FACTORS AFFECTING IN USING INFORMATION TECHNOLOGY OF EMPLOYEES IN THE SERVICE INDUSTRIES: HOTELS AND HOSPITALS, THAILAND

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ABSTRACT

The purpose of this study was to explore the influence factors on the adoption of information technology by hotel and hospital employees in Thailand. Questionnaires have been distributed to target 400 hotel and hospital employees. Hypothesis of this study builds from the model of Unified Theory of Acceptance and Use of Technology (UTAUT) and the data collections were statistically analyzed through independent samples t-test and structural equation modeling testing (SEM) with hotels and hospitals representative samples. The results found that performance expectancy, effort expectancy, social influence, and facilitating conditions, are the main factors that influence the adoption of IT in hotel industries. This study also found that the main factors that influence the adoption of IT in hospitals are the same as hotel industries, except that “Social influence” was not an adoption factor in hospital employees. This study will be helpful in the decision making by management to plan and support technology performance; to develop employees in hotels and hospitals for more performance, such as support with hardware/software, training and IT staff services. The employees in service industries perceived and accepted technology readily including servicing effectively for customer satisfaction.

KEY WORDS: TECHNOLOGY ACCEPTANCE / UTAUT / SERVICE INDUSTRY

132 pages

ปัจจัยที่มีผลต่อการยอมรับการใช้เทคโนโลยีสารสนเทศของพนักงานในอุตสาหกรรมบริการ: โรงแรมและโรงพยาบาลในประเทศไทย

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บทคัดย่อ

การศึกษาวิจัยนี้มีวัตถุประสงค์เพื่อค้นหาปัจจัยใดที่มีผลต่อพฤติกรรมการยอมรับการใช้เทคโนโลยีสารสนเทศของพนักงานในอุตสาหกรรมบริการ: โรงแรมและโรงพยาบาลในประเทศไทย โดยมีกลุ่มตัวอย่างที่ตอบแบบสอบถาม จำนวนกลุ่มละ 400 คน โดยนำทฤษฎี Unified Theory of Acceptance and Use of Technology (UTAUT) มาสร้างเป็นสมมุติฐาน และนำมาวิเคราะห์ทางสถิติด้วย Independent Samples *t*-Test และใช้การวิเคราะห์ด้วยโมเดลสมการโครงสร้าง (Structural Equation Modeling Testing (SEM)) ทั้งกับกลุ่มตัวอย่างโรงแรมและโรงพยาบาล จากผลการวิจัยพบว่า ความคาดหวังในเรื่องประสิทธิภาพการใช้งาน ความคาดหวังในเรื่องความง่าย อิทธิพลจากบุคคลรอบข้าง และการสนับสนุนจากโครงสร้างพื้นฐาน ปัจจัยทั้งหมดล้วนเป็นปัจจัยที่ส่งเสริมให้เกิดการยอมรับการใช้งานเทคโนโลยีในกลุ่มพนักงานโรงแรม ขณะที่ผลวิจัยในกลุ่มของผู้ที่ปฏิบัติงานในโรงพยาบาล ได้ผลเหมือนกับในกลุ่มโรงแรม ยกเว้นปัจจัยในเรื่องอิทธิพลจากบุคคลรอบข้างที่ไม่ส่งผล งานศึกษาวิจัยนี้จะช่วยในการตัดสินใจในระดับของผู้บริหารในการวางแผนและสนับสนุนในด้านประสิทธิภาพของเทคโนโลยี และพัฒนาพนักงานทั้งในโรงแรมและโรงพยาบาลให้มีประสิทธิภาพดีมากยิ่งขึ้น ทั้งด้านเทคโนโลยีที่มีประสิทธิภาพ การสนับสนุนในเรื่องฮาร์ดแวร์ ซอฟต์แวร์ การอบรม และมีแผนกไอทีที่คอยช่วยเหลือด้วย เพื่อให้พนักงานในอุตสาหกรรมบริการเหล่านี้ได้รับรู้ และยอมรับการใช้เทคโนโลยีมากขึ้น รวมถึงสามารถทำงานเพื่อให้บริการได้อย่างมีประสิทธิภาพจนกระทั่งผู้ใช้บริการเกิดความพึงพอใจ

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CHAPTER I
INTRODUCTION

1.1 Background and Statement of Problems

Currently, the information technology (IT) was begun to apply in many service industries. Service industries use IT for servicing and adding convenience to the customers. For instance, in hotels industry, IT enables the hotel front desk an access to the essential information such as room availability, vacancy rate, customer relationship management information. Hotel's employees can use the websites to contact the customers and promote the hotels. IT also adds working efficiency of the employees work.

The flow of information throughout the organization will give the benefit from customer, employee, and company perspective. Enhancing profits and sales is likely the end result from the IT implementation.

Service industries have adopted IT extensively. Employees need to be trained to have computer/IT skills. For instance, in the hotel business, the front desks have responsible role to check-in guests in their front counter. They must have a proper training session to operate the system to perform various necessary routine tasks such as checking the vacant rooms for guests, make reservation, customize the room to customer need etc. The guests will receive more satisfactions to fast and convenience from the better service. Furthermore, it is helped to add profit value and good communications for contacting with guests or the other department in hotels.

Information technology does not only reduce the cost, but it also creates the new procedures/ system to improve the valve through the service. This will create the differentiation among the same business. IT can easily connect or access to customer or opportunity, and can implement the various valued added such as customer retention program. IT can also support the inventory managements to both service customer better, and reduce the inventory cost to the organization.

Customers can have more varied service via technology to interact, or access to the service of the company. Good service is helped to build satisfying and retention to the customers (Rust & Miu, 2006). IT is very usefulness in the future for service business.

The service organizations such as restaurants, hotels or health care can use technology to improve their business. For instance, McDonald's restaurants use very effective and efficient technologies to improve the reliability and quality. With a good IT implementation, McDonald can control temperature, and time interval to cook their French fried so that to optimize the quality speeds, and deliciousness (Lee, Barker, & Kandampully, 2003).

In other country, role of IT is more important. It has been developed service industry. In the United States, most hotels and travel agents likes to co–operations and use technologies to connect each party. For instance, the hotels must operate with technologies in order to customer or travelers safety (Murphy & Rottet, 2009). It cans add benefits in confidence and customer loyalty. Therefore, employees who use IT in their works must have the reasonable IT skills to execute the task effectively, and efficiently.

Table 1.1 Growth rate of Domestic Production in Major Sectors (Calendar Year) (Office of the National Economic and Social Development Board, 2010)

Unit: Percentage Changes

	2004	2005	2006r	2007r	2008r	2009P
Gross domestic products at 1988 prices	6.3	4.6	5.1	5.0	2.5	-2.3
Agricultural sectors	-2.4	-1.8	5.0	1.2	4.2	1.3
Agriculture, Hunting and Forestry	-3.5	-2.7	4.4	1.7	4.3	0.7
Fishing	3.6	2.8	8.1	-1.2	3.4	4.4
Non-agricultural sectors	7.4	5.3	5.1	5.4	2.3	-2.7
Mining (including fuel)	5.5	9.0	4.0	3.8	0.2	0.9
Manufacturing	8.2	5.2	5.9	6.2	3.9	-6.1
Electricity, gas and water supply	6.4	5.3	4.7	5.1	4.0	0.9
Constructions	7.2	5.7	4.6	2.5	-5.3	0.4
Wholesale and retail trade, repair of vehicles and personal and household goods	4.8	4.8	3.4	5.5	1.0	-0.3
Hotels and restaurants	12.2	2.1	11.1	4.4	1.6	-0.3
Transport, storage and communicate	7.5	4.8	6.2	6.0	-0.5	-3.8
Financial intermediation	12.4	8.4	3.2	5.6	8.3	4.0
Real estate, renting and business activities	6.6	5.3	5.5	3.2	2.5	1.1
Public administration and defence, compulsory social security	3.2	4.0	-0.8	4.6	1.3	0.1
Educations	3.5	7.0	3.3	9.8	0.3	5.3
Health and social work	2.3	11.1	5.0	7.3	-0.8	2.0
Other community, social and personal service activities	12.5	6.4	2.9	-5.1	0.7	0.5
Private households with employed persons	3.6	0.1	-2.3	2.6	1.8	1.9

Mark: P = Preliminary/ r = Revised

In Table 1.1 shows Growth rate of Domestic Production on Major Sectors. These are divided into 2 sectors: i) Agriculture and ii) Non-Agriculture. In 2004-2006, Growth rate of Domestic Production, hotels and hospitals in non-agriculture sector is higher rate than all agriculture sectors. However, United States was happened economic bubble and Thailand has been political events in 2008. Thus, a number of tourists decrease in Thailand. Therefore, Preliminary data in 2009, it found Hotels and Restaurants of Thailand Growth rate of Domestic Production accounts -0.3% by Year on Year(Y on Y).

Table 1.2 Total receipts of business establishments in 2009

(National Statistical Office, 2010) Unit: Thousand baht

Category of business industry	Number of Establishments	Total	Receipts from sales of goods and services	
			Total	Online sales
Total	1,606,418	7,640,149,043.8	7,469,887,821.5	13,457,887.0
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	178,279	2,201,418,346.1	2,170,074,570.9	44,131.5
Wholesale trade and commission trade, except of motor vehicles and motorcycles	75,191	2,748,287,264.7	2,717,051,997.3	4,235,052.1
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	259,054	384,539,524.3	370,304,281.1	1,798,045.7
Hotels and restaurants	70,327	231,194,936.1	178,998,049.7	4,015,379.2
Real estate activities	20,496	24,763,169.3	24,009,337.4	354.1
Renting of machinery and equipment without operator and of personal and household goods	4,485	42,849,596.6	42,096,833.3	454,963.7
Computer and related activities	35	1,754,095.1	1,730,725.4	-
Research and development	40,562	199,164,299.6	191,680,680.6	48,060.0
Other business activities (as Lawyer activity, Advertising)	27,760	90,109,169.8	84,249,157.7	7,286.7
Recreational, cultural and sporting activities	157,528	36,982,053.3	36,379,782.1	-
Other service activities (as laundry, barber)	1,606,418	7,640,149,043.8	7,469,887,821.5	13,457,887.0

Among all Thailand's leading industries, service activities industry become the biggest industry. This represents the industry value of 7,640,149,043.8

thousand baht in 2009. Medications are also the part of service industries which involve with service traveler, and patients respectively.

National Statistical Office, in the wholesale trade and commission trade, except of motor vehicles and motorcycles establishment, and hotels/restaurants establishment which accounts 4,015,379.2 thousand baht is the third of the highest in all establishments. In the addition, the hotel/restaurant is highest in the online sale value (National Statistical Office, 2010). This shows the importance of the technology online as internet is roles adding profit in hotel industry.

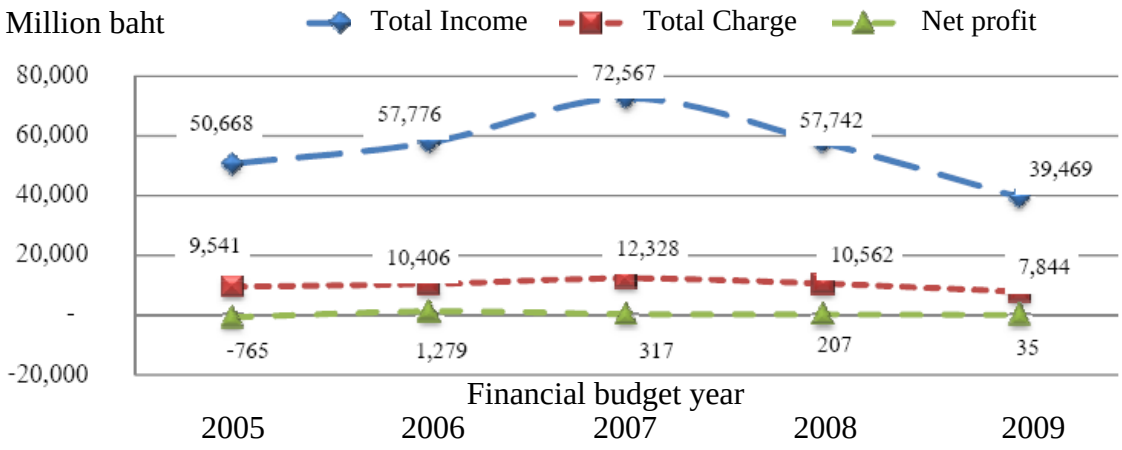


Figure 1.1 The Incoming value of agent travel in 2005-2009

(The Department of Export promotion, 2010)

In Figure 1.1 shows Incoming value of agent travel in 2005-2009. In 2005 income value grows 50,668 to 72,567 Million baht (grows up 43%). It shows that potential in adding value since 2005 to 2007. However, in 2008-2009, value income is decrease to 57,742 to 39,469 Million baht (decreases 32%). Because of the political unrest in Thailand and economic depression in around the world, this is affects to travel business. Moreover, the natural disasters are also caused in low income value. But, in the main business view, it has some net profits. Hotel business is one of the most earning businesses in Thai economy.

Healthcare needs to have good services for treating patients. Physicians or doctors, nurses, and health personnel are more convenient and add satisfaction of the patients. Maintaining and improving are most important in servicing that it has been

affected with efficacy, safety and quality (Calman, Kitson, & Hauser, 2007; Taner & Antony, 2006). The satisfaction of patients and heath care quality are element to improving health care service accomplishment and organization image (Naidu, 2009).

Leading Thai hospital such as Bangkok hospital group pays close attention to the IT implementation in their organization. Bangkok Hospital Group and IBM provide quality healthcare in Thailand ("Emerald | Thailand - Bangkok Hospital Group and IBM to provide quality healthcare in Thailand," 2009).

1.2 Objective of this Study

The purpose of this study consists of:

To indicate factors which the influence the adoption of service technology in hotel and hospital Thailand

1.3 Scope of this Study

The scope of this study composes:

1. This research will study on factor of technology acceptance, which has been affected by the employee's service skill in Thailand.
2. Representative Sample:
   - Respondent of hotels and hospitals in Thailand from sending online/mail questionnaires, divided by provincial part.
3. This research uses SPSS for window version 16.0 for window and Lisrel version 8.72 in order to analyze the data.
4. The research compares hotels and hospitals in accepting technology.

1.4 Expected Results

The expected outcome of this study includes:

1. Support development or adoption IT in hotel and hospital
2. Support administrators/owners decision for choosing IT solution

CHAPTER II
LITERATURE REVIEW

This chapter reviews basic knowledge and other researches in order to define scope area and procedure of this research.

2.1 Service Industry

Service is an activity, benefit, or the satisfaction which can offer to the buyers. Sometime, this activity is occurred in the same time when selling the products. There are two types of service: i) service products and ii) the acquisition of services.

Service products are the activity, benefit, satisfaction create as the product to need consumer demand. For example, in hospitals, the physicians' services are diagnosis and medical therapy to patients. The hotels' facilities, such as resting rooms, restaurants, spas, gyms or swimming pools, are provided to serve the customers to gain the maximum satisfaction. The teachers or lecturers teach the students to have more knowledge skills.

While product service is the product created for customer, the acquisition of services is proposed to be support activities or benefits for products offered to customers to make the extra satisfaction. For instance, in the electronic departments, if customer would like to buy electrical equipments such as a washing machine, the buyer could set up the free delivery and installation as the acquisition of service (Samerchai, 2004).

Service business can be separated into 13 types. As per below:

1. *Communication :* telephone connecting system, television station, post office, or internet provider.

2. *Occupancy :* hotels, resorts, service apartment or rented house.

3. *Managing place* : home builder, architecture, decorate home, or termite kill service at your home.

4. Relaxing : Entertainment business style such as theater, bowling, sport stadium, Museum, restaurant, bar, or pub.

5. Private Service : individual service as beauty salon, laundry, or tailor's shop.

6. Healthcare service : hospital, dentist clinic, or weight loss institute.

7. Consult : lawyer, business consultant, advertising agent, researcher, or wedding planner.

8. Finance : bank, cooperate finance, or stock exchange.

9. Assurance : private assurance and industry/commercial assurance.

10. Transportation : bus, taxi, airway, or car rental.

11. Education : international school, college, or university.

12. Traveling : hotel/flight reservation website.

13. Other service : non-profit organization such as Wildlife fund of Thailand (WFT), National Council on Social Welfare of Thailand.

2.2 Hotel Management

Nowadays, hospitality industry is expanded all around the world. One of the most important functions in this industry is hotel management. Hotel management is to control employees and facilities to provide good services to customers in order to make satisfactions. Technology service is critical for the future of hospitality industry (Lee, Barker, & Kandampully, 2003). Information technology can be developed to make unique selling point and create value added that can differentiate the hotel from other competitors. The hotel manager has to choose the suitable information technology that can be use by the employees.

Hotel business can be classified by using three criteria: size, star rating, and level of service

2.2.1 Size

i) Independent hotel : the small-size hotel with at least 50 rooms and has one branch

ii) Domestic hotel : the mid-size hotel with many branches within the country

iii) International chain hotel: the large-size hotel with the branches operated in both domestic and international locations as Marriott (USA), Four seasons (Canada), Mandarin Oriental (Hong Kong), or Shangri-La (Hong Kong) (Krawsaad, 2008).

2.2.2 The Star Rating of Hotel

The number of star can be used to define the service quality of particular hotels. Five-star rating is deluxe, four-star rating is superior, three-star rating is first class, two-star rating and no-star rating is economy.

2.2.3 Level of Service Hotel

Level of service hotel consisted of luxury service, full service, limited service and economy service. First, luxury service is special services for special customers or guests. Almost, it was founded in the international hotel such as 24-hour room service, open kitchen room for food preparing, flower shop, business center, or special activities such as cooking training for guests. Second, full service is extra service that the customer has to pay additional costs to acquire the full range of service. For example, customer can pay more to upgrade to be VIP guest to get free breakfast service in bed, free appetizers, or faster registration process. For example, Marriott and Hilton ("Hotel Facilities Vary Depending Upon The Service Level," 2010).

Third, limited service is the service which customers add to pay extra for each service that customer would like to get, for example, extra bed, or laundry service. The last level, economy service, is normal practice that hotel should provide to customer such as room cleaning service. This level is mostly founded in small hotels or motels (Baum & Mezias, 1992).

2.2.4 Channel of Distributions

There are two types of Distribution Channels in the hotel business (Krawsaad, 2008) as per below:

2.2.4.1 Traditional Distribution Channel - Traditionally, hotels and travel agencies will work together to bring the customer to the service with the wide network of travel agency, customer will make the reservation to travel agency will get a round ten percent commission fee from the hotel. Customers will present booking confirmation or voucher from the agency to the hotel and they can enjoy and full promising service from the hotel.

Some of the hotel does not use agency or Intermediaries. They will directly contact customer directly by their sell term or their hotel chain.

2.2.4.2 Electronic Distribution Channel - With the emerging of internet, internet has been used as a powerful tool to contact customers. Customers can easily search, check, and book the hotels on the internet twenty-four hours seven days. Leading travel agency change from traditional sale to on-line booking as the customer books the hotel over the internet. Large chain hotel develop their website to promote and making reservation directly to customer. Since internet easily connect customer on twenty-four hours on budget on the cheaper cost base, internet reduces the cost and provide added value to the hotels.

In the addition, electronic database also provide customer relationship management (CRM) with is powerful tool for the marketing campaign. This channel process, hotels and intermediaries can collect the data from users. Hotel and Agent can collect and analyze data directly from customer to improve their service according to their customer requirement. In customer part, they can search hotel information and check resting room what they wants (Krawsaad, 2008).

2.3 Hotel Technology

Hotel technology is divided into in-room service technology and management hotel technology (Lee et al., 2003) as following:

2.3.1 In-room Service Technology

In-room service technology is the technology that customer interact and experience while they are using in the hotel room. Most of the hotels provide the service such as

- Multiple phone lines
- Voice mail
- On-demand PC
- TV-Internet
- In-room check-out systems
- TV-wake up system/Automatic wake up
- TV-meal ordering
- E-mail
- Network computer/Internet access
- Electronic locking systems
- Room energy sensors

2.3.2 Management and Service-Operation Hotel Technology

Management and service-operation hotel technology is the technology that implements aiming to optimize the hotel management of the hotel. These technologies are mostly used by hotel employee and management. There are five main hotel technologies which are;

- *PMS (Property management system)* is related with Front-office systems. PMS is the core of the internal computerized systems used in a hotel. PMS can check occupied or vacant of guest and details of all sales and payment transactions (*International Dictionary of Hospitality Management*, 2008).

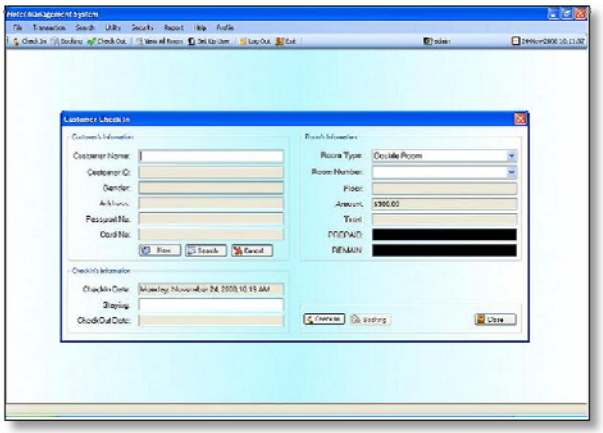


Figure 2.1 Property management systems
("Hotel Property Management System," 2009)

- *CRS (Central reservation system or Computer reservation system)* is computerized system used to store and retrieve information and conduct transactions. It is originally designed and used for inventory management by airline to real time book the airline ticket. With the benefit of real time both customer order booking and internal company stock transaction and management, hotel has widely use CRS to manage sales, make reservations, conduct customer relationship management and other marketing promotion, payments and accounting event at a one-to-one customer basis (*International Dictionary of Hospitality Management*, 2008).

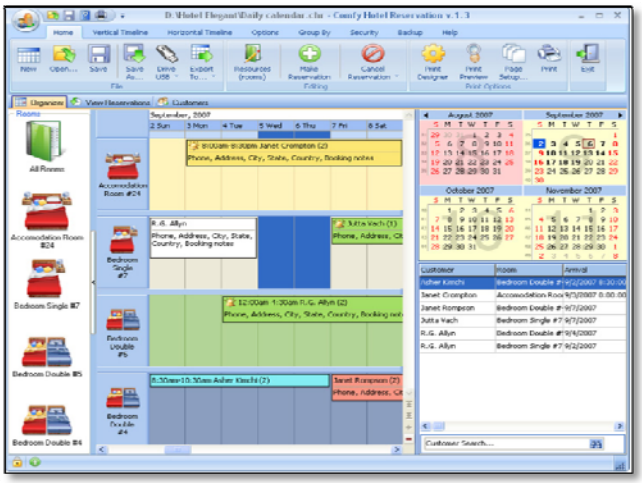


Figure 2.2 Computer reservation systems
("Hotel Reservation System," 2009)

- *GDS (Global distribution system)* is central database system for all parties to share information together. The GDS has been begun in the travel agencies for servicing reservation the plane tickets. Many airline companies decrease commission fee with travel agencies (Samipatra, 2002). This system allows hotel's subscribers to reserve, change and cancel reservations (Krawsaad, 2008). The popular GDS systems in hotel industry are Sabre, Galileo, Amadeus and Worldspan (Samipatra, 2002).

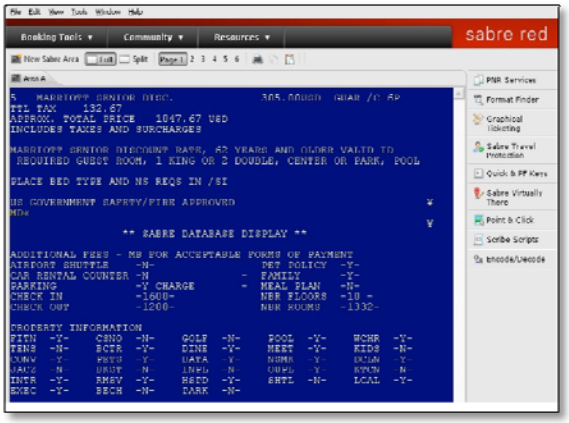


Figure 2.3 Sabre Global Distribution System
("Travel Horizons: Sabre red workspace," 2010)

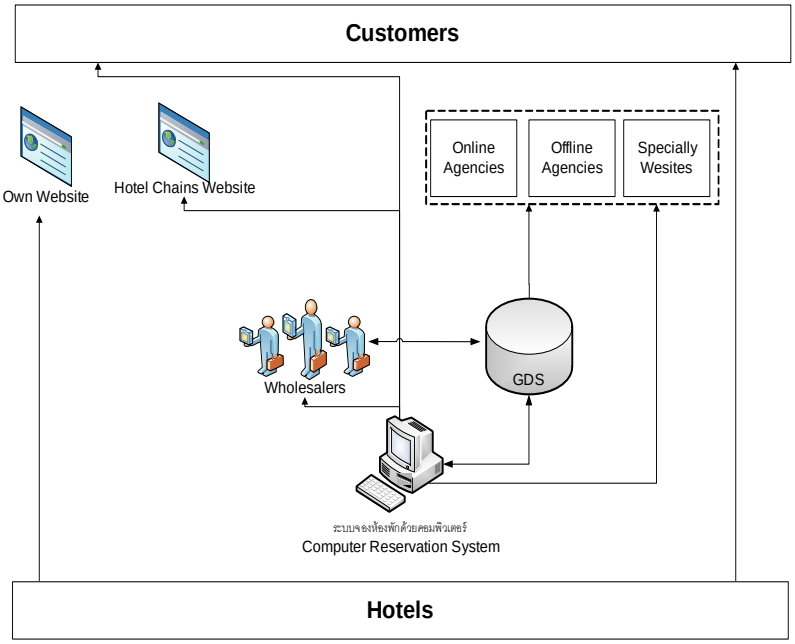


Figure 2.4 Global Distribution System process (Krawsaad, 2008)

Figure 2.4 shows that GDS system which shares all the information to related parties. GDS links agencies, wholesaler, and hotel chain website to the hotel computer reservation system. However, the small-size hotel which have small budget may run their own website to directly contact to the customer.

