UNDERSTANDING THE ADOPTION OF HOSPITAL INFORMATION SYSTEM (HIS): UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY

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This master independent study is conducted based on the rapid development of Hospital Information Systems might discourage new staffs and irritate existing one so it will impact to their perceptions and other conflicts raised by technology changes. I hope this study will be useful for the management of hospital to provide strategy to suitable for this problem.

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ABSTRACT

One of the most important factors for the success of Hospital Information System (HIS) implementation is users' acceptance and use. Increasing investment in information technology by healthcare organizations has made user acceptance an important issue in technology implementation and management. Despite the increased focus on Hospital Information Systems, there continues to be user resistance. A mixed method research both quantitative and qualitative employing to understanding and investigate the factors affecting Hospital Information Systems acceptance, based on the Unified Theory of Acceptance and Use of Technology (UTAUT). Data collected from 449 employees including physicians, nurses, and hospital staff members. The results found that the factors with a significant effect are performance expectancy, effort expectancy and social influence. They were also found to have a significant impact on behavioral intention to use the acceptance of HIS. In addition, facilitating conditions positive significance was found to direct using behavior. As a result, the findings will help the management of hospital to address the key factors influence technology acceptance of HIS.

KEY WORDS: Hospital Information System/ technology acceptance/ Unified Theory of Acceptance and Use of Technology (UTAT).

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CHAPTER I
INTRODUCTION

Healthcare is a very important part of our society and it is imperative for healthcare providers to do their jobs in an efficient and effective manner. Each day hundreds of thousands of patients enter healthcare facilities challenging the administration to run the show smoothly. The employees have to manage and integrate clinical, financial and operational information that grows with the practice. Previously, this data was organized manually, which was time consuming and failed to deliver the desired level of efficiency. Most professionally run hospitals and clinics now rely on Hospital Information Systems (HIS) that help them manage all their medical and administrative information.

1.1 Hospital Information System

A Hospital Information System (HIS) is essentially a computer system that can manage all the information to allow health care providers to do their jobs effectively. These systems have been around since they were first introduced in the 1960s and have evolved with time and the modernization of healthcare facilities. The HIS should also be patient centric, medical staff centric, affordable and scalable. The technology changes quickly and if the system is not flexible it will not be able to accommodate hospital growth. An effective HIS also delivers benefits such as; enhances information integrity, reduces transcription errors, reduces duplication of information entries and optimizes report turnaround times. HIS is categorized into three, which are Total Hospital Information System (THIS), Intermediate Hospital Information System (IHIS), and Basic Hospital Information System (BHIS) based on hospital size. THIS is for the hospitals with more than 400 beds, IHIS is for the hospitals with more than 200 beds but less than 400 beds, and BHIS is for the hospitals with less than 200 beds.(Mohamad, 2005)

Regarding to prior reviewed, HIS consists of two or more of these components; Clinical Information System (CIS), Financial Information System (FIS), Laboratory Information System (LIS), Nursing Information Systems (NIS), Pharmacy Information System (PIS), Picture Archiving Communication System (PACS) and Radiology Information System (RIS) (Ltd., 2006) as show in figure.1.1

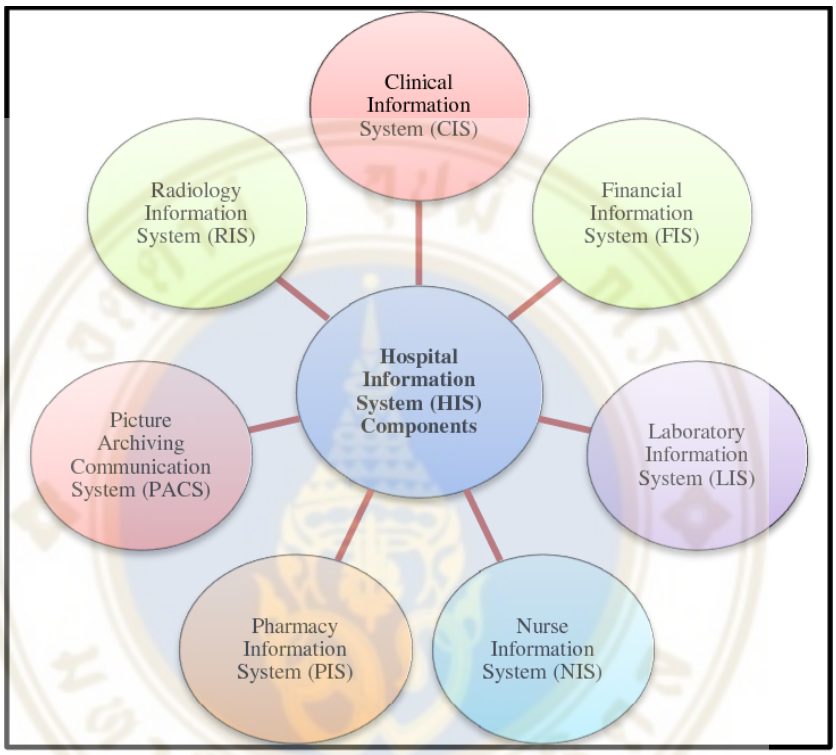

Figure 1.1 The components of Hospital Information System

1.1.1 Clinical Information System (CLS)

A Clinical Information System (CIS) is a computer-based system that is designed for collecting, storing, manipulating and making available clinical information important to the healthcare delivery process. Usually, it has been used in clinical department, especially by doctors and nurses.

1.1.2 Financial System and Insurance Management (FIS)

Financial System and Insurance Management (FIS)is referred as computer systems that manages the business aspects of a hospital and used in financial department by accountants. This system keeps records of all revenues and expenditures and manages

a medical institution's entire accounting needs. Insurance verification is another vital aspect of this module, as accurate information is required to bill and collect from third-party payers.

1.1.3 Laboratory Information System (LIS)

The laboratory disciplines such as clinical chemistry, hematology and microbiology which are used in laboratory by Medical Technologist. If a healthcare institution has a pathology lab, it would be better to complement its HIS with the LIS module for efficiently recording and disseminating information regarding tests performed. LIS generally reports results and tracks capabilities, taking getting information from software that stores and processes data from different stages of medical tests and procedures. Another advantage of having a HIS is, for example, that information from a pathology lab can be incorporated using a LIS module for efficient recording and dissemination of lab information. A LIS reports results and provides information from various stages of medical tests and procedures.

1.1.4 Nurse Information System. (NIS)

Nursing Information Systems (NIS) is a computer system that manages clinical data from a variety of healthcare environments, and made available in a timely and orderly fashion to aid nurses in improving patient care which is used in wards by doctors and nurses.

1.1.5 Pharmacy Information Systems. (PLS)

A Pharmacy Information System (PIS) is a complex computer system that has been designed to meet the needs of a pharmacy department which is used in pharmacy department by pharmacists. Designed to address the demands of a pharmacy department, PIS helps pharmacists monitor how medication is used in hospitals. PIS helps users supervise drug allergies and other medication-related complications. The system allows users to detect drug interactions and also helps administer the proper drugs based on the patient's physiologic factors.

1.1.6 Picture Archiving Communication System. (PCAS)

Picture Archiving Communication System (PACS) is a loose term to describe a set of systems that facilitate the archiving, processing and viewing of digital radiological images and their related information and used in x-ray and imaging department by Imaging Officers.

1.1.7 Radiology Information System. (RIS)

Radiology information system (RIS) is a computer system that assists radiology services in the storing, manipulation and retrieving of information. In addition, it is also used to manage and store radiology information also used in x-ray and imaging department by imaging officers. These systems are also popular for their ability to provide radiology billing services, appointment scheduling as well as reporting and patient database storage. The radiology practice has become more complex with advances in technology and more hospitals now turn to RIS to manage the business side of their practices.

For instance, a hospital may decide to shift a patient to another facility for better care or specialty treatment. If the present hospital has updated all the patient information in their HIS, the second hospital can instantly access the information needed for treatment. The medical history of the patient will always be stored within these facilities and can be readily retrieved if the patient is not able to provide it himself.

1.2 Rationale of the Study

Increasing investment in information technology by healthcare organizations has made user acceptance an important issue in technology implementation and management. Despite the increased focus on Hospital Information Systems, there continues to be user resistance. Thus, understanding users' perception of the technology will assist the management of hospital in making decision for the successful technology adoption and implementation plan.

1.3 Statement of Problem

In Thailand, The Ministry of Public Health controls most of the hospitals. There are more than a thousand public hospitals in the country. Government hospitals in Thailand are of three types, there are regional hospitals in the provinces with at least 500 beds, general hospitals in major districts or province capitals with a capacity of 200 to 500 beds, and community hospitals in the districts that can admit 10 to 30 patients. The quality of healthcare in the government hospitals is generally good; however, as the hospitals cater to a large number of people, you can expect a long wait with over-crowded of patients. Nevertheless, the private hospitals are the best choices with high service quality and less volume of patients but mostly located in major cities.

With the rapid development of information systems and advances in healthcare. Technology paired with current concerns arise over patients' safety and how to cure them efficiently. Especially, the Hospital Information System is the most attracting the attention of more and more to staffs who work in hospital.

More than 40% of information technology (IT) developments in various sectors including the health sector have failed or been abandoned. One of the major factors leading to the failure is the inadequate understanding of the sociotechnical aspects of IT, particularly the understanding of how people and organizations adopt information technology. (Beynon-Davies, 2002)

However, technology changes might discourage new staffs and irritate existing one so it will impact to their perceptions and other conflicts raised by technology changes. The purpose of this study is to examine the influence of the adoption of HIS to provide an appropriate suggest for the intention to use Hospital Information System.

1.4 Research Objectives

1. To identify the cause and effect relationships between the relevant factors affecting the intention to use Hospital Information Systems.
2. To examine the influence of the staff on the adoption of information system in hospital.
3. To provide recommendation for the healthcare management intended to adopt their innovation and technology strategy investment.

1.5 Research Questions

1. Technologies in hospital are changing all the time?
2. What is the barrier of changing in technology?
3. Why do users refuse the usage new technology?
4. How do demographic characteristics and user experience affect the technology acceptance for new technology in healthcare?
5. Has technological change impacted to improving quality of care?

1.6 Scope of the Study

This research examined the technological acceptance of Hospital Information System for users with limited or no experience through literature review which provides the theory for the deduction of the hypotheses and later followed by empirically test.

The mix method strategy is selected as to explore the relationship between theory and research empirically. A measurement is used to identify the differences between the factors of Unified Theory of Acceptance and Use of Technology (UTATT) which impact on the technology acceptance for adoption technology in hospital. The data will be collected as survey research based on questionnaires and semi-structured interview.

1.7 Contribution of the Study

With the rapid development of information systems and advances in healthcare technology paired with current concerns arise over patients' safety and how to cure them efficiently. Especially, the Hospital Information System is the most attracting the attention of more and more to staffs who work in hospital. However, technology changes might discourage new staffs and irritate existing one so it will impact to their perceptions and other conflicts raised by technology changes. The purpose of this study is to propose a conceptual model, appropriate for the intention to use Hospital Information System as the external variables and integrating the three dimensions of perceived usefulness, perceived ease of use, and intention to use.

CHAPTER II
LITERATURE REVIEW

The background of this study is drawn into four sectors. Section 2.1 provides the details about Hospital Information System, function, stages of development, issues and benefits. Section 2.2 provides detail of Diffusion of innovations Theory. 2.3 provides detail of Theory of reasoned action (TRA) and Theory of Planed behavior (TPB) 2.4 provides detail of technology acceptance model (TAM), its background, purpose, structure and its applicability with external factors from previous empirical studies. Section 2.5 provides detail of UTATT 2.6 provides detail of the contribution from literature review to this research.

2.1 The adoption of Hospital Information Systems.

When Hospital Information Systems (HIS) were first introduced, in around the 1960's, the focus was constrained primarily to the core financial aspects of the business. This limitation was imposed not for lack of ingenuity, but simply due to the high investment cost of mainframe computing and lack of network capability. (VENTER, MAY 02, 2011)

The 80's brought increased availability of local area networks (LAN), the introduction of smaller personal computers and a lower investment barrier, providing the initial triggers for change. Vendors were now able to link disparate internal systems allowing a more encompassing approach to the management of healthcare services within a facility.

The introduction of the Wide-Area Network (WAN), enabled connectivity between different hospital sites, forming the initial foundations for digital data sharing. Technology now provided the ability to send and receive data electronically. Having the capability to transfer data from one system to another is not enough in itself. For data to be successfully shared between disparate hospitals and data systems, the data format needs to be consistent and predictable. System A and System B need to understand

data in the same way - this is where Health Level Seven International (HL7) stepped in to fill the gaps. HL7 provides an international standard for the exchange, sharing and retrieval of electronic health information. It is simply a protocol or agreement that enables better collaboration between multiple organizations and systems.

