municipality cannot share his/ her knowledge among different municipalities.

4) The people ware problem seemed to be the most critical in every municipality in terms of adopting IT as follows.

Employees lacked of knowledge and had a negative perception of learning about IT adoption. In addition, they resisted change and stuck to their previous practices, as indicated by one of the focus group participants:

Most personnel are resisted to change and have negative mindset toward IT adoption since they believe that IT adoption will increase their workload. They just follow the order of the management. As a result, IT adoption is highly dependent on the mindset of the management toward IT.

Meanwhile, every focus group participant agreed that " [s] ome personnel were addicted to signature authorization. As a result, paperless authorization is not accepted and has to wait until the signature authorization.

However, some focus group participants did not agree:

The resistance to change mostly come from aged employees who most age more than 50 years old" but this depends on the attitude of the person, whether he/she is eager to learn something new or not.

Insufficient IT personnel also leads to a heavy workload.
According to one of the focus group participant

There is no IT personnel in the municipality. Any IT related work will be forwarded to personnel in various departments who have the most IT knowledge but not IT specialist.

Another focus group participant also added the following:

As there is no IT specialist in the municipality, some IT related works will be time consuming. and further elaborate by another focus group participant that
As there is no IT specialist and only 2 personnel have IT knowledge, their IT related workload is heavy. In addition, their main duty are also affected since they always be called for IT help.

Employees are sorting their documents differently. As a result, there is no link or communication within and among organizations. All employees are working as a standalone unit.

According to one of the focus group participant

Different departments in municipality have their own way to collect and sort their document. As a result, information and data sharing is quite limited, which all focus group participants agreed with.

5) Problems regarding the supported policy and budget from the central and local government were also a serious issue. The IT-related acquisition policy was getting stricter. As a result, acquiring new IT was very complicated and required higher authority for approving the acquisition.

According to one of the focus group participant

The acquisition process has to go through central authority and time consuming. Hence, the new computer required may become outdated by the time of approval. In addition, according to the Sena Town Municipality, "management also influence the IT adoption in the municipality as there will be more budget allocated.

6) The auditing process by outsiders such as ombudsmen does not truly understand the working process of the municipality. For example, the ombudsmen did not allow the civil or town planning department use high specification computers, although this department required its since intense processing programs are going to be used such as AutoCAD. Hence, if the ombudsman approves high specification computers, he or she is not allowed to buy the required software as a package. As a result, the required software will be brought separately at a higher price.

According to one of the focus group participant

Sometime auditing authority is viewing municipality as a whole and do not fully understand the different IT requirements for different departments in the municipality.

4.5.2 IT Usage in the Municipality

1) The use of the platform provided by the central government for service receivers only includes the citizenship registration system. On the other hand, regarding the system for taxation, revenue, social welfare, public relations, and development plan, the information input is done individually based on each municipality's management.

2) In terms of the linking of information with other municipalities, outsourced employees are used to develop and set up the system for the ease of use in serving citizens. The systems included linking with the irrigation department, the department for the prevention and mitigation of danger, the Construction/ city planning department, and the education/economic department.

3) The procedures used to provide service to the citizens are done proactively and provide information to them.

According to one of the focus group participant

Currently we also have a mobile units to give services on-site because our data are directly linked. These mobile units services are only available in a few places in Thailand. The mobile units will station in large community area like MuangThong Thani etc. We make monthly plan on where and when the mobile unit will be to provide the services to gives convenience to those who have difficulties travelling to the municipality due to traffic in the area. With this mobile unit traveling to schools areas, children at the age of 7 can now register for their first ID card there.

On the other hand, another focus group participant added that they have mobile applications and social media tools implemented to provide services as well:

The implementation of website, Facebook, and LINE chat are beneficials. These help official to be close to the citizens, easier to interact and/or communicate in term of getting the comments, easier to reach the targeted citizens, and fasten the problem solving process as citizens can contact the officers faster due to more communication channels as mentioned earlier. These tools make our services more effective and efficent.