- *RFID (radio frequency identification)* is tool for improving guest satisfaction, service quality, and add profit value for service sectors. RFID, is the identity of electronic tags, includes a wireless communication technology (Nath, Reynolds, & Want, 2006). RFID has been begun in the airlines, retail sector, supply chain management, warehouse management, logistics, manufacturing, and service sector. Hotel uses RFID application for accessing control system, payment system, tracking system, kiosk and information management, and preference capturing (Öztaysi, Baysan, & Akpinar, 2009).

Access control cans identifies the guests, controls guest rights, and manages access permission of guests. For instance, keyless room; guests have the right to enter their own room; the door automatically opens as guest approach it.

Payment system is an automation system for inside hotel payments of the guests. RFID tags of the guests are related with the guests account and every payment of the guest is paid automatically from the associated account. For family and particularly for control of children payments, a confident payment limit can be defined.

Tracking system is maintained by RFID antennas that are place in each department of the hotels. RFID antennas correspond with the RFID tag and save the related data.

Kiosk-integrated information sharing cans also be used in hotels. For example, the guest and shows the place of the accompanying individuals, who use the RFID tags. Parents can check seeing their children place with online data management.

Preference capturing is part of the invisible systems that can maintain guest satisfaction, and loyalty. The system cans be improved in order to learn preferences of the guest such as lighting, mini-bar usage temperature, and consumed services (Öztaysi et al., 2009).

- *Web sites* are an important role for marketing and service-operation between guests and hotels as online reservation, promotion and communication between hotels and guests (Chung & Law, 2003). The performance of hotel's website should be good measuring for servicing and operating. The service favorite is reservation online, direct mail and hotel viewing system (Lee et al., 2003).

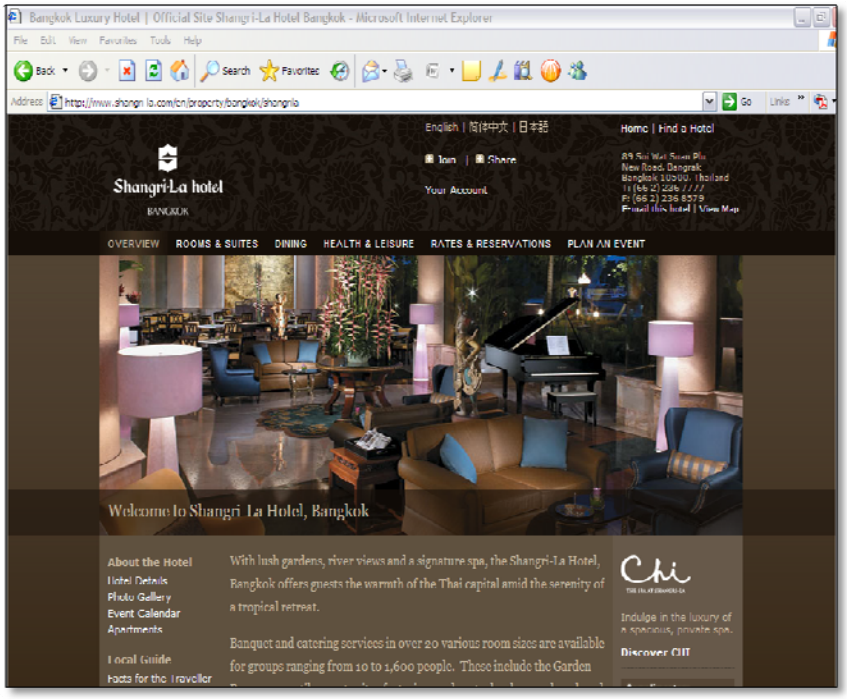


Figure 2.5 The example of International Chain hotel websites ("Bangkok Luxury Hotel | Official Site Shangri-La Hotel Bangkok," 2010)

Apart from five main technology management systems, some hotels also implement the below systems;

- E-mail/Electronic mail
- Database
- Office software such as Microsoft Word, Excel and PowerPoint

2.4 Healthcare Technology

Healthcare technology is important for the patient's therapy. It can be used to develop therapy and increase the opportunity of saving life patients. Moreover, healthcare technology can increase performance and benefits to hospitals. Physicians and nurses need to train for the skill to implement the healthcare technology (Callen, Buyankhishig, & McIntosh, 2008; Wu, Chen, & Greenes, 2009)

Professor Van Bemmel from the free University of Amsterdam explained that there are explain six connection levels between medication and computer technology (Lele, 2005). There six level as per below;

2.4.1 Level 1: Communication and Telematics

Technology or system can help in telecommunication connected between inside and outside hospitals. The lab test result can be sent to nursing station or nursing ward immediately. So, that physician can evaluate the condition of patient and can for immediate medication service. The speed of this communication depends on the speed information technology in the organization.

The technology in this level is related with data acquisition, transmission coding and decoding process and encoding process.

The main information technology flow from the devices in the hospital are as per below;

- Biological signal – Electrocardiogram (ECG), Electroencephalography (EEG), arterial and venous BP, transuders, amplifiers, digital signals was sent into the ICU computers and show on the monitors or printers.
- Transmission images - X-ray, ECG for connecting Tele-consultation in therapy cases or patients' data between general physicians to the hospital
- Most of the hospital uses LAN (Local Area Network) to transfer the test results from laboratory test; include to lab testing from clinician's test, transfers physicians' prescriptions to the pharmacy department.

2.4.2 Level 2: Storage and Retrieval of Database

This technology level can defined as recording data. Most hospitals use Electronic Health Record (EHR), which is the real-time system for recording data such

as the therapy pictures, the patient's history file, and past medical prescription. The EHR helps physicians or nurses by providing access to patient's health record information, so they can easier and faster making the decision, and by incorporating evidence-based decision support (N. Davis, 2007).

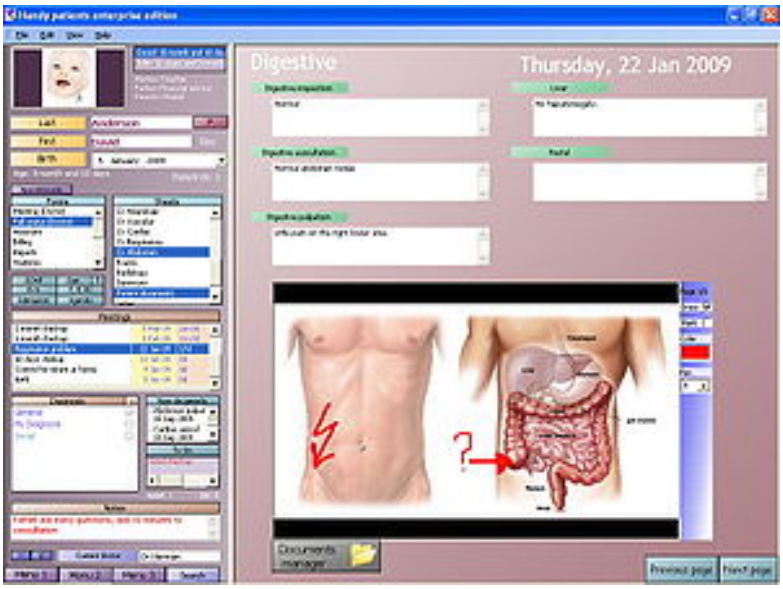


Figure 2.6 Electronic Health Record program (EHR)
("Electronic health record - Wikipedia, the free encyclopedia," 2007)

The database requires to store these information are require to be at minimum of 100 gigabyte or even terabyte. Moreover, it can use for database analysis by special query languages (SQL) as per below:

1. Patient database: This data is stored by database. The data includes each personal patient data, frequency of medication, personal medication history part prescription records etc. The database is so beneficial with statistic analysis.

2. Hospital database: Hospital database is the pool database of all patients in each hotel.

3. Nationwide databases: This can use for epidemiology, management and planning in healthcare policies and Quality Assurance (QA).

4. Knowledge bases: This is the update medical research database, report for physicians to review and update new medical information. The example of this knowledge base is MEDLINE, drug information.

All databases must have the comparison and report capability so that the physicians and nurses can evaluate the data for the best medical equipment.

Images are stored by data compression according the industrial standard to transport images from one place to another (PACS). Complex is in this levels which is assisted of semantic inter-connections of data. So, this can be useful from those data.

2.4.3 Level 3: Processing and automation

These Technologies or tools are related with processing diagnosis or therapy as X-ray therapy, Blood bank and Mammography.

In the medical service laboratory, microprocessors equipped inside the medical laboratory devices can self-analyze and transfer the result to the central laboratory computer which produces role control quantity and reports.

Laboratory automation includes blood and urine sample bar code reading device. It also scopes the biological signals' processing. And, it included computer processing to tackle mathematical and physical problems and quality control.

The example of computer processing data and automation such as

- Nuclear medicine tests
- Computerized Tomography (CT scan)
- Positron Emission Tomography (P.E.T. scan)
- 3D image

2.4.4 Level 4: Diagnosis and Decision-making – Linked to Therapy

Level four is technology/tool using to analyze and construct the best treatment to each patient decision to therapies. The examples of information technology are CT scanner and Ultrasound.

This level composed of development patterns. And, the instance of diagnosis such as truth table, decision tree, Multivariate statistics (include the Bayes' theorem and Expert system until recognition of subject and picture styles/ signals as

X-ray picture, ECG interpretation and cell, Chromosome or cervical smear recognition. As Follows:

- ECG Computerized interpretation as ST depression
- Radiation dosage and RT planning
- Computerized imaging, CI, MRI, SPECT/PET, image interpretation by ANNs
- Decision support system such as diagnosis of abdominal pain and clinician decision support systems (Zheng, Padman, Johnson, & Diamond, 2005)

2.4.5 Level 5: Therapy and Control

This technology is used for patient therapy such as cardiac cauterization, lithotripsy, and angioplasty etc.

This technology level is automatic control of Fluid balance in a post-operative intensive care unit (ICU). Some researcher teams work on implantable Microsystems. For instance, self-energizing Implantable Medical Microsystems - SIMM by this tool is worked by on balloon. It is installed in heart chamber.

This technology level also includes:

- ICU close look fluid monitoring
- Insulin pumps
- Demand pacemakers and Implanted special purpose computer

2.4.6 Level 6: Research and Modeling

This level is used for operational researching and using the results which is developed to treat patients as transplantation issue laboratory to plant human issue (Vazquezsalceda, Padget, Cortes, Lopeznavidad, & Caballero, 2003), blastocyst center.

It includes simulations and analysis system as per below:

- Mathematical modeling of physiological control systems until respiration, circulation, temperature regulation, acid-base and pH value; connection of neuron for movement controlling.
- Modeling of three-dimensional structure of proteins to computer-assisted drug design

- Three-dimensional, anatomical and physiological mapping to i) Statistical Analysis such as Multivariate analysis clustering regression coefficient ii) Epidemiological Studies as risk factor and risk quantity. The example, Framingham Study, Logistic regression model, epidemiologic model. The example for using in hospitals as HIV spread prediction.

- BMD (Biomedical Computer Package): high statistic as SPSS, GENSTAT, GLIM and Operation Research.

2.5 Compare Technology in Hotel and Hospital

Present, technology has been developed in many industries such as tourism industries, service industries, or healthcare industries. Technology can be help to supports in many factors as performance in job, patient satisfaction (Naidu, 2009), or service quality (Taner & Antony, 2006).

Technologies are compared the different of technology between hospitality and healthcare industry. But, they are mainly business aim at guest/patient satisfaction and service quality (Lee et al., 2003). This also concludes, Table 2.1 Show different and similar of the hotel and hospital technology.

Table 2.1 Hotels and Hospitals Technology

TECHNOLOGY TYPE	HOTEL TECHNOLOGY	HEATHCARE TECHNOLOGY
Communication	Multiple Phone line Voice mail / E-mail LAN/ WAN Website	Biological signal - ECG, EEG / Tele-consultation LAN / WAN Website
Database and Retrieval	Property management system (PMS) Global Distribution System (GDS) Computer reservation system (CRS)	Electronic Health Record (EHR) Electronic Medical Record (EMR)
Other specific each industries	*For In-room Service* - Electronic locking system - Room energy sensor - TV-wake up system *For service-operation* - *RFID*	*For Processing/automation* - Nuclear medicine test - CT/PET scan *For Diagnosis/Decision* - ECG - MRI/PET image - Computerized imaging/CI - MRI *For Therapy/Control* - ICU close look fluid monitoring - Insulin pumps - Demand pacemakers *For Research/modeling* - Mathematical modeling - Blastocyst center *For operations* - RFID

2.6 Technology Acceptance Model

2.6.1 Technology Acceptance Model History

Many theories are concerned with IT Acceptance such as Innovation Diffusion Theory, Utilization Model, Social Cognitive Theory, Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Extended Technology Acceptance Model (TAM2), Theory of Planned Behavior (TPB) and the last technology acceptance model is "The Unified Theory of Acceptance and Use of Technology (UTAUT)".

Accepting technologies are affected from organization size, structure, potential supply chain strategy, transaction climate, supporting from supply chain members and other environments (Patterson, Grimm, & Corsi, 2003).

Scupola (2003) studied adoption of internet commerce. The researcher founded accepting technology factors are three elements: Technological characteristics, Organization characteristics, and Environment characteristic (Scupola, 2003).

Chieh-Yu Lin and Yi-Hui Ho (2008) also studied accepting technology logistic innovation in China. They considered accepting factors that divided into three factor groups: Technological, Organizational and Environmental (Lin & Ho, 2008).

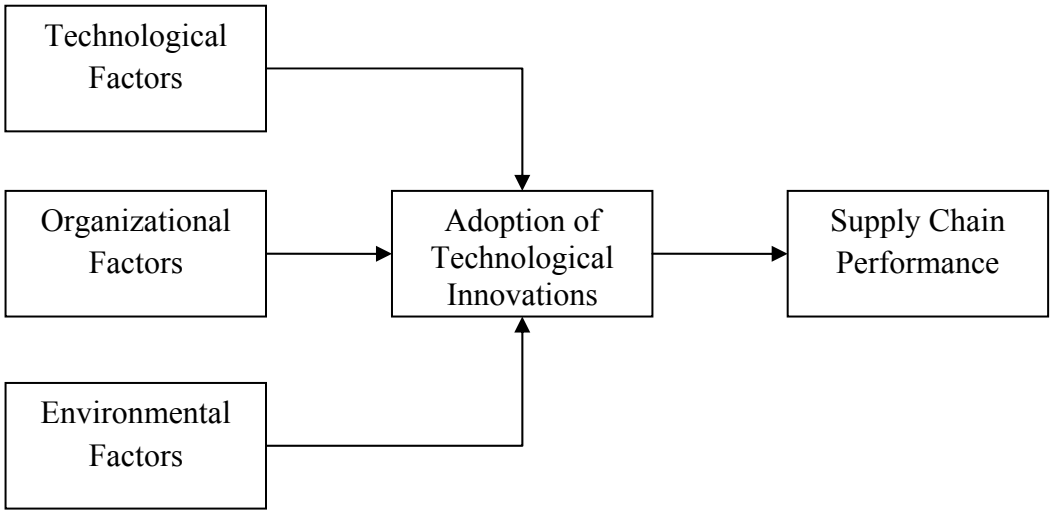


Figure 2.7 Technology Acceptance Factor (Lin & Ho, 2008)

Theory of Reasoned Action (TRA) is one of the most fundamental and influential theories of human behavior. TRA included 2 core constructs: i) Attitude Toward Behavior and ii) Subjective norm. Attitude Toward Behavior is defined "an individual's positive or negative feeling (evaluate affect) about performing the target behavior". And, Subjective norm is defined "the person's perception that most people who are important to him/her think he/her should or should not perform the behavior in question" (Fishbein & Ajzen, 1975).

TPB, TAM and UTAUT use TRA theory that Behavior Intention (BI) is used for predicting users' behavior what technologies using. BI is the main determinant for measuring degree of intention in using those technologies or deciding something. It is considered from individual behavior of user and other factors what it related.

Davis (1989) developed Technology Acceptance Model (TAM) (F. D. Davis, 1989).This theory is based on the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975). TAM included 2 determinants: i) perceived usefulness (PU) and ii) perceived ease of use (PEOU) (Figure 2.8). Perceived usefulness refers to the people believes that using a specific system will increase his or her job performance within industries/organizational. Perceived ease of use is defined as the degree to which the prospective user expects the target system to be free of effort (F. D. Davis, Bagozzi, & Warshaw, 1989). PEOU and PU affected to Attitude towards using technology (AT) on using technology. BI also affected from AT and PU which these are behavior determinations in adopting technology.

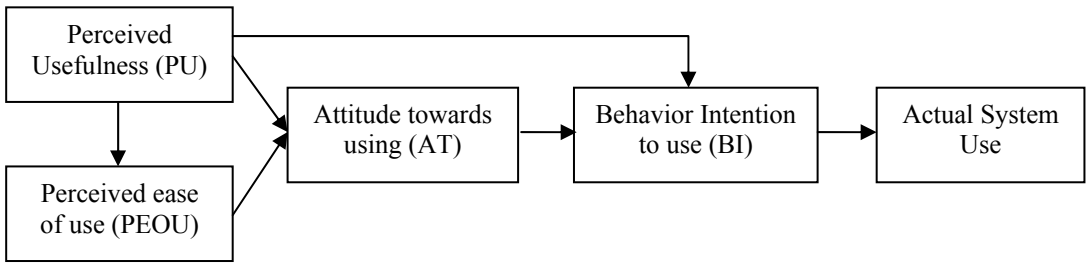


Figure 2.8 Technology Acceptance Model (TAM) (Davis, 1989)

TAM is related the behavior of individuals, can be forecasted by Behavior Intention (BI), which is determinant of the reliability and acceptance in using information technology (IT) or decide to do something.

Theory of Planned Behavior (TPB) extended TRA by adding the construct of perceived Behavioral Control (Ajzen, 1991). Attitude Toward Behavior and Subjective norm are adopted from TRA. Perceived Behavior Control is defined as the perceived ease of difficulty of performing the behavior. In addition, individual behavior is considered BI on Attitude, Subjective norm and perceived behavioral control. Ajzen presented a review of several studies that successfully used TPB to predict intention and behavior in a wide variety of settings. TPB has been successfully applied to the understanding of individual acceptance and usage of many different technologies (Harrison, Mykytyn, & Riemenschneider, 1997; Mathieson, 1991; Taylor & Todd, 1995b).

In 1992, Davis, Bagozzi and Warshaw developed Motivation Model (MM). Motivation Model is a significant body of research in psychology has supported general motivation theory as an explanation for behavior. The model is included 2 core constructs: i) Extrinsic Motivation and ii) Intrinsic Motivation. Extrinsic Motivation is the perception that users will want to perform an activity "because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay or promotions". Intrinsic Motivation is the perception that users will want to perform an activity "for no apparent reinforcement other than the process of performing the activity per se" (F. Davis, Bagozzi, & Warshaw, 1992).

Combined TAM and TPB (C-TAM-TPB) combines the predictors of TPB with perceived usefulness from TAM to provide a hybrid model (Taylor & Todd, 1995a). C-TAM-TPB is 4 constructs: i) Attitude Toward Behavior ii) Subjective norm iii) Perceived Behavior Control and iv) Perceived Usefulness. Attitude Toward Behavior, Subjective norm and Perceived Behavior are adopted from TRA/TPB. Perceived Usefulness is adopted from TAM.

Human behavior theory widely, Triandis (1977) presents a perspective to that proposed by TRA and TPB (Triandis, 1977). Thomson et al. (1991) adopted and refined Trandis' model for IS contexts and used the model to predict PC utilization.

Model of PC Utilization (MPCU) is suitable for predict individual acceptance and use of information technologies levels. In this model have six determinants: i) Job-fit ii) Complexity iii) Long-term Consequences iv) Affect Towards Use v) Social Factors vi) Facilitating Conditions. Job-fit is defines as the scope which an individual believes that using Information technologies can improve the performance of his/her job. Complexity is defines that "the degree to which an innovation is perceived as relatively difficult to understand and use". Long-term Consequences means "outcomes that have a pay-off in the future". Affect Towards Use, bases on Tradis model, this determinant defines "feelings of joy, or pleasure, or depression, displeasure, or hate associated by an individual with a particular act". Social Factors define "the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with other in specific social situations". Facilitating Conditions is related environment that observers agree making an act easy to complete (Thompson, Higgins, & Howell, 1991).

Moore and Benbasat (1991) adapted the characteristics of innovations Innovation Diffusion Theory (IDT). This theory explains from individual in person from attitude towards to the innovation technology. Which each person will decide whether to adopt these technological. If the innovation is assumed as being 'better' than an existing system (relative advantage), easy to apply (ease of use), image and users' expectation (compatibility) than positive attitudes will emerge. Therefore, it frequently is studied with technological innovations. There are four IDT constructs. First, Relative Advantage is defines as the degree to which an innovation is perceived as being better than its precursor. Second, Ease of Use is defines as the degree to which an innovation is perceived as being difficult to use. Third, Image is defines as the degree to which use of an innovation is perceived to enhance one's image or status in one's social system. And last, Compatibility is defines as the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters. (Moore & Benbasat, 1991).

Social Cognitive Theory (SCT) is developed by Bandura and Adams in 1997. They founded five main factors: Outcome Expectations-Performance, Outcome Expectations-Personal, Self-efficacy, affect and Anxiety (Bandura & Adams, 1997). First, Outcome Expectation-Performance is defines as performance that is people will

be expecting efficiency in those job-related outcomes. Second, Outcome Expectation-Personal is defines as the performance effect on behavior. Especially, individual expectations deal with the personal esteem and achievement signal. Third, Self-efficacy is determination of an ability to use a technology as computers, or iPods. Fourth, Affect is an individual's favorite particular behavior as iPods use. And last, Anxiety is defined as evoking anxious or emotional reactions when it comes to performing a behavior as using iPods. The theory is tested to the learning technologies (D. Compeau, Higgins, & Huff, 1999; D. R. Compeau & Higgins, 1995a, 1995b).

In 2003, Venkatesh et al. is testing hypothesis tests to the 8 theories for finding good factors. They develops IT acceptance theories. It is called "The Unified Theory of Acceptance and Use of Technology (UTAUT)".

Comparing four determinants of UTAUT, and acceptance theories affects with behavior intention (BI). First, Performance Expectancy is same determinants as perceived usefulness (from TAM, TAM2, and C-TAM-TPB), Job fit (from MPCU), Relative advantage (from IDT), Extrinsic Motivation (from MM), and Outcome expectation (from SCT). Second, Effort Expectancy also same determinants as Perceived ease of use (from TAM, TAM2), Complexity (from MPCU), and Ease of use (from IDT). Third, Social Influence is similar to the Subjective norm (from TAM2, TRA, TPB/DPTB, and C-TAM-TPB), Social factors (MPCU), and Image (from IDT). And finally, Facilitating Conditions also is same as Perceived Behavioral Control (from TPB/DPTB, and C-TAM-TPB), and Compatibility (from IDT). It cans conclude determinants comparing with other technology acceptance models, shows in Table 2.2.

Table 2.2 Comparing determinants of UTAUT with other technology acceptance models

	Determinant (UTAUT)			
Model name	**Performance Expectancy (PE)**	**Effort Expectancy (EE)**	**Social Influence (SI)**	**Facilitating Conditions (FC)**
TAM	Perceived Usefulness	Perceived Ease of Use	-	-
TAM2	Perceived Usefulness	Perceived Ease of Use	Subjective Norm	-
TRA	-	-	Subjective Norm	-
TPB/DPTB	-	-	Subjective Norm	Perceived Behavioral Control
C-TAM-TPB	Perceived Usefulness	-	Subjective Norm	Perceived Behavioral Control
MPCU	Job-fit	Complexity	Social Factors	Facilitating Conditions
IDT	Relative Advantage	Ease of use	Image	Compatibility
MM	Extrinsic Motivation	-	-	-
SCT	Outcome Expectations	-	-	-

2.6.2 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) is developed form 8 theories which include Theory of Reasoned Action (TRA), Technology Acceptance Model(TAM), Motivational Model(MM), Theory of Planned Behavior (TPB), Combined TAM-TPB (C-TAM-TPB), Model of PC Utilization (MPCU), Innovation Diffusion Theory (IDT) and Social Cognitive Theory(SCT) (Venkatesh, Morris, Gordon B. Davis, & Davis, 2003). Venkatesh et al. (2003) introduced a new this IT acceptance theory.