At the national level, the Thai Ministry of Interior (MoI) has developed and implemented a computerized civil registration system including components for individual citizen and household identifying systems since 1982. Every individual citizen is assigned a unique identification number which is known as the 13-digit number. The citizen ID has been used to identify an individual when the person transacts with both public and private organizations including healthcare organizations. (Kijsanayotin B & Ingun P, 2013) The Ministry of Public Health in Thailand has developed, adopted and implemented several health data standards. Most of these standards serve administrative purposes. We had adopted ICD 10 since its inception, more than a decade ago, and modified and extended the WHO ICD 10 international to ICD 10 TM (Thai Modification). The main use is for public health reports and reimbursements. The ICD10 -TM and ICD9-CM (Clinical Modification) are used for coding diagnosis and health service intervention respectively. DRG has been developed since 1992 as a financing tool for prospective payment systems. It progressively evolved and has been widely used for acute care in-patient reimbursement since 2002. (20) The Ministry of Public Health also developed and maintained health facility registry and identification code (health facility IDs). (Ministry of Public Health, 2016)

Informed by the study of current available health data standards and the country needs of integrated interoperable health information systems (2), THIS has proposed the health data standards development plan that the country should take. The plan aims to support and enable both administrative (insurance reimbursement and population health report) and clinical (healthcare services) information exchange. Standard data set for patient health summary to serve information exchange in the transition of healthcare services is considered the priority. As for semantic standards, THIS identified the country's urgent need for developing medicine terminology standards and clinical laboratory data standards because information about drug and laboratory investigation utilization provides a large value for both clinical care and healthcare expenditure management. In addition, THIS also proposed that standard clinical terminology, SNOMED CT,

which is more expressive than ICD and essential for clinical care, should be studied and considered for implementation in the near future. Since there is no syntactic data standards adopted at the national level, a selected international syntactic data standard is proposed. They are HL7 messaging standard, HL7 CDA standard and DICOM standard. Ministry of Information and Communication Technology (MICT) is the center of the security and privacy data standards development in Thailand. THIS has been actively involved and participated in the development with the ministry

Traditionally, a patient's Electronic Medical Record (EMR) that is their medical history tests, diagnosis, treatments etc. have been stored and owned by the facility that provided the treatment. The exchange of patient data between disparate facilities is often facilitated again using standards like HL7 or Fast Healthcare Interoperability Resources.

The Ministry of Public Health (MOPH) of Thailand has been restructuring the country's health information system to support the country's universal healthcare coverage scheme, which has been implemented since 2001 and is still evolving. ("Health Policy in Thailand 2006," 2006). The Ministry of Public Health in Thailand has developed, adopted and implemented several health data standards.

Governments with public health schemes are constantly faced with an ever-growing aging population, a shift from treating infectious diseases like cholera and smallpox to long term chronic conditions such as heart disease and cancer. This increase in demand is paired with reduced funding, a lack of medical care providers and ever-increasing patient expectations. In order to meet demand, health systems need to increase efficiencies by reducing waste, enabling faster treatment times and improving patient outcomes.

2.2 Diffusion of innovations Theory.

Diffusion of Innovations seeks to explain how innovations are taken up in a population. An innovation is an idea, behavior or object that is perceived as new by its audience. Diffusion of Innovations takes a radically different approach to most other theories of change. Instead of focusing on persuading individuals to change, it sees change as being primarily about the evolution or reinvention of products and behaviours so they become better fits for the needs of individuals and groups. (E. M Rogers, 1983)

2.2.1 Characteristics of Innovations That Affect Diffusion.

2.2.1.1 Relative advantage; an innovation will only be adopted if it is seen as better than the idea, product, or program it supersedes. Advantages considered can be economic, social, utilitarian, and so on.(E. M Rogers, 1983)

2.2.1.2 Compatibility; innovations that are compatible with the intended users' values, norms, beliefs, and perceived needs are more readily adopted. The concept of reinvention, sometimes identified as a distinct feature of innovations (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004) can also be thought of as an extension of compatibility. If potential adopters can adapt, change, and modify an innovation to suit their own needs and context, it will be adopted more easily.

2.2.1.3 Complexity; innovations perceived as easy to use are more likely to be adopted, whereas more complex innovations are less successfully adopted.

2.2.1.4 Trialability. Innovations with which intended users can experiment on a limited basis are adopted and assimilated more easily.

2.2.1.5 Observability. If the benefits of an innovation are easily identified and visible to others, it will be adopted more easily.

These five qualities make a valuable checklist to frame focus group discussions or project evaluations. They can help identify weaknesses to be addressed when improving products or behaviours.

2.2.2 Characteristics of Individuals

E. M. Rogers (2002) described the process of innovation adoption by individuals as a normal, bell-shaped distribution, with five adopter categories: 1. innovators, 2. early adopters, 3. early majority adopters, 4. late majority adopters and 5. laggards.

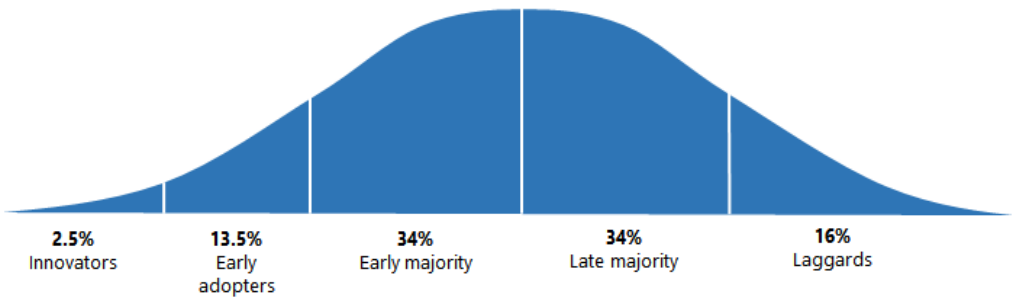

Figure 2.1 Characteristics of Innovations

2.2.2.1 Innovators; the adoption process begins with a tiny number of visionary, imaginative innovators. They often lavish great time, energy and creativity on developing new ideas and gadgets.

2.2.2.2 Early adopters is the segment (13.5%) that tries/ uses/ experiences the offering way before most of the market try their hand on it. they are on the lookout for a strategic leap forward in their lives or businesses and are quick to make connections between clever innovations and their personal needs.

2.2.2.3 Early majority is the first sizeable segment (34%) of the target market to adopt the innovation. The people belonging to the early majority are not the risk-takers but have an above average social status. They are often less educated less affluent and always look for cues from early adopters and innovators. They only adopt the innovation after being influenced by innovators and early adopters whom they follow or know personally.

2.2.2.4 Late majority is the last sizeable segment (34%) of the target market to adopt the innovation. This segment is made up of risk-averse adopters who only adopt the innovation when it is validated and assimilated as a part of daily life by a majority. People belonging to this segment are usually old, less educated and less affluent than the early majority.

2.2.2.5 Laggards is the final segment (16%) of the target market to adopt the innovation. This segment is made up of seniors and those with very low socio-economic status who doesn't like change and only accept new things and experiences when forced to.

2.3 Theory of reasoned action. (TRA)

The theory of reasoned action (TRA), developed by Martin Fishbein and Icek Ajzen, posits that individual behavioral is driven by behavioral intentions. The theory received particular attention in the field of consumer behavioral as it provides a simple tool to identify possibilities to change customers' behavioral when using an innovation. (Fishbein, 1975)

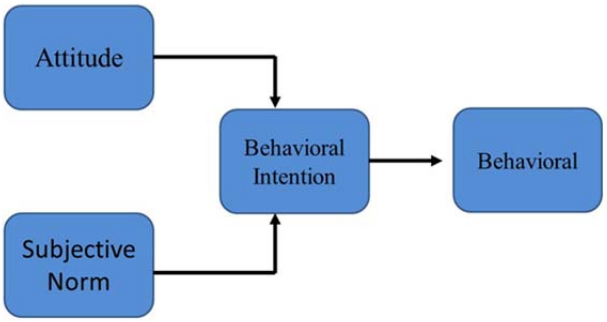

Figure 2.2 Schematics of the theory of reasoned action (TRA)

To this regard, the actual use of an innovation is determined by the individual's behavioral intention to use it. The model resulting from their research is visualised in and consist of the following components: Starting from the behavioral intentions, these include the functions of an individual's attitude towards the behavioral and the subjective norm surrounding the performance of the behavioral. Accordingly, the actual use of an innovation is determined by the individual's behavioral intention to use it. The Attitude towards an act or a behavioral are the individual's positive or negative feelings about performing a behavioral, determined through an assessment of one's beliefs. Subjective norm is defined as an individual's perception of whether people important to the individual think the behavioral should be performed. To put the definition into simple terms: a person's volitional (voluntary) behavioral is predicted by his/her attitude toward that behavioral and how he/she thinks other people would view them if they performed the behavioral. A person's attitude, combined with subjective norms, forms his/her behavioral intention.

However, the TRA has some limitations on explaining all mechanisms of the actual use of an innovation and the role of the individual's behavioral intent, which are discussed in the relevant scientific literature. One limitation is the significant risk of confounding between attitudes and norms since attitudes can often be reframed as norms and vice versa. Furthermore, the assumption that when someone forms an intention to act, they will be free to act without limitation, is often unfounded. Lastly, in practice, constraints such as limited ability, time, environmental or organizational limits, and unconscious habits will limit the freedom to act.

2.4 Theory of Planned behavior. (TPB)

The theory of planned behavior is an extension of the theory of reasoned action made necessary by the original model's limitations in dealing with behaviors over which people have incomplete volitional control. (Ajzen, 1991)

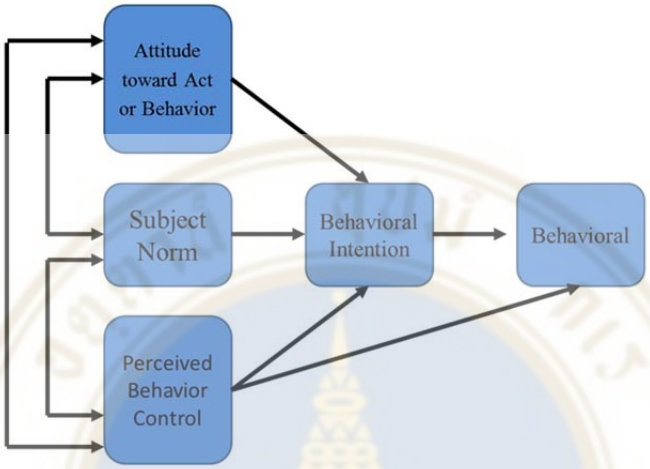

Figure 2.3 Theory of planned behavior

Figure 2.3 depicts the theory in the form of a structural diagram. As in the original theory of reasoned action, a central factor in the theory of planned behavior is the individual's intention to perform a given behavior. Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior. As a general rule, the stronger the intention to engage in a behavior, the more likely should be its performance. It should be clear, however, that a behavioral intention can expression in behavior only if the behavior in question is under volitional control, if the person can decide at will to perform or not perform the behavior. Although some behaviors may in fact meet this requirement quite well, the performance of most depends at least to some degree on such nonmotivational factors as availability of requisite opportunities and resources (e.g., time, money, skills, cooperation of others; see (Ajzen, 1985), for a discussion). Collectively, these factors represent people's actual control over the behavior. To the extent that a person has the required opportunities and resources, and intends to perform the behavior, he or she should succeed in doing so.

2.5 Technology Acceptance Model. (TAM)

The Technology Acceptance Model has been widely applied to explain the adoption of technologies. Introduced by Davis (Davis & D., 1989), the model refers to the fact that consumers' attitude towards information system has a crucial impact on its acceptance. Information systems are seen as successfully adopted when the consumers are actually using it. However, they would only use information system when it satisfies their needs. The basic Technology Acceptance Model comprises the factors perceived usefulness (PU) and perceived ease of use (PEOU).

Perceived Usefulness (PU) is the degree to which a person believes that using a particular system would enhance his or her job performance

Perceived Ease of Use (PEOU) is the degree to which a person believes that using a particular system would be free of effort.

Both constructs have an impact on the formation of attitude towards the usage of an information system. A positive attitude will lead to the intention towards using and ultimately to the actual usage of the information system.

Davis (1989) found that usefulness has a significantly stronger linked to the usage than ease of use. Users are driven to adopt an application based on how well its functions is performed and how difficult or easy to get it to perform those functions. Although the users may willing to overcome the difficulties in using a system that is critically needed for them while difficulties could also discourage the system adoption, but amount ease of use cannot compensate for the system that does not perform useful functions for users. However, even the system is very useful but users don't perceive it as useful, they are not likely to use it, or in the other hand, users can overrate and adopt the dysfunctional system.