Another focus group participant also mentioned that they provide basic information and promotion of festival and product in the area on the website. In addition, procurement information will be posted in order to create corruption free organization.

4.5.3 Factors that Influence IT Adoption in the Municipality

According to the focus group participants, the factors that influence the implementation of an IT system in the municipality can be summarized as below:

1) IT is a tool that enhances the communication system.

Mention by the one of the focus group participants

Currently we're implementing more IT usage which provide more access and convience to contact with other almost immediately. Unlike before where we need to wait for the paper work and the hard copy of the document to actually reach each other, so the IT helps fasten the communion as well as the trasfering of documents.

2) IT is a tool to provide better service

According to one of the focus group participant

Free wifi will provide to the citizen in the area in order to promote life long learning and comply with "SMART CITY" policy. In addition, LED sign also set to provide information for the citizen in the high population density area.

Meanwhile another focus group participant explained the following:

Since most of the citizen in the area is in agricultural sector, they are not IT ready and have no time to learn new thing. So duplicate work still have to be done to pass information to these citizen. So, IT ready citizen will receive faster information compared to traditional method.

However, another focus group participant explained his willingness to improve the service quality in the following passage:

Complaint and service receiver satisfaction can be collected through " Dum Rong Tham" center where management can studied this information and later improve the service quality of the municipality.

4.5.4 Suggestions from the Interviewees

1) In the long term, because the Department of Local Administrative's main objective is to provide services to the citizens in the area, the investment in infrastructure costs has to be done to achieve a common standard system that can link data both internally and externally. This can help to save unnecessary costs such as maintenance costs.

According to one of the focus group participant

The important thing is the geographic system because the construction and city planning department and tax planning department need to work together but the system is still not support this link. If there's an existance of infrastructure for the area we are responsible in, then it will be a lot better. If the geographic system is effective, then it would be easy for office to get access to information. Right now Pakkret Municipality is working with King Prajadhipok's Institute beceause the lecturer emphasise on the geographic, as it is beneficial in term of protection system such as preparing for disasters, knowing where and when the diaster may occur and statistic of where it hasn't occur.

2) The policymakers from the central government and the local government should give importance to the implementation of IT usuage and take it more seriously and they should also provide the standard plateform in terms of usage in order to enhance conveniences and standardization throughout the country.

According to one of the focus group participant

The central government or department of local administrative should set a common report format. In addition, the report format should also not be changed often. Hence, basic infrastructure should also be built in order to support IT usages. For example, more servers should be built in order to support more Internet traffic during report submitting period.

3) IT training should be supported by the central authority.

According to one of the focus group participant

As there is high IT personnel turnover in the municipality, IT related training should be given regularly. In addition, since there is always change in IT system provided by the central government, new IT personnel will find it very difficult to follow up. Hence, IT knowledge especially regarding the e-plan and e-LAAS system is not widely understood, new IT personnels have to learn from their senior only.

4) IT adoption motivation must be implemented.

According to one of the focus group participant

IT adoption should be set as a criteria for performance assessment. This is because as there is no proper motivation method to influence the IT adoption, the management does not give priority toward IT adoption.

CHAPTER 5

CONCLUSION AND SUGGESTIONS

This chapter interprets and discusses the analysis from chapter five. The chapter begins with a summary, followed by a discussion of the findings in chapter five, in conjunction with the results of other recent studies found in the focus group session. Next, it assesses the contribution of the study, followed by discusses the limitations. Finally, it explores future research directions.

5.1 Summary

This study classified and identified municipalities in terms of the extent of their information technology adoption and studied and developed a model of the factors affecting the information technology adoption and revenue-generating performance of municipalities. Information technology system adoption was conceptualized as the municipalities' response to environmental pressures and change. Regarding the IT adoption by the municipalities, the municipalities in this study were classified into four: laggard, reactive, active, and proactive.