UTAUT (Venkatesh et al., 2003) proposes four main determinants of behavior intention when people, using information technology, are Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC) (Figure 2.9). In addition, the UTAUT model founded four moderators which affectation with determinants: gender, age, experience and voluntariness of use from attitude of social psychology.

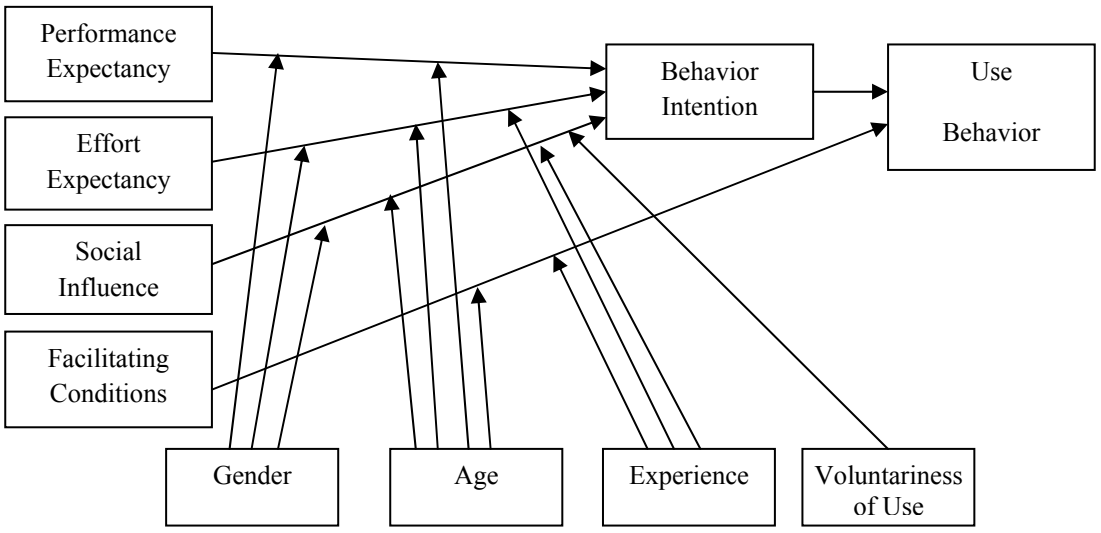


Figure 2.9 Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)

Performance Expectancy defines as the performance in information technology for the user. Effort Expectancy defines as the degree of ease levels associated with the use of the system. The Social influence is defined as the degree to which an individual perceives the importance that others believe he or she should use

the new system. Social influence is the system or the application-specific, whereas subjective norm relates to non-system-specific. Facilitating Conditions is defined as the degree to which an individual believes that an organization and technical infrastructure exist to support the use of the systems (Venkatesh et al., 2003).

Comparing factors of UTAUT and TAM affects with behavior intention (BI). It founds that performance expectancy is perceived usefulness (TAM) and effort expectancy is perceived ease of use (TAM).

In the past, UTAUT applied to examine the acceptance in relationship with many technologies including Web-base learning (Chiu & Wang, 2008), Mobile banking (Al-Somali, Gholami, & Clegg, 2009), Internet Banking (AbuShanab & Pearson, 2007), E-government service (AlAwadhi & Morris, 2008), Electronic Medical Records (Janz & Hennington, 2007), and Website (Oshlyansky, Cairns, & Thimbleby, 2007).

2.7 The past research/paper on the acceptance of IT in hotels and hospitals

Many researchers have studied factors that service industries such as hotels and hospitals. The Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT) are theoretical scope to predict with users who accept the technologies. The statistic report of Turkish hotel industries shows that there is a high correlated relationship between technology implementation and the improvement of hospitality service. As the use of technology increases, the service hospitality will increase (Karadag & Dumanoglu, 2009).

Additional, the report also shows that technology implementation can reduce the requirement of headcount required in the hospitality (Karadag & Dumanoglu, 2009).

In medical industries, Chang and his co-researchers studied the acceptance of a pharmacokinetics-based clinical decision support system (CDSS) of physicians from three Taiwanese hospitals. They use UTAUT model for their study. They found that performance expectancy; effect expectancy positively affects the physicians' intention to the CDSS. And, Performance expectancy was more significant impact

than effort expectancy. Furthermore, social Influence and facilitating conditions were found to be significant on behavior intention of physicians (Chang, Hwang, Hung, & Li, 2007).

In China, Zhou and his team studied the technology acceptance to service customers. They applied the task technology fit (TTF), and the unified theory of acceptance and usage of technology (UTAUT) theories to study factors leading to acceptance of the mobile banking technology. They found that performance expectancy, social influence, facilitating conditions, and task technology fit have a significant effect on user mobile banking adoption (Zhou, Lu, & Wang, 2010).

In Saudi Arabia, Al-Gahtani, Hubona and J. Wang studied how information technology is acceptance in the culture and the organization. They also studied the different of technology acceptance between men and women Muslim society. They use UTAUT theory for investigating factors. The results indicated that performance expectancy and subjective norm are significant on behavior intentions to use computers (Al-Gahtani, Hubona, & Wang, 2007).

In the United state, Jeong and Lambert found perceived usefulness, perceived ease of use affected with intention to use information and information using of the customers' purchase behavior using the lodging Web sites. Also, attitude has significant on intention to use information and recommendation (Jeong & Lambert, 2001).

Chiu and Wang researched the acceptance of Web-based learning from primary, secondary, high school, and university students. The extended UTAUT was used in this research. They found that performance expectancy and effort expectancy were significantly positive effect. Moreover, the other factors (such as computer efficacy, attainment value, utility value, and intrinsic value) were significant to individuals' intentions to continue using Web-based learning (Chiu & Wang, 2008).

It can be concluded each factors. Therefore, it follows as;

Performance Expectancy

Performance expectancy is defined as "The degree to which an individual believe that using the system will help him or her attain gains in job performance" (Davis, 1989). In service industries, employees must have some computer knowledge

skills for using computer. From Al-Gahtani et al.(2007) research, the researcher have founded age and gender are not moderate the influence of performance expectancy on behavior intention with using computers (Al-Gahtani et al., 2007). In Taiwan research about physicians' acceptance of pharmacokinetics-based clinical decision support systems. Performance expectancy was found to be a stronger factor affecting behavior intention of usage than effort expectancy (Chang et al., 2007). Web-based learning research also was found that performance expectancy is positively connected (Chiu & Wang, 2008). And, other research about physicians' beliefs use electronic medical records (EMR) and computerized provider order entry (CPOE). Holden founded the most physicians in the Midwest believed EMR and CPOE saved time in their jobs when they retrieve information. It also can help to add performance and add quality of care by physicians to access more up-to-date information more quickly (Holden, 2010).

Effort Expectancy

Effort Expectancy is defined that the degree of ease associated with the use of the system (F. D. Davis, 1989). I-Chiu Chang et al. found effort expectancy is affecting with using the clinical decision support system (Chang et al., 2007). The computers or systems should be user friendly. From acceptance web-based learning research founded effort expectancy is affected with web-based learning usage in the future (Chiu & Wang, 2008). From mobile hotel reservation adoption founded effort of technological effort was significant with adoption mobile hotel reservations system. In this research founded that information and system quality have a positive effect on perceived value (Wang & Wang, 2010). The information and service quality also related effort expectancy. It affected with using and user satisfaction (DeLone & McLean, 2003).

Social Influence

The researcher expects a positive of social influence on behavior intention to use IT/IS. Lam et al. found subjective norm has a higher degree on intention towards IT adoption. The employees' hotel in China, interested keep on adopting technology and believe that technology can help their job performance. The growing

trend in hotel affected a positive with recruit new employees with IT skills (Lam, Cho, & Qu, 2007). From acceptance hospital information systems (HIS) research founded social influence is affected with hospital personnel behavioral intention (Aggelidis & Chatzoglou, 2009). Also, technical skill is affected on support satisfaction for customers (Ramasubbu, Mithas, & Krishnan, 2008).

Facilitating Conditions

There are some studies show that facilitating conditions relate to the influence on behavior intention. Turkey research results show many hotels have adopted information technology. This research emphasizes guest-related information technology application (Karadag & Dumanoglu, 2009). And, Saudi Arabia researchers found that facilitating conditions is affected with use behavior of employees (Rouibah, Hamdy, & Al-Enezi, 2009). Zhou and co-researcher found that facilitating conditions are affected with user adoption of mobile banking (Zhou et al., 2010). Also, training has a strong indirect impact on behavior intention between mediators of facilitating conditions and ease of use (Aggelidis & Chatzoglou, 2009).

Demographic

Demographic is the characteristic of individual people such as age gender, or occupation. Many studies show that user demographic affects on the technology acceptance determinants. Vankatesh et al. found three determinants: gender, age, and experience, that these determinants are affect with main determinants. Gender is affects to the performance expectancy, effort expectancy, and social influence. Age is affects to the performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Okazaki (2006) indicated that demographics characteristics, such as gender, age, marital status, occupation and family life, affect m-commerce's user acceptance in Japan. He found that young, affluent, and single women are most positively to m-commerce (Okazaki, 2006). Min and researcher teams (2008) founded that user demographic is related on effort expectancy and social factors. These factors are affected to the behavior intention (Min, Ji, & Qu, 2008).

Provincial part

Cultural differences in provincial parts or countries make a difference including technology acceptance. Such as, the healthcare in capital can be founded technology up-to-date and support from the healthcare administrators/directors. It also cans support to ease of using technology. Different cultures in each country affects on behavior intention. From research, India and United State's culture are different culture, but it is founded that cultures affect on behavior intention to using technology (Kakoli & Soumava, 2008). When culture identity invoke different characteristics each provincial part and country, it will be contrast access of person to using technologies. For instance, Chinese and British students are affected with using internet and computers, including access knowledge, civilization and perceived usefulness. Their difference of culture in students is studied purpose for using technology distinctly (Li & Kirkup, 2007). Additionally, cross-cultural affects within technology acceptance factors considerably. For example, some research indicates that social influence has a significant with all country samples. It shows that difference cross culture is affect actual results (Oshlyansky et al., 2007). Therefore, cross-cultural is suitable for research into technology acceptance. It will be useful with countries where they have many provincial parts such as China, or Thailand. In addition, Thailand has a difference cultures in each provincial part. Provincial parts are difference in various fields such as access technologies, cultures, dialects or localisms, or local foods. Hence, researcher also is interested in studying provincial parts that this is a modulator of the technology acceptance factors.

Table 2.3 Related Researches (UTAUT/TAM)

Studies	Technologies	Sample	UTAUT	Antecedent
(Aggelidis & Chatzoglou, 2009)	Hospital information systems (HIS)	341HIS users	- Perceived usefulness(PU) - Ease of use(EU) - Social Influence(SI) - Facilitating conditions (FC) - Attitude Toward Behavior (ATB) - Self-efficacy(SE) - Computer Anxiety(CA) - Training	PU, SI, ATB, EU, FC, SE, Training
(Al-Gahtani et al., 2007)	IT adoption	200 users	- Performance Expectancy(PE) - Effort Expectancy(EE) - Subjective norm(SN) - Facilitating Conditions(FC) - Behavior Intention(BI)	PE,SN, BI
(Chang et al., 2007)	Pharmacokinetics-based clinical decision support system(CDSS)	115 medicine physicians	- Performance Expectancy(PE) - Effort Expectancy(EE) - Social Influence(SI) - Facilitating Conditions(FC) - Behavior Intention(BI)	PE,EE,SI, FC, BI
(Chiu & Wang, 2008)	Web-based learning	286 part-time students	- Performance Expectancy(PE) - Effort Expectancy(EE) - Social Influence (SI) - Facilitating Conditions(FC)	PE,EE
(Oshlyansky et al., 2007)	Cross culture and website	1,080 people from 9 countries	- Performance Expectancy(PE) - Effort Expectancy(EE) - Attitude - Social influence(SI) - Self-efficacy - Facilitating Conditions(FC) - Anxiety	PE,EE,SI
(Zhou et al., 2010)	Technologies mobile banking	250 peoples (83students and 167 professional workers)	- Performance Expectancy(PE) - Effort Expectancy(EE) - Social Influence(SI) - Facilitating Conditions(FC) - Technology Characteristic X EE	PE, SI, FC, Technology Characteristic X EE

2.8 Structural Equation Modeling (SEM)

Jöreskog, Keesling and Willey adopted factor analysis, path analysis including parameter estimation in regression analysis. The new statistic analysis was included. This is called "Structural Equation Modeling (SEM)". SEM is suitable to test and confirm the theoretical hypothesis result. First, Model statistic is a model subsume under model research (Figure 2.10). It can be analyzed in order to the estimate parameter of all value in one time (Angsuchok, Vijittra, & Pinyopanuwat, 2009). Second, Model statistic has latent variable and error term. Example in Figure 2.10, can fixed observed variables (X1/ X2/ X3/ Y1/ Y2/ Y3). And last, error term cans relationship together. It helps to relax elementary agreement in part analysis.

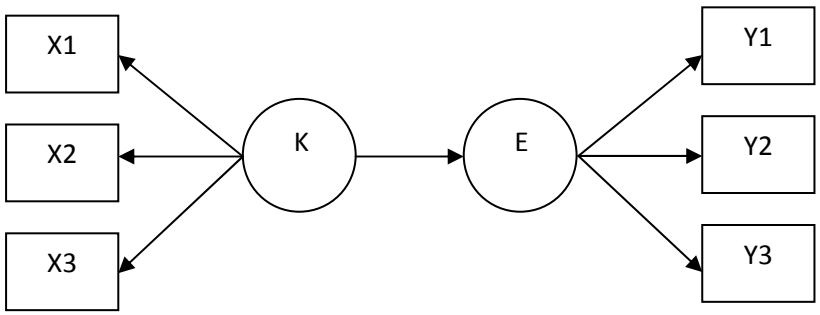


Figure 2.10 Simply regression model statistic between K and E

Linear Structure RELationship (Lisrel) was developed by Karl Jöreskog and Dag Sörbom.

Karl Jöreskog is Professor Emeritus at Uppsala University (Sweden), Professor at the Norwegian School of Management in Oslo (Norway). His research interests include: multivariate analysis, factor analysis, covariance structure analysis, structural equation models, and statistical applications in behavioral and social sciences. Together with Professor Dag Sörbom, he developed the LISREL model and the LISREL computer program ("SSI - Scientific Software International, Inc.," 2005).

Dag Sörbom teaches statistics at the University of Uppsala. His research interests include: covariance structure analysis and structural equation models, especially multiple-group problems. Together with Professor Karl Jöreskog, he developed the LISREL computer program ("SSI - Scientific Software International, Inc.," 2005).

Lisrel is the first program that it was developed for Structural Equation Modeling (SEM). Today, the program is widely used in Thailand and other country. For example of other SEM Model program, AMOS, M plus, or EQS (Suppamas, Somtawin, & Rudchaneekun, 2009).

2.8.1 Structural Equation Modeling Symbol

Structural Equation Modeling picture (Figure 2.11) and symbol. As Follows:

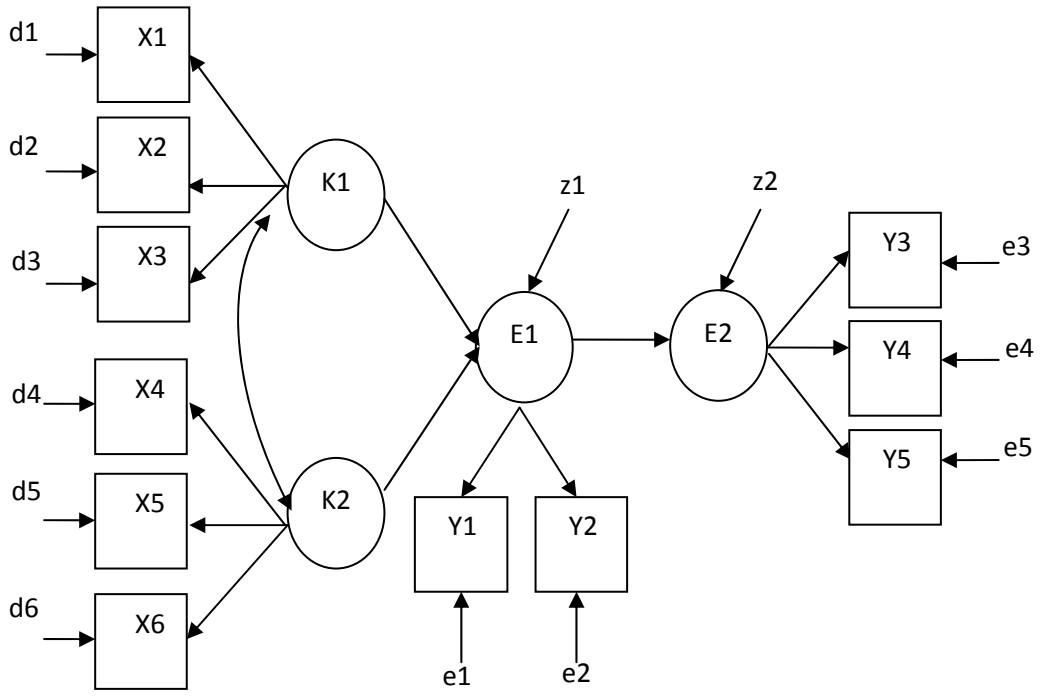
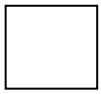
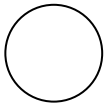


Figure 2.11 Structural Equation Modeling (SEM)

Table 2.4 Symbol picture and meaning

Symbol Picture	Meaning
	Observed variable
	Latent variable
	Path analysis/Factor analysis Relationship
	Covariance or Relationship of 2 variables

Latent variable in SEM is divided into two types: i) Latent cause (From Figure 2.11 is K1 and K2) is called "Exogenous variables". The symbol is K or ξ (KSI). ii) Latent result (From Figure 2.11 is E1 and E2) is called "Endogenous variable". It used "E" symbol or η (ETA).

Observed variable is divided into two types: i) Observed variable for measuring exogenous variable (X symbol). ii) Observed variable for measuring endogenous variable (Y symbol).

Error of measuring observed X variable uses "d" or Θ (THETA). Then, error of measuring observed Y variable uses "e" or ε (EPSILON). And, error of measuring latent E variable uses symbol "Z" or ζ (ZETA).

From Figure 2.11, it has two exogenous variables (K1 and K2), two endogenous variables (E1 and E2). Exogenous observed variable is six variables (X1, X2, X3, X4, X5, and X6). K1 has three observed variables (X1, X2, and X3). Also, K2 has three observed variables (X4, X5, and X6).

Endogenous observed variable is Y1, Y2, Y3, Y4, and Y5. Y1 and Y2 are observed variable of E1. Also, Y3, Y4, and Y5 are observed variable of E2. And, d1, d2, d3, d4, d5 and d6 are variance of error (X1, X2, X3, X4, X5, and X6). For e1, e2, e3, e4, and e5 are variance of error (Y1, Y2, Y3, Y4, Y5, and Y6). And last, z1 and z2 are variance of error (E1 and E2).

Structural equation modeling is consisted two parts. There are two kinds i) Measurement model, and ii) structural model. Measurement model shows linear relationship between latent and observed variable. Structural model shows linear relationship of latent variable together.

2.8.2 Data Analysis process by SEM

Data analysis is using structural equation modeling (SEM) process (Figure 2.12). As follows;

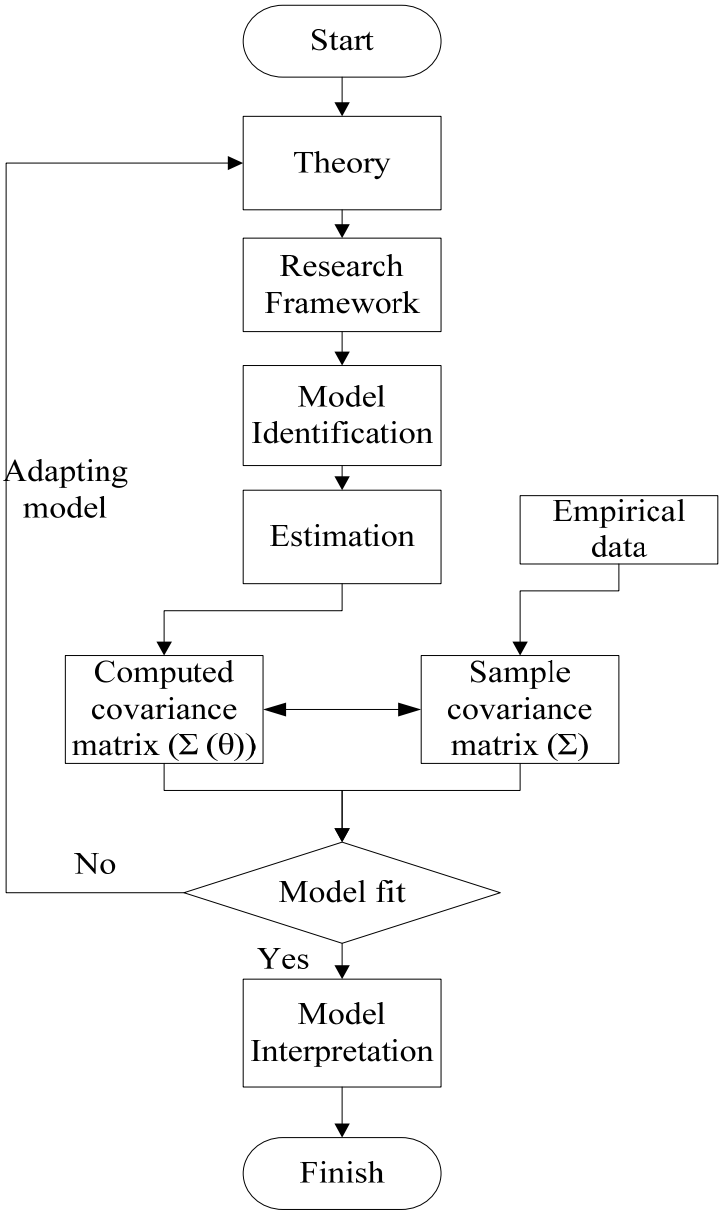


Figure 2.12 Structural equation modeling process

Step1 (Theory): Study of related theories and literatures helps the researcher understand in variable choosing in model what that variable should be build variables.

Step2 (Research framework): Developing research model cans be use variables which it related researches into research framework completely.

Step3 (Model Identification): Model identification is studies parameter value characteristic is no value what analyzes condition by comparing with n(n+1)/2 and amount of parameters want estimation.(n stand for amount of observed variable in model included X and Y); Condition follow as

1. n(n+1)/2 < amount parameter what it estimation is Under Identification. Lisrel shows df = negative (-) / no estimation report
2. n(n+1)/2 = amount parameter what it estimation is Just Identification. Lisrel shows df = Zero (0) / no SE and t-value report
3. n(n+1)/2 > amount parameter what it estimation is Over Identification. Lisrel shows df = Positive (+) / show estimation, SE and t-value report

Step4 (Estimation): After checking estimation is founds as Over Identification. Program will showed all estimations and using parameter value calculate to variance /co-variance of observed variables. It shows computed covariance matrix ($\Sigma(\theta)$).

Step5 (Model fit): Program calculates value for checking model fit. Follow as;

H_0: Hypothesis model consistent with interpretation data

H_1: Hypothesis model does not consistent with interpretation data

χ^2- test is not significant shows hypothesis model consistent with interpretation data

Step6 (Model Interpretation): If hypothesis model does not consistent with interpretation data, researchers need to adapt model again until model fit.

2.8.3 Parameter Type

The Parameters of SEM are divided into

1. Free parameter. Free parameter is defined as non parameter value and estimation. For instance, regression coefficient in structural model or factor loads in measurement model which researchers want to know the value.

2. Fixed parameter. Fixed parameter is defined as parameter which has no estimation or "0" value.

3. Constrain parameter defines as the parameter which has unknown value, but researcher has made and assumption on the value that parameter ("SSI - Scientific Software International, Inc.," 2005).