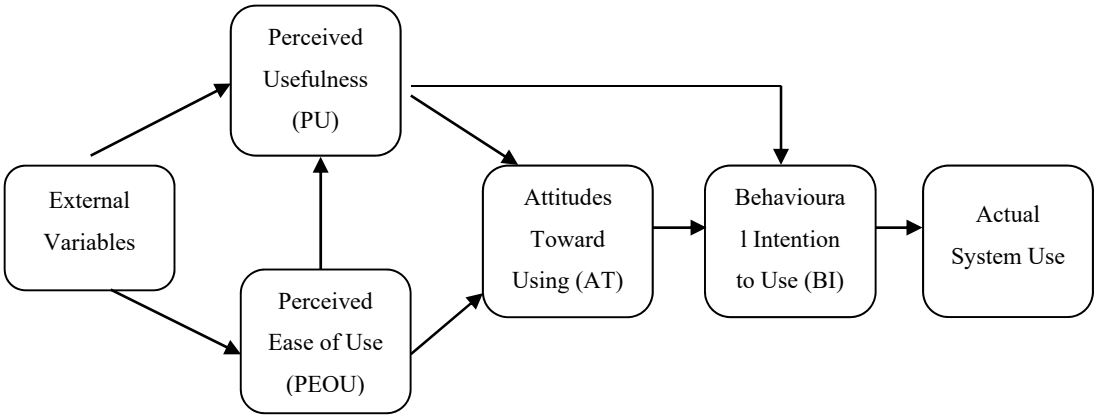

Figure 2.4 A Technology Acceptance Model.

Adams (1992) replicated Davis' (1989) work on the same subject to evaluates psychometric properties of the ease of use and usefulness scales and examines the relationship between ease of use, usefulness and system usage. The study result revealed that the relationship of the two constructs (PEOU & PU) to usage is more complex than is typically postulated as no absolute measure of ease of use and usefulness. Moreover, the users perceive of these constructs may also vary with time and experience for any given system.

TAM uses Theory of Reasoned (TRA) as a theoretical basis for specifying the causal linkages between two key beliefs: perceived usefulness and perceived ease of use, and users' attitudes, intentions and actual computer adoption behavior. TRA explains that the individual's behavioural intention depends on the attitude towards the behavior in relation to subjective norms. The TRA has been further extended with the Theory of Planned Behaviour (Ajzen, 1985) by taking into account the perceived behavioural control as an additional determinant of an individual's behavioural intention.

However, even both theories provide a basis to explain behavioural intentions and behaviours, the literature states that TAM is considerably less general than TRA and more specifically designed to explain the actual adoption of information systems (Davis, Bagozzi, & Warshaw, 1989). By its explanatory power and parsimony, TAM has been widely applied to various set of user acceptance on technologies, information system and services including logistic services, learning management system (LMSs). self-service technology.

2.6 Unified Theory of Acceptance and Use of Technology. (UTAUT)

Venkatesh & Morris (2003) developed a unified model that brings together alternative views on user and innovation acceptance; The unified theory of acceptance and use of technology (UTAT) by a decade ago, based on eight technology acceptance competing models. These models and theories are the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), a model combining the Technology Acceptance Model and the Theory of Planned Behavior (C-TAM-TPB), the model of PC utilization, the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). The theory was established on four theoretical constructs representing determinants of Intention to Use or Usage Behavior, which play essential roles as surrogates of Technology Acceptance. These constructs are: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. In addition to these variables the theory considers also moderating factors which moderate the relations between various variables and Intention to Use. The Moderators are Gender, Age, Experience, and Voluntariness of use.

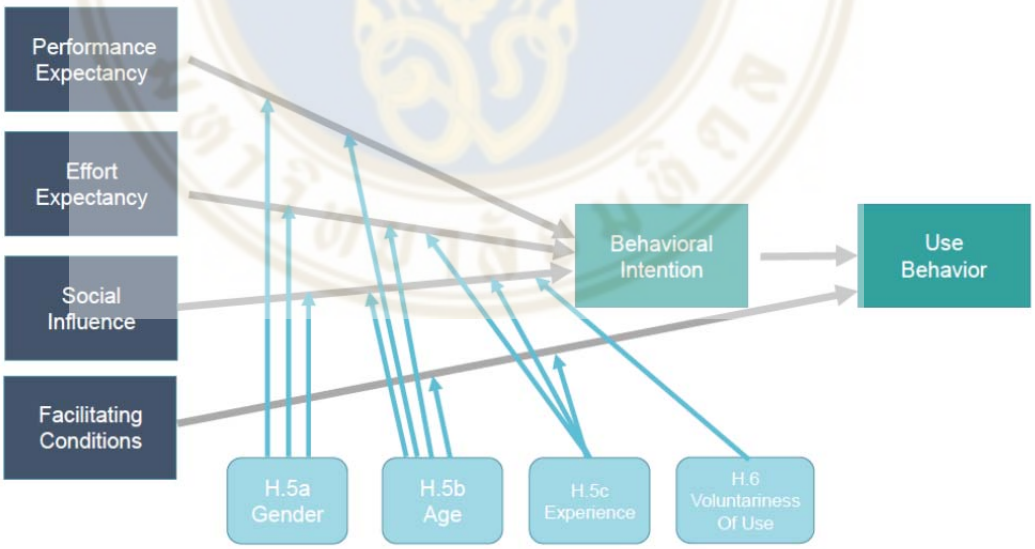

Figure 2.5 The Unified Theory of Acceptance and Use of Technology

2.6.1 Performance Expectancy.

A. Theoretical constructs of UTAUT and their moderators Performance Expectancy (PE) Performance expectancy is the degree to which an individual believes that using the system will help him or her to attain gains in job performance. There are five key variables derived from Technology Acceptance Models match Performance Expectancy according to

2.6.1.1 Perceived Usefulness, which is derived from Technology Acceptance Model (TAM/TAM 2), Combined TAM and TPB (C–TAM–TPB), is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context.

2.6.1.2 Extrinsic Motivation, which is derived from Motivational Model (MM) introduced by, is defined as 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.

2.6.1.3 Job-Fit, which is derived from Model of PC Utilization (MPCU), is defined as the extent to which an individual believes that using a technology can enhance the performance of his or her job.

2.6.1.4 Relative advantage, which is derived from Innovation Diffusion Theory (IDT), is defined as the degree to which an innovation is perceived as being better than its precursor.

2.6.1.5 Outcome Expectations, which is derived from Social Cognitive Theory (SCT), is defined as perceived likely consequences of using computers.

As declared in Performance Expectancy remains significant and is the strongest construct as a predictor of Intention among Technology Acceptance Models and Theories. It was expected (from a theoretical Point of view) that Although Gender, and Age moderate the relationship between Performance Expectancy and Intention to Use, Studies have shown recently that taking into account the Gender factor alone results in misleading results unless the Age factor is taken into account too. Therefore, it is expected in that both Gender and Age moderates the impact of expected performance.

2.6.2 Effort Expectancy (EE)

Effort Expectancy is the degree of ease associated with the use of the system. There are three key variables derived from Technology Acceptance Models match Effort Expectancy according to;

2.6.2.1 Perceived Ease of Use, which is derived from Technology Acceptance Model (TAM /TAM 2), is defined as the degree to which the prospective user expects the target system to be free of effort.

2.6.2.2 Complexity, which is derived from Innovation Diffusion Theory (IDT) and Model of PC Utilization (MPCU), is defined as the degree to which an innovation is perceived as relatively difficult to understand and use.

2.6.2.3 Ease of use, which is derived from Innovation Diffusion Theory (IDT) is defined as the degree to which an innovation is perceived as being difficult to use.

Similarities between some of these variables are pointed out As explained in the performance Expectancy, Gender and Age are expected to moderate the relationship between Effort Expectancy and Intention to Use. Furthermore, Experience is expected to moderate this relationship also. Accordingly, it is expected in that the effect of Effort Expectancy on Intention will be stronger for women, particularly younger women, at early stages of experience dealing with the system.

2.6.3 Social Influence (SI)

Social Influence is the degree to which an individual perceives that important others believe he or she should use the new system. There are three key variables derived from Technology Acceptance Models match Social Influence according to;

2.6.3.1 Subjective Norm, which is derived from Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM/TAM 2), Theory of Planned Behavior (TPB), Decomposed Theory of Planned Behavior (DTPB), Combined TAM and TPB (C–TAM–TPB), is defined as the person's perception that most people who are important to him think he should or should not perform the behavior in question.

2.6.3.2 Social Factors, which is derived from Model of PC Utilization (MPCU), is defined as the individual’s internalization of the reference

group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations.

2.6.3.3 Image, which is derived from Innovation Diffusion Theory (IDT), is defined as the degree to which use of an innovation is perceived to enhance one's image or status in one's social system.

Many studies pointed out the complex role of Social Influence in Technology Acceptance that it is subject to a wide range of conditional influences. It has an effect on individual behavior through three mechanisms; compliance, internalization, and Identification. While the last two mechanisms relate to changing and modifying individual's beliefs structure and/or lead to the individual's response to potential gains from the situation or social status, the compliance mechanism leads to changing individual's intention as a response to social pressures. An individual comply with the impact of social influence for those referent others who have the ability to motivate and reward the desired behavior of these individuals, and penalize unwanted behavior only in the presence of moderating effect of voluntarily use. It is expected in that women tend to be more sensitive to the opinions of others and thus the effect of social Influence will be stronger for women while forming intention to use new technology. As experience increase, this effect will decline specially in the older ages. As such, it is expected that there will be a complex and interactive relationships between these moderating factors leading to final moderating impact on the relationship between Social influence and Intention to use.

2.6.4 Facilitating Conditions

The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. There are three key variables derived from Technology Acceptance Models matched Facilitating Conditions according to;

2.6.4.1 Perceived Behavioral Control, which is derived from Theory of Planned Behavior (TPB), Decomposed Theory of Planned Behavior (DTPB), Combined TAM and TPB (C–TAM–TPB), is defined as individual perception of the presence or absence of requisite resources and opportunities. According to it reflects perceptions of internal and external constraints on behavior, and Includes Self-efficacy, resource facilitating conditions, and technology facilitating conditions.

2.6.4.2 Facilitating Conditions, which is derived from Model of PC Utilization (MPCU), is defined as objective factors in the environment that observers agree make an act easy to accomplish.

2.6.4.3 Compatibility, which is derived from Innovation Diffusion Theory (IDT), is defined as the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters.

2.6.5 Voluntariness of Use.

Voluntariness of use is the attitude toward using technology is individual's overall affective reaction to using a system. There are four key variables derived from Technology Acceptance Models match Attitude toward using technology according to;

2.6.5.1 Attitude Toward Behavior, which is derived from Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Decomposed Theory of Planned Behavior (DTPB), and Combined TAM and TPB (C–TAM–TPB), is defined as an individual's positive or negative feelings (evaluative affect) about performing the target behavior.

2.6.5.2 Intrinsic Motivation, which is derived from Motivational Model (MM) is defined as the perception that users will want to perform an activity for no apparent reinforcement other than the process of performing the activity.

2.6.5.3 Affect toward Use, which is derived from Model of PC Utilization (MPCU), is defined as feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act.

2.6.5.4 Affect, which is derived from Social Cognitive Theory (SCT), is defined as an individual's liking for a particular behavior.

2.7 Contribution of Literature Review to This Research

This chapter provides the theoretical framework of diffusion of innovations, theory of reasoned action (TRA), theory of planned behavior (TPB), technology acceptance model (TAM) and Unified Theory of Acceptance and Use of Technology. UTAUT has been used as a structural model for this study because of its explanatory power and parsimony, designing to explain the actual adoption of an information system with

focusing on performance expectancy, effort expectancy, social influence, facilitating condition and voluntariness of use toward the intention to use and usage behavior of Hospital Information System. Thus, the following chapter presents the proposed theoretical framework and research hypotheses based on provided literature review.

2.8 The Integrative Framework.

Hospital Information Systems have become very advanced and new innovations are continuously being introduced. But a HIS is useless if it confuses the hospital employees. The system must be user friendly and should include training by the vendors. A good HIS offers numerous benefits to a hospital including but not limited to the delivery of quality patient care and better financial management. The HIS should also be patient centric, medical staff centric, affordable and scalable. The technology changes quickly and if the system is not flexible it will not be able to accommodate hospital growth.

Driven by a motivation to unify these research efforts in Technology Acceptance literature, UTAUT was introduced and developed by a decade ago, based on eight Technology Acceptance competing models. These models and theories are the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), a model combining the Technology Acceptance Model and the Theory of Planned Behavior (C-TAM-TPB), the model of PC utilization, the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). The theory was established on four theoretical constructs representing determinants of Intention to Use or Usage Behavior, which play essential roles as surrogates of Technology Acceptance. These constructs are: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. In addition to these variables the theory considers also moderating factors which moderate the relations between various variables and Intention to Use. The Moderators are Gender, Age, Experience, and Voluntariness of use.