Based on an integration of institutional theory, resource dependence theory, innovation theory, and literature reviews of IT, the study proposed that technological, organizational, and institutional factors are the main influencing factors of IT adoption in the municipalities. Ten hypotheses were presented describing a theorized relationship between the three factors and the level of IT adoption. In addition, another hypothesis explained the relationship between the level of IT adoption and revenue-generating performance. The findings in chapter five indicated the following: 1) the level of IT adoption is predicted by relative advantage, cost, management support and commitment, perceived importance by stakeholders, degree of interconnectedness, and IT adoption by others; 2) revenue increase was seen to be related to level of IT adoption.

5.2 Discussion

The following section discusses the results from municipality classification and the hypothesis testing.

5.2.1 Discussion of the Classification of the Respondent Municipalities

As confirmed by the results shown in chapter five, the municipalities were classified into four groups with significant differences in terms of level of IT adoption. The four groups were laggard municipalities, reactive municipalities, active municipalities, and proactive municipalities. These four groups have different level of IT implementation which their IT usage can be explained as follows.

1) Laggard: The municipalities in this group adopt a low level of IT. They only fully use IT in the citizenship registration system and partially in the accounting/finance/treasury, taxing and database system.

2) Reactive: The municipalities in this group adopt a moderate level of IT. They fully use IT in citizenship registration and Internet/ intranet systems and partially with an average usage of IT in websites, and in their account/finance/treasury and budgeting systems. However, there are still many systems those do not use IT.

3) Active: The municipalities in this group adopt IT in every system but not completely, except regarding water/irrigation duties, which do not use IT at all.

4) Proactive: The municipalities in this group adopt IT at a high level where all of them are complete or almost complete. In addition, there is also information sharing among them in some duties.

5.2.2 Discussion of the Results of Hypothesis Testing

After of the data were collected, and the variables were measured and tested for their reliability and validity. Then the hypotheses were tested using regression analysis. The following discussion explains the results of these tests and provides some potential reasons for the failure of the unsuccessful hypotheses.

Hypothesis 1: (Supported) The study found a strong relationship between the relative advantage and the level of IT adoption in the municipality. This implies that

the municipalities realized that IT adoption was beneficial. For example, IT adoption will help to minimize overall costs, increase service receivers' satisfaction, and help to create a better image for the municipality, which is related to the technology acceptance model of Roger (1983). According to Davis (1985), the realizations of IT adoption benefits is a factor influencing IT adoption and alters human practices. This is related to Thong and Yap (1995): "The analysis of benefit and cost of IT adoption will be analyzed prior to the IT adoption process take place." Hence, this relationship finding was also related to the information obtained during the focus group session—that new IT systems are likely to serve the service receiver better and allow them to be more satisfied with the service received.

Hypothesis 2: (Not supported) This study found no relationship between compatibility and level of IT adoption. This hypothesis deals with the extent to which the new IT adoption has to relate and comply with the existing practice, culture, and tradition of the municipality. Surprisingly, the regression analysis revealed that there was no significant relation between compatibility and level of IT adoption. A possible explanation for the lack of the significance appears to be twofold. First, according to the institutional theory of DiMaggio and Powell (1991), "[o]rganizations will decide to act according to either norm, mimetic or coercive force." Since there is no relationship between compatibility and level of IT adoption, it can be concluded that the IT adoption in the municipalities was driven by coercive force. This means that the central government or department of local administration just creates a new IT program such as e-plan or e-LAAS and forces the municipality to adopt this system without asking for comments or feedback on whether the new system complies with the existing practice of the municipality or not. Hence, this is also related to the information obtained from the focus group-that the departments of local administration always keep changing the format of the e-LAAS report without prior notice.

Another explanation may be found in the diffusion of innovation suggested by Rogers (1995). It is suggest that an individual that has been taught about innovation is inclined to accept it more rapidly than those that have not. This mean that municipalities in Thailand are likely to be "late majority," which implies that they will decide to adopt new IT only when there is strong evidence of the usefulness of IT adoption or are pushed by the society. Therefore, municipalities will adopt new IT

only when they foresee the benefit or being pushed by the society (related to hypothesis #1 and hypothesis #9) without checking whether the new IT system is compatible with the existing practice, culture, or tradition of the municipality.