Table 2.5 indices in using in this SEM (Hair et al., 1998)

Indices type	**Recommend Value**
χ^2/d.f.	≤ 3.00
Goodness-of-fit (GFI)	≥ 0.90
Adjusted goodness-of-fit (AGFI)	≥ 0.80
Normalized fit index (NFI)	≥ 0.90
Non-normalized fit index (NNFI)	≥ 0.90
Comparative fit index (CFI)	≥ 0.90
Root mean square residual (RMR)	≤ 0.05
Standardized RMR	≤ 0.05
Root mean square error of approximation (RMSEA)	≤ 0.10

Lisrel program was developed by Karl Jöreskog and Dag Sörbom. Lisrel analysis shows relationship in picture model. The program provides overall picture and pictures of each factor that may affect to other factors ("SSI - Scientific Software International, Inc.," 2005). Many researches use Lisrel to analyze hypotheses such as "A LISREL analysis of work-related risk factors and health complaints in the nursing profession" in International Archives of Occupational and Environmental Health journal (Engels, van der Beek, & van der Gulden, 1998). They use Lisrel to analyze data and founded that work factor relate to musculoskeletal or psychosomatic.

2.9 Summary Research Framework

According to the study of related research, the many service industry, hotels and hospitals are service industry especially which can add profit for Thailand. Technology in two service industry is some different. It helps employees as hotel managers or nurse in the industries for management, servicing, and public relation as the Website. So, employees need to accept technology for using or understanding important. Technology acceptance is roles for many organization or industry in other country. UTAUT is technology acceptance is developed by Venkatesh and team research (Venkatesh et al., 2003). Venkatech et al. build four core determinants (Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions. And add other factors are other demographic as age or gender and provincial parts. Their determinants are affected with behavior intention to use behavior by survey from hotel employee and hospital employee in Thailand. The research was done by using Lisrel for analyzing. Figure 2.13 shows of the research frameworks.

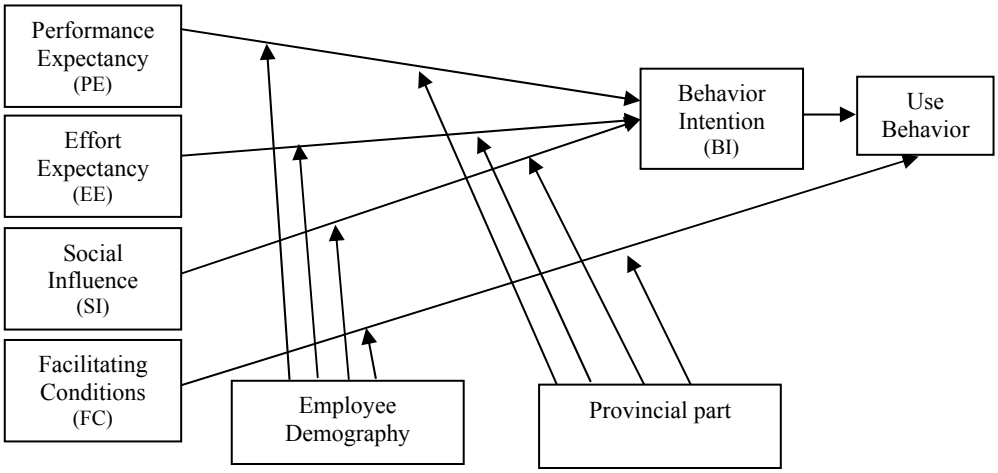


Figure 2.13 Research Framework

CHAPTER III
MATERIAL AND METHODOLOGY

The chapter research methodology represents the part of study methods, target groups, research tools and research planning schedule.

3.1 Research Methodology

In order to get the completely effective research, the researcher needs to plan the research process thoroughly. My process plan consists of 6 steps in the figure below.

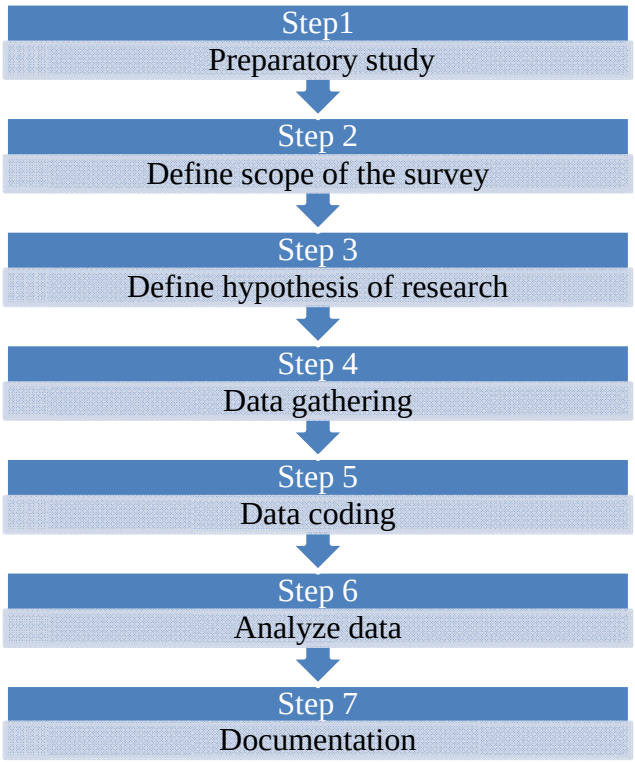


Figure 3.1 Research Methodology

3.1.1 Preparatory study

1) The study of related literatures help gathering data or results from the related researches, other thesis, academic journals, survey reports, internet searches and also from specialist advices.

2) The study of field research in hotel and hospital business. The field research is focus on technology acceptance model by studying on IT adoption and IT accepting in service of hotels and hospitals industries in Thailand.

3) The study of population on hotels and hospitals in Thailand from Department of Business Development, Ministry of Commerce and Office of the Permanent Secretary, Ministry of Public Health.

3.1.2 Define Scope of Survey

3.1.2.1 Target Zone

The target zone of this survey is employees of hotels and hospitals in Thailand. This research divides target zone into 5 groups by Thailand provincial. According to the Department of Provincial Administration, Ministry of Interior (Ministry of Interior, 20--)'s data. Thailand provincial is divided into Bangkok and 4 provincial parts: middle, northeast, north and south.

3.1.2.2 Population and Sampling

The population of this research is the employees in 2 service industries: hotels and hospitals. The hotel population is sampling from the hotels and guest houses survey (National Statistical Office, 2010). Total of 180,431 employees are divided into Bangkok 34,228 people, Middle (not included Bangkok) 51,718 people, North 18,260 people, Northeast 17,057 people and South 59,168 people.

The hospital population is sampling from Monitoring and Management System (MMS) report (Ministry of Public Health, 2010). Total 165,054 employees are divided into Bangkok 30,727 employees, Middle (not included Bangkok) 44,757 employees, North 29,604 employees, Northeast 37,457 employees and South 22,509 employees.

This research sampling utilizes multistage sampling from population. As follows:

3.1.2.2.1 The selection of target group is from using of the purposive sampling method in hotels and hospitals' employees in Thailand.

1) Hotel targets are IT employees whose main responsibility is to maintain IT system and IT related hotel employees who get benefit from using IT system.

2) Hospital targets are physicians and nurses from both public and private hospitals. The targets from public hospitals are sourced from the list of Hospital Information System (HIS) in the Information & Communication Technology Center (Ministry of Public Health, 2010). The researcher has sourced private hospital targets from the list of the private hospital ("The Private Hospital Association, Thailand," 2011).

3.1.2.2.2 There are 678 samples of target group. It is divided into 400 hotel samples and 400 hospital samples. The researcher will use random from size of this population by quota sampling.

Table 3.1 The population number of hotels and hospital employees

Provincial parts	**Hotel ***	**Hospital ****
Bangkok	34,228	30,727
Middle	51,718	44,757
(Beyond Bangkok)		
North	18,260	29,604
Northeast	17,057	37,457
South	59,168	22,509
Total	180,431	165,054

* Hotel- (National Statistical Office, 2010)

** Hospital- (Ministry of Public Health, 2010)

Due to the size of the population of hotels and hospitals are not equal, the size of 180,431 hotel employee samples and 165,054 hospital employees samples conform to Yamane's(1973) finite population sampling formula, along with a 95% confident level and a 5% precision level.

$$n = \frac{N}{1 + Ne^2}$$

Where n = Sample size

N = Population size

e = Level of precision

With assuming a 95% confidence level and a maximum variability in a population (P = 0.5)

Table 3.2 The number of sample in hotel and hospital employees

Provincial parts	**Hotel Sampling**	**Hospital Sampling**
Bangkok	76	74
Middle (Beyond Bangkok)	115	108
North	40	72
Northeast	38	91
South	131	55
Total	400	400

3.1.2.2.3 Simple random is carried out by using computer method. The population data are input into Excel program. Bangkok is random into 6 districts.

3.1.2.2.4 The collection data is done by applying questionnaire. There are two questionnaire set, one for hotels and another for hospitals. Two methods of random sampling are used in applying questionnaire. First, the researcher gathers data in hotel or hospital. Second, questionnaire is sent to target to gather data by e-mail/letters.

3.1.3 Research Hypothesis

The research model of this study was developed by the Unified Theory of acceptance and use of Technology (UTAUT) and including modulators such as age, gender, and provincial part. It shows in below.

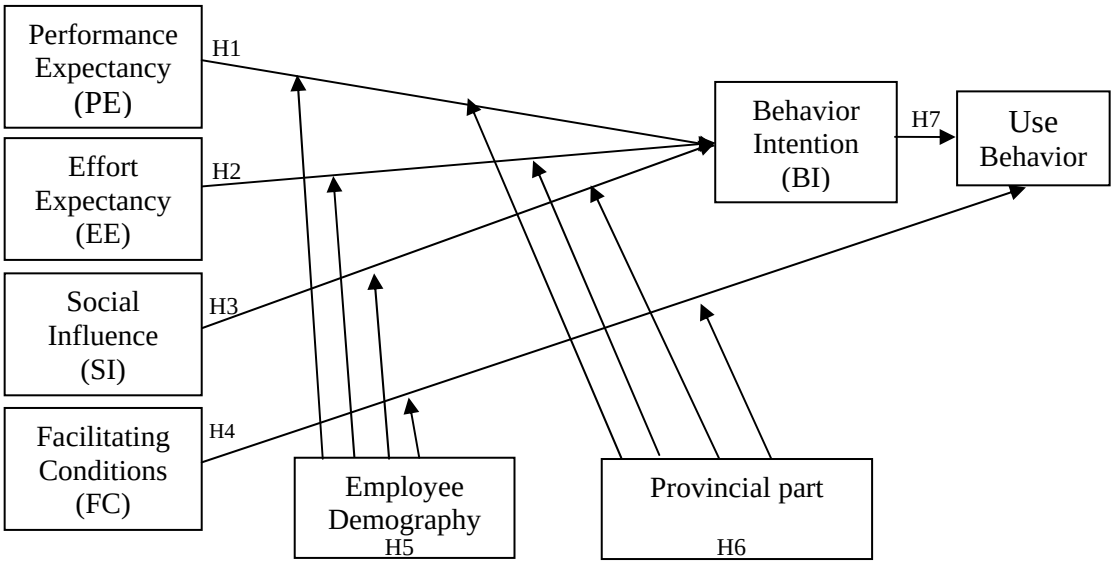


Figure 3.2 All determinants in Research Hypothesis

There are 8 main factors in this research hypothesis which including performance expectancy, effort expectancy, social influence, facilitating conditions, employee demography, provincial part, behavior intention, and use behavior.

As above, this research hypothesis that performance expectancy, effort expectancy, and social influence are directly affected behavior intentions. Next, facilitating conditions are directly affected use information technology behavior. And, both employee demography and Thai of provincial part are indirectly affected to four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Behavior intention also directly affected using information technology's behaviors in hotels and hospitals.

- **Determining Factors**

Performance Expectancy refers to the performance of information technology or system for users. In Taiwan research about physicians 'acceptance of

pharmacokinetics-based clinical decision support systems. In Taiwan, Chang et al. (2007) found that performance expectancy to be stronger factor affecting behavior intention of usage than expectancy (Chang, Hwang, Hung, & Li, 2007). Yi et al. (2006) have founded that perceive usefulness is affect on Behavior Intention with using PDA of physicians in United State (Yi et al., 2006). Pai and Huang (2011) also found that perceived usefulness is had direct on intention to use positively (Pai & Huang, 2011). Therefore, it follows that:

Hypothesis 1: Performance Expectancy is positively on Behavioral Intentions to use IT/IS.

Effort expectancy is considered to be directly ease associated with the use of the system. Many early researches found effort expectancy is affecting with usage their systems. It is found that effort expectancy has a positive significant effect on intention to use the clinical decision support systems (Chang et al., 2007), healthcare information system (Pai & Huang, 2011), and adverse event reporting system (Wu et al., 2008). Thus, it follows that:

Hypothesis 2: Effort Expectancy is positively on Behavior Intention to use IT/IS.

Social Influence is refers to believe he/her should use the systems. It has been founded in the other technology acceptance model as TRA, TPB and DTPB. From acceptance hospital information systems (HIS) research (Aggelidis & Chatzoglou, 2009) founded social influence is affected with hospital personnel behavioral intention. Wu et al. (2008) also indicated that subjective norm had a direct positive effect on Behavior intention to using adverse event reporting system (Wu et al., 2008). Accordingly, hypothesis is presented as follows:

Hypothesis 3: Social Influence is positively on Behavioral Intentions to use IT/IS.

Facilitating Conditions is an individual believe exist to support his/her activities such as infrastructure, or environment. Chang et al. (2007) showed that Facilitating Conditions had a positive effect on use physicians' behavior to pharmacokinetics-based clinical decision support systems (Chang et al., 2007). Yi et al. (2006) found that Perceived Behavioral Control (PBC) was a significant determinant of Behavior Intention to use PDA in physicians (Yi et al., 2006). Facilitating Conditions as a direct determinant of use behavior was represented by PBC. Therefore, researcher hypothesized:

Hypothesis 4: Facilitating Conditions is positively influence on "Use Behavior".

Employee demography, we are defined as characteristic of the hotel/medical staff. With UTAUT hypothesis have four main factors which relationships with other moderators. The moderators were consisted by age, gender, voluntariness and experience. These moderators have been shown to intention to adopt other researches (Burtonjones & Hubona, 2006; Kijsanayotin, Pannarunothai, & Speedie, 2009; Venkatesh, Morris, Gordon B. Davis, & Davis, 2003; Yu, Li, & Gagnon, 2009). We dropped voluntariness from UTAUT moderators and using three moderators only. Base on past research results, hypothesis is presented as follows:

Hypothesis 5a: Age is positively influence of (PE, EE and SI) on Behavior Intention to use IT/IS.

Hypothesis 5b: Gender is positively influence of (PE, EE, and SI) on Behavior Intention to use IT/IS. And, Gender is positively influence of Facilitating Condition on "Use Behavior".

Hypothesis 5c: Experience is positively influence of (EE, SI and FC) on Behavior Intention to use IT/IS. And, Experience is positively influence of Facilitating Condition on "Use Behavior".

There are many researches that they are related to provincial part and technology acceptance. Kakoli and Soumava (2008) studied in the user acceptance of prepayment between India and United State. Two countries are very different culture and access technology in countries. They found, performance expectancy, effort expectancy, and social influence, these factors have a positively affects on users' intention to use the prepayment. Each country, different technology access and culture has affects on behavior intention in two countries (Kakoli & Soumava, 2008). Oshlyansky et al. (2007) are studied cross-culturally with technology acceptance of many countries. There are nine countries samples: Czech Republic, Greece, India, Malaysia, New Zealand, Saudi Arabia, South Africa, United Kingdom, and United States. They found that social influence is affects on website acceptance in Saudi Arabia than in the other countries (Oshlyansky, Cairns, & Thimbleby, 2007). Consequently, there are four hypotheses developed according to the research model. As follows:

Hypothesis 6a: Provincial part is positively influence of Performance Expectancy on Behavior Intention to use IT/IS.

Hypothesis 6b: Provincial part is positively influence of Effort Expectancy on Behavior Intention to use IT/IS.

Hypothesis 6c: Provincial part is positively influence of Social influence on Behavior Intention to use IT/IS.

Hypothesis 6d: Provincial part is positively influence of Facilitating Conditions on "Use Behavior".

3.1.4 Data Gathering

The survey is developed from many researches. There are 4 sections in this questionnaire.

Table 3.3 Topic of the Questionnaire

Section	Topic
1	The General information based on the hotel/hospital employee
2	The General information based on hotel/hospital
3	The usage of the Information Technology in hotel/hospital
4	The factor affected the decision to choose information technology for service.

Section 1: The General information based on the hotel/hospital employee

This section is the information about hotel/hospital employee background such as gender, carrier position of respondent, experience employment. It is check list type with 11 questions (for hotel) and 10 questions (for hospital).

Section 2: The General information based on hotel/hospital

The second section is the information related to hotel and hospital. Since hotel and hospital have different nature of business, the information of those businesses will be different. This section is check list type with 7 questions for hotel questionnaire and 3 questions for hospital questionnaire.

- *The hotel questionnaire contains criteria as follow:*
  - Hotel type
  - Star rating
  - Hotel management
  - Location
  - Hotel rooms

- Service level
- Propose service

- *The hospital questionnaire contains criteria as follow:*
  - Hospital type
  - Number of beds
  - Location

Section 3: The usage of the Information Technology in hotel/hospital

The third section is the information of IT usage in hotel and hospital. Hotel technology will be divided into In-room service and hotel management (Lee, Barker, & Kandampully, 2003). Hospital or healthcare technology will be divided into 6 levels (Lele, 2005). This section is multi choice. The respondents can choose more than 1 choice.

Section 4: The factor affected the decision to choose information technology for service.

The last section is the information of factors to acceptance technology of the respondents in each industry. This section is rating scale type with 34 questions.

Table 3.4 Summary definition of all constructs

Constructs	Reference
Performance expectancy (PE) Definition: The degrees to which a hotel/hospital employee believes that using the system/IT will help him/her attain gains in servicing performance. Measurement items • Technology helps speed up the business process.(PE1) • Technology enhances customer's satisfaction.(PE2) • Technology enhances the efficiency of your service.(PE3) • Technology enhances the accessibility and communication to your customer.(PE4)	(Al-Gahtani, Hubona, & Wang, 2007), (Venkatesh et al., 2003)
Effort expectancy (EE)/ EE with quality (EEQ) Definition: The degree of ease associated with the use of the system/IT. Measurement items • Technology can be used easily.(EE1) • Technology helps facilitate your service.(EE2) • You can easily fix the error/fault of the technology.(EE3) • Your technology is always up-to-date. (EEQ1) • Your technology is self-solving when error. (EEQ2)	(Davis, 1989), (Venkatesh et al., 2003) (Wang & Wang, 2010)

Table 3.4 Summary definition of all constructs (cont.)

Constructs	Reference
Social Influence (SI) Definition: The degree to which a hotel/hospital employee perceives that important other believe he or her would use the new system/IT.	(Lam, Cho, & Qu, 2007),(Venkatesh et al., 2003)
Measurement items • Your colleague expects that your service is better by using the technology system. (SI1) • Your colleague expects that you can use the technology efficiently.(SI2) • Your customers believe that technology system is very useful for your organization. (SI3) • Your hotel hire IT specialists staffs to look after IT system.(SI4) • 14. Your hotel has enough staff to look after IT specialists and related staff.(SI5) • Your boss support training and attending seminar on new technology.(SI6) • Your hotel IT specialist has high level of experience.(SI7) • IT problem, your specialist IT can solve them.(SI8)	
Facilitating conditions (FC)/ Facilitating Conditions with organizations' interest (FCI) Definition: The degree to which a hotel/hospital employee believes that a hotel/hospital organization and technical infrastructure exist to support use of the system/IT.	(Venkatesh et al., 2003)
Measurement items • Your hotel/hospital gives importance on service driven by technology.(FC1) • Your hotel/hospital always improves & upgrades the IT system.(FC2) • Your hotel/hospital has IT department to look after the system.(FC3) • Your hotel/hospital supports the training for the new employee run by professional trainer.(FC4)	

Table 3.4 Summary definition of all constructs (cont.)

Constructs	**Reference**
• Your hotel/hospital provides the training for employee whenever there is important on the system/technology. (FC5) • Your hotel/hospital supports the capital investment in the system & IT.(FC6) • Your hotel/hospital pays attention to bring in new technology.(FCI1) • When other hotels/hospitals bring in the new technology, your hotel/hospitals will pay special attention to.(FCI2) • When there is a new technology, your hotel/hospital always set up a trial of the new technology before any purchase decision.(FCI3)	
Provincial part (P) Experience in each provincial with employee Definition: Experience in each provincial with hotel/hospital	(Kakoli & Soumava, 2008) (Venkatesh et al., 2003)
Measurement items • Your hotel locates in the region that interest in technology. (P1) • You believe the technology in your hotel is better than other hotels.(P2) • You believe that the technology in your hotel is more advance those other hotels.(P3) • You always pay attention to the technology run by the hotel from other territory.(P4) • Your local area has access to the new technology.(P5) Your territory always received new technology faster than other territory.(P6)	
Behavior Intention (BI) Definition: A hotel/hospital's intention to use system/IT	(Venkatesh et al., 2003)
Measurement items • You want to use new technology to serve to your customer.(BI1) You believe that you will bring in the new technology to improve the service to your customer, and the efficiency to your work. (BI2)	

This research use testing these items for Structural Equation Modeling (SEM). Variables are Nominal scale/Ordinal scale will be changed to the dummy variable. Dummy variable is “0” and“1” value. The variable’s interest is “1” value and other.

Demography information

Gender

1) Female 2) Male

Dummy variable Female = 1 Male = 0

Age

1) Lower or 20 years 2) 21-25 years 3) 26-30 years

4) 31-40 years 5) > 41 years

Dummy variable 20-40 years = 1 more than 40 years = 0

Experience employment

1) 0-2 years 2) 3-5 years

3) 5-7 years 4) over 7 years

Dummy variable 0-5 years = 1 5 - 7 years = 0

variable is “0” value (Krajornsin, 2005). Following as;

Use behavior (USE)

Questions: How frequent do you use computer such as play the internet or search the information? (USE3)

1) one to three times per a month 2) a month

3) About once a day 4) 0nce a day

5) Several times a day

Scale

After questionnaire had built finished, the researcher tests with 30 respondent samples. Cronbach’s alpha of all construct exceeding the value of 0.7 was classified as adequate reliability (Sinjaru, 2009).

Table 3.5 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.975	.975	34

Table 3.6 Item-Total Statistics

Construct	Item	Corrected Item-Total Correlation	Cronbach's Alpha
Performance Expectancy	PE1	.592	.975
	PE2	.689	.975
	PE3	.663	.975
	PE4	.600	.975
Effort Expectancy	EE1	.567	.975
	EE2	.681	.975
	EE3	.490	.976
	EEQ1	.724	.975
	EEQ2	.607	.975
Social Influence	SI1	.455	.976
	SI2	.455	.976
	SI3	.590	.975
	SIS1	.810	.974
	SIS2	.837	.974
	SIS3	.829	.974
	SIS4	.850	.974
	SIS5	.751	.974
Facilitating Conditions	FC1	.890	.974
	FC2	.868	.974
	FC3	.808	.974

3.1.5 Data Coding

The researcher collected data code from each respondent's questionnaire into SPSS file and Lisrel for analyzing the data. For SPSS is analyzing basic the data. And, Lisrel is analyzing by factor data.

3.1.6 Analyze Data

The questionnaire results are inputted into Google Doc. Next, the data is transferred into SPSS software 16.0 and Lisrel 8.8 (Student version). SPSS result is shown in form of chart, table and percentage. Lisrel result is shown relationship factors.

Section 1: The questionnaires relate to characteristic of the hotel/hospital employees. This section is check list type, researcher use frequency method and percentage. The result is factor in Lisrel for check affecting in hypothesis. The researcher use mean and the standard deviation (SD) method.

Section 2: The questionnaires relate to profile of hotel/hospital. This section is check list type, researcher use frequency method and percentage. The researcher use mean and the standard deviation (SD) method.

Section 3: The questionnaires relate to profile of hotel/hospital. This section is check list type and categorical data, researcher use frequency and categorical data method IT in hotel/hospital. The result is shown in percentage. The researcher use mean, the standard deviation (SD) method.

Section 4: The questionnaires relate to main factors affected the decision to choose information technology for service. This section is rating scale type. The researcher use summary each all factors into SPSS for the description statistics, mean, and correlation matrix.

In rating scale questionnaire, the researcher will analyze all data and data conclude as follows (Sinjaru, 2009)

Table 3.7 Point average in analyzing each level (Sinjaru, 2009)

Point average	Level
4.50 – 5.00	Highest level
3.50 – 4.49	High level
2.50 – 3.49	Medium level
1.50 – 2.40	Low level
1.00 – 1.49	Lowest level

3.1.7 Documentation

Finally, the result is analyzed, concluded and presented with recommendation for the future research related. Research documentation is made and inspected.