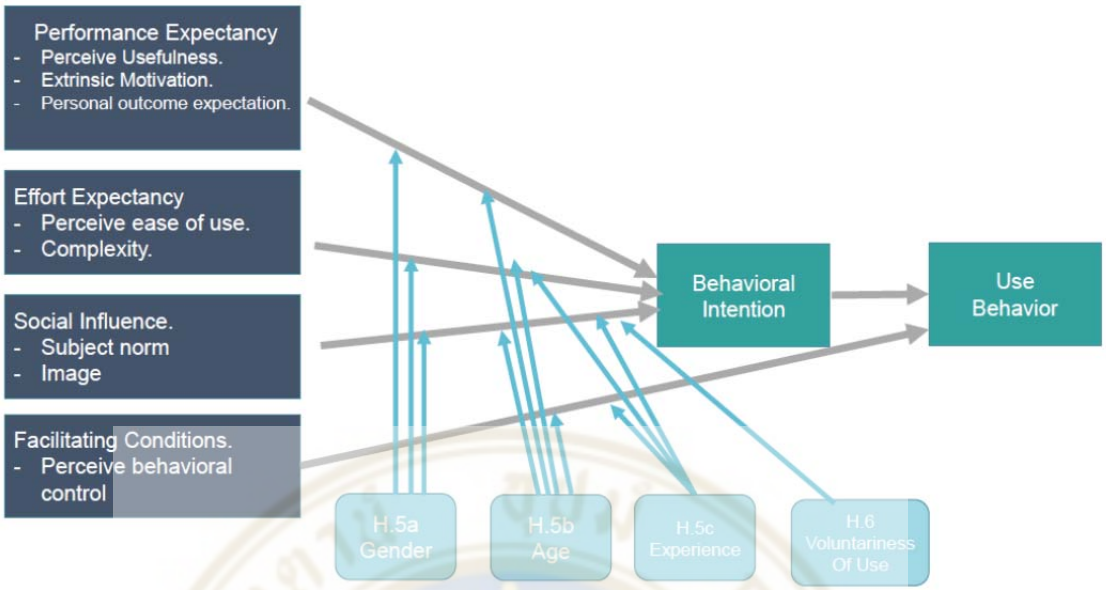

Figure 2.6 The Integrative Framework

2.9 Hypotheses in This Study

In this study, Figure 2.7 presents the research model and hypotheses, which were expanded based on the Unified Theory of Acceptance and Use of Technology. The main UTAUT factors include performance expectancy, effort expectancy, social influence, and facilitating conditions. External factors also are explained by provincial areas and employee demographics. Performance Expectancy refers to the performance of information technology and associated systems for users. Therefore, it follows that:

Performance Expectancy refers to the performance of information technology and associated systems for users. In Taiwan, research has been conducted about physicians 'acceptance of pharmacokinetics- based clinical decision support systems.

H1: Performance Expectancy positively affects Behavioral Intention to use Hospital Information System.

Effort expectancy is considered to be directly associated with ease use of the system. Many early research studies found that effort expectancy affects the usage of systems. It was found that effort expectancy has a positive significant effect on intention to use clinical decision support systems (Chang I-C & Hwang H-G, 2007), healthcare information systems and adverse event reporting systems. Thus, it follows that:

H2: Effort Expectancy is positively related to Behavioral Intention to use Hospital Information System.

Social Influence refers to beliefs as to whether an individual should use a system. It has been found in other technology acceptance models, such as the TRA, TPB and DTPB. From research on acceptance of Hospital Information Systems (HIS). (Aggelidis VP & PD., 2009) It was found that social influence affects the behavioral intention of hospital personnel. (Wu J-H , Shen W-S, & DW., 2008) also indicated that subjective norm had a direct positive effect on Behavioral Intention in using an adverse event reporting system. Accordingly, a hypothesis is presented as follows:

H3: Social Influence positively affects Behavioral Intention to use Hospital Information System.

Facilitating Conditions are circumstances that an individual believes exist to support his/her activities, such as the infrastructure or environment. (Chang I-C & Hwang H-G, 2007) showed that Facilitating Conditions have a positive effect on physicians' use behavior of pharmacokinetics-based clinical decision support systems. (Yi MY & Jackson JD, 2006) found that Perceived Behavioral Control (PBC) was a significant determinant of Behavioral Intention to use PDAs in physicians. Facilitating Conditions were represented by the PBC as a direct determinant of use. Therefore, I hypothesized:

H4: Facilitating Conditions positively influence Use Behavior.

Employee demographics are defined as the characteristics of hospital staff. With the UTAUT hypothesis, I have four main factors which define relationships with other moderators. The moderators consisted of age, gender, voluntariness and experience, a hypothesis is presented as follows:

H5a: Age positively influences (PE, EE and SI) and Behavioral Intention to use Hospital Information System.

H5b: Gender positively influences (PE, EE, and SI) and Behavioral Intention to use Hospital Information System. And, Gender positively influences Facilitating Conditions on Use Behavior.

H5c: Experience positively influences (EE, SI and FC) and on Behavioral Intention to use healthcare technology. And, Experience positively influences Facilitating Conditions on Use Behavior.

Voluntariness in technology adoption and use is vital in promoting technology diffusion and use in organizations. This leads to poor uptake of technology and results to unclear understanding regarding to their attitudes towards using it. Therefore, I hypothesized:

H6: Voluntariness of use positively influences SI and on Behavioral Intention to use Hospital Information System.

To summarize the hypotheses as above, the research model is illustrated in figure 2.7.

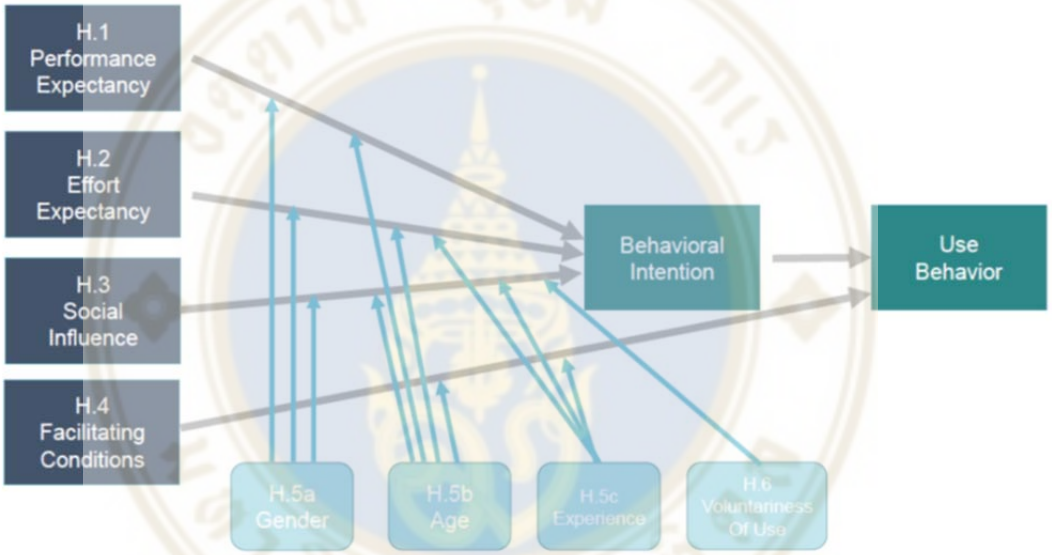

Figure 2.7 the Empirical Model for Research Framework

CHAPTER III
RESEARCH METHODOLOGY

This chapter presents research methodology of the understanding the adoption of Hospital Information System. The aim of this chapter is to describe data collection of this research which can be divided into 9 sections; research design, population and sample selection, research framework, data collection process, research questionnaire, pilot test, data collection and data analysis.

Quantitative data includes close-ended information such as that found to measure attitudes (e.g., rating scales), behaviors (e.g., observation checklists), and performance instruments. The analysis of this type of data consists of statistically analyzing scores collected on instruments (e.g., questionnaires) or checklists to answer research questions or to test hypotheses.

Qualitative data consists of open-ended information that the researcher usually gathers through interviews, focus groups and observations. The analysis of the qualitative data (words, text or behaviors) typically follows the path of aggregating it into categories of information and presenting the diversity of ideas gathered during data collection.

By mixing both quantitative and qualitative research and data, the researcher gains in breadth and depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself. A mixed methods study is one in which the researcher incorporates both qualitative and quantitative method of data collection and analysis in a single study. This type of a study enables a policy researcher to understand complex phenomena qualitative as well as to explain phenomena through number, charts, and basic statistical analysis. (Creswell JW & VL, 2011) Use qualitative data to explore quantitative findings. This explanatory sequential design typically involves two phases: (1) an initial quantitative instrument phase, followed by (2) a qualitative data collection phase, in which the qualitative phase builds directly on the results from the quantitative phase. In this way, the quantitative results are explained in more detail through the qualitative data.

The data in this research is gathered by using online self-administered questionnaires. Base theory of UTAT is used to measure the user's perception toward Hospital Information System and to explore the relationship between the factors and user's intention toward using which could constrain the technology adoption. At the same time, user's demographic characteristics experience and voluntariness of use are applied to find the effects on technology acceptance. Next step used qualitative data to explore quantitative findings by asking questions through oral interviews.

3.1 Research design

The research method used in this study is an online survey questionnaire conducting to assess the proposed psychological determinants of hospital information adoption. Its purpose has been developed based on the empirical study in the previous literature research and adapted to acceptance context as shown in the hypotheses.

3.2 Population and sample selection

3.2.1 Population

The population for this study included users of information technology in healthcare technology, including physicians, nurses, and healthcare staff members who work for hospitals in each provincial area of Thailand. The randomly sampled population weighed provincial areas of Thailand included public and private hospital.

3.2.2 Sample characteristics

Users of information technology in healthcare technology, including physicians, nurses, and healthcare staff members who work for hospitals in each provincial area of Thailand.

3.2.3 Sample size

The Taro Yamane's simplified formula was used to determine the sample size for this research. The total number of the human health and social work activities in January 2017 in Thailand is 0.684 million approximately is used as a population with 95% confidence level(Office, 2017). The estimated sample size is determined by using Yamane's formula.(Israel, 1992)

$$n = \frac{N}{1+N(e)^2}$$

When: n = sample size,
N = population, and
e = error of the sampling.

Thus, the sample size for this study can be calculated as follow:

$$n = 684{,}000 / 1 + ((684{,}000)(0.05)2)$$
$$= 399.766g \text{ or approximately } 400 \text{ samples}$$

As a result, the sample size of 400 respondents is used in this research. Data collection is conducted through online questionnaires were distributed on a convenience-based to the hospital workforce in Thailand. The questionnaires were administrated to target respondents during April 2017. Data collection will be monitored through Google Form application.

3.2.4 Sample selection

Stratified sampling is used to select the sample through Google Form application for quantitative data. For qualitative issue used oral interview to investigate the opinion of focusing group based on the result of questionnaires.

3.3 Data collection process

The target group is specific group using snowball sampling can help the researcher to collect the data from the target population. The respondents would be more convenience and comfortable to answer to questionnaire when using online survey. Online survey requested the respondents to induce this survey to the other that they know to participate in this research which can help to reach to the target group. Second, investigated the result of questionnaires and use qualitative data to explore quantitative findings. Select the focusing group and collecting information by asking questions through oral interviews. In this way, the quantitative results are explained in more detail through the qualitative data.

3.4 Questionnaire Development.

The data in this research is gathered by using online questionnaires. Base theory of UTAT is used to measure the user's perception toward Hospital Information System to find impact factors and user's perception. The questionnaire is adapted and constructed based on various empirical studies on UTAT, explains the purpose of this research and data confidentiality. The questionnaire is divided into two parts.

Section 1: Demographic characteristics

Section 2: The perception of Hospital Information System adoption.

The respondents are asked to evaluate the 37 questionnaire items to measure their attitudes with five-point Likert scale anchored by 1 ("Strongly Disagree") and 5 ("Strongly Agree") to create a crude measure and force distinctions into two directional categories of "agree" and "disagree" without "neutral" category. (Neuman, 2007) All questionnaire items appear in Appendix 1. The transition of the level ranking us analyzed by criteria of the user perceptions

$$\text{The interval score of each level} = \frac{\text{Maximum score} - \text{Minimum score}}{\text{The amount of level}}$$

$$= \frac{5-1}{5}$$

$$= 1.33$$

The results were calculated from mean scores and grouped into three classes:

The score among 1.00 – 2.33 mean disagree

The score among 2.34 - 3.67 mean neutral

The score among 3.68 - 5 mean agree.

The level of agreement is measured by using the 5-level Likert scale. The items of each construct are shown in tables below.

Table 3.1 Component of performance expectancy

Variable	Description	Question
Performance expectancy	The degree to which an individual believes that information of HIS can enhanced the benefit of job.	20. The information of HIS enhances the benefits of work.
	The degree to which user perceives that using HIS will help to enhance work's performance.	22. Using HIS enhance work's performance.
	The degree to which prospective user's subjective probability that using HIS will improves the quality of work.	23. HIS improves the quality of work.
	The degree to which user perceives that technology in HIS improves the quality of work.	32. Technology in HIS improves the quality of work.
	The degree to which user perceives using HIS can enhance them to reduce the time.	33. Using HIS enables workers to work faster.
	The degree to which user perceives that HIS will usefulness for work.	34. Perceive usefulness of HIS increase the intention to use of technology.

Sources: Chismar WG & S. (2002)

Performance expectancy is the degree to which an individual believes that using the system will help him or her to attain gains in job performance. There are five key variables derived from technology acceptance models match performance expectancy according to perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectation.