Hypothesis 3: (Not supported) This study found no relationship between complexity and level of IT adoption. This hypothesis deals with the extent of the difficulty in using IT by the employee. In the municipality context, the basic IT system used by the municipalities is provided by the central government. In addition, the instruction manual will also be provided and simplified by the central government. As a result, all IT systems will be user friendly.

Hypothesis 4: (Supported) This hypothesis was related to the cost of using IT and IT acquisition. The regression analysis showed that there was a negative relationship between cost and level of IT adoption. Similar to the idea of Tan, Chong, Lin and Eze, 2009, it was found that cost of IT adoption was an important factor affecting the decision to implement IT. In addition, the initial investment was not the only expense, maintenance cost, personnel salary, and training are also included to the cost which is the factor affecting the IT adoption in organization (Thong and Yap, 1995).

Hypothesis 5: (Not supported) This hypothesis was related to security in IT adoption. The regression analysis showed that there was no significant relationship between security and level of IT adoption. One possible explanation for this is because municipalities are organization under the department of the local administration. That is, municipalities are public organizations: " Many scholars in economics and political science have taken the position that public bureaucracies differ from private organizations in important ways" (e.g., Dahl & Lindblom, 1954). This means that related parties feel that it is secure and safe to do a transaction with public organizations. As a result, security does not influence the IT adoption in the municipalities in Thailand.

Hypothesis 6: (Not supported) This hypothesis was related to the organization size and IT adoption. The regression analysis showed that there was no significant relationship between security and level of IT adoption. One possible explanation for this is that if the municipalities perceive the usefulness of IT, they are willing to adopt IT no matter what their size is. This is related to hypothesis #8. Another possible

explanation can be derived from institutional theory where every municipality is being forced by the governing authority to adopt a certain minimum level of IT (hypothesis #2).

Hypothesis 7: (Supported) The study revealed that the municipality tended to adopt IT systems proportionately to the extent of their management support and commitment. These results support the resource dependence and strategic choice perspective, where the management of organizations possesses considerable discretion in designing structures to respond to task-related pressures from their environments (Oliver, 1991, pp. 145-179). The more the members in a municipality are supported by management to implement IT systems, the stronger is their belief in their importance, and then, the more likely that the systems will be integrated into the work process. This finding is consistent with previous research conducted by Chin and Pun (1999), which suggested that management commitment is one of the major concerns for the implementation of IT. In addition, the qualitative results revealed that organizations with management that are committed to IT and that have higher education are more likely to adopt IT systems.

Hypothesis 8: (Supported) This hypotheses was related to the perceived importance of stakeholders. The perceived importance of the stakeholder (i. e. government agencies, the community, and environmental organizations) is significantly influence the IT adoption. This result supports organizational perspectives; that is, the importance of dependence on institutional constituents induces organizations to conform to their expectations (Tolbert, 1985, pp. 1-13). This finding is also consistent with previous research where it is indicated that the strategies that organizations use in dealing with stakeholders depend on the extent to which those stakeholders are perceived to have the ability to fulfill the "critical" needs of the organization (Jawahar & McLaughlin, 2001, pp. 397-414).

Hypothesis 9: (Supported) The study revealed that the level of IT adoption by other municipalities in the same area did influence its level of IT adoption. This hypothesis deals with the extent to which IT adoption spreads through voluntary diffusion. The regression analysis revealed that there was a significant relation between the IT adoptions by other municipalities and the likelihood of the IT adoption of a municipality in the same local area. A possible explanation for this significance

appears to be twofold. First, it is proposed that the adoption and diffusion of IT adoption practice are facilitated by close geographic proximity (Cooke & Morgan, 1998). As a result, the municipality is likely to follow IT adoption by other municipalities in the same area. In addition, it might be possible that the geographic proximity among surveyed municipalities and other municipalities in the same province is close enough to cause the municipalities to exchange IT adoption and, consequently, to perceive the intensity of IT adoption by other municipalities.