3.2 Research Tools

Hardware

CPU	:	Intel Pentium Compatible
RAM	:	at least 1.66 GH
Hard Disk	:	at least 1.5 GB
Monitor	:	Super VGA Monitor
Peripherals	:	Mouse, Keyboard, Printer

Software

Operation System	**:**	Microsoft Windows 2002 Service Pack 3
Statistical Program	**:**	SPSS v.16
		Lisrel 8.8 (Student version)
PDF View Tool	**:**	Adobe Acrobat 7.0 Profressional
		Foxit Reader 5.1
Other Tools	**:**	Microsoft Word 2007
		Microsoft Excel 2007
		Microsoft PowerPoint 2007
		Google Doc

3.3 Research Schedule

Table 3.8 Research Schedule

Activities	Time (Months)											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Preparatory study	→											
Define scope of survey		→	→	→								
Define hypothesis			→	→	→							
Data gathering				→	→	→	→					
Data coding							→	→				
Analyzing data							→	→	→	→	→	
Documentation	→	→	→	→	→	→	→	→	→	→	→	→

CHAPTER IV
RESULTS AND DISCUSSION

This chapter presents the survey reports and discussion. Researcher will show the collect data analyzed. This chapter is divided into two parts. The first part presents the survey results from questionnaires in all populations. And, the second part presents the hypothesis results testing that investigate the factors influence on adoption information technology in two service industries: hotels and hospitals. The researcher used structure equation model testing (SEM) to investigate relationships among all factors on research model.

4.1 The Survey Results

From the survey, the questionnaires were sent to target by letter and e-mail to the hotel/ hospital of Thailand. The most respondents will be receiving letters. The main survey had 454 hotel employees and 404 hospital employees. Among then, researchers deleted questionnaires e.g. some filling in the items incompletely, asking some two parts only. Some respondents who had not service technology of the industries were also eradicated. Finally, an overall 400 hotels' employee questionnaires and 400 hospitals' employee questionnaires were used for analysis, response rate of 100%. Table 4.1 shows the summary of all hotel respondents and Table 4.2 shows the summary of all hospital respondents.

Table 4.1 concluded characteristics of the hotel respondents. The researcher founds that hotel respondents mostly were female (51.75%), age in between twenty one to thirty (48%), Bachelor's degree (72.5%), Front desk officer (17.5%), over 7 years in experience employment (45%), over 10 years in the internet experience (34.5%), over 3 hours for using in work (61%), more than 3 hours in using the internet or IT (61%), and used computer for other activity about several time a day (67%). Most hotels were independent hotel management (58.5%), hotel type (59.5%), and

main purpose of the resort service for guests (32.76%), Four-Star Rating (32%), and located in Bangkok area (29%).

Table 4.1 Characteristic of the hotel respondents

Measure	Categories	Number of Responses	Percentage (%)
Total		400	100
Gender	Male	193	48.25
	Female	207	51.75
Age	20-30 years	192	48.00
	31-40 years	126	31.50
	41-50 years	82	20.50
Education	TAFE/Commercial College	43	10.75
	Bachelor's	290	72.50
	Master's	48	12.00
	Ph.D.	4	1.00
	Other	15	3.75
Position	Owner	48	12.00
	Sales manager	16	4.00
	General manager	48	12.00
	Assistant general manager	23	5.75
	IT manager and IT employee	51	12.75
	Sales and marketing manager	22	5.50
	Front office manager	3	0.75
	Admin and assistant general officer	47	11.75
	Front desk officer	70	17.50
	Public Relation officer	11	2.75
	Other	61	15.25

*** Respondent's profile (*N*=400)**

Table 4.1 Characteristic of the hotel respondents (cont.)

Measure	Categories	Number of Responses	Percentage (%)
Experience Employment	0-2 years	68	17.00
	3-5 years	85	21.25
	5-7 years	67	16.75
	Over 7 years	180	45.00
Years of Internet experiences	Less than 1 year	5	1.25
	1-3 years	61	15.25
	4-6 years	76	19.00
	7-10 years	120	30.00
	Over 10 years	138	34.50
Average hours for using for work	Below 1 hours	83	20.75
	1-2 hours	32	8.00
	2-3 hours	41	10.25
	Over 3 hours	244	61.00
Experience of using the Internet or IT	Less than 30 min.	52	13.00
	30 min to hour	31	7.75
	1-2 hours	32	8.00
	2-3 hours	41	10.25
	More than 3 hours	244	61.00
How often use computer in other activity	None or less than once a month	6	1.50
	Two or three times per a month	34	8.50
	A month	22	5.50
	About once a day	15	3.75
	Once a day	55	13.75
	Several times a day	268	67.00

*** Respondent's profile (*N*=400)**

Table 4.1 Characteristic of the hotel respondents (cont.)

Measure	Categories	Number of Responses	Percentage (%)
Hotel Management	Independent hotel	232	58.00
	International chain hotel	112	28.00
	Domestic chain hotel	56	14.00
Hotel type	Hotels	238	59.50
	Resorts	100	25.00
	Service apartments	10	2.50
	Guesthouses	8	2.00
	Hotels and resorts	41	10.25
	Hotels and service apartments	3	0.75
Purpose of Service	Business hotel	146	20.80
	Convention hotel	91	12.96
	Resort hotel	230	32.76
	Transient/Commercial hotel	113	16.10
	Residential hotel	55	7.83
	All service purposes	67	9.54
Star Rating	Five-star	75	18.75
	Four-star	128	32.00
	Three-star	125	31.25
	Two-star	19	4.75
	One-star	8	2.00
	No star rating	45	11.25
Location	Bangkok	116	29.00
	Middle	107	26.75
	Northeast	27	6.75
	North	45	11.25
	South	105	26.25

*** Respondent's profile (*N*=400)**

The profiles of hospital respondents were shown in Table 4.2, with a total sample size of 400. The data indicated that the respondents were males (51.5%) and female (48.5%). From respondent information were between 41-50 years old (38.50%), between 31-40 years old (31.5%), between 21-30 years old (29.5%) and over 50 (0.5%). Marital status of respondents were single (49%), married (49%) and divorced/widowed (2%). Education levels, it found that the major of hospital respondents had a certificate or bachelor's degree (61.5%), and were more than half as physicians (51.5%). Hospital were community hospitals (54%).The routine activities in the hospital staffs, they are almost working over 3 hours (41.5%).

All most respondents, who use healthcare technology, had an internet and healthcare technology experience.

Table 4.2 Characteristic of the hospital respondents

Measure	**Categories**	**Number of Responses**	**Percentage (%)**
Total		400	100
Gender	Male	206	51.50
	Female	194	48.50
Age	20-30 years	118	29.50
	31-40 years	126	31.50
	41-50 years	154	38.50
	Over 50	2	0.50
Marital status	Single	199	49.00
	Married	197	49.00
	Divorced/Widowed	8	2.00
Education	Certificate/Bachelor's degree	246	61.50
	Master's degree	130	32.50
	doctor's degree	24	6.00

*** Respondent's profile (*N*=400)**

Table 4.2 Characteristic of the hospital respondents (cont.)

Measure	Categories	Number of Responses	Percentage (%)
Position	Physician	206	51.50
	Nurse	150	37.50
	IT manager	14	3.50
	Other	30	7.50
Experience Employment	Below 2 years	35	8.75
	3-5 years	32	8.00
	5-7 years	58	14.50
	7-10 years	42	10.50
	10-15 years	66	16.50
	Over 15 years	167	41.75
Years of Internet experiences	Below 3 years	32	8.00
	3-6 years	53	13.30
	6-9 years	145	36.30
	Over 9 years	170	42.50
Average hours for using for work	Below 1 hours	112	28.00
	1-2 hours	62	15.50
	2-3 hours	60	15.00
	Over 3 hours	166	41.50
Hospital Type	General hospital	41	10.25
	Center hospital	19	4.75
	Community hospital	216	54.00
	University hospital	65	16.30
	Other public hospital	8	2.00
	Private hospital	51	12.75

*** Respondent's profile (*N*=400)**

Table 4.2 Characteristic of the hospital respondents (cont.)

Measure	Categories	Number of Responses	Percentage (%)
No. of Bed	Below 11 beds	15	3.75
	11-30 beds	90	22.50
	31-60 beds	92	23.00
	61-90 beds	39	9.75
	91-120 beds	9	2.25
	121-150 beds	9	2.25
	151-200 beds	13	3.25
	201-250 beds	13	3.25
	Over 250 beds	120	30.00
Location	Bangkok	97	24.25
	Middle	91	22.75
	Northeast	78	19.50
	North	71	17.75
	South	63	15.75
*** Respondent's profile (*N*=400)**			

4.2 Descriptive Analysis of hotels and hospitals

4.2.1 Overall Perception of All Hotel Constructs

Table 4.3 presents the mean, standard deviation for all of perceptions. Following Table 4.3, most perception about behavior intention the score were high level. Next, the same highest value of perception was performance expectancy and effort expectancy follow by social influence and provincial part, respectively. However, the mean value of the facilitating conditions has a medium level. This suggested that hotel employees feel useful, easily, collogues and hotels supported in technology services, can access to technology easily, and satisfied with using technology service for customers or guests.

Table 4.3 Perception of all hotel constructs

Items	Mean	Standard deviation	Interpretation
Performance Expectancy	4.22	0.686	High
Effort Expectancy	4.22	0.795	High
Social Influence	3.69	0.937	High
Facilitating Conditions	3.38	1.139	Medium
Provincial Part	3.51	1.001	High
Behavior Intention	4.33	0.817	High

4.2.2 Overall Perception of All Hospital Constructs

The table 4.4 shows the means, standard deviation all of perceptions. The highest value of perception was behavior intention follow by performance expectancy, social influence and effort expectancy respectively. But the mean value of all factors has a medium level of agreement including facilitating condition and provincial part. Therefore, the results also suggest that medical staffs would use technology to the behavior and they are interested in useful, ease of use by collogues or boss/administrators and facilitating condition are the important IT acceptance in the hospitals including also access technology to provincial part.

Table 4.4 Perception of all hospital constructs

Items	Mean	Standard deviation	Interpretation
Performance Expectancy	3.40	0.704	High
Effort Expectancy	3.61	0.671	High
Social Influence	3.73	0.693	High
Facilitating Conditions	3.47	0.755	Medium
Provincial Part	3.33	0.787	Medium
Behavior Intention	4.12	0.626	High

4.3 Hypotheses Testing

In this study, research has conducted the following statistical analysis to test our hypotheses. Firstly, researcher used independent samples *t*-test to test difference between hotels and hospitals. Secondly, researchers used structural equation modeling for confirming the theoretical hypothesis results.

4.3.1 Independent samples *t*-test

Comparison different between hotels and hospitals were made using independent sample *t* test. The researcher shows mean, standard deviation (S.D.), and statistics were used in hypotheses testing of comparing between two service industries by influence factors, are given in Table 4.5.

Table 4.5 Independent Samples *t*-test results

Factors	Hotel		Hospital		*t*	*p*
	Mean	S.D.	Mean	S.D.		
Performance Expectancy	4.29	0.77	3.71	0.70	11.11	0.00*
Effort Expectancy	4.50	0.65	0.46	0.76	20.92	0.00*
Social Influence	3.94	0.90	2.25	1.87	16.22	0.00*
Facilitating Conditions	2.77	0.46	2.31	1.93	4.72	0.00*
Behavior Intentions	4.39	0.59	3.99	0.70	8.75	0.00*
Use on behavior	3.16	0.49	3.59	0.67	-10.43	0.00*

* Significant at .05

As Table 4.5 data were also analyzed to examine the different of factors influence using in information technology of service industries: hotels and hospitals. All factors are significant at 0.05.

From comparing mean values between hotel and hospital, researcher founds that performance expectancy, effort expectancy, social influence, facilitating conditions, and behavior intentions of the hotel group are higher than the same factors

of hospital group. Expect, means value of the use on behavior's hospital group is higher than mean value of the use on behavior's hotel group.

The results revealed that the hotel employees were interested in performance expectancy, effort expectancy, social influence, facilitating conditions, and behavior intention. These factors are important for hotel employees with adoption information technology in servicing in the hotels. Therefore, focusing in the influence factors will be increase accepting technology them.

While using technology on hospital employees' behavior are higher than the using technology hotel employees' behavior. It indicated that servicing in hospitals need to using technology so much. Treat or saving life of patients also are important parts in using technology of hospital staffs. Therefore, healthcare technology will helps to add fastness, satisfactions and safety. Hospital employees will adoption technology somewhat be high.

4.3.2 Structure Equation Model Test

Structure equation modeling (SEM) is suitable to test and confirm the theoretical hypothesis result. Structural equation modeling or Confirm Factor Analysis (CFA) was used to test the sufficiency of the measurement model by Lisrel 8.8 (Student version). The sufficiency of the measurement model was examined in the model fit and multicollinearity.

This hypothesis is tested by SEM within the hotels and hospitals respectively. Accordingly, this research testing the following:

- **Structure Equation Model Testing in Hotels**

In Table 4.6 show overall model fit indices for measurement of hotels. The Chi-square value normalized by degree of freedom (χ^2/d.f.) value was 4.90. Goodness-of-fit was 0.99, Adjusted goodness-of-fit (AGFI) was 0.80. Normalized fit index (NFI) was 1.00, Non-normalized fit index (NNFI) was 0.92, Comparative fit index (CFI) was 1.00, Root mean square residual (RMR) was 0.009, Standardized RMR was 0.009, and Root mean square error of approximation (RMSEA) was 0.02.

Most measurement values were good fit. Except, Chi-square value normalized by degree of freedom (χ^2/d.f.) value was over 3.00 as 4.90. But, Gefen and

Keil (1998) suggests value of normalized by degree of freedom (χ^2/d.f.) value should smaller than 5, it is considered to be good fit (Gefen & Keil, 1998). Accordingly, the measurement model in Table 4.6 was a good fit**.**

Table 4.6 Overall model fit indices for measurement - Hotels

Goodness-of-fit measures	**Recommend Value ***	**Model Value**
fit measure		
χ^2	N/A	28.10
d.f. (Degree of freedom)	N/A	6
χ^2/d.f.	≤ 3.00 / ≤ 5.00	4.68
Goodness-of-fit (GFI)	≥ 0.90	0.99
Adjusted goodness-of-fit (AGFI)	≥ 0.80	0.80
Normalized fit index (NFI)	≥ 0.90	1.00
Non-normalized fit index (NNFI)	≥ 0.90	0.92
Comparative fit index (CFI)	≥ 0.90	1.00
Root mean square residual (RMR)	≤ 0.05	0.009
Standardized RMR	≤ 0.05	0.009
Root mean square error of approximation (RMSEA)	≤ 0.10	0.098

* Gefen & Keil, 1998; Hair et al., 1998

A preliminary test was finding the Tolerance and Variance Inflation Factor (VIF) for checking multicollinearlity. When tolerance value is close to zero, there is high multicolinearity of that variable with other variables and the beta co-efficient will be instable (Hair et al., 1998). Conversely, the VIF are higher than inter-correlation of the variables.

This indicates that it was almost no multicollinearity problem in these variables. Although some values were not standard, they are dummy variables. Follow as in Table 4.7.

Table 4.7 Tolerance value and Variance Inflation Factor (VIF) - Hotels

Factors	**Tolerance**	**VIF**
USE (Dependent)		
BI	.902	1.108
FC	.804	1.244
A*FC	.830	1.205
P*FC	.938	1.066
BI (Dependent)		
PE	.941	1.062
EE	.888	1.126
SI	.897	1.115
G*PE	.083	12.021
G*EE	.069	14.438
G*SI	.099	10.054
A*PE	.165	6.051
A*EE	.138	7.242
A*SI	.184	5.422
P*PE	.171	5.859
P*EE	.162	6.174
P*SI	.424	2.357

From Table 4.8 correlation matrix was showed in. It cans explain relation between dependent variable and independent variable.

Table 4.8 Correlation Matrix analysis – Hotel

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
BI	1																
USE	0.622**	1															
PE	0.571**	0.204**	1														
EE	0.610**	0.337**	0.206**	1													
SI	0.606**	0.367**	0.182**	0.297**	1												
FC	0.394**	0.510**	0.033	0.076	0.204**	1											
G*PE	0.165**	0.119*	0.149**	0.007**	0.102*	0.022	1										
G*EE	0.156**	0.106*	0.023	0.133**	0.102*	0.018	0.752**	1									
G*SI	0.200**	0.216**	0.002	0.033	0.297**	0.015	0.731**	0.743**	1								
A*PE	0.298**	0.292**	0.342**	0.065	0.244**	0.067	0.202**	0.138**	0.164**	1							
A*EE	0.274**	0.324**	0.051	0.287**	0.250**	0.069	0.149**	0.192**	0.177**	0.803**	1						
A*SI	0.333**	0.358**	0.080	0.106*	0.550**	0.082	0.145**	0.145**	0.242**	0.868**	0.791**	1					
A*FC	0.228**	0.389**	0.005	0.009	0.198**	0.357**	0.143**	0.141**	0.160**	0.875**	0.797**	0.756**	1				
P*PE	0.250**	0.269**	0.209**	0.024	0.180**	0.110*	0.160**	0.122*	0.122*	0.233**	0.164**	0.172**	0.181**	1			
P*EE	0.264**	0.264**	0.182**	0.038	0.212**	0.104*	0.096	0.065	0.081	0.222**	0.164**	0.173**	0.179**	0.707**	1		
P*SI	0.194**	0.198**	0.166**	0.013	0.034	0.062	0.050	0.032	0.030	0.260**	0.217**	0.180**	0.230**	0.732**	0.748**	1	
P*FC	0.216**	0.228**	0.156**	0.039	0.130**	0.042	0.075	0.065	0.079	0.266**	0.227**	0.201**	0.221**	0.674**	0.732**	0.719**	1

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

** Correlation is significant at the 0.01 level (2-tailed)

Figure 4.1 revealed the final model with the non-significant paths rejected. All hypotheses were supported expect for H5b3, H6a, and H6b. The path between age and social influence to behavior intention (H5b3; $\beta = 0.19$, $t = 1.21$, ns), and the path between Provincial part and performance expectancy influence to behavior intention (H6a; $\beta = -0.05$, $t = -0.76$, ns), and finally, between provincial part and effort expectancy influence to behavior intention (H6b; $\beta = 0.07$, $t = 1.13$, ns) were found non-significant.

Total of explained variance (R^2) for behavior intention and actual use behavior are 76% and 50%, subsequently. Data analysis revealed that the path between performance expectancy and behavior intention (H1; $\beta = 0.58$, $t = 8.18$, $p < 0.01$), the path between effort expectancy and behavior intention (H2; $\beta = 0.35$, $t = 4.96$, $p < 0.01$), the path between social influence and behavior intention (H3; $\beta = 0.27$, $t = 3.30$, $p < 0.01$), the path between facilitating conditions and use behavior (H4; $\beta = 0.27$, $t = 6.76$, $p < 0.01$) were also found significant.

The employee demography is modulators which are consisted of gender and age, respectively. In gender, if significant was negative, it explains as female. From Figure 4.1, male also affects to performance expectancy (H5a1; $\beta = 0.44$, $t = 4.09$, $p < 0.01$) and social influence (H5a3; $\beta = 0.25$, $t = 4.09$, $p < 0.05$). Then, female affects to effort expectancy on behavior intention to actual behavior (H5a2; $\beta = -0.62$, $t = -4.14$, $p < 0.01$). In age, if significant were negative, it explains as over 40 years. Therefore, the over age 40 affects to performance expectancy on behavior intention (H5b1; $\beta = -0.72$, $t = -4.14$, $p < 0.01$). And, age in fewer 40 affects to effort expectancy influence on behavior intention (H5b2; $\beta = 0.55$, $t = 2.32$, $p < 0.05$) among facilitating conditions on using behaviors (H5b4; $\beta = 0.15$, $t = 4.61$, $p < 0.01$).

For modulators (e.g. gender, age and provincial parts), the research results founded that provincial parts have an indirect affect with social influence (H6c; $\beta = 0.09$, $t = 2.27$, $p < 0.05$) and facilitating conditions (H6d; $\beta = 0.11$, $t = 3.49$, $p < 0.01$).Their constructs also indirectly influence to the behavior intention and actual behavior.

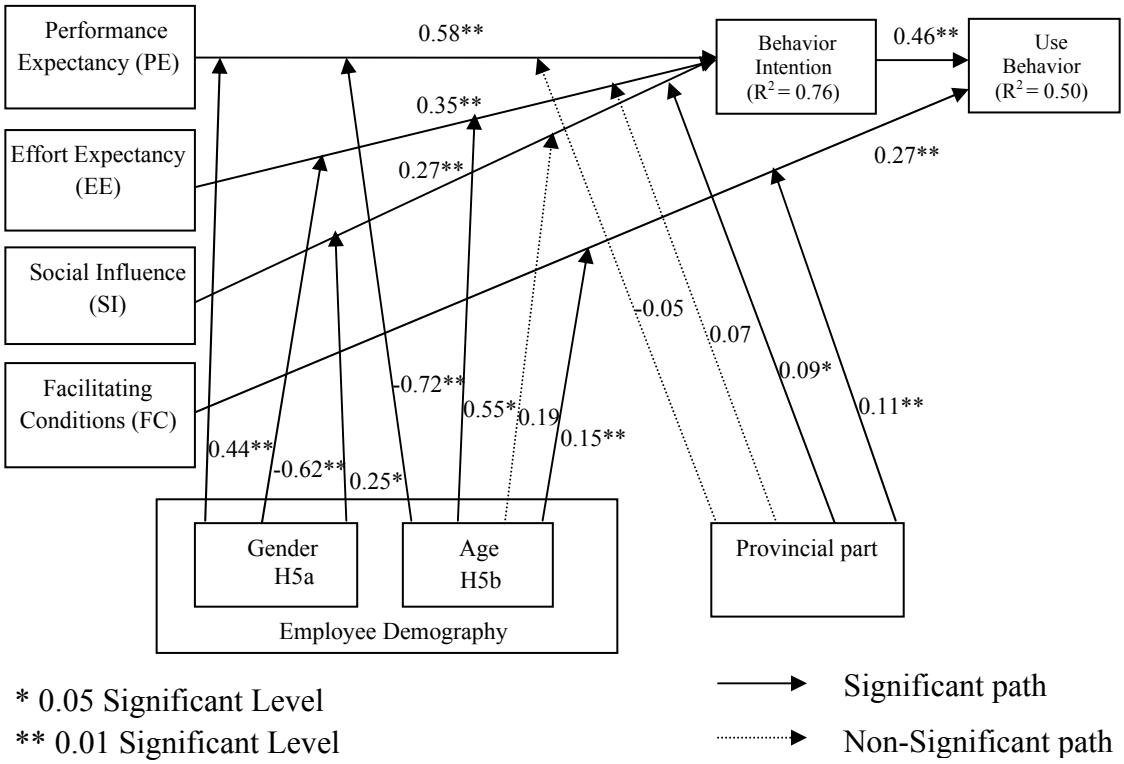


Figure 4.1 Structure model results (Hotel)

In conclude the 19 hypotheses tested in initial structure results model of hotel, 3 hypotheses (Experience (H5c)) were also deleted from the model, while 13 hypotheses were found to be significant and 3 hypotheses were not supported. Finally, this research results also supports with previous other researches. And, all results were shown in Table 4.9.

Table 4.9 Test results of information technology of the hotel acceptance model

	Beta (β)	**R^2**
(1) Behavior Intention (BI)		0.76
BI=PE+EE+SI+G*PE+G*EE+G*SI+A*EE +A*SI+P*PE+P*EE+P*SI		
PE	0.58**	
EE	0.35**	
SI	0.27**	
G*PE	0.44**	
G*EE	-0.62**	
G*SI	0.25*	
A*PE	-0.72**	
A*EE	0.55*	
A*SI	0.19	
P*PE	-0.05	
P*EE	0.07	
P*SI	0.09*	
(2) Use Behavior = (USE)		0.50
USE =BI+FC+A*FC+PC*FC		
BI	0.46**	
FC	0.27**	
A*FC	0.15**	
P*FC	0.11**	

* 0.05 Significant Level

** 0.01 Significant Level

Table 4.10 Decomposition of the effects analysis (Hotel)

Criterion variable predictors	**Behavior intention** $R^2 = 0.76$			**Use behavior** $R^2 = 0.50$		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**
PE	0.58** *(0.07)*	-	0.58** *(0.07)*	-	0.26** *(0.04)*	0.26** *(0.04)*
EE	0.35** *(0.07)*	-	0.35** *(0.07)*	-	0.16** *(0.04)*	0.16** *(0.04)*
SI	0.27** *(0.08)*	-	0.27** *(0.08)*	-	0.12** *(0.04)*	0.12** *(0.04)*
FC	-	-	-	0.27** *(0.04)*	-	0.27** *(0.04)*
G*PE	0.44** *(0.11)*	-	0.44** *(0.11)*	-	0.20 *(0.05)*	0.20** *(0.05)*
G*EE	-0.62** *(0.15)*	-	-0.62** *(0.15)*	-	-0.29 *(0.08)*	-0.29** *(0.08)*
G*SI	0.25** *(0.12)*	-	0.25** *(0.12)*	-	0.11 *(0.06)*	0.11 *(0.06)*
A*PE	-0.72** *(0.20)*	-	-0.72** *(0.20)*	-	-0.33** *(0.10)*	-0.33** *(0.10)*
A*EE	0.55* *(0.24)*	-	0.55* *(0.24)*	-	0.25* *(0.11)*	0.25* *(0.11)*
A*SI	0.19 *(0.15)*	-	0.19 *(0.15)*	-	0.09 *(0.07)*	0.09 *(0.07)*
A*FC	-	-	-	0.15** *(0.03)*	-	0.15** *(0.03)*
P*PE	-0.05 *(0.06)*	-	-0.05 *(0.06)*	-	-0.02 *(0.03)*	-0.02 *(0.03)*
P*EE	0.07 *(0.07)*	-	0.07 *(0.07)*	-	0.03 *(0.03)*	0.03 *(0.03)*
P*SI	0.09* *(0.04)*	-	0.09* *(0.04)*	-	0.04* *(0.02)*	0.04* *(0.02)*
P*FC	-	-	-	0.11** *(0.03)*	-	0.11** *(0.03)*
BI	-	-	-	0.46** *(0.04)*	-	0.46** *(0.04)*

Note1 : * Significant at $p < .05$, ** Significant at $p < .01$

Note2 : Construct abbreviations: PE = Performance expectancy,

EE = Effort expectancy, SI = Social influence, FC = Facilitating conditions,

A = Age, Gen = Gender, P = Provincial part, BI = Behavior intention

Note3 : DE= Direct effect, IE = Indirect effect, TE = Total effect

Note4 : Parentheses ( ) = Standard Error (SE)

Table 4.10 presents the value of a decomposition of the effects analysis of hotel respondents. In the four main constructs, performance expectancy had direct affect on behavior intention to using hotel technology, followed by effort expectancy, and social influence, respectively. This indicates that hotel technology has to useful for hotel employees. They feel realize importance of the hotel technology for servicing with customers, firstly. While hotel employees are also interested in ease of use technology and received influence from people in the hotels such as collogues, manager, or owner/boss. Next, actual behavior or use behavior received direct affect from behavior intention, and facilitating conditions, respectively. This indicates that willingness in behavior also helps bring out actual behavior really, including facilitating conditions. Facilitating condition describe hotel technical infrastructure for supporting exist to support use of the system or information technology.