Table 3.2 Component of effort expectancy

Variable	Description	Question
Effort expectancy	The degree to which the prospective user expects the target system to be facilitate work.	21. Technology in HIS supports your current work.
	The degree to which the prospective user expects the target system to be free of effort.	31. The perception on ease of using HIS benefits technology adoption.
	The degree of ease associated with the use of HIS.	35. HIS can easily be learned.

Sources: Wu J-H et al. (2008); Wu J-H & Wang S-C (2007); Yi MY & Jackson JD (2006)

Effort expectancy is the degree of ease of associated with the use of the system. There are three key variables derived from technology acceptance models match effort expectancy according to perceive ease of use, complexity and ease of use.

Table 3.3 Component of social influence

Variable	Description	Question
Social influence.	The degree to which organization's culture, vision and values enhance you to use HIS.	27. Organization's culture, vision and values have impacts on HIS usage.
	The degree to which an individual perceives that important other believe he or her should use HIS.	28. Your colleague expects that your service is better by using HIS.
	The degree to which supporting from organizations affects to user perception about the advantage of HIS.	30.Supporting from organizations affects to your perception about the advantage of HIS.

Sources: Kijsanayotin B & Ingun P (2013)

Social influence is the degree to which an individual perceives that important others believe he or she should use the new system. There are three key variables derived

from Technology Acceptance Models match Social Influence according to subject norm, social factors and image.

Table 3.4 Component of facilitating conditions

Variable	Description	Question
Facilitating conditions.	The degree to which HIS is perceived as being consistent give benefit potential to work.	24. HIS gives benefit to work driven by technology.
	The degree to which user perceives value by training HIS.	25. You have the knowledge necessary to use HIS by training.
	The degree to which user believes that IT person or technical infrastructure exist to support to use HIS.	29. Your technological professional has an IT department influences you to use HIS.

Sources: Fishbein (1975)

Facilitating Conditions is the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.

Table 3.5 Component of behavior intention

Variable	Description	Question
Behavior intention.	The degree to which an individual users' behavior intention to using HIS.	11. You intend to use HIS to serve your patients.
	The degree to which user perceive that their intention motivated them to use HIS.	13. Your intention to use HIS at work motivates you to learn faster.

Sources: Fishbein (1975)

Behavior intention is a function of both attitudes toward a behavior and subject norms toward that behavior, which has been found to predict actual behavior.

Table 3.6 Component of Use Behavior

Variable	Description	Question
Use Behavior.	The degree to which user willing to use HIS on dairy life.	36. The use of HIS has become a habit for me.
	The degree to which user familiar with the HIS system.	37. You familiar with this HIS system.

Sources: Fishbein (1975)

Use behavior is defined as behavior of the user when their use HIS on working life.

Table 3.7 Component of Voluntariness of use

Variable	Description	Question
Voluntariness of use.	The degree to which a person is willing to use the new technology of HIS.	12. You want to use the new technology of HIS.
	The degree to which a person is interesting to use the new technology of HIS.	26. Are you interested to use the new technology of HIS.

Sources: Yi MY & Jackson JD (2006)

Voluntariness in technology adoption and use is vital in promoting technology diffusion and use in organizations. In organization context, not all users are willing to use technology as required. In such circumstances, they are mandated to use it in order to fulfil their working duties.

3.5 Validity and Reliability Test of Questionnaire.

A valid questionnaire will enable accurate data that actually measure the concepts the researcher is interested in to be collected, while one that is reliable will mean that these data are collected consistently(M. Saunders, Lewis, & Thornhill, 2016, p. 449). Despite the questions used in this research were adapted from previous empirical studies of UTAT which have already been tested on their validity and reliability, however,

it is still important to re-assess their validity and reliability to ensure that they reflect the underlying theoretical construct.

3.5.1 Validity Assessment

According to (Saunders & M., 2016), the validity refers to the extent to which the methods in research's data collection are accurately measure what they were intended to measure. The validity can be referred to content validity, criterion-related validity and construct validity. The content validity refers to the extent to which the measurements in the construct model have adequate coverage of the investigating questions. This research is assumed having adequate content validity through the literature review, adaptation of questions from previous empirical UTAT studies and discussion with research advisor.

The criterion-related validity is defined as the ability of the measurements to make accurate predictions. The Pearson's bivariate analysis is used to assess the criterion-related validity to find the correlation coefficient between pairs of variables. Moreover, the measurements were adopted from previous empirical studies focusing on UTAT. The construct validity refers to extent to which the measurement questions are actually measure the presence of the construct as intended. As all the correlation between measures in the same construct are positively correlated with each other while Cronbach's alpha values are above 0.7, this has validated that measurement questions are convergent in the construct validity.

3.5.2 Reliability Assessment

The reliability is defined as the extent to which data collection technique or techniques will yield consistent findings, similar observations would be made or conclusions reached by other researchers or there is transparency in how sense was made from the raw data. Cronbach's alpha coefficient is considered as one of the most frequently used in measuring the consistency of responses to a set of questions. The alpha coefficient value is range between 0 and 1 while values of 0.7 or above indicate that the questions combined in the scale are measuring the same thing (Saunders & M., 2016).

3.6 Research framework.

Hospital Information Systems have become very advanced and new innovations are continuously being introduced. But a HIS is useless if it confuses the hospital employees. The system must be user friendly and should include training by the vendors. A good HIS offers numerous benefits to a hospital including but not limited to the delivery of quality patient care and better financial management. The HIS should also be patient centric, medical staff centric, affordable and scalable. The technology changes quickly and if the system is not flexible it will not be able to accommodate hospital growth.

Driven by a motivation to unify these research efforts in Technology Acceptance literature, UTAUT was introduced and developed by a decade ago, based on eight Technology Acceptance competing models. The theory was established on four theoretical constructs representing determinants of Intention to Use or Usage Behavior, which play essential roles as surrogates of Technology Acceptance. These constructs are: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. In addition to these variables the theory considers also moderating factors which moderate the relations between various variables and Intention to Use. The Moderators are Gender, Age, Experience, and Voluntariness of use.

3.6.1 Performance Expectancy

Performance Expectancy is the degree to which an individual believes that using the system will help him or her to attain gains in job performance. There are five key variables derived from Technology Acceptance Models match Performance Expectancy according to refers to the performance of information technology and associated systems for users. Therefore, it follows that: perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectations. Performance Expectancy remains significant and is the strongest construct as a predictor of intention among Technology Acceptance Models and Theories. It was expected that although Gender, and Age moderate the relationship between Performance Expectancy and Intention to Use.

H1: Performance Expectancy positively affects Behavioral Intention to use Hospital Information System.

3.6.2 Effort expectancy.

Effort expectancy is considered to be directly associated with ease use of the system. Many early research studies found that effort expectancy affects the usage of systems. It was found that effort expectancy has a positive significant effect on intention to use clinical decision support systems (Chang I-C & Hwang H-G, 2007), healthcare information systems, and adverse event reporting systems (Wu J-H et al., 2008). Thus, it follows that:

H2: Effort Expectancy is positively related to Behavioral Intention to use Hospital Information System.

3.6.3 Social Influence.

Social Influence refers to beliefs as to whether an individual should use a system. It has been found in other technology acceptance models, such as the TRA, TPB and DTPB. From research on acceptance of Hospital Information Systems (HIS) (C. P. Aggelidis VP, 2009), it was found that social influence affects the behavioral intention of hospital personnel, a hypothesis is presented as follows:

H3: Social Influence positively affects Behavioral Intention to use Hospital Information System.

3.6.4 Facilitating Conditions.

Facilitating Conditions are circumstances that an individual believes exist to support user activities, such as the infrastructure or environment. Research showed that Facilitating Conditions have a positive effect on physicians' use behavior of pharmacokinetics-based clinical decision support systems. (Chang et al.2007). Facilitating Conditions were represented by the PBC as a direct determinant of use. Therefore, hypothesized:

H4: Facilitating Conditions positively influence Use Behavior.

3.6.5 Employee demographics

Employee demographics are defined as the characteristics of hospital staff. With the UTAUT hypothesis, I have four main factors which define relationships with

other moderators. The moderators consisted of age, gender, experience and voluntariness of use; a hypothesis is presented as follows:

H5a: Gender positively influences (PE, EE and SI) and Behavioral Intention to use Hospital Information System.

H5b: Age positively influences (Performance Expectancy, Effort Expectancy and Social Influence) and Behavioral Intention to use Hospital Information System and age positively influences to Facilitating Conditions on Use Behavior.

H5c: Experience positively influences (Effort Expectancy, Social Influence) and on Behavioral Intention to use HIS. And experience positively influences Facilitating Conditions on Use Behavior.

3.6.6 Voluntary of use

Voluntariness in technology adoption and use is vital in promoting technology diffusion and use in organizations. In organization context, not all users are willing to use technology as required. In such circumstances, they are mandated to use it in order to fulfil their working duties. This leads to poor uptake of technology and results to unclear understanding regarding to their attitudes towards using it. Therefore, I hypothesized:

H6: Voluntariness of use positively influences Social Influence and on Behavioral Intention to use Hospital Information System.

3.7 Pilot Test

The pilot test was executed with 20 respondents to determine respondents' comprehension of items constructed in the questionnaire. For user perception items, there were some unclear, double-barreled and duplicate measure questions which were re-written and reduced from 40 questions to 37 questions.

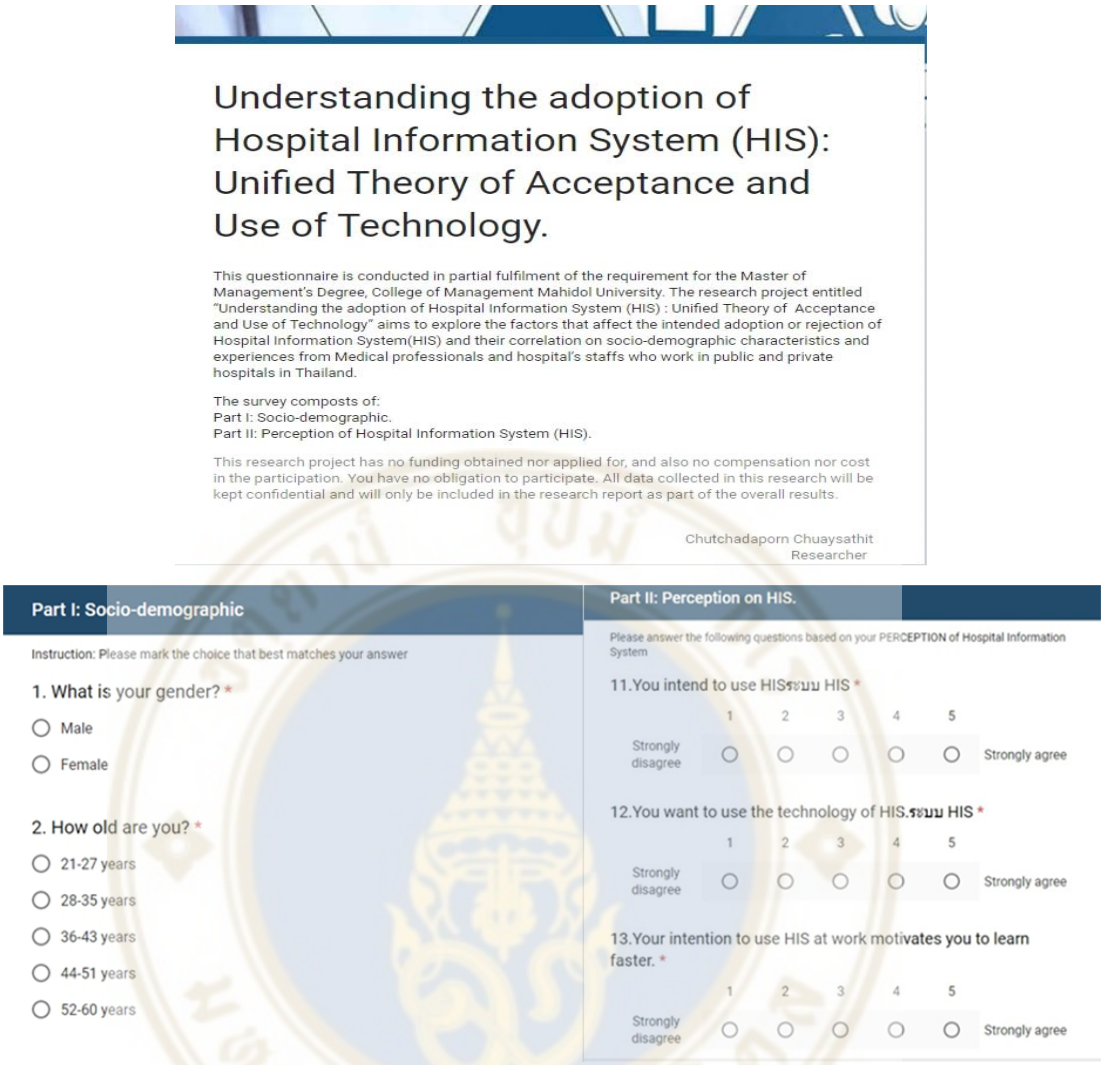

Figure 3.1 Illustrates the three main pages of the online questionnaire used in this research.