Another explanation may be found in institutional theory. It is suggested that the stage of institutionalization of practices affects the strength of institutional pressures. During the pre-institutionalization stage, when few municipalities have adopted IT, pressures to adopt IT are weak. Hence, the decisions to do so depend on economic and technical issues (Barringer & Milkovich, 1998). Since this hypothesis was significant, it can be presumed that IT adoption is currently in a mid or later stage of institutionalization. Hence, IT adoption in Thailand is relatively old and many organizations, including municipalities, have adopted IT systems. In sum, it could be said that the IT systems in Thailand are in the mid or later stage of institutionalization; therefore, one of the decisions to adopt the IT system depends on the level of IT adopted by other organization in the same area.

Hypothesis 10: (Supported) As shown in the preceding chapter, interconnectedness did lead to greater responsiveness in the IT adoption. The result indicated that the interconnectedness or the diffusion of IT through attendance at IT conferences, having membership in an organizations (i.e. The National Municipal League of Thailand), and the engagement of external IT consultants influenced the level of IT adoption. The qualitative data revealed that a lack of IT knowledge is an obstacle to IT adoption. These findings supported the institutional perspective, whereby the extent of organizational conformity to institutional norms and expectations depends on the environmental context, specifically the degree of interconnectedness among environmental institutions (Oliver, 1991, pp. 145-179).

In addition, the descriptive results indicated that government agencies were the most important sources of IT information and knowledge and have provided more information and knowledge to the municipalities compared to other sources.

Hypothesis 11: (Supported) This study revealed that level of information technology adoption in the local government organization was positive significantly

related to its revenue-generating performance. This finding is similar to the previous finding (Sirirak et al., 2011), which indicated that there was a significant revenue-generating performance difference between organizations adopting different levels of information technology.

5.3 Contributions

5.3.1 Theoretical Contribution

Two primary theoretical contributions will be addressed in this section. These include 1) the idea that the integration of the resource dependence and institutional theory should be included in the analysis of IT adoption; 2) the extension of the model should include the proactive as a level beyond acquiescence in the continuum of strategies that municipalities adopt in response to institutional pressures.

5.3.1.1 Integration of Resource Dependence and Institutional Theory

With an increasing number of tasks assigned by the central government to the municipalities to perform, municipalities have to consider acquiring IT in order to perform those assigned tasks effectively and efficiently. Therefore, greater understanding of how municipalities adopt IT is needed.

However, past studies often lacked substantial explanations or failed to ground their assertions and observations in theory. This study overcomes these limitations by theoretically suggesting and testing a comprehensive framework for explaining the factors influencing IT adoption. The theoretical hypotheses in the framework were developed not on the basis of a single theory but on the integration of two complementary theories, resource dependence and institutional theory, and innovation theory, to provide a better understanding of the adoption process. Looking at any one theory without considering the other perspective would limit understanding of the situation. Therefore, a contribution of this study is that the three theories must be considered in the analysis of IT adoption.

5.3.1.2 Four Groups of Diffusion of Innovation

According to the diffusion of innovation "DOI" theory introduced by Rogers in the 1960s, people or organizations can be classified into 5 groups. These five groups, as mentioned in chapter 2.7.6.2, are classified according to their behavior

and action regarding the adoption of innovation. However, in this study under the municipality context, the municipalities were classified into four groups according to their IT adoption as follows.

1) Laggard: The municipalities in this group adopt a low level of IT. They only fully use IT in the citizenship registration system and partially in the accounting/finance/treasury, taxing and database system.

2) Reactive: The municipalities in this group adopt a moderate level of IT. They fully use IT in citizenship registration and Internet/intranet systems and partially with an average usage of IT in their websites, and in the accounting/ finance/ treasury and budgeting systems. However, there are still many systems those do not use IT.

3) Active: The municipalities in this group adopt IT in every system but not completely except in the water/irrigation duty where it is not used at all.

4) Proactive: The municipalities in this group adopt IT at a high level where all of them are complete or almost complete. In addition, there is also information sharing among them in some duties.