- **Structure Equation Model Testing in Hospitals**

It shows good model fit value, Tolerance and Variance Inflation Factor (VIF) for checking multicollinearity, correlation matrix analysis; and testing model results also confirm the factors.

For a good model fit. The Chi-square value normalized by degree of freedom (χ^2/d.f.) value was 1.11.Goodness-of-fit was 1.00, Adjusted goodness-of-fit (AGFI) was 0.96. Normalized fit index (NFI) was 1.00, Non-normalized fit index (NNFI) was 1.00, Comparative fit index (CFI) was 1.00, Root mean square residual (RMR) was 0.01, Standardized RMR was 0.012, Root mean square error of approximation (RMSEA) was 0.02. Therefore, the measurement model has a good fit (Table 4.11).

Table 4.11 Overall model fit indices for measurement - Hospital

Goodness-of-fit measures	**Recommend Value ***	**Model Value**
fit measure		
χ^2	N/A	7.75
d.f. (Degree of freedom)	N/A	7
χ^2/d.f.	≤ 3.00	1.11
Goodness-of-fit (GFI)	≥ 0.90	1.00
Adjusted goodness-of-fit (AGFI)	≥ 0.80	0.96
Normalized fit index (NFI)	≥ 0.90	1.00
Non-normalized fit index (NNFI)	≥ 0.90	1.00
Comparative fit index (CFI)	≥ 0.90	1.00
Root mean square residual (RMR)	≤ 0.05	0.01
Standardized RMR	≤ 0.05	0.012
Root mean square error of approximation (RMSEA)	≤ 0.10	0.020

* Hair et al., 1998

To check multicollinearity, the data was analyzed by finding the Tolerance and Variance Inflation Factor (VIF). The data results show that tolerance values were more than 0.1 and VIF values were lower than 10 (Hair et al., 1998).

There were only dummy variables which were not criteria. It shows the all variables as show in Table 4.12.

Table 4.12 Tolerance value and Variance Inflation Factor (VIF) - Hospitals

Factors	**Tolerance**	**VIF**
USE (Dependent)		
BI	.889	1.125
FC	.605	1.652
A*FC	.874	1.144
P*FC	.630	1.588
BI (Dependent)		
PE	.555	1.802
EE	.400	2.503
SI	.515	1.943
G*PE	.041	24.512
G*EE	.040	24.997
G*SI	-	-
A*PE	-	-
A*EE	.047	21.093
A*SI	.048	20.676
P*PE	-	-
P*EE	-	-
P*SI	.481	2.080

From Table 4.13 shows correlation matrix analysis which relationship between dependent and independents.

Table 4.13 Correlation Matrix analysis – Hospital

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
PE	1												
EE	0.661**	1											
SI	0.523**	0.691**	1										
FC	0.487**	0.619**	0.797**	1									
A*EE	0.175**	0.386**	0.261**	0.204**	1								
A*SI	0.150**	0.324**	0.338**	0.247**	0.775**	1							
A*FC	0.167**	0.334**	0.319**	0.319**	0.767**	0.786**	1						
G*PE	0.338**	0.315**	0.223**	0.203**	0.118*	0.119*	0.125*	1					
G*EE	0.273**	0.379**	0.260**	0.229**	0.153**	0.147**	0.150**	0.778**	1				
P*SI	0.483**	0.619**	0.601**	0.707**	0.208**	0.204**	0.246**	0.142**	0.177**	1			
P*FC	0.388**	0.578**	0.513**	0.589**	0.279**	0.253**	0.290**	0.139**	0.184**	0.721**	1		
BI	0.376**	0.425**	0.340**	0.310**	0.042	0.122**	0.125**	0.122*	0.145**	0.391**	0.270**	1	
USE	0.287**	0.347**	0.323**	0.317**	0.175**	0.158**	0.176**	0.158**	0.163**	0.361**	0.323**	0.339**	1

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

** Correlation is significant at the 0.01 level (2-tailed)

Structure equation modeling was applied to examine the hypothesis model using Lisrel. The Final model (Figure 4.2) shows result the affect factors with the non-significant paths removed.

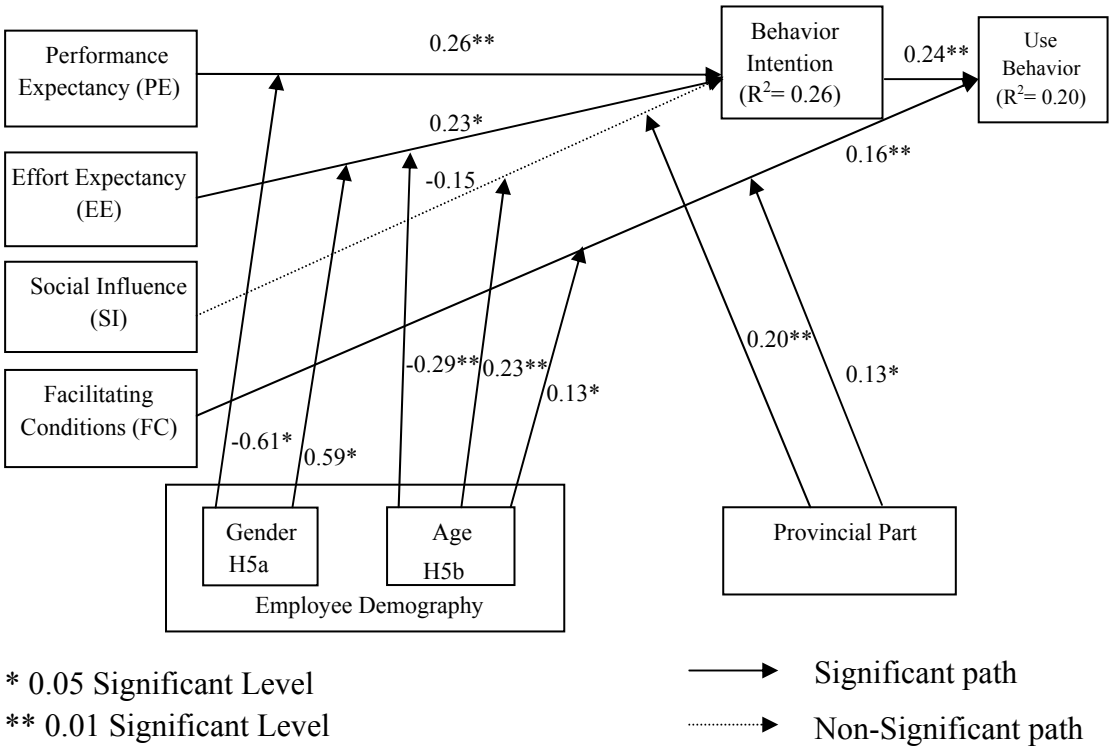


Figure 4.2 Structure model results (Hospital)

Figure 4.2 presents the structure model results with construct variables and modulators (e.g. age, gender and provincial part) were included. Researcher examined using the resulting of the total of explained variance (R^2) for behavior intention and using behavior are 26% and 20%, subsequently. These results indicate that the structure model is satisfactory in that it has founded Falk and Miller who suggest for level of variance explained (R^2> 0.1 and predictor variable explaining ≥ 1.5% of variance) (Jöreskog & Sörbom, 1996). The majority of the hypotheses were strongly supported expect for hypotheses H3, H5a3 and H5c. The result indicates that user's technology acceptance about performance expectancy (H1; β = 0.26, t = 3.12, p < 0.01), and effort expectancy (H2; β = 0.23, t = 2.25, p < 0.05) positively affected

behavior intention towards the using actual behavior of the healthcare staffs to accept healthcare technology respectively. In the addition, facilitating conditions (H4; β = 0.16, t = 3.00, p < 0.01) positively also affected using actual behavior of the healthcare staffs. But, social influence which is a main construct, it had a non-significant (H3; β = -0.15, ns) influence on behavior intention.

For the modulators, researcher founded that provincial part have an indirect affect with social influence (H6c; β = 0.20, t = 3.22, p < 0.01) and facilitating condition (H6d; β = 0.13, t = 2.14, p < 0.05). Their constructs also influence to the behavior intention and using behavior. For the employee demography consisted of gender and age, respectively. If the gender were negative significant, it represents female. Female also affects to performance expectancy (H5a1; β = -0.61, t = -2.03, p < 0.05). Next, male affects to effort expectancy on behavior intention to using healthcare staff's behavior (H5a2; β = 0.59, t = 1.97, p < 0.05). If age were negative significant, it represents as over 40 years. Thus, the over age 40 affects to effort expectancy on behavior intention (H5b2; β = -0.29, t = -3.92, p < 0.01). And, fewer 40 affects to social influence on behavior intention (H5b3; β = 0.23, t = 3.00, p < 0.01) among facilitating conditions on using behaviors (H5b4; β = 0.13, t = 2.48, p < 0.05).

In conclude the 19 hypotheses tested in structure results model of hospital, 7 were also deleted from the model, while 11 hypotheses were found to be significant and a hypothesis was not supported. Finally, this research results also supports with previous other researches. And, all results were shown in Table 4.14.

Table 4.14 Test results of information technology of the hospital acceptance model

	Beta (β)	**R^2**
(1) Behavior Intention (BI)		0.26
BI = PE+EE+SI+G*PE+G*EE+A*EE+A*SI+PC*SI		
PE	0.26**	
EE	0.23*	
SI	-0.15	
G*PE	-0.61*	
G*EE	0.59*	
A*EE	-0.29**	
A*SI	0.23**	
PC*SI	0.20**	
(2) Use Behavior = (USE)		0.20
USE =BI+FC+A*FC+PC*FC		
BI	0.24**	
FC	0.16**	
A*FC	0.13*	
PC*FC	0.13*	

* 0.05 Significant Level

** 0.01 Significant Level

Table 4.15 shows decomposition of the effects analysis of hospital respondents.

Table 4.15 Decomposition of the effects analysis (Hospital)

Criterion variable predictors	**Behavior intention** $R^2 = 0.26$			**Use behavior** $R^2 = 0.20$		
	DE	**IE**	**TE**	**DE**	**IE**	**TE**
PE	0.26** *(0.08)*	-	0.26** *(0.08)*	-	0.06** *(0.02)*	0.06** *(0.02)*
EE	0.23* *(0.10)*	-	0.23* *(0.10)*	-	0.06** *(0.03)*	0.06** *(0.03)*
SI	-0.15 *(0.11)*	-	-0.15 *(0.11)*	-	-0.04 *(0.03)*	-0.04 *(0.03)*
FC	-	-	-	0.16** *(0.05)*	-	0.16** *(0.05)*
G*PE	-0.61* *(0.30)*	-	-0.61* *(0.30)*	-	-0.15 *(0.08)*	-0.15 *(0.08)*
G*EE	0.59* *(0.30)*	-	0.59* *(0.30)*	-	0.14 *(0.08)*	0.14 *(0.08)*
A*EE	-0.29** *(0.08)*	-	-0.29** *(0.08)*	-	-0.07** *(0.02)*	-0.07** *(0.02)*
A*SI	0.23** *(0.08)*	-	0.23** *(0.08)*	-	0.06* *(0.02)*	0.06* *(0.02)*
A*FC	-	-	-	0.13* *(0.05)*	-	0.13* *(0.05)*
P*SI	0.20** *(0.06)*	-	0.20** *(0.06)*	-	0.05** *(0.02)*	0.05** *(0.02)*
P*FC	-	-	-	0.13* *(0.06)*	-	0.13* *(0.06)*
BI	-	-	-	0.24** *(0.05)*	-	0.24** *(0.05)*

Note1 : * Significant at $p < .05$, ** Significant at $p < .01$

Note2 : Construct abbreviations: PE = Performance expectancy,
EE = Effort expectancy, SI = Social influence, FC = Facilitating conditions,
A = Age, Gen = Gender, P = Provincial part, BI = Behavior intention

Note3 : DE= Direct effect, IE = Indirect effect, TE = Total effect

Note4 : Parentheses ( ) = Standard Error (SE)

The major of constructs, performance expectancy had a strongest direct effect to behavior intention, following by effort expectancy. This indicates that healthcare technology cans support medical staffs to the hospital/healthcare services until they feel realize useful of using technology. Use behavior most received direct effect from behavior intention and facilitating conditions, respectively. Social

influence may be non-significant effect influence on behavior intention of users. But, it also a little effect on behavior intention to the medical staffs.

Table 4.16 Comparison finding results between hotels and hospitals

Hypotheses	Hypothesis path	Hotel Results		Hospital Results	
		Path coefficient (β)	**Finding**	**Path coefficient (β)**	**Finding**
H1	PE→BI	0.58**	**Supported**	0.26**	**Supported**
H2	EE→BI	0.35**	**Supported**	0.23*	**Supported**
H3	SI→BI	0.27**	**Supported**	*-0.15*	*Not Supported*
H4	FC→ USE	0.27**	**Supported**	0.16**	**Supported**
H5a1	G*PE→BI	0.44**	**Supported (Male)**	-0.61*	**Supported (Female)**
H5a2	G*EE→BI	-0.62**	**Supported (Female)**	0.59*	**Supported (Male)**
H5a3	G*SI→BI	0.25*	**Supported (Male)**	-	*Not Supported*
H5b1	A*PE→BI	-0.72**	**Supported (Old)**	-	*Not Supported*
H5b2	A*EE→BI	0.55*	**Supported (Young)**	-0.29**	**Supported (Old)**
H5b3	A*SI→BI	0.19	*Not Supported*	0.23**	**Supported (Young)**
H5b4	A*FC→USE	0.15**	**Supported (Young)**	0.13*	**Supported (Young)**
H5c1	EXP*PE→BI	-	*Refuted*	-	*Refuted*
H5c2	EXP*EE→BI	-	*Refuted*	-	*Refuted*
H5c3	EXP*SI→BI	-	*Refuted*	-	*Refuted*
H5c4	EXP*FC→USE	-	*Refuted*	-	*Refuted*
H6a	P*PE→BI	-0.05	*Not Supported*	-	*Not Supported*
H6b	P*EE →BI	0.07	*Not Supported*	-	*Not Supported*
H6c	P*SI→BI	0.09*	**Supported**	0.20**	**Supported**
H6d	P*FC→USE	0.11**	**Supported**	0.13*	**Supported**

Note: * $p < 0.05$, ** $p < 0.01$

4.4 Discussion Findings

This topic presents discussion findings of two service industries: hotels and hospitals. The research discussions are shown as follows:

4.4.1 Discussions of Hotel Findings

Testing result showed that hotel employees' technology acceptance for service technology in service industries. The research result of finding was that performance expectancy, effort expectancy, social influence, and facilitating conditions, all main factors were positive directly influence on behavior intention. In addition, the modulators also are indirect effects to the main factors. Performance expectancy was strongest direct effect than other main factors. And, effort expectancy, social influence, and facilitating conditions also were affected positively respectively. It was shown that social influence results as well as facilitating conditions results, but less than effort expectancy. Meanwhile, the modulators, gender affected on performance expectancy, effort expectancy, and social influence. Age also affected to performance expectancy, effort expectancy, and facilitating conditions, except for social influence; while provincial part affected on both social influence and facilitating conditions.

Performance Expectancy

As a results, this determinant was strongest positively affect to behavior s' intent. The result is in accordance with prior findings (Al-Gahtani et al., 2007; Chang et al., 2007; Chiu & Wang, 2008; Holden, 2010). When guests/customers are reservation via hotel website, hotel employees will be managing hotel reservation immediately. Hotels knows amount of people check-in. Hotel management add job performance in serving and control each department. The example, restaurants of hotel provided the amounts of guest food are suitable. As performance of hotel technology can enhance hotel employees' perception of perceived usefulness in the hotel servicing. Hotel technology should focus on IT development by hotel employee participants. Thus, the executive and manager of hotels should choose hotel technology which they must also consider in usage actual for employees. Therefore, the hotel employees also will perceive in usefulness more and more.

In the modulators, male and older than 40 which they are the modulators have indirect affected on performance expectancy to behavior intention. Similar findings are also studied UTAUT by Venkatesh et al. (2003). Almost, elderly male are managers. Managers' roles related to manage and operate in each department closely. Thus, hotel technologies must response quickly. The hotels should training by focusing hotel manager in perceived usefulness of technology. Finally, manager will perceive usefulness increase.

Effort Expectancy

Effort expectancy (H2) was found to be a less significant impact than performance expectancy on behavior intention. This is accordant with the result of the prior researches (Chang et al., 2007; Chiu & Wang, 2008; H. Wang & S. Wang, 2010). Hotel employee use front-office systems for check occupied/vacant of guest and sale detail and payment transactions directly. Guest who is booking via internet everywhere, they will receive servicing from front office employees so faster. Accordingly, hotel technologies should easily for leaning or usage actual, interact with system or database quickly including easy remembering to use from new/old hotel employees. Hotel technology easily will be built motivation of usage intent. Moreover, hotel technologies should be provided not complicated and work IT function of appropriately. And, training also will support in perceived ease of the hotel employees' usage. When hotel employees had perceived ease of use in hotel technology by themselves, they always request hotel technology of usage actual.

As a result, about the modulators affect to the effort expectancy, is female and younger worker. Because of younger female likely job in servicing with guests directly (e.g. front desk officer and public relation officer), technology should be easy to use and ready to serve. Therefore, training of new women employees must focus on perceived ease of usage intention what they want use technology for operate actively. New women employees will feel perceived ease of use technology by themselves, and they would use hotel technology for service highly.

Social Influence

Social Influence (H3), this research result showed that it had a positive effect on behavior intention. This finding is consistent with previous research of the other researches (Lam et al., 2007; Aggelidis & Chatzoglou, 2009; Ramasubbu et al., 2008) Lam et al. (2007) related information technology adoption in the hotel employee. In their research, subjective norm are closest with the social influence determinants of UTAUT. Hotel employees with high social influence had high intentions to use hotel technology service. This indicates that hotel employees would use technology for good service until guest satisfactions when they receive more influence from their colleagues, managers, or practitioners. Therefore, more social pressure was more important to usage hotel technology themselves until employees feel accept technology for operating in work. Employee also should attend to the other hotels/associations. They will receive exchange experience in IT and learn within other hotel technology from other hotel employees.

Male and provincial parts were found to be an indirect effect to social influence on behavior intention. The results were showed that male in hotel each provincial, they also are interested in technology specific in their job specially. Male employees always receive technology information from friends/colleagues both same hotels and other hotels. Accordingly, practitioners considerably support training of male employees group within other provincial parts or hotels in order to they will be exchange information between employees together.

Facilitating Conditions

Facilitating conditions (H4) also has a positive influence on usage intent and found to have the significant same as social influence. The result is in accordance with prior findings (Karadag & Dumanoglu, 2009; Rouibah et al., 2009; Zhou et al., 2010). Many prior studies, the facilitating conditions were defined as knowledge or skill necessary, technical support for user, knowledge or technical assistance for using the system. Facilitating conditions should be support from other organizations such as own hotels or hotel practitioners, Thai hotel association and Tourism Authority of Thailand. Own hotels should participant with Thai hotel associations and Tourism Authority of Thailand, for developing IT in hotels. Thai hotel associations must

support using hotel technology such as advice IT for new hotels, or providing IT staff assistants. Tourism Authority of Thailand also encourage each provincial part is interested in hotel technology and hotel employees perceived good benefit from hotel technology. It was indicated that barrier was removed from both hotel practitioners and hotel association, and Tourism Authority of Thailand, they are cooperates. Hence, training, new technology and IT staffs will help develop employee and accepted in using hotel technology highly.

Finally, younger and provincial part moderated the relationship between facilitating conditions and usage actual. Almost younger employees were new employees and they have IT knowledge, new opportunity for using technology up-to-date such as smart phone, or tablet. They also are interested in these supports. Therefore, the most of younger in provincial parts should receive satisfied with these facilitating utilization supports.

4.4.2 Discussions of Hospital Findings

The researcher has founded factors influenced with using information technology in Hospitals. The results indicated that main factors are performance expectancy, and effort expectancy, were significant determinants to the users' behavior intention among facilitating conditions also were significant with usage actual behavior. Moreover, the modulator was gender, age, and provincial part also indirect affected to the majority factors. Performance expectancy has strongest direct effects to behavior intention, whereas social influence was found no direct affect on behavior intention as well as no significant total direct affect to using healthcare technology behavior. However, when age and provincial part, are modulators, which indirect affect on social influence to user' behavior intent. Beside age also affected to effort expectancy and facilitating conditions. In the addition, gender also indirect affected on both performance expectancy and effort expectancy; meanwhile, provincial part affected on social influence and facilitating conditions directly.

Performance Expectancy

Performance expectancy (H1) was strongest affect to behavior intention than other main determinants. The result consistent with what studies (Venkatesh et

al., 2003; Chang et al., 2007; Yi, et al., 2006). Healthcare technology helps support serving including medical care in the hospitals. Physicians use robotic surgeries with caring patients such as gynecology, or oncology. Robot surgery is a part of the health care technology. It will limit both in time and space to make complicated processes (Schreuder & Verheijen, 2009). Physicians will therapy patients correctly and quickly. Patients will loss bleeding, secure, safe and small wounds. Thus, patients also get well so quickly until return to life ordinarily and happy. It makes more satisfactions between physicians and patients. Therefore, they believe using healthcare technology that it will enhance this performance of servicing hospitals (Davis, 1989; Venkatesh et al., 2003). Similar findings also made by Chang et al. (2007). Their studied that it believed physicians trust in their prescriptions will be accepted truly. Hospital staffs will be adoption healthcare technology for servicing what they should perceive usefulness from actual usage. Therefore, when users believes that using healthcare technology will bring in positive efficiency for good servicing to users will perceive using the healthcare technology.

Hospital staffs received in usefulness from healthcare technology highly. The results suggest that hospitals are deciding in healthcare technology what healthcare uses actual usage within hospitals. Thus, healthcare technology should be motivation and suitable for using actual until it will be makes more fast and performance including decrease error. While as, hospitals should focus on healthcare technology choosing and training. Healthcare staffs should be participated develop to choose technology since beginning. Healthcare technology chosen has been implemented within hospital process. Training also need to explain let healthcare staffs recognize usefulness of these healthcare technologies more and high benefit.

The research results also different with UTAUT finding with respect to the moderators as gender. As females in hospital staffs of Thailand, almost are nurses. Mainly, nurses are more participant for helping physicians who emphasize treatments. Nurses must be attentive to use of technology in works more than physicians. Consequently, female in hospital staffs that female should focus on explaining the benefits of the healthcare technology rather than process.

Effort Expectancy

The testing result showed that effort expectancy (H2) was found to be a fewer factor affect effecting behavior intension of usage than performance expectancy. The result is in accordance with prior findings (Chang et al., 2007; Davis et al., 1989; Moore & Benbasat, 1991; Lee & Chao, 2004). The key of healthcare technology is based on the simple to ease of use. Both physicians and nurses use computerized physician order entry (CPOE), this application is providing write orders online. It helps legible and can be identify in all patients description such as aliments, or medicines. Pharmacists will read physician orders easily and immediately. It reduces medical error and the frequent of adverse drug events (Bates, 2000). Physicians sufficiently gain of CPOE for support with easier, correct and faster to caring process such as making the decision for care. Therefore, information and service quality also related with perceived ease of use (DeLone & McLean, 2003). It also affected with using and physician satisfactions by their feeling about whether they are easier to use the conventional method. And finally, they also perceives in easy of using actual in job.