Table 3.8 Reliability analysis in pilot test

Construct	Cronbach's Alpha	No of Items
Performance Expectancy	0.906	6
Effort expectancy	0.831	3
Social Influence	0.847	3
Facilitating Conditions	0.822	3
Behavior intention	0.793	2
Use Behavior.	0.885	2
Voluntariness of use	0.742	2

SPSS program's reliability calculation, scale's reliability is suggested to higher 0.7. The reliability of the scales was acceptable. All constructs were higher 0.7 which is acceptable for the reliability.

3.8 Data collection.

After the questionnaire has been revised based on the feedback and distributed in online. The online questionnaires were distributed on a convenience-based to the hospital workforce in Thailand. The questionnaires were administrated to target respondents during April 2017. Data collection will be monitored through Google Form application.

3.9 Data analysis

SPSS program is used to analyze the data. Descriptive analysis is used to interpret the data and make it easy to understand. Mean and frequency used to exam the different demographic characteristics. While linear regression are used to test hypothesis 1 to 4 and moderator regression are used to test the hypothesis 5a, 5b, 5c and hypothesis 6.

CHAPTER IV
RESEARCH RESULTS

This chapter presents the results of analyses based on the data of 449 samples. Descriptive statistics have been used to describe the respondents' demographic information and the results of the survey focusing on understanding the adoption of Hospital Information System (HIS). The research then uses SPSS 23.0 software to screen the preliminary data. Mean, frequency, linear regression and moderator regression are used to test the hypothesis of this research.

The analysis results consist of five sections in the following:

Section 1:reliability and validity of the construct

Section 2:summary of the respondent's' demographic information

Section 3: results of the survey concerning to the respondents' perception on understanding the adoption of Hospital Information System (HIS).

Section 4: data analysis and summarize of the hypothesis verification through multiple regression analyses and the relationships of demographics, HIS usage experience and overall technology acceptance factors.

Section 5: qualitative data consists of open-ended information that the researcher usually gathers through interviews and focusing groups. The analysis of the qualitative data typically follows the path of aggregating it into categories of information and presenting the diversity of ideas gathered during data collection.

4.1 Reliability and validity of the constructs

The information is gathered from 449 respondents by using self-administered questionnaires. The questionnaire is divided into 8 parts performance expectancy, effort expectancy, social influence, facilitating conditions, behavior intention, use behavior, voluntariness of use and experience.

Table 4.1 Reliability analysis

Construct	Cronbach's Alpha	No of Items
Performance Expectancy	0.942	6
Effort expectancy	0.819	3
Social Influence	0.862	3
Facilitating Conditions	0.868	3
Behavior intention	0.847	2
Use Behavior.	0.918	2
Voluntariness of use	0.787	2
Experience	0.878	3
Overall	0.997	24

Table 4.1 Show the reliability ranged from 0.819 to 942, scale's reliability of performance expectancy is 0.942, effort expectancy, is 0.819, social influence is 0.888, facilitating condition sis 0.868, behavior intention is 0.847, use behavior is 0.918, voluntariness of use is 0.787 and experience is 0.878. Factor loading of all items in each construct, scale's reliability is 0.997. From the SPSS program's reliability calculation, scale's reliability is suggested to higher 0.7. This shows that the questionnaire has good reliability and validity of the measurement model.

Table 4.2 Correlation test validity analysis

Variables	Performance expectancy	Effort expectancy	Social influence.	Facilitating conditions	Behavior intention	Use Behavior	Voluntariness of use
Performance expectancy	1.000	0.797	0.783	0.798	0.754	0.776	0.703
		0.000**	0.000**	0.000**	0.000*	0.000**	0.000**
Effort expectancy		1.000	0.790	0.763	0.747	0.745	0.791
			0.000**	0.000**	0.000*	0.000**	0.000**
Social influence.			1.000	0.747	0.667	0.735	0.708
				0.000**	0.000**	0.000*	0.000**
Facilitating conditions				1.000	0.714	0.734	0.755
					0.000**	0.000**	0.000*
Behavior intention					1.000	0.682	0.744
						0.000**	0.000**
Use Behavior						1.000	0.722
							0.000**
Voluntariness of use							1.000

** correlation is significant at the 0.001 level

From table 4.2, factor loading for check the validity analysis of the measurement model. To predict, concurrent validity and test the relationship between the variable of factor that impact to perception of HIS. Factor loading of all items in each construct, the result of analysis shows by correlation coefficient scores range from 0.667 - 0.798 that less than 0.80. Correlation is significant at the 0.001 level so the construct validity in this paper was ensured and that there was almost no multicollinearity problem with these variables.

4.2 Demographic information of the respondents.

The characteristic of the samples are described in this section. The respondents are the Medical professionals and hospital's staffs who work in public and private hospitals in Thailand. The respondents' demographic are divided into ten categories: gender, the age range, the education level, the job title, the type of hospital, the size of hospital, the experience employment, the experience of HIS, the average hours that using HIS for work and the experience of training. All the results are presented in tables 4.3 as below.

Table 4.3 Demographic profile of the respondents (total 449)

Demographic	Categories	Number	Percentage (%)
Gender	Male	103	22.9
	Female	346	77.1
Age	21 to 27 years	68	15.1
	28 to 35 years	188	57.0
	36 to 43 years	71	15.8
	44 to 51 years	64	14.3
	52 to 60 years	51	12.9
Education	Below High Vocational Certificate	37	8.2
	High Vocational Certificate	33	7.3
	Bachelor's degree	294	65.5
	Master's degree	73	16.3
	Ph.D. (Doctor of Philosophy)	12	7.7
Job Title	Management level	58	12.9
	Medical staffs	74	16.5
	Medical Support	278	61.9
	General Staffs	39	8.7
Hospital type	Public hospital	363	80.8
	Private hospital	86	19.2

Table 4.3 Demographic profile of the respondents (total 449) (cont.)

Demographic	Categories	Number	Percentage (%)
Hospital size	Big	347	77.3
	Medium	51	11.4
	Small	51	11.4
Experience Employment	0-5 years	149	33.2
	6-10 years	108	24.1
	11-15 years	38	8.5
	16-20 years	46	10.2
	more than 20 years	108	24.1
HIS experience	No	39	8.7
	Yes	410	91.3
Using hours	0 hours	39	8.7
	1-2 hours	99	22
	3-4 hours	76	16.9
	5-6 hours	75	16.7
	7-8 hours	160	35.6
Training	No	194	43.2
	Yes	255	56.8

According to the table 4.3, 77.1% of the respondents are female and 22.9% are male. The age ranges of the respondents are divided into 5 groups. 57% of respondents are aged 28 to 35 years old. The groups of respondents aged between 21 to 27 years old, 36 to 43 years old, 44 to 51 years old and 52 to 60 years old are 15.1%, 15.8%, 14.3% and 12.9%.

Among respondents, the majority education levels are Bachelor's degree (65.5%) and Master degree (16.3%). The majority job titles are medical support (61.9%), medical staffs and management level which hold similar percentage at 16.5% and 12.9%.

Most of the hospital type is the public hospital (80.8%) and the hospital size is big (more than 91 beds of IPD patient) which hold percentage at77.3%.

The experience employment divided in to 5 ranged. Most respondents employed 0-5 years (33.2%), 6-10 years and more than 20 years which hold similar percentage at 24.1%.

In terms of HIS experience, the majority of respondents have experience with HIS last version (91.3%). Most of the usage hours are 7-8 hours per day (35.6%), 3-4 hours and 5-6 hours which hold similar percentage at 16.9% and 16.7%. However, there are respondents (43.2%) who never trained in term of HIS before and the percentage

of trained HIS program is 56.8%. The detail of the questionnaire results for demographics were shown in Appendices.

4.3 Result of the respondents' perception on understanding the adoption of Hospital Information System (HIS).

Table 4.4 Performance expectancy

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q.20 The information of HIS enhances the benefits of work.	strongly disagree	2	0.4	4.34	Agree
	disagree	4	0.9		
	fair	46	10.2		
	agree	183	40.8		
	strongly agree	214	47.7		
Q.22 Using HIS enhance work's performance.	strongly disagree	3	0.7	4.32	Agree
	disagree	5	1.1		
	fair	48	10.7		
	agree	183	40.8		
	strongly agree	210	46.8		
Q. 23 HIS improves the quality of work.	strongly disagree	4	0.9	4.25	Agree
	disagree	4	0.9		
	fair	64	14.3		
	agree	179	39.9		
	strongly agree	198	44.1		
Q.32Technology in HIS improves the quality of work.	strongly disagree	2	0.4	4.27	Agree
	disagree	5	1.1		
	fair	68	15.1		
	agree	170	37.9		
	strongly agree	204	45.4		
Q. 33 Using HIS enables workers to work faster.	strongly disagree	2	0.4	4.28	Agree
	disagree	4	0.9		
	fair	70	15.6		
	agree	164	36.5		
	strongly agree	209	45.5		
Q.34 You perceive the usefulness of HIS technology.	strongly disagree	2	0.4	4.20	Agree
	disagree	4	0.9		
	fair	70	15.6		
	agree	198	44.1		
	strongly agree	175	39.0		

Table 4.4 show the perception of performance expectancy. Regarding HIS can enhances the benefit to work by system information, 47.7% of respondents are strongly agree and 40.8% agree with that term. While the percentage of user are disagree with the benefit of HIS information is 0.9% and strongly is 0.4%.

In term of technology of HIS help to enhances work's performance, 46.8% of respondents are strongly agree and 40.8% are agree. While 0.7% and 1.1% of respondents are strongly disagree and disagree.

Regarding quality of work, 44.1% of respondents strongly agree with using HIS help to improve quality of work and 39.9% are agree. While the percentage of respondents who strongly disagree and disagree are 0.9%.

Majority of the respondents strongly agree with the technology in HIS can help to improve the quality of work (45.4%) and 37.9% are agree. 15.1% are fair (mean = 4.27) and minority of the respondents are strongly disagree (0.4%).

Among the 449 respondents, 45.5% of the respondents are strongly agree that using HIS enable worker to work faster and 36.5% are agree. While 0.4% and 0.9% of respondents are strongly disagree and disagree.

Majority of the respondents agree that their perceive the usefulness of HIS technology 44.1% and 39.0% are strongly agree. 15.6% are faire (mean =4.20) and minority of respondents are disagree and disagree with the percentage 0.9% and 0.4%

Table 4.5 Effort expectancy

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q.21Technology in HIS supports your current work.	strongly disagree disagree fair agree strongly agree	2 7 53 187 200	0.4 1.6 11.8 41.6 44.5	4.28	Agree
Q. 31The perception on ease of using HIS benefits technology adoption.	strongly disagree disagree fair agree strongly agree	2 4 68 175 200	0.4 0.9 15.1 39.0 44.5	4.26	Agree
Q. 35 HIS can easily be learned.	strongly disagree disagree fair agree strongly agree	2 4 101 197 145	0.4 0.9 22.5 43.9 32.3	4.07	Agree

Table 4.5 show the perception in term of effort efficiency with HIS, 44.5% strongly agree that technology in HIS support their work and 41.6% agree. 11.8% are fair (mean= 4.28) and 1.6 % of respondents are disagree, 0.4% are strongly disagree.

Regarding the perception on ease of use HIS benefit technology adoption, 44.5% of respondents are strongly agree and 39.0% of respondents are agree. 15.1% of respondents are fair (mean = 4.26), minority of respondents are strongly disagree with the percentage 0.9% and disagree with the percentage 0.9%.

Majority of respondents are agree that HIS can easily be learned with the percentage at 43.9% and strongly agree with the percentage at 32.3%. 22.5% of the respondents are fair(mean = 4.07) and the minority of the respondents are strongly disagree with the percentage at 0.4%.

Table 4.6 Social influence.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q.27Organization's culture, vision and values have impacts on HIS usage.	strongly disagree disagree fair agree strongly agree	5 9 96 176 163	1.1 2.0 21.4 39.2 36.3	4.08	Agree
Q. 28 Your colleague expects that your service is better by using HIS.	strongly disagree disagree fair agree strongly agree	5 10 99 190 145	1.1 2.2 22.2 42.3 32.3	4.02	Agree
Q. 30 Supporting from organizations affects to your perception about the advantage of HIS.	strongly disagree disagree fair agree strongly agree	3 4 66 172 204	0.7 0.9 14.7 38.2 45.4	4.27	Agree

Table 4.6 show the perception in term of social influence, majority of the respondents agree that organization's culture, vision and values have impacts on HIS usage with the percentage at 39.2% and 36.3% are strongly agree. 21.4% are fair (mean = 4.08). The minority of the respondent are strongly disagree with this term at 1.1% and disagree at 2.0%.

Regarding the expectation of colleague for better service when using HIS, 42.3% of respondents are agree, 32.3% are strongly agree and 22.2 % are fair(mean= 4.02).