5.3.2 Managerial and Policy Contribution

This study makes many important managerial and policy contributions. First, the results of this study are of interest to mayors and municipality clerks faced with decisions regarding IT adoption. The results of this study indicate that municipalities anticipate that they can gain more revenue when they adopt IT systems. This finding, then, can assure the mayor and municipality clerk that the adoption of IT systems will increase their municipalities' efficiency.

Second, this study provides an understanding of management support and commitment in terms of IT, especially for the mayor of the municipality. According to the Thai constitution, the mayor of a municipality has to be elected. As a result, these mayors have to develop the community in a more "physical" approach in order to be elected or reelected. For example, developments in infrastructures are preferred because everyone in the local community can easily realize these developments, whereas IT development is difficult to realize. As a result, the central government

should have a measure to ensure that the mayor should be more concerned about IT adoption in the municipality.

Third, according to the cluster analysis, this study classified the level of IT adoption by municipalities into 4 groups. As a result, the management of the municipality and policymakers can customize the appropriate " tools" in order to encourage further IT adoption by different municipalities according to which group they belong to. In addition, this will help to maximize resources utilization because each municipality will be given the appropriate support and help for further adoption of IT since it is a proven tool for enhancing the performance and efficiency of the municipalities.

Finally, the personnel in the municipalities have limited knowledge of IT. As a result, IT adoption in the municipalities is not smoothly done, whereas the usage of IT is also limited to certain activities. Therefore, this study suggests that IT seminars or IT training must be arranged in order to improve the knowledge of these personnel in the municipalities. The management should also provide more support and commitment to these trainings, such as setting up an IT session in the municipalities to provide necessary IT knowledge for these personnel.

5.4 Limitations of the Study

There are a number of theoretical and methodological limitations that must be considered when evaluating the results of this study. The cross-sectional nature of this study is also a limitation that must be considered. A single set of responses at a single point of time was used to represent each research construct. Without multiple response points over time, substantive causal inferences cannot be made. Even though it was presumed that the independent variables and the dependent variable were causally related, only a correlation relationship existed in this study. While many causal relationships between the independent variables and the dependent variable in this study can be theoretically supported, they need to be examined with a time lag between the independent variables and their impact on the dependent variable for more rigorous study.

Reliability is another issue. The internal reliability (as shown in Table 4.3) was high enough for the perceptual measures used in this study. However, inter-rater reliability was not calculated because there was only one informant for each municipality. In addition, the problem of the one informant was a common method variance problem. Because one informant measured both independent variables and the dependent variable, there was a possibility that the relationships between them were influenced by the informants' hypothetical speculation on the relationship between the independent variables and the dependent variable. Furthermore a single respondent may paint a more positive picture of his/her municipality than what is actually happening. While the common-method variance is a less serious problem for a study at an organizational level than at individual levels, the possibility of the existence of common-method variance still remains as a limitation.

The sample survey methodology employed in this study must also be considered as a limitation. Surveys of this type must be carefully constructed in order to allow the data to be complete and precise. Simple questions and the Likert-type response format limit what a respondent is able to say. These issues, however, were carefully considered in developing the instruments used. Consequently, this limitation did not detract from the survey because the focus group provided some support for the statistical analyses, and the results were also consistent with some previous studies.

5.5 Future Research

This research and its findings suggest a number of areas where further investigation might be warranted to deepen the understanding of how the municipality adopts IT in order to generate more revenue.

First, as discussed in chapter two, the term "information technology" has been defined widely. There has not been a concrete agreement on the contents of an IT system. However, the term IT system in this study was defined and measured by IT adapting from the scope given to municipalities in Thailand by department of local administration. Therefore, further study should develop the definition and measures of IT systems. A better definition and improved measures can help us better understand what does and does not constitute IT and what activities municipalities should be engaged in.

Second, it is likely that the factors influencing IT adoption discussed in this study are not exhaustive. For instance, the finding that level of IT was adopted differently across municipalities with certain organizational characteristics such as size and management support and commitment suggests that future research needs to study the broader context of organizational characteristics, such as municipalities' existing resources and capability, employee's knowledge, and location.