The results of the research demonstrate that hospital staffs should perceived ease of use in the healthcare technology. First, healthcare technology should be use easily by learning faster, easing to remember how to perform tasks with systems, clearly, flexible to use, including easy becoming skillful. Secondly, the function of those healthcare technologies should be uncomplicated, flexible with usage. Responding and searching systems are not difficult. By information or data also is managed in a systematic clearly when hospital staffs using. And finally, the hospital staffs also must acquire be training seriously among perceived understanding in technology increase. After, healthcare technologies had been trained to the hospital staffs, they perceived easy to use by themselves. They feel convenient with usage actual and acceptance also increases.

In the male and older than 40 which they are the modulator affected with effort expectancy. This suggests that they should understanding healthcare technology usage, convenient, ease of use and uncomplicated; until they would like to be usable. Almost male and older are physicians. Physicians are important role to treat patient mainly. The researcher expects physicians' times are limited and they want easiness of

working. Sometime, physicians wants finding by themselves. Therefore, the reasons make motivation for studying those healthcare technologies.

Social Influence

Different to social influence (H3) was found to have no significant affects on behavior intentions which are no similar finding for healthcare technology acceptance research directly. The nearby prior research the researcher cans refer to is the study conducted by Chismar and Wiley-Patton (2002) about internet adoption. In their study, social norm and image are similar with the social influence determinants in UTAUT. Healthcare staffs do not need to perceived compression form social influence. They decision to adoption healthcare technology are not influenced by compressions from other people in hospitals. Chang et al. (2007) also presented that social influence had less affect on behavior intention for technology acceptance in physician targets. The most physician targets will be high ego and good technical skills. Physicians were expert technical skills which it affected to the research. In addition, limitation times of the physicians or nurses also affect to interaction or exchange less. Furthermore, medical experts do not need to be gained benefit from using these healthcare technologies because they also perceived usefulness and ease of use.

Although social influence factors were not directly affecting to behavior intention, modulator as younger and provincial part affected. The main reason, new generation hospital staffs work with colleagues who were similar age and always usage new technology. In addition, each provincial part, new physicians also often to be leader for bring new healthcare technology to the hospital. Thus, hospital should interest in the new physicians' opinion.

Facilitating Conditions

The impact of facilitating conditions has a positive influence on using actual behavior (H4). This is in line with the results of previous studies (Kijsanayotin et al., 2009; Rouibah et al., 2009; Zhou et al., 2010). This implied that the infrastructure support such as computer/systems, or knowledge necessary. Internal and external organizations encourage healthcare technology affect to the usage physician's

behavior. Health information technology policy is important parts to support hospitals staffs adoption (Menachemi et al., 2011). The internal organizations as hospitals support in knowledge/technical assistance for using the healthcare technology as technology simply, or IT staffs. IT staffs in the hospitals who are technology support assistants with employees as physicians. Some physicians may be having knowledge necessary but not enough. Therefore, IT staffs also should be employed from hospitals in order to support their healthcare job. The external organizations as Ministry of Public Health, helps increase health IT, price, and provider. They cans support software centrals which Ministry of Public Health provided healthcare technology chosen suitable for hospitals in country and training. Finally, the hospital staffs accept healthcare technology into hospitals.

It helps reduce barriers of using new information technology for servicing (Chang et al., 2007). And, IT utilization facilitates with the physical behavior intentions (Taylor & Todd, 1995). Therefore, the healthcare staffs should receive supporting from internal/external organizations such as IT utilizations, IT staffs and technical resources. Thus, the most of the participants feel satisfactions for all supports and accepted.

New finding of modulators in this research reveals that provincial part has a positive influence of facilitating conditions on using behavior of hospital staffs. As nearly finding of Kakoli and Soumava (2008), their study about different two country's prepayment acceptance, in two countries contrasts access of person to using technologies. Countries or provincial part build different in accessing the technologies. While as, in our researches demonstrates with UTAUT. It is founded only social influence and facilitating conditions. Hospital staffs are received influence from participants in each provincial part until affect to using actual behavior. Therefore, the hospital participants (as hospital administrations) in provincial part also are important role with hospital staffs. Besides facilitating conditions should support to each provincial part be equal such as hardware, software, and IT staffs. The example, hospital administrators may be defining policy in IT staff clearly as salary, or welfare.

4.4.3 Discussions between Hotels and Hospitals

In this research, performance expectancy had a positive effect on behavior intention. Employees in hotel and hospital have founded performance expectancy positively influence on behavior intention. This is consistent with the research results (Chang et al., 2007; Chiu & Wang, 2008). This implies that hotels and hospitals are as part of service industries. Good performance servicing is the high priority. Accordingly, service technology should help enhance efficiency including performance services, and decrease times in operate, until patient/customer feel satisfactions. Technology in the service industries should be useful to improve the service performance and quality.

Hypothesis 1: Performance Expectancy is positively on Behavioral Intentions to use IT/IS.

Hypothesis 2: Effort Expectancy is positively on Behavior Intention to use IT/IS.

After testing, researcher founded effort expectancy which it is main construct. It also positively affect with behavior intention. This research result with a according to in early research results (Chang et al., 2007; Pai & Huang, 2011; Wu et al., 2008). Service employees who receive technology respond so fast the more likely that they feel these technologies useful and decrease difficult for using in their jobs. This suggests that technology should be always easy and up-to-date for using in service with customer or patients. Thus, customers will feel satisfied for servicing.

Hypothesis 3: Social Influence is positively on Behavioral Intentions to use IT/IS.

Social influence significant affected behavior intention to use hotel technology. This is again consistent with the previous studies results (Aggelidis & Chatzoglou, 2009; Wu et al., 2008). Although in the hospital results, it does not affect until at the significant level. Hotel employee society have more participations and

closet relationships both hotel association and hotels in same provincial part. But, social influence is main factors of UTAUT that it is important for building driven in every organizations. Colleague will create incentives for use technology with same departments. Among, social influence cans activate employees including support in organizations. Therefore, owner and boss should support in training, up-to-date technology, and IT staff/specialists.

Hypothesis 4: Facilitating Conditions is positively influence on "Use Behavior".

The research reveals that facilitating conditions has a positive influence on use behavior. The result is consistent with the result of previous studies (Chang et al., 2007; Yi, Jackson, Park, & Probst, 2006). Facilitating conditions explains an individual believe exist to support employee such as infrastructure, IT staff, technology service; knowledge/specialists are directly impact to using technology with hotel and hospital. Service employee always will received support from their organization because good technology helps support servicing of employee until guests/patients' satisfactions. Therefore, facilitating conditions should be support in IT system, IT staff and technology performance by owners, bosses or managers.

Hypothesis 5a: Age is positively influence of (PE, EE and SI) on Behavior Intention to use IT/IS.

Hypothesis 5b: Gender is positively influence of (PE, EE, and SI) on Behavior Intention to use IT/IS. And, Gender is positively influence of Facilitating Condition on "Use Behavior".

Hypothesis 5c: Experience is positively influence of (EE, SI and FC) on Behavior Intention to use IT/IS. And, Experience is positively influence of Facilitating Condition on "Use Behavior".

The finding shows that demographic employees which are modulators as characteristics of the hotel and hospital staffs. The result consistent with what Venkatesh et al. (2003) concluded in their study proves hypotheses in order to develop new technology acceptance model as UTAUT which it also adds the new modulators (Venkatesh et al., 2003). In hotel respondents, gender was positively influence to PE, EE and SI. And, age also was positively influence of all main constructs except SI. In hospital respondents, gender was positively influence to PE, and EE expect SI. And age also was positively influence of EE, SI and FC.

Hypothesis 6a: Provincial part is positively influence of Performance Expectancy on Behavior Intention to use IT/IS.

Hypothesis 6b: Provincial part is positively influence of Effort Expectancy on Behavior Intention to use IT/IS.

Hypothesis 6c: Provincial part is positively influence of Social influence on Behavior Intention to use IT/IS.

Hypothesis 6d: Provincial part is positively influence of Facilitating Conditions on "Use Behavior".

The research results proves that provincial part positively influence on social influence on IT/IS of hotels, with a path coefficient of 0.09 and *p*-value at 0.05; among hospitals with a path coefficient of 0.02 and *p*-value at 0.01, supporting H6c. This is in line with the results of the (Kakoli & Soumava, 2008; Oshlyansky, Cairns, & Thimbleby, 2007) analysis with different provincial part were affected on behavior intentions to using technology. Hence, the provincial part is positively influence of social influence. Although, in Thai provincial parts have different cultures or langauages, it also impacts with socials from collogues or friends. Hotel and hospital employee received technology information of provincial parts from collogues. When they perceive influence from social, they also wanted use information technology.

For provincial part is positively influence of Facilitating conditions on "Use Behavior", in hotels with a path coefficient of 0.11 at *p*-value and 0.01, in hospitals with a path coefficient of 0.13 and *p*-value at 0.05. This is in accordance with Oshlyansky et al. (2007) found in exploring cross-culturally affect to technology acceptance from many countries (Kakoli & Soumava, 2008; Oshlyansky et al., 2007). Facilitating utilizations help respond with organizations or governments although it is not enough. If facilitating conditions received supporting with service industries, it will help more perceived usage of employee of organizations. Accordingly, the barrier will be removed when facilitating utilizations are supported from organization, association and governments seriously.

CHAPTER V
CONCLUSION AND RECOMMENDATIONS

In this chapter, it is divided into 3 parts. First, researcher also will be conclusion of research final result. Secondly, limitation in this study and finally, it related recommendation for service industries in hotel/hospitals including proceeding in the future research.

5.1 Conclusions

Nowadays, information technologies are interested in service industries as hotel and hospital. Service businesses have been more competitions highly in order to response with customer/patients feel satisfy. Employee in their service industries also need to be IT knowledge/skills and acceptance in service technology. The aim of this study was to explore factors which influence of information technology of the employee's behavior in service industries: hotels and hospitals. The Unified Theory of Acceptance and Use of Technology (UTAUT) is used in research model for studying; including adds modulators (employee demography and provincial part of culture) which affect with behavior intention and actual behavior. The survey was conducted by collecting data divided into 400 hotel respondents and 400 hospital respondents, who use information technology in service industries, Thailand.

In the hotel employees were founded four main factors (performance expectancy, effort expectancy, social influence, facilitating conditions) and other modulators (age, gender, provincial part) which UTAUT also impact factors for hotel. However, in the hospital employees also are founded three main factors (performance expectancy, effort expectancy and facilitating conditions) and same hotel modulators. The finding of this study indicates that those factors are influence of technology acceptance in the service industries.

The research result shows that most hotel employees were female, younger, bachelor's degree and front desk officer. They have experience in over seven years in working. And, they are working at the independent management hotels (Four star rating) which locate area in Bangkok. In addition, in the part of hospital respondents were mostly male, elderly, and bachelor's degree and physicians. They also have experience employment in over fifteen years. Almost, they are working at the community hospitals and the routine activities in the hospital staffs; they are almost working over 3 hours.

Both hotel and hospital results, the performance expectancy was found to be a little stronger main factors affecting behavior intention to usage than other factors. The results are suggested that service technology cans support in their service job performances and customers feel satisfactions with serving. Service employees should participants with IT developing or implement. Training also help service employee that they perceived in usefulness of service technology. Finally, they are accepting in service technology until usage intent. For effort expectancy and facilitating conditions factors have a significant on behavior intention and using on behavior, respectively. These results imply that employee would like to use service technology easily and good IT utilizations support obviously. Thus, service technologies need to understandable, clearly, learning, recognizable, and flexible to usage.

But, the social influence factor of hotel employees are impact on behavior intention meanwhile this factor in the hospital staffs has no significant. In the hotel, Young employees are working with the colleagues, or managers. Colleagues can introduce and teaching technology for usage in job. It helps new or young employees feel believe and using technology including they thinks technology will be helped within works. However, in the hospital, almost employees as physicians or nurses are not received from social influence. This result indicated that limitation times of the employees also affect to interaction or exchange less. Medical experts do not need to be gained benefit from using these healthcare technologies because they also perceived usefulness and ease of use.

And, the results of study that it founded modulators for supported in two service industries. As older males in hotel employees are indirect affected on

performance expectancy to behavior intention. This research result suggests that male in hotels are important role in decision making positions such as managers. They have more power in the hotel management. Therefore, their technologies need to be fast responding and giving benefits highly. Next, younger female also are indirect affected with effort expectancy to behavior intention. They are new generations or employees. Thus, technology should be easy for learning and usage. In hospital employees, females are indirect affected on performance expectancy to behavior intention. It proves that female as nurses like use technologies what they respond so fast and good stability. Consequently, technology for female employees in hospitals should develop in performance. As old male as physicians, they are experiencing in job and limit times for studying technologies. They also are indirect affected with effort expectancy to behavior intention. Therefore, technologies of old male employees in hospitals, it should be easy with understand, usage, learning, and remember.

5.2 Research Limitations

This study has some limitations as follows:

Firstly, the data were gathered from respondents: hotels and hospitals. Researcher cans access collect data in hotel and hospital but it needs to collect from online questionnaire (Google Doc). The researcher will not know what respondents you want. And, it also takes a long time for collecting. Therefore, in the future researches should collect with hotel/hospital employees who using actual technology behavior directly.

Secondly, the researcher studied in respondents who using technology mainly. Not only technologies should select only one, but also specific in targets who often uses the technologies. There is possibility that the technology acceptance will increase.

Finally, in the future's researches should develop new factors for checking difference such salary, education or prices. It may be founds the new factors which are effected on behavior intention to actual behavior.

5.3 Recommendations

In the service industries have many businesses such as airline, banking, and restaurants. The researcher gave recommendations for hotels and hospitals are following in below.

5.3.1 Recommendations for Hotels

In the research results, there are four factors supporting acceptance of using hotel technology: performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy is the most important factoring directly affected on behavior intention to usage intent. This result suggests that hotel employees appreciate that use of hotel technology helpful service performance in their jobs. The hotel technology will be adopted to increase if hotel employee perceived benefit of usage actual. Therefore, hotel technology should good quality and respond quickly, easy to usage. And, the hotels have to support in technology performance and developing hotel employee IT skills such as supporting in hardware/software, training and IT staff services. If the hotels want to develop employee for IT, they should be encourage in the fours factors. Some hotels have not budgets comfortable; their hotels should develop from performance expectancy, effort expectancy, social influence, and facilitating conditions, respectively. And, hotels cans choose to develop, in the male employees respect to perceived usefulness in hotel technology each department among the female employees also respect to perceived ease of use such as training.

5.3.2 Recommendations for Hospitals

In the research results, there are three factors supporting acceptance of using hotel technology: performance expectancy, effort expectancy, and facilitating conditions. The most important factoring is performance expectancy. This result demonstrates that quality and performance of technology helps to perceive usefulness of hospital employees. Therefore, technology in hospital should support in good quality: service and information technology including data processing well. They feel perceived usefulness of technologies. Some hospitals are not enough for budget in technologies. They cans choose support in performance expectancy factors, firstly.

Female employees should respect to perceived usefulness. Old male employees also should respect to perceived ease of use.

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APPENDIX

แบบสอบถามเพื่อการวิจัย

Questionnaire for researching

Title: Factor which affect to accept technology of employee in the service industry in Thailand
(ปัจจัยที่มีผลต่อการยอมรับการใช้เทคโนโลยีสารสนเทศของพนักงานโรงแรมในอุตสาหกรรมบริการ)

Dear Respondent,

This questionnaire is a part of the master thesis, Technology Information System Management (TISM), Faculty of Engineering, Mahidol University. The objective of this questionnaire is to determine the correct factors which affect to accept technology of employee in the service industry in Thailand. This research will evaluate the current usage of information technology (IT) in the hotel business, and lead to the enhancement of the usage of IT in this business. Your answers are important with this research. Your information will be keep give.

Your feedback is important to my research. I appreciate for your help to completely fulfill this questionnaire according to your own judgment. Only the complete with your own judgment can be used this survey evaluation.

There are 4 sections/ Total 8 pages. For this questionnaire

Section 1: The General information based on the hotel employee. This section is check list type with 9 questions.

Section 2: The General information based on your hotel. This section is check list type with 7 questions.

Section 3: The usage of the Information Technology in your hotel. This section is check list type with 5 questions.

Section 4: The factors affected the decision to choose the kind of information technology for service. This section is rating scale type with 34 questions.

Section 1 The General information based on the hotel employee

Instruction Please mark ✓ in provided ○ in front of the correct answer if you choose

1. Gender

○ 1) Male ○ 2) Female

2. Marital status

○1) Single ○2) Married ○3) Divorced/Widowed

3. Age

○1) lower or 20 years ○2) 21-25 years ○3) 26-30 years

○4) 31-40 years ○5) > 41 years

4. Degree / Equivalent Qualification

○1) TAFE/Commercial College ○2) Bachelor's

○3) Master's ○4) Ph.D.

○5) Other .....

5. Experience employment

○1) 0-2 years ○2) 3-5 years

○3) 5-7 years ○4) over 7 years

6. Career position of Respondents

○1) Owner

○2) Information Technology manager ○3) Information Technology employee

○4) Marketing manager ○5) Marketing

○6) Sales manager ○7) Salesman

○8) General Manager ○9) Admin officer

○10) Assistant general manager ○11) Assistant general officer

○12) Front Office Manager ○13) Front desk officer

○14) Operation Manager ○15) Public Relation officer

○16) Others .....

7. Experience of using Internet or Information Technology

○1) less than 1 year ○2) 1-3 years ○3) 4-6 years

○4) 7-10 years ○5) more than > 10 years

8. How long do you use the computer at work?

○1) Never ○2) less than 30 min. ○3) 30 min to 1 hour

○4) 1-2 hours ○5) 2-3 hours ○6) more than 3 hours

9. How frequent do you use computer such as play the internet or search the information?

○1) none or less than once a month ○2) two or three times per a month ○3) a month

○4) about once a day ○5) once a day ○6) several times a day

Section 2 The General information based on your hotel

Instruction Please mark ✓ in provided ○ in front of the correct answer if you choose

1. Hotel management

○1) Independent hotel ○2) International Chain hotel ○3) Domestic Chain hotel

2. Star Rating

○1) Five-star ○2) Four-star

○3) Three-star ○4) Two-star

○5) One-star ○6) No star rating

3. Hotel type

○1) Hotels ○2) Resorts

○3) Service Apartments ○4) Guesthouses

○5) Hotels and Resorts ○5) Hotels and Service Apartments

4. Purpose of Service **(You may choose more than 1 choice)**

○1) Business hotel ○2) Convention hotel

○3) Resort Hotel ○4) Casino hotel

○5) Transient/Commercial hotel ○6) Residential hotel

5. What is your hotel location?

○1) Bangkok ○2) Central/Middle (Not Bangkok)

○3) West ○4) East

○5) Northeastern part ○6) South

○7) North

6. How many hotel rooms does your hotel have?

○ 1) Less than or 50 rooms ○ 2) 51-100 rooms

○ 3) 101-150 rooms ○ 4) 151-200 rooms

○ 5) 201-300 rooms ○ 6) 301-400 rooms

○ 7) 401-500 rooms ○ 8) more than 501-600 rooms

7. Service Level in your hotel **(You may choose more than 1 choice)**

○ 1) Luxury Service ○ 2) Full Service

○ 3) Limited Service ○ 4) Economy Service

Section 3 The usage of the Information Technology in your hotel

Instruction Please mark ✓ in provided ○ in front of the correct answer if you choose

1. Does your hotel provides technology as are of the service to guests?

○ 1) Yes **(Skip to question no.2)** ○ 2) No **(Skip to page 4)**

2. You hotel provide technology on one of servicing

2.1. What kind of technology that your hotel provides on In-room service?

(**You may choose more than 1 choice)**

○ 1) Multiple phone lines

○ 2) Voice mail

○ 3) On-demand PC

○ 4) TV-Internet

○ 5) In-room check-out systems

○ 6) TV-wake up system/Automatic wake up

○ 7) TV-meal ordering

○ 8) E-mail

○ 9) Network computer/Internet access

○ 10) Electronic locking system

○11) Room energy sensor

○12) Other .....

2.2. What kind of technology that your use of manage the hotel?

(**You may choose more than 1 choice)**

○1) PMS (Property management system)

○2) CRS (Central reservation system)

○3) GDS (Global distribution system)

○4) Internet

○5) E-mail/ Electronic mail

○6) Database

○7) Office software Such as Microsoft Word Excel and PowerPoint

○8) RFID (Radio Frequency Identification)

○9)Other .....

(Finished Question no. 2.1-2.2 Please skip to Section 4)

3. **Please answer below another if your hotel does not provide any technology as service**

3.1. Why does your hotel not provide technology as one of service to guests?

(**You may choose more than 1 choice)**

○1) Lack of knowledge to provide technology as service

○2) No Budget

○3) Current system is adequate to service quests need

○4) technology is too expensive

○5) No human resource who have knowledge about technology

○6) Other .....

4. What kind of service that your hotel website to service client?

(Please skip to Section 4 after finish this question)

(You may choose more than 1 choice)

- ○1) Online reservation
- ○2) Hotel viewing system
- ○3) Direct e-mail
- ○4) Linkage partners
- ○5) Feedback form
- ○6) Special promotions
- ○7) List chain hotels
- ○8) Multilingual site
- ○9) Audio presentation
- ○10) Frequent programs
- ○11) Other .....

5. Why does your hotel have no website to service and PR to customer?

(**You may choose more than 1 choice)**

- ○1) Lack of knowledge to provide technology service
- ○2) No Budget
- ○3) Current system is adequate to service quests need
- ○4) technology is too expensive
- ○5) No human resource who have knowledge about technology
- ○6) Other .....