While the minority of respondents are disagree and strongly disagree with the percentage of 2.2% and 1.1%.

In term of the affecting from organization support for user perception about the advantage of HIS, most of respondents are strongly agree (45.4%) and 38.2% of respondents are agree. The minority of respondents are strongly disagree with the percentage of 0.7% and disagree with the percentage of 0.9%.

Table 4.7 Facilitating conditions.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q. 24 HIS gives benefit to work driven by technology.	strongly disagree	3	0.7	4.21	Agree
	disagree	5	1.1		
	fair	68	15.1		
	agree	192	42.8		
	strongly agree	181	40.3		
Q. 25You have the knowledge necessary to use HIS by training.	strongly disagree	3	0.7	4.23	Agree
	disagree	3	0.7		
	fair	65	14.5		
	agree	193	43.0		
	strongly agree	185	41.2		
Q. 29Your technological professional has an IT department influences you to use HIS.	strongly disagree	5	1.1	4.10	Agree
	disagree	13	2.9		
	fair	79	17.6		
	agree	187	41.6		
	strongly agree	165	36.7		

Table 4.7 show the perception in term of facilitating conditions. Minority of respondents are strongly agree that HIS gives benefit to work with the percentage of 0.7% and 1.1% are disagree. The majority of respondents are agree with the percentage of 42.8% and 40.3% are strongly agree. While 15.1% of respondents are fair (mean= 4.21).

Majority of the respondents are agree that they have the knowledge necessary to use HIS by training with the percentage of 43.0% and strongly agree with the percentage of 41.2%. While 14.5% are fair (mean= 4.23) and the minority of the respondents are strongly disagree and disagree with the percentage of 0.7%

Regarding of technological professional has an IT department influences user to use HIS. The majority of the respondents are agree (41.6%) and 36.7% of the respondents are strongly agree. While 17.6% of the respondents are fair (mean= 4.10) and the minority of the respondents are strongly disagree with the percentage of 1.1% and disagree with the percentage of 2.9%.

Table 4.8 Behavior intention.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q. 11 You intend to use HIS to serve your patients.	strongly disagree disagree fair agree strongly agree	4 10 83 167 185	0.9 2.2 18.5 37.2 41.2	4.16	Agree
Q. 13Your intention to use HIS at work motivates you to learn faster.	strongly disagree disagree fair agree strongly agree	4 12 66 181 186	0.9 2.7 14.7 40.3 41.4	4.19	Agree

Table 4.8 show the perception in term of behavior intention. Most of respondents are strongly agree (41.2%) and agree (37.2%) that the respondents intend to use HIS to serve their patients. 18.5% are fair (mean= 4.16), while the minority of respondents are strongly disagree with the percentage of 0.9% and disagree with the percentage of 2.2%.

In term of user intention that motivates them to learn faster, the majority of the respondents are strongly agree (41.1%) and agree with the percentage of 40.3%. While 14.7% are fair and the minority of the respondents are strongly disagree with the percentage of 0.9% and 2.7% are disagree.

Table 4.9 Use Behavior.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q. 36 The use of HIS has become a habit for me.	strongly disagree disagree fair agree strongly agree	2 5 57 189 196	0.4 1.1 12.7 42.1 43.7	4.27	Agree
Q.37 You familiar with this HIS system.	strongly disagree disagree fair agree strongly agree	2 4 62 179 202	0.4 0.9 13.8 39.9 45.0	4.28	Agree

Table 4.9 show the perception in term of use behavior, the majority of user are strongly agree that the use of HIS has become a habit for them with the percentage of 43.7% and 42.1% are agree. While 12.7% of the respondents are fair (mean = 4.27%), the minority of the respondents are strongly disagree (0.4%) and disagree (1.1%).

Regarding the perceptions of familiar with HIS system, The majority of the respondents are strongly agree with the percentage of 45.0% and agree with the percentage of 39.9%. While 13.8% are fair (mean=4.28%) and the minority of the respondents are strongly disagree with the percentage of 0.4% and disagree with the percentage of 0.9%.

Table 4.10 Voluntariness of use.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q.12You want to use the new technology of HIS.	strongly disagree	3	0.7	4.29	Agree
	disagree	9	2.0		
	fair	64	14.3		
	agree	151	33.6		
	strongly agree	222	49.4		
Q.26 Are you interested to use the new technology of HIS.	strongly disagree	3	0.7	4.25	Agree
	disagree	6	1.3		
	fair	63	14.0		
	agree	179	39.9		
	strongly agree	198	41.1		

Table 4.10 shows the perceptions in term of voluntariness of use, the majority of the respondents are strongly agree that they want to use the new technology of HIS with the percentage of 49.4% and agree with the percentage of 33.6%. While 14.3% are fair (mean= 4.29) and the minority of the respondents are strongly disagree with the percentage of 0.7% and 2.0% of the respondents are disagree.

In term of interesting to use the new technology of HIS, most of the respondents are strongly agree with the percentage of 41.1% and 39.9% are agree. While 14.0% are fair (mean = 4.25) and the minority of the respondents are strongly disagree with percentage of 0.7% and disagree with the percentage of 1.3%.

Table 4.11 Experience.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q. 14Your work experience is beneficial and contributes to or support to use HIS.	strongly disagree disagree fair agree strongly agree	4 11 73 176 185	0.9 2.4 16.3 39.2 41.1	4.17	Agree
Q. 15Your work experience plays a role in the acknowledgement of HIS's advantage	strongly disagree disagree fair agree strongly agree	8 6 60 156 219	1.8 1.3 13.3 34.7 48.8	4.27	Agree
Q. 16 Your work experience helps to use HIS easier.	strongly disagree disagree fair agree strongly agree	3 11 79 187 169	0.7 2.4 17.6 41.6 37.6	4.13	Agree

Table 4.11 shows the perceptions of experience, most of the respondents are strongly agree that work experience is beneficial and contributes to or support to use HIS with the percentage of 48.8% and agree with the percentage of 34.7%. While 13.3% are fair (mean= 4.27) and the minority of the respondents are disagree (1.3%) and 1.8% are strongly disagree.

Regarding work experience plays a role in the acknowledgement of HIS's advantage, the majority of the respondents are strongly agree with the percentage of 48.8% and 34.7% are agree. While 13.3% of the respondents are fair (mean= 4.27), the minority of the respondents are disagree (1.3%) and 1.8% are strongly disagree.

In term of work experience helps to use HIS easier, most of the respondents are agree with the percentage of 41.6% and 37.6% are strongly agree. While 17.6% of the respondents are fair (mean = 4.13), 2.4% of the respondents are disagree and 0.7% of respondents are strongly disagree.

Table 4.12 Education.

	Level of agreement	Number of respondents (449)	Percentage (%)	Mean	Indicator
Q17.Your education level has an impact on using HIS.	strongly disagree disagree fair agree strongly agree	8 28 135 163 115	1.8 6.2 30.1 36.3 25.6	3.78	Agree
Q.18 Your education level plays a role in acknowledgement of HIS's advantage.	strongly disagree disagree fair agree strongly agree	7 17 115 175 135	1.6 3.8 25.6 39.0 30.1	3.92	Agree
Q.19 Your education experience helps to use HIS easier.	strongly disagree disagree fair agree strongly agree	10 16 97 177 155	2.2 3.6 21.6 38.1 34.5	3.99	Agree

Table 4.12 show the perceptions in term of education, mostly of the respondents are agree that education level has an impact on using HIS with the percentage of 36.3% and 25.6% of the respondents are agree. While 30.1% of the respondents are fair (mean = 3.78), 6.2% of the respondents are disagree and 1.8% are strongly disagree.

Regarding education level plays a role in acknowledgement of HIS's advantage, 39.0% of the respondents are agree and 30.1% are strongly agree. While 25.6% of the respondents are fair (mean = 3.92), the minority of the respondents are strongly disagree with the percentage of 1.6% and 3.8% are disagree.

In term of experience on educations helps to use HIS easier, most of the respondents are agree with the percentage of 38.1% and 34.5% are strongly agree. While 21.6% of the respondents are fair (mean= 3.99), the minority of the respondents are strongly disagree with the percentage of 2.2% and 3.6% of the respondents are disagree.

4.4 Hypothesis Testing Results.

The objective of this study was to investigate the relationship between performance expectancy, effort expectancy, social influence, facilitating conditions and behavior intention, and usage behavior. Thus, multiple regression technique was used to test the developed hypotheses for this study. Further, Landau and Everitt (2004)

defined multiple regression as an analysis method for evaluating the relationship between a single response variable (known as dependent variables), and each of a set of explanatory variables (or independent variables, but this is not recommended because the variables are often correlated).For rejecting the null hypotheses, the decision rule considers the significance level (α-level) was chosen to be 0.05.

4.4.1 Hypothesis 1

H1: Performance Expectancy positively affects Behavioral Intention to use Hospital Information System.

Table 4.13 The regression analysis between the performance expectancy and the behavioral intention to use Hospital Information System.

Model (H1)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	0.402	0.157		2.551	0.011	0.754	0.568	0.567	224.695	0.000*
Performance expectancy	0.881	0.036	0.754	24.235	0.000					
Durbin-Watson = 2.023										

* Significant at or below the 0.05 level

Table 4.13 shows the regression analysis between the performance expectancy and the behavioral intention to use HIS. Result indicated that the relation between variable has strong relationship at the level of R = 0.754 and Adjusted R Square is 0.568 so indicated that the performance expectancy has influenced to change the behavioral intention to use HIS at the percentage of 56.70% (Adjusted R Square = 0.567). From the result of F-statistics (224.695, Sig. = 0.000 < 0.05), indicated that significant. For Durbin-Watson test, the result is 2.023 (> 1.5) indicate that no autocorrelation between variables.

Regarding the results from Constant, unstandardized coefficients is 0.402, standard error of the coefficients is 0.157. The result from regression analysis show t – test = 24.235 (sig. = 0.000 < 0.05) and Beta = 0.754, indicated that the performance expectancy positively affects to behavioral intention to use by one unit of the performance expectancy influence behavior intention to use HIS increase at the level of 0.754 units (significant at the 0.05 level).

The findings demonstrated that hypotheses 1 accepted, the performance expectancy positively affects to behavioral intention to use HIS, the model explain affects to changes at 56.70% and significant at the 0.05 level.

4.4.2 Hypothesis 2

H2; Effort Expectancy positively affects Behavioral Intention to use Hospital Information System.

Table 4.14 The regression analysis between the Effort Expectancy and the behavioral intention to use Hospital Information System.

Model (H2)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	0.425	0.160		2.659	0.008	0.747	0.557	0.556	562.755	0.000*
Effort expectancy	0.891	0.038	0.747	23.722	0.000*					
Durbin-Watson = 1.978										

* Significant at or below the 0.05 level

Table 4.14 shows the result of the regression analysis between the Effort Expectancy and the Behavioral Intention to use HIS. Result indicated that the relation between variable has strong relationship at the level of R. = 0.747 and Adjusted R Square = 0.557 so indicated that the effort expectancy has influenced to change the behavioral intention to use HIS at the percentage of 55.60% (Adjusted R Square = 0.556). From the result of F-statistics (562.755, Sig. = 0.000 < 0.05)), indicate that significant. For Durbin-Watson test, the result is 1.978 (> 1.5) indicate that no autocorrelation between variables.

Regarding the results from Constant, unstandardized coefficients is 0.425, standard error of the coefficients is 0.160. The result from regression analysis show t – test = 23.722(sig = 0.000 < 0.05) and Beta = 0.747, indicated that the effort expectancy positively affects to behavioral intention to use HIS by one unit of the effort expectancy influence behavior intention to use HIS increase at the level of 0.747 (significant at the 0.05 level).

The findings demonstrated that hypotheses 2 accepted, the effort expectancy positively affects to behavioral intention to use HIS, the model explain affects to changes at 55.60% and significant at the 0.05 level.

4.4.3 Hypothesis 3

H3: Social influence positively affects Behavioral Intention to use Hospital Information System.

Table 4.15 The regression analysis between the social influence and the behavioral intention to use HIS.

Model (H3)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	1.228	0.158		7.773	0.000	0.667	0.445	0.444	358.085	0.000*
Social influence	0.714	0.038	0.667	18.923	0.000*					
Durbin-Watson = 1.927										

* Significant at or below the 0.05 level

Table 4.15 shows the regression analysis between the Social influence and the behavioral intention to use HIS. Result indicated that the relation between variable has strong relationship at the level of R. = 0.667 and Adjusted R Square is 0.445 so indicated that the social influence has influenced to change the behavioral intention to use HIS at the percentage of 44.40% (Adjusted R Square = 0.444). From the result of F-statistics (358.085, Sig. = 0.000 < 0.05) indicated that significant. For Durbin-Watson test, the result is 1.924 (> 1.5) indicate that no autocorrelation between variables.