Third, as this study was confined to the municipalities, based on the framework developed in this study, further insight could be gained by studying other government organizations. Further research is needed to examine whether the relationships found here hold in other organizations (i. e. provincial administration organizations and sub-district administration organizations) that have very different characters and regulatory conditions.

5.5.1 Summary

This dissertation has shown the factors influencing IT adoption, and, based on these factors, has made recommendations designed to enhance IT adoption as well as suggestions for future research to increase the body of knowledge that exists at present. If followed, the organization under the department of local administration, and Thailand in general, will gain huge benefits as the result of increased IT adoption.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

Research Questionnaire

Explanation

"Information" means data that went through the processes of gathering, storing, correcting, classifying into types, and conclude into 'information' that can be use beneficially such as report, research, news, etc.

"IT" (Information Technology) means teachnology are used to create more value to the information, make the information more useful, and can use more widely. IT covers technology in various aspects including those that use in 'gathering, storing then analyzing for results' or communications; such as communcation tools telephone, fax, computers, Internet connection, networking, and 'ready-made' programs or software, etc.

This questionairre is divided into 4 parts.

Part 1: Respondent's profile

Part 2: Organization's General Information

Part 3: Organization IT usage information

Part 4: Comments and Recommendations

Please answer the questionaire by filling in information, use √ in the circle box ◯ or choose the box that corectly represent your answer.

All the information that you provided will be keep strictly confidential and use for this reserach purpose only.

Part 1 Respondent's Profile

1.1 Gender ◯ Male   ◯ Female

1.2 Age………..….years

1.3 Education   ◯ Lower than Bachelor Degree

◯ Bachelor Degree

◯ Master Degree   ◯ Doctoral/Ph.d. Degree

◯ Others (please indicate)…………………….

1.4 Worked in this current organization for………….years

1.5 Current position is ……………………………………

and you are in this current positin for............years

Part 2 Organization's General Information

2.1 Your organization is located in which region

◯ Central   ◯ North   ◯ South

◯ Northeast   ◯ East

2.2 Currently, your organization has a total of ....employees

2.3 Over the past 3 years, how much is your organization income?

(unit : million baht)

Income	2012	2013	2014	2015	2016
Self allocated					
Central Government allocated					
Sponsored					

2.4 Your organization has a total of ....computers used to run all of the response jobs.

2.5 Your organization use Internet

◯ Yes ◯ No

2.6 Your organization has its own website

◯ Yes ◯ No

If yes, (please check if ture)

◯ your organization owns and runs the website

◯ your organization leaves the data in others' website(s)

◯ your organization owns the website and leave data in others website(s) too

Part 3 Organization IT Usage Information

3.1 IT usages level in your organizations to run/organize systems indicated below.

	IT not in use and has no plan of using	IT not in use but has plan to use within the next 2 years	IT not in use but has plan to use this year	IT currently in use but still not working perfectly	IT currently in use and working well almost perfect	IT currently in use and work perfectly	IT work perfectly and connected to other systems
1. Document Management System							
2. Financial and Account System							
3. Taxing Plan System							
4. Data Management System							
5. Tax Income Management System							
6. Infrastructure and City Planning System							
7. Citizen Data System							
8. Internet/Intranet							
9. Budget Management System							
10. Website Management System							
11. Social Insurance/Welfare system							
12. Geographic System							
13. Education/Economic/ Social Management System							
14. Irrigation System							
15. Protection and Rescue System							

3.2 To what level do you agree in term of IT usage within your organization

Types of IT usage in your organization	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
1. The current IT systems are compatible with the service receiver							
2. The current IT systems are compatible with current duties							
3. The current IT systems are compatible with the organization structure							
4. The current IT systems are not conflict with the practices or procedures of the employees in the organization.							
5. Most of the personnel in the organization have difficulty using IT in their duties							
6. The current IT systems using in the organization are complex and difficult to use							
7. The current employees are lack of IT knowledge							
8. The organization is lack of tool to support IT usage in efficient ways							
9. IT service cost such as Internet fee is expensive							
10. IT software related to the organization is expensive							
11. IT hardware and equipment are expensive							