(If Finish Question no.3 and no.6 Please skip to Last page)

Section 4 The factors affected the decision to choose the kind of information technology in hotel

Instruction Please select the scale number according to your feedback to the provided question

5 = Completely Agree 4 = Mostly Agree 3 = Natural

2 = Mostly Disagree 1 = Completely Disagree

Question for: The factors affected the decision to choose the kind of information technology in hotel business	Scale Number of your opinion				
	Completely Agree	Mostly Agree	Natural	Mostly Disagree	Completely Disagree
Question on technology usage for a quality of service					
1. Technology helps speed up the business process.	5	4	3	2	1
2. Technology enhances customer's satisfaction.	5	4	3	2	1
3. Technology enhances the efficiency of your service.	5	4	3	2	1
4. Technology enhances the accessibility and communication to your customer.	5	4	3	2	1
Question on the complexity of your technology usage					
5. Technology can be used easily.	5	4	3	2	1
6. Technology helps facilitate your service.	5	4	3	2	1
7. You can easily fix the error/fault of the technology.	5	4	3	2	1
Question on quality at the technology					
8. Your technology is always up-to-date.	5	4	3	2	1
9. Your technology is self-solving when error.	5	4	3	2	1
Question on your colleague / outsider from organization					
10. Your service is better by using the technology system.	5	4	3	2	1
11. Your colleague expects that you can use the technology efficiently.	5	4	3	2	1

Question on your colleague / outsider from organization (Cont.)					
12. Your customers believe that technology system is very useful for your hotel.	5	4	3	2	1
Question on the support from other people					
13. Your hotel hire IT specialists staffs to look after IT system.	5	4	3	2	1
14. Your hotel has enough staff to look after IT specialists and related staff.	5	4	3	2	1
15. Your boss support training and attending seminar on new IT.	5	4	3	2	1
16. Your hotel IT specialist has high level of experience.	5	4	3	2	1
17. IT problem, your specialist IT can solve them.	5	4	3	2	1
Question on the support of the hotel on IT					
18. Your hotel gives importance on service driven by technology.	5	4	3	2	1
19. Your hotel always improves & upgrades the IT system.	5	4	3	2	1
20. Your hotel has IT department to look after the system.	5	4	3	2	1
21. Your hotel supports the training for the new employee run by professional trainer.	5	4	3	2	1
22 Your hotel provides the training for employee whenever there is important on the system/technology.	5	4	3	2	1
23. Your hotel supports the capital investment in the system & technology.	5	4	3	2	1
Question on your hotel's interest on the new technology					
24. Your hotel pays attention to bring in new technology.	5	4	3	2	1
25. When other hotels bring in the new technology, your hotel will pay special attention to.	5	4	3	2	1
26. When there is a new technology, your hotel always set up a trial of the new technology before any purchase decision.	5	4	3	2	1

Question on the effect of the local culture to the hotel					
27. Your hotel locates in the region that interest in technology.	5	4	3	2	1
28. You believe the technology in your hotel is better than other hotels.	5	4	3	2	1
29. You believe that the technology in your hotel is more advance those other hotels.	5	4	3	2	1
Question on the effect of the provincial culture to the employee					
30. You always pay attention to the technology run by the hotel from other territory.	5	4	3	2	1
31. Your local area has access to the new technology.	5	4	3	2	1
32. Your territory always received new technology faster than other territory.	5	4	3	2	1
Question on the intension/willingness to bring in new technology					
33 You want to use new technology to serve to your customer.	5	4	3	2	1
34. You believe that you will bring in the new technology to improve the service to your customer, and the efficiency to your work.	5	4	3	2	1

Please state your opinions or suggestions on the Factor leading to accept the IT in your hotel industry

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แบบสอบถามเพื่อการวิจัย

เรื่อง ปัจจัยที่มีผลต่อการยอมรับการใช้เทคโนโลยีสารสนเทศของพนักงานในอุตสาหกรรมบริการ กรณีศึกษา : โรงพยาบาลในประเทศไทย

เรียน ท่านผู้ตอบแบบสอบถาม

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ระดับปริญญาโท สาขาวิชาเทคโนโลยีการจัดการระบบสารสนเทศ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์ที่จะสำรวจปัจจัยที่มีผลต่อการยอมรับการใช้เทคโนโลยีของพนักงานในอุตสาหกรรมบริการ กรณีศึกษา: โรงพยาบาลในประเทศไทย ซึ่งผลการวิจัยครั้งนี้จะทำให้ทราบถึงข้อมูลเกี่ยวกับพฤติกรรมการใช้เทคโนโลยีของผู้ปฏิบัติงานในโรงพยาบาล เพื่อนำไปสู่การพัฒนาการให้บริการของอุตสาหกรรมบริการในประเทศ คำตอบของท่านจักมีคุณค่าอย่างยิ่งต่องานวิจัยครั้งนี้ ผู้วิจัยจะเก็บข้อมูลที่ได้รับจากท่านไว้เป็นความลับ ข้อมูลที่ตรงกับความเป็นจริงและสมบูรณ์จะช่วยให้การวิจัยดำเนินไปด้วยความถูกต้อง ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามตามความคิดเห็นของท่านอย่างรอบคอบให้ครบทุกข้อ แบบสอบถามที่ตอบครบสมบูรณ์เท่านั้นที่จะสามารถนำไปใช้ในการวิจัยได้

แบบสอบถามนี้แบ่งออกเป็น 4 ตอน มีจำนวน 8 หน้า

ตอนที่ 1 เป็นแบบสอบถามข้อมูลเกี่ยวกับข้อมูลทั่วไปเกี่ยวกับผู้ปฏิบัติงานในอุตสาหกรรมบริการ
ลักษณะแบบสอบถามเป็นแบบตรวจสอบรายการ (Check List) มีจำนวน 9 ข้อ

ตอนที่ 2 เป็นแบบสอบถามข้อมูลเกี่ยวกับข้อมูลทั่วไปเกี่ยวกับโรงพยาบาลที่ท่านสังกัดอยู่
ลักษณะแบบสอบถามเป็นแบบตรวจสอบรายการ (Check List) มีจำนวน 4 ข้อ

ตอนที่ 3 เป็นแบบสอบถามเกี่ยวกับการใช้เทคโนโลยีสารสนเทศของโรงพยาบาล
ลักษณะแบบสอบถามเป็นแบบตรวจสอบรายการ (Check List) มีจำนวน 7 ข้อ

ตอนที่ 4 เป็นแบบสอบถามเกี่ยวกับปัจจัยที่มีผลต่อการตัดสินใจในการใช้เทคโนโลยีเพื่อให้บริการ
ลักษณะแบบสอบถามเป็นแบบมาตราส่วนประเมินค่า (Rating Scale) มีจำนวน 36 ข้อ

<u>ตอนที่ 1</u> ข้อมูลทั่วไปของผู้ปฏิบัติงานในโรงพยาบาล

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ✓ลงในช่อง ○ หน้าคำตอบที่ตรงกับสภาพความเป็นจริงเพียง 1 ข้อ ถ้าไม่มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า อื่นๆ กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

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1. เพศ ○ 1) ชาย ○ 2) หญิง

2. สถานภาพสมรส (Marriage status)

○1) โสด ○2) สมรส ○3) หย่า/หม้าย

3. อายุ (Age)

○1) ต่ำกว่าหรือเท่ากับ 20 ปี ○2) 21-25 ปี ○3) 26-30 ปี

○4) 31-40 ปี ○5) 41-50 ปี ○5) 51 ปีขึ้นไป

4. วุฒิการศึกษา

○1) ระดับประกาศนียบัตรวิชาชีพ ○2) ปริญญาตรี (Bachelor's)

○3) ระดับปริญญาโท (Master's) ○4) ปริญญาเอก (Ph.D.)

○5) อื่นๆ (โปรดระบุ) .....

5. ประสบการณ์การทำงาน

○1) 0-2 ปี ○2) 3-5 ปี

○3) 5-7 ปี ○4) 7-10 ปี

○5) 10-15 ปี ○6) 15 ปีขึ้นไป

6.ตำแหน่งหน้าที่ (Position of Respondents)

○1) แพทย์ (Medical) สาขา ☐ อายุรแพทย์ ☐ศัลยแพทย์ ☐กุมารแพทย์

☐ สูตินรีแพทย์ ☐แพทย์ออโธปิดิกส์ ☐เวชศาสตร์ครอบครัว ☐อื่นๆ

○2) พยาบาล (Nurse) แผนก...../ พยาบาลผู้เชี่ยวชาญสาขา …….

○3) อื่นๆ (โปรดระบุ) .....

7. ประสบการณ์ในการใช้อินเตอร์เน็ต (Experience of using Internet or Information Technology)

○1) น้อยกว่า 1 ปี ○2) 1-3 ปี ○3) 4-5 ปี

○4) 6-10 ปี ○5) มากกว่า 10 ปีขึ้นไป

8. โดยเฉลี่ยท่านใช้คอมพิวเตอร์บ่อยแค่ไหนระหว่างการทำงาน?

○1) ไม่เคย ○2) น้อยกว่า 30 นาที ○3) 30 นาที ถึง 1 ชั่วโมง

○4) 1-2 ชั่วโมง ○5) 2-3 ชั่วโมง ○6) มากกว่า 3 ชั่วโมงขึ้นไป

9. ท่านใช้คอมพิวเตอร์ในการทำกิจกรรมต่างๆเช่น หาข้อมูล ดูข่าวสาร เล่นอินเตอร์เน็ต เป็นต้น บ่อยแค่ไหน?

○1) น้อยกว่า 1ครั้ง /เดือน ○2) 2-3 ครั้ง/เดือน ○3) มากกว่า 3 ครั้ง/เดือน

○4) 1 ครั้ง/สัปดาห์ ○5) 1 ครั้ง/วัน ○6) หลายครั้งต่อวัน

ตอนที่ 2 ข้อมูลทั่วไปเกี่ยวกับโรงพยาบาลที่ท่านสังกัดอยู่

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ✓ลงในช่อง ○ หน้าคำตอบที่ตรงกับสภาพความเป็นจริงเพียง 1 ข้อ ถ้าไม่มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า อื่นๆ กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

1. ประเภทของโรงพยาบาลที่ท่านปฏิบัติงานอยู่ (Hospital Type) **<u>(ตอบได้มากกว่า 1 ข้อ)</u>**

○1) โรงพยาบาลทั่วไป (General hospital) ○2) โรงพยาบาลศูนย์ (Center hospital)

○3)โรงพยาบาลชุมชน (community hospital)○4)โรงพยาบาลมหาวิทยาลัย(university hospital)

○5)โรงพยาบาลสาธารณะอื่นๆ(other public hospital)○6) โรงพยาบาลเอกชน (private hospital)

2. จำนวนเตียงของโรงพยาบาล (No. of Bed)

○1) น้อยกว่า 11 เตียง ○2) 11-30 เตียง ○3) 31-60 เตียง

○4) 61-90 เตียง ○5) 91-120 เตียง ○6) 121-150 เตียง

○7) 151-200 เตียง ○8) 201-250 เตียง ○9) มากกว่า 250 เตียง

3. ที่ตั้งตามภูมิภาคของโรงพยาบาล (Location)

○1) กรุงเทพมหานคร ○2) ภาคกลาง (ไม่รวมกทม.)

○3) ภาคตะวันตก ○4) ภาคตะวันออก

○5) ภาคตะวันออกเฉียงเหนือ ○6) ภาคใต้

○7) ภาคเหนือ

<u>ตอนที่ 3</u> แบบสอบถามเกี่ยวกับการใช้เทคโนโลยีที่ให้บริการในโรงพยาบาล

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ✓ ลงในช่อง ○ หน้าคำตอบที่ตรงกับสภาพความเป็นจริงเพียง 1 ข้อ ถ้าไม่มีการระบุไว้เป็นอย่างอื่น และหากท่านเลือกคำตอบที่ระบุว่า อื่นๆ กรุณาระบุรายละเอียดเพิ่มเติมในช่องว่าง

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1. โรงพยาบาลที่ท่านปฏิบัติงานอยู่ ให้บริการเทคโนโลยีในด้านการรักษาพยาบาลแก่ผู้ป่วย/ผู้รับบริการด้วยหรือไม่

○ 1) มี **(ไปตอบข้อ 2)**

○ 2) ไม่มี **<u>(ข้ามไปตอบข้อ 3 และข้อ 4)</u>**

2. โรงพยาบาลที่ท่านปฏิบัติงานอยู่ ให้บริการเทคโนโลยีชนิดใดบ้าง (**<u>ตอบได้มากกว่า 1 ข้อ</u>**)

☐ <u>เทคโนโลยีด้านการสื่อสาร และ Telematic</u> เป็นเทคโนโลยี/ระบบที่ช่วยในการติดต่อสื่อสารภายใน/นอกโรงพยาบาล

เช่น เครือข่ายอินเตอร์เน็ต (Internet), ระบบเครือข่ายภายในโรงพยาบาล (LAN), เว็บไซต์ (Website)

☐ <u>เทคโนโลยีด้านการจัดเก็บและค้นหาข้อมูลจากฐานข้อมูล</u> เป็นเทคโนโลยี/ระบบที่ช่วยในการบันทึกประวัติการรักษาของคนไข้

- ☐ ฐานข้อมูลเวชระเบียนคนไข้ออนไลน์ (Electronic Medical Record: EMR)
- ☐ ฐานข้อมูลภายใน/นอกโรงพยาบาล
- ☐ MEDLINE (ฐานข้อมูลทางการแพทย์)
- ☐ ฐานข้อมูลการประกันสุขภาพรัฐ
- ☐ อื่นๆ (โปรดระบุ) .....

☐ <u>เทคโนโลยีด้านกระบวนการ และAutomation</u> เป็นเทคโนโลยีหรือเครื่องมือที่อยู่ในกระบวนการช่วยตรวจวิเคราะห์โรค

เช่น X-ray therapy, Blood bank, Mammography (การ X-ray ทรวงอก) เป็นต้น

☐ <u>เทคโนโลยีด้านการวินิจฉัยโรค และ ด้านการตัดสินใจที่เชื่อมโยงการบำบัด</u> เป็นเทคโนโลยีหรือเครื่องมือที่ใช้ในการวิเคราะห์ และตัดสินใจรักษาโรคนั้นๆ เช่น เครื่อง CT scanner (เครื่องถ่ายภาพ

รังสีส่วนตัดอาศัยคอมพิวเตอร์), PET scanner, SPECT scanner, การตรวจอัลตร้าซาวด์, การตรวจประเมินทางด้านหัวใจ เป็นต้น

☐<u>เทคโนโลยีด้านการบำบัดรักษา และควบคุม</u> เป็นเทคโนโลยีหรือเครื่องมือที่ใช้ในการบำบัดรักษาผู้ป่วย

เช่น Cardiac catheterization (การฉีดสีทึบแสงเข้าเส้นเลือดเลี้ยงหัวใจ), บริการด้านแผนกฉุกเฉิน, การขบ-สลายนิ่ว, Angioplasty (การขยายหลอดเลือดเลี้ยงหัวใจ) เป็นต้น

☐ <u>เทคโนโลยีด้านการวิจัยและรูปแบบจำลอง</u> เป็นเทคโนโลยีที่ใช้ในการวิจัยเพื่อใช้พัฒนาไปสู่การรักษาผู้ป่วย

เช่น ห้องปฏิบัติการเพื่อเพาะเลี้ยงเนื้อเยื่อ, การวิจัยด้านเซลล์กระดูก เป็นต้น

<u>(ถ้าท่านทำข้อ 2 กรุณาข้ามไปตอบ ข้อ 5)</u>

3.โรงพยาบาลที่ท่านปฏิบัติงานอยู่ไม่มีการให้บริการในด้านการรักษาพยาบาลแก่ผู้ป่วยเพราะเหตุใด **<u>(ตอบได้มากกว่า 1 ข้อ)</u>**

〇1) ขาดความรู้ในการนำเทคโนโลยีมาใช้ในการให้บริการ

〇2) ขาดเงินทุนสนับสนุน

〇3) ระบบที่ให้บริการเพียงพอต่อความต้องการของผู้รับบริการ/ประชาชนแล้ว

〇4) เทคโนโลยีมีราคาแพงเกินไป

〇5) ไม่มีบุคลากรทางด้านเทคโนโลยี

〇6) อื่นๆ (โปรดระบุ) .....

5.โรงพยาบาลของท่านมีเว็บไซต์ที่ให้บริการและประชาสัมพันธ์แก่ประชาชนที่ใช้บริการด้วยหรือไม่

〇1) มี **(ตอบข้อ 6)** 〇2)ไม่มี **<u>(ข้ามไปตอบข้อ 7)</u>**

6. Website โรงพยาบาลของท่านมีการให้บริการแก่ผู้รับบริการส่วนใดบ้าง

(ตอบได้มากกว่า 1 ข้อ) (หากทำข้อนี้แล้วให้ข้ามไปตอบ ตอนที่ 4)

- ○1) ข้อมูลด้านการรักษาของโรงพยาบาล (Health care information)
- ○2) อีเมล์/จดหมายอิเล็กทรอนิกส์ติดต่อโรงพยาบาล (Direct e-mail)
- ○3) เว็บบอร์ด (Web board)
- ○4) ลิงค์ของโรงพยาบาลในเครือ/สังกัด (Linkage partners or branches)
- ○5) แบบฟอร์มให้กรอกเพื่อสอบถาม หรือแจ้งให้ตอบกลับ (Feedback form)
- ○6) โปรโมชั่นพิเศษของโรงพยาบาล (Special promotions)
- ○7) โปรแกรมการรักษาแบบใหม่ๆ หรือ โปรโมชั่น ผ่านอีเมล์

  (Update program or promotions via email)
- ○8) การค้นหาแบบด่วน (Quick search)
- ○9) เว็บไซต์ในภาษาอังกฤษ (English version websites)
- ○10) เว็บไซต์ในภาษาอื่นๆ เช่น ภาษาจีน ภาษาอินเดีย ภาษาญี่ปุ่น เป็นต้น

  (Other version websites in other languages (India, Chinese, Japan, French and other))
- ○11) อื่นๆ โปรดระบุ .....

7. โรงพยาบาลของท่านไม่มีเว็บไซต์ที่ให้บริการและประชาสัมพันธ์แก่ผู้ใช้บริการเพราะเหตุใด

(ตอบได้มากกว่า 1 ข้อ)

- ○1) ขาดความรู้ในการนำเทคโนโลยีมาใช้ในการให้บริการ
- ○2) ขาดเงินทุนสนับสนุน
- ○3) ระบบที่ให้บริการเพียงพอต่อความต้องการของผู้ใช้บริการ/ประชาชนแล้ว
- ○4) เทคโนโลยีมีราคาแพงเกินไป
- ○5) ไม่มีบุคลากรทางด้านเทคโนโลยี
- ○6) ผู้บริหารไม่ให้การสนับสนุน
- ○7) อื่นๆ (โปรดระบุ) .....

<u>ตอนที่ 4</u> แบบสอบถามข้อมูลเกี่ยวกับปัจจัยที่มีผลต่อการตัดสินใจในการใช้เทคโนโลยีในการ

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ✓ลงในช่อง ☐ ตามค่าตัวเลขด้านบนที่ตรงกับความคิดเห็นของท่านมากที่สุด เรียงลำดับดังนี้

ข้อ 5 = เห็นด้วยมากที่สุด / ข้อ 4 = เห็นด้วยมาก / ข้อ 3 = เห็นด้วยปานกลาง

ข้อ 2 = เห็นด้วยน้อย / ข้อ 1 = เห็นด้วยน้อยที่สุด

ข้อความที่ต้องการความคิดเห็น เรื่อง ปัจจัยการยอมรับการใช้เทคโนโลยีในอุตสาหกรรมบริการ : โรงพยาบาลในประเทศไทย	**ระดับความคิดเห็น**				
	เห็นด้วยมากที่สุด	**เห็นด้วยมาก**	**เห็นด้วยปานกลาง**	**เห็นด้วยน้อย**	**เห็นด้วยน้อยที่สุด**
	5	**4**	**3**	**2**	**1**
คำถามเกี่ยวกับการใช้เทคโนโลยีเพื่อให้เกิดคุณภาพของการให้บริการ	**5**	**4**	**3**	**2**	**1**
1. เทคโนโลยีที่ใช้ช่วยให้เกิดความรวดเร็วยิ่งขึ้น ในการปฏิบัติงาน					
2. เทคโนโลยีที่ใช้ช่วยให้ผู้ใช้บริการเกิดความพึงพอใจและกลับมาใช้บริการอีก					
3. เทคโนโลยีที่ใช้ช่วยให้การบริการดูแลรักษาของท่านมีประสิทธิภาพเพิ่มมากขึ้น					
4. เทคโนโลยีที่ใช้ช่วยให้โรงพยาบาลของท่านติดต่อกับผู้ใช้บริการ/ผู้ป่วยได้ง่ายขึ้น					
คำถามเกี่ยวกับความง่ายในการใช้งาน	**5**	**4**	**3**	**2**	**1**
5. ท่านคิดว่า เทคโนโลยีที่ใช้ช่วยลดระยะเวลา ทำให้ท่านรักษา/ดูแลผู้ป่วยได้ดี					

คำถามเกี่ยวกับความง่ายในการใช้งาน (ต่อ)	**5**	**4**	**3**	**2**	**1**
6. ท่านคิดว่า การเรียนรู้เทคโนโลยีใหม่ๆ เพื่อให้บริการเป็นเรื่องง่ายสำหรับท่าน					
7. เมื่อเกิดความผิดพลาดขึ้นกับเทคโนโลยีที่ใช้ ท่านสามารถแก้ไขได้ง่าย					
คำถามเกี่ยวกับคุณภาพของเทคโนโลยีที่ใช้ให้บริการ	**5**	**4**	**3**	**2**	**1**
8. เทคโนโลยีของท่านมีความทันสมัยและมีการปรับปรุงอยู่เสมอ					
9. เทคโนโลยีของท่านสามารถแก้ไขได้เอง หากเกิดข้อผิดพลาดขณะให้บริการรักษา					
คำถามเกี่ยวกับการได้รับแรงผลักดันจากบุคคลใน/นอกองค์กร	**5**	**4**	**3**	**2**	**1**
10. คนในองค์กร คาดหวังว่า ท่านสามารถใช้เทคโนโลยีเพื่อให้บริการได้ดี					
11. คนในองค์กร คาดหวังว่า ท่านสามารถใช้เทคโนโลยีเพื่อให้บริการได้อย่างมีประสิทธิภาพ					
12. ผู้ใช้บริการยอมรับว่า การใช้ระบบ/เทคโนโลยีเป็นประโยชน์ในโรงพยาบาลมาก					
คำถามเกี่ยวกับการได้รับการสนับสนุนจากบุคคลอื่นๆ	**5**	**4**	**3**	**2**	**1**
13. โรงพยาบาลของท่านมีการจัดจ้างพนักงานด้าน IT เพื่อดูแลระบบและเทคโนโลยีโดยเฉพาะ					
14. โรงพยาบาลของท่านมีเจ้าหน้าที่ที่ดูแลระบบหรือเทคโนโลยีเพียงพอต่อความต้องการของโรงพยาบาล					
15. หัวหน้าหรือผู้บังคับบัญชาของท่านให้การสนับสนุนในการเข้าอบรมการใช้เทคโนโลยีใหม่ๆอยู่เสมอ					
16. เจ้าหน้าที่ที่ดูแลระบบ/เทคโนโลยีมีความเชี่ยวชาญสูง					
17. เมื่อระบบหรือเทคโนโลยีเกิดปัญหา มีผู้เชี่ยวชาญด้านระบบหรือเทคโนโลยีช่วยแก้ไขให้					

คำถามเกี่ยวกับการสนับสนุนของโรงพยาบาล	**5**	**4**	**3**	**2**	**1**
18. โรงพยาบาลของท่านให้ความสำคัญกับเรื่องการให้บริการด้วยเทคโนโลยีมากเป็นอันดับแรกๆ					
19. โรงพยาบาลของท่านมีการปรับปรุง รักษาระบบให้ดีและมีประสิทธิภาพอยู่เสมอ					
20. โรงพยาบาลของท่านมีการจัดตั้งแผนกด้านไอทีเพื่อคอยดูแลระบบตลอดเวลา					
21. โรงพยาบาลของท่านสนับสนุนให้มีการอบรมแก่พนักงานที่เข้าใหม่โดยผู้เชี่ยวชาญ					
22. โรงพยาบาลของท่านให้การสนับสนุนในการอบรมบุคลากรเมื่อมีการเปลี่ยนแปลง (Update) ระบบ/เทคโนโลยีใหม่เสมอ					
23. โรงพยาบาลของท่านให้การสนับสนุนเงินทุนในด้านเทคโนโลยี ระบบ และผู้ดูแลระบบด้วย					
คำถามเกี่ยวกับความสนใจเทคโนโลยีของโรงพยาบาล	**5**	**4**	**3**	**2**	**1**
24. เมื่อมีเทคโนโลยีใหม่ๆ โรงพยาบาลของท่านเริ่มให้การสนใจและนำมาใช้ในโรงพยาบาลเป็นลำดับแรกๆ					
25. เมื่อโรงพยาบาลอื่นๆนำเทคโนโลยีใหม่ๆมาใช้โรงพยาบาลของท่านให้ความสนใจเป็นพิเศษ					
26. เมื่อมีเทคโนโลยีใหม่ๆเข้ามา ทางโรงพยาบาลมักจัดให้มีการอบรมหรือได้ลองใช้จริง ก่อนที่โรงพยาบาลจะตัดสินใจเลือกซื้อเทคโนโลยีนั้นๆ					
คำถามเกี่ยวกับวัฒนธรรมในภูมิภาคที่มีผลต่อโรงพยาบาล	**5**	**4**	**3**	**2**	**1**
27. โรงพยาบาลของท่านอยู่ในภูมิภาคที่ให้ความสนใจในเรื่องเทคโนโลยีมากเป็นอันดับแรกๆ					
28. ท่านคิดว่า เทคโนโลยีที่ใช้ในโรงพยาบาลของท่านมีคุณภาพดีกว่าโรงพยาบาลอื่นๆในภูมิภาคเดียวกัน					

คำถามเกี่ยวกับวัฒนธรรมในภูมิภาคที่มีผลต่อโรงพยาบาล	**5**	**4**	**3**	**2**	**1**
29. ท่านคิดว่า เทคโนโลยีที่ใช้ในโรงพยาบาลของท่านมีความทันสมัยดีกว่าโรงพยาบาลในภูมิภาคอื่นๆ					
คำถามเกี่ยวกับวัฒนธรรมในภูมิภาคที่มีผลต่อพนักงาน	**5**	**4**	**3**	**2**	**1**
30. ท่านให้ความสนใจกับเทคโนโลยีในโรงพยาบาลของภูมิภาคอื่นๆอย่างสม่ำเสมอ					
31. ภูมิภาคของท่านสามารถเข้าถึงหรือหาซื้ออุปกรณ์ด้านเทคโนโลยีใหม่ๆได้ง่าย					
32. ท่านมักได้รับข่าวสารใหม่ๆเกี่ยวกับเทคโนโลยีของโรงพยาบาลในภูมิภาคของท่าน ก่อนโรงพยาบาลในภูมิภาคอื่นๆเสมอ					
คำถามเกี่ยวกับการตั้งใจนำเทคโนโลยีมาใช้	**5**	**4**	**3**	**2**	**1**
33. ท่านอยากใช้เทคโนโลยี เพื่อให้บริการกับผู้ใช้บริการมากขึ้น					
34. ท่านคิดว่า ในอนาคตจะนำเทคโนโลยีใหม่ๆมาใช้เพื่อพัฒนาการให้บริการแก่ผู้ใช้บริการ และเพิ่มประสิทธิภาพในการทำงาน					

<u>ตอนสุดท้าย</u>

กรุณาแสดงความคิดหรือข้อเสนอแนะเกี่ยวกับปัจจัยการยอมรับการใช้เทคโนโลยีในอุตสาหกรรมบริการของท่าน

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BIOGRAPHY

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