Types of IT usage in your organization	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
12. The organization believe that the current IT system could provide safe and secure financial transaction							
13. Service receivers believe the organization IT systems could provide safe and secure financial transaction							
14. The counter parties believe the organization IT systems could provide safe and secure financial transaction							
15. Service receivers believe the organization IT systems could provide safe and secure information							
16. The organization believe that the current IT systems could provide safe and secure information to perform duties							
17. The counter parties believe the organization IT systems could provide safe and secure information							
18. The management of the municipality is financially support the use of IT							
19. The management of the municipality has good IT knowledge							
20. The management of the municipality does not give priority toward IT budget							

Types of IT usage in your organization	Strongly Disagree	Disagree	Slightly Disagree	Neither agree nor disagree	Slightly Agree	Agree	Strongly Agree
21. Many municipalities nearby are widely use IT system							
22. Many municipalities nearby perceive the importance of IT and invest a lot of money on IT							
23. Many municipalities nearby successfully adopt IT system							

3.3 Your <u>level expectation in the benefit that organization</u> would gain from implementing IT

Benefit(s) that you <u>expect</u> from the introduction of IT in your organization	Expectation Level						
	Very Low	Low	Somewhat Low	Neutral	Somewhat High	High	Very High
1. Will help lower the overall costs in organization's operation							
2. Will help lower organization's costs in communication with the external or other organizations							
3. Will help satisfy the service users when receiving services from my organization							
4. Will facilitate and enhance convernieces to organization's partners such as constructors							

Benefit(s) that you expect from the introduction of IT in your organization	Expectation Level						
	Very Low	Low	Somewhat Low	Neutral	Somewhat High	High	Very High
5. Will help my organization to create better relationship with the service users and partners							
6. Will help my organiztions to get faster and better access to information and news							
7. Will help my organization collects more income							
8. Will help enhance my organization'd image/reputation							
9. Will help my organization to effectively follow-up and control service quality							
10. Will help enhance organization's effectiveness in its work as a whole							
11. Will help create opportunity to develop the organization							
12. Will receive a worthy advantages when compare to the actual investment paid							

3.4 Over the past 2 years, how frequent does your organization receives information, news, or invitations to seminar about the IT that is related my organization's work from various sources

Sources of information on IT that your organization received over the past 2 years	Average Frequency in notifications receives						
	Very Low (less than 2 times per year)	Low (2-3 times per year)	Slightly Low (4-5 times per year)	Neutral (6-8 times per year)	Slightly High (once a month)	High (2 times per month)	Very High (more than 2 times per month)
1. From entering previous seminar about IT							
2. From organizations that directly overlook the IT							
3. From organization, indrectly overlook IT							
4. From the sale-representatives of the IT products							
5. From magazines or news on IT							
6. From other central governmental organizations							

3.5 Please rate the importance of the following person/organizations toward your decision on IT adoption

Importance of Stakeholder	Importance Level						
	Very Low	Low	Somewhat Low	Neutral	Somewhat High	High	Very High
1. Service receivers							
2. Personnel within the municipality							
3. Other municipalities nearby							
4. Other related parties							
5. Governing organization							
6. Other government organizations							

Part 4 Comments and Recommendations

From your opinion, what are the factors that motivate or restrict the implementation of IT usage in your organization? And what would be your recommendation(s) about it?

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Thank you very much,

your participation is much appreciated.

APPENDIX 2

CORRELATION TABLE

		Level of IT Adoption	Average Revenue Increase 3 years
Level of IT Adoption	Pearson Correlation	1	.162*
	Sig. (2-tailed)		.015
	N	226	226
Average Revenue Increase 3 years	Pearson Correlation	.162*	1
	Sig. (2-tailed)	.015	
	N	226	226

Note: *Correlation is significant at the 0.05 level (2-tailed).

BIOGRAPHY

NAME   Mr. Thitipat Charoenchaipong

ACADEMIC BACKGROUND   Bachelor degree of art, Economic
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