Regarding the results from Constant, unstandardized coefficients is 1.228, standard error of the coefficients is 0.158. The result from regression analysis show t – test = 18.923 (sig. = 0.000 < 0.00) and Beta = 0.667, indicated that the social influence positively affects to behavioral intention to use HIS by one unit of the social influence motivate to the behavioral intention to use HIS increase at the level of 0.667 units (significant at the 0.05 level).

The findings demonstrated that hypotheses 3 accepted, the social influence positively affects to behavioral intention to use HIS, the model explain affects to changes at 44.44% and significant at the 0.05 level.

4.4.4 Hypothesis 4

H4: Facilitating conditions positively affects influence use behavior Hospital Information System.

Table 4.16 The regression analysis between the Facilitating conditions and the influence use behavior Hospital Information System.

Model (H4)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	0.723	0.113		6.423	0.000	0.834	0.696	0.696	1025.227	0.000*
Facilitating conditions	0.850	0.027	0.834	32.019	0.000*					
Durbin-Watson = 1.859										

* Significant at or below the 0.05 level

Table 4.16 show the regression analysis between the Facilitating conditions and the usage behavior of HIS. Result indicated that the relation between variable has strong relationship at the level of R. = 0.834 and Adjusted R Square is 0.696 so indicated that the Facilitating conditions has influenced to change the influence of use behavior HIS at the percentage of 69.60% (Adjusted R Square = 0.696). From the result of F-statistics (1025.227, Sig. = 0.000 < 0.05), indicated that significant. For Durbin-Watson test, the result is 1.859 (> 1.5) indicate that no autocorrelation between variables.

Regarding the results from Constant, unstandardized coefficients is 0.723 and standard error of the coefficients is 0.113. The result from regression analysis show t – test = 32.019 (sig. = 0.000 < 0.05) and Beta = 0.834, indicated that the Facilitating conditions positively affects influence to usage behavior of HIS by one unit of the Facilitating conditions influence to the usage behavior of HIS increase at the level of 0.834 units (significant at the 0.05 level).

The findings demonstrated that hypotheses 4 accepted, the facilitating conditions positively affects to usage behavior of HIS, the model explain affects to changes at 69.60% and significant at the 0.05 level.

4.4.5 Hypothesis 5

Employee demographics are defined as the characteristics of hospital staff. With the UTAUT hypothesis, I have four main factors which define relationships with other moderators. The moderators consisted of age, gender, voluntariness an experience, a hypothesis is presented as follows:

4.4.5.1 H5a: Gender positively influences (PE, EE and SI) and Behavioral Intention to use Hospital Information System.

- H5a1: Gender positively influences to the performance expectancy and Behavioral Intention to use Hospital Information System.

Table 4.17 The regression analysis moderator of gender and performance expectancy positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5a1)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.171	0.248	168.439	0.000	0.754	0.568	195.071	0.000	4.171	0.248
Gender x Performance expectancy	-0.021	0.079	-0.275	0.782					-0.021	0.079

* Significant at or below the 0.05 level

Table 4.17 show the regression analysis between gender, performance expectancy and behavioral intention to use HIS which define relationships of gender with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.754 and Adjusted R Square is 0.568. The result of F-statistics is 195.071(Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.171 and standard error of the coefficients 0.248. The result regression analysis moderator of gender and performance expectancy show t – test = -0.275 (sig. = 0.782 > 0.05), indicted

that the moderator of gender and performance expectancy has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5a1 rejected, the moderator of gender and performance expectancy has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5a2: Gender positively influences to the effort expectancy and Behavioral Intention to use Hospital Information System.

Table 4.18 The regression analysis moderator of gender and effort expectancy positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5a2)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.171	0.025	166.548	0.000	0.747	0.558	187.235	0.000	4.171	0.025
Gender x effort expectancy	-0.021	0.081	0.401	0.688					-0.021	0.081

* Significant at or below the 0.05 level

Table 4.18 show the regression analysis between gender, effort expectancy and behavioral intention to use HIS which define relationships of gender with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.747 and Adjusted R Square is 0.558. The result of F-statistics is 187.235 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.171 and standard error of the coefficients 0.025. The result regression analysis moderator of gender and effort expectancy show t – test = -0.021 (sig. = 0.668 > 0.05), indicted that the moderator of gender and effort expectancy has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5a2 rejected, the moderator of gender and effort expectancy has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5a3: Gender positively influences to social influence and Behavioral Intention to use Hospital Information System.

Table 4.19 The regression analysis moderator of gender and social influence positively influences to Behavioral Intention to use Hospital Information System

Moderators Model (H5a3)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.170	0.028	148.517	0.000	0.667	0.445	119.223	0.000	4.170	0.028
Gender x Social influence	-0.066	0.083	-0.793	0.427					-0.066	0.083

* Significant at or below the 0.05 level

Table 4.19 show the regression analysis between gender, social influence and behavioral intention to use HIS which define relationships of gender with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.667 and Adjusted R Square is 0.445. The result of F-statistics is 119.223 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.170 and standard error of the coefficients 0.028. The result regression analysis moderator of gender and effort expectancy show t – test = -0.793 (sig. = 0.427 > 0.05), indicted that the moderator of gender and social influence has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5a3 rejected, the moderator of gender and social influence has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

4.4.5.2 H5b: Age positively influences (PE, EE, SI and Facilitating condition) and Behavioral Intention to use Hospital Information System.

- H5b1: Age positively influences to the performance expectancy and Behavioral Intention to use Hospital Information System.

Table 4.20 The regression analysis moderator of age and performance expectancy positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5b1)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.171	0.024	168.439	0.000	0.753	0.568	195.152	0.000	4.171	0.024
Age x Performance expectancy	-0.008	0.030	-0.270	0.786					-0.008	0.030

* Significant at or below the 0.05 level

Table 4.20 show the regression analysis between age, performance expectancy and behavioral intention to use HIS which define relationships of gender with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.753 and Adjusted R Square is 0.568. The result of F-statistics is 195.152(Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.171 and standard error of the coefficients 0.024. The result regression analysis moderator of gender and performance expectancy show t – test = -0.270 (sig. = 0.786 > 0.05), indicted that the moderator of gender and performance expectancy has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5b1 rejected, the moderator of age and performance expectancy has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5b2: Age positively influences to the effort expectancy and Behavioral Intention to use Hospital Information System.

Table 4.21 The regression analysis moderator of age and effort expectancy positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5b2)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.170	0.025	166.405	0.000	0.747	0.559	188.323	0.000	4.170	0.025
Age x effort expectancy	-0.024	0.031	-0.769	0.441					-0.024	0.031

* Significant at or below the 0.05 level

Table 4.21 show the regression analysis between age, effort expectancy and behavioral intention to use HIS which define relationships of age with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.747 and Adjusted R Square is 0.559. The result of F-statistics is 188.323 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.170 and standard error of the coefficients 0.025. The result regression analysis moderator of age and effort expectancy show t – test = -0.769 (sig. = 0.441 > 0.05), indicted that the moderator of age and effort expectancy has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5b2 rejected, the moderator of age and effort expectancy has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5b3: Age positively influences to the social influence and Behavioral Intention to use Hospital Information System.

Table 4.22 The regression analysis moderator of age and social influence positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5b2)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.170	0.025	166.405	0.000	0.747	0.559	188.323	0.000	4.170	0.025
Age x effort expectancy	-0.024	0.031	-0.769	0.441					-0.024	0.031

* Significant at or below the 0.05 level

Table 4.22 show the regression analysis between age, social influence and behavioral intention to use HIS which define relationships of age with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.667 and Adjusted R Square is 0.445. The result of F-statistics is 119.343 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.170 and standard error of the coefficients 0.028. The result regression analysis moderator of age and social influence show t – test = -0.644 (sig. = 0.519 > 0.05), indicted that the moderator of age and social influence has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5b3 rejected, the moderator of age and social influence has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5b4: Age positively influences to the facilitating conditions and Behavioral Intention to use Hospital Information System.

Table 4.23 The regression analysis moderator of age and facilitating conditions positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5b4)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.273	0.018	228.493	0.000	0.843	0.711	365.637	0.000	4.273	0.018
Age x Facilitating conditions	-0.050	0.021	-2.349	0.019*					-0.050	0.021

* Significant at or below the 0.05 level

Table 4.23 show the regression analysis between age, facilitating conditions and behavioral intention to use HIS which define relationships of age with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.843 and Adjusted R Square is 0.711. The result of F-statistics is 365.637 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.273 and standard error of the coefficients 0.018. The result regression analysis moderator

of age and facilitating conditions show t – test = -2.349 (sig. = 0.019 < 0.05), indicted that the moderator of age and facilitating conditions has negative effects (-0.050 units) to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5b4 accepted, the moderator of age and facilitating conditions has negative affects to Behavioral Intention to use HIS (significant at the 0.05 level).

4.4.5.3 H5c: Experience positively influences (EE, SI and Facilitating condition) and on Behavioral Intention to use Hospital Information System.

- H5c1: Experience positively influences to the effort expectancy and Behavioral Intention to use Hospital Information System.

Table 4.24 The regression analysis moderator of experience and effort expectancy positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5c1)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.178	0.024	169.503	0.000	0.808	0.653	280.178	0.000	4.178	0.024
Experience x effort expectancy	-0.018	0.028	-0.627	0.530					-0.018	0.028

* Significant at or below the 0.05 level

Table 4.24 show the regression analysis between experience, effort expectancy and behavioral intention to use HIS which define relationships of experience with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.808 and Adjusted R Square is 0.653. The result of F-statistics is 280.178 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.178 and standard error of the coefficients 0.028. The result regression analysis moderator of experience and effort expectancy show t – test = -0.627 (sig. = 0.530 > 0.05), indicted that the moderator of experience and effort expectancy has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5c1 rejected, the moderator of experience and effort expectancy has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5c2: Experience positively influences to the social influence and Behavioral Intention to use Hospital Information System.

Table 4.25 The regression analysis moderator of experience and social influence positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5c2)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.183	0.025	164.884	0.000	0.791	0.625	248.213	0.000	4.183	0.025
Experience x Social influence	-0.032	0.028	-1.148	0.251					-0.032	0.028

* Significant at or below the 0.05 level

Table 4.25 show the regression analysis between experience, social influence and behavioral intention to use HIS which define relationships of experience with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.791 and Adjusted R Square is 0.625. The result of F-statistics is 248.213 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.183 and standard error of the coefficients 0.028. The result regression analysis moderator of experience and social influence show t – test = -1.148 (sig. = 0.251 > 0.05), indicted that the moderator of experience and social influence has no affects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5c2 rejected, the moderator of experience and social influence has no affects to Behavioral Intention to use HIS (significant at the 0.05 level).

- H5c3: Experience positively influences to the facilitating conditions and Behavioral Intention to use Hospital Information System.

Table 4.26 The regression analysis moderator of experience and facilitating conditions positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H5c3)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.284	0.020	207.664	0.000	0.840	0.706	357.429	0.000	4.284	0.020
Experience x Facilitating conditions	-0.017	0.022	-0.804	0.421					-0.017	0.022

* Significant at or below the 0.05 level

Table 4.26 show the regression analysis between experience, facilitating conditions and behavioral intention to use HIS which define relationships of experience with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.840 and Adjusted R Square is 0.706. The result of F-statistics is 357.429 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.284 and standard error of the coefficients 0.022. The result regression analysis moderator of experience and facilitating conditions show t – test = -0.824 (sig. = 0.421 > 0.05), indicted that the moderator of experience and facilitating conditions has negative effects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H5c3 rejected, the moderator of experience and facilitating conditions has negative affects to Behavioral Intention to use HIS (significant at the 0.05 level).

4.4.6 Hypothesis 6

H6: Voluntariness of use positively influences Social Influence and on Behavioral Intention to use Hospital Information System.

Table 4.27 The regression analysis moderator of voluntariness of use and social influence positively influences to Behavioral Intention to use Hospital Information System.

Moderators Model (H6)	B	Std. Error	Beta	t	Sig.	Model significance				
						R	R Square	Adjusted R Square	F.	Sig.
(Constant)	4.182	0.022	188.969	0.000	0.850	0.722	387.006	0.000	4.182	0.022
Voluntaries of use x Social influence	-0.027	0.025	-1.086	0.277					-0.027	0.025

* Significant at or below the 0.05 level

Table 4.27 show the regression analysis between voluntaries of use, social influence and behavioral intention to use HIS which define relationships of with other as moderators. Result indicated that the relation between variable has strong relationship at the level of R. = 0.850 and Adjusted R Square is 0.722. The result of F-statistics is 387.006 (Sig. = 0.000 < 0.05).

Regarding the results from Constant, unstandardized coefficients is 4.182 and standard error of the coefficients 0.025. The result regression analysis moderator of voluntaries of use and social influence show t – test = -1.086 (sig. = 0.277> 0.05), indicted that the moderator of voluntaries of use and social influence has negative effects to the behavioral intention to use HIS (significant at the 0.05 level).

The findings demonstrated that hypotheses H6 rejected, the moderator of voluntaries of use and social influence has negative affects to Behavioral Intention to use HIS (significant at the 0.05 level).

4.4.7 Testing the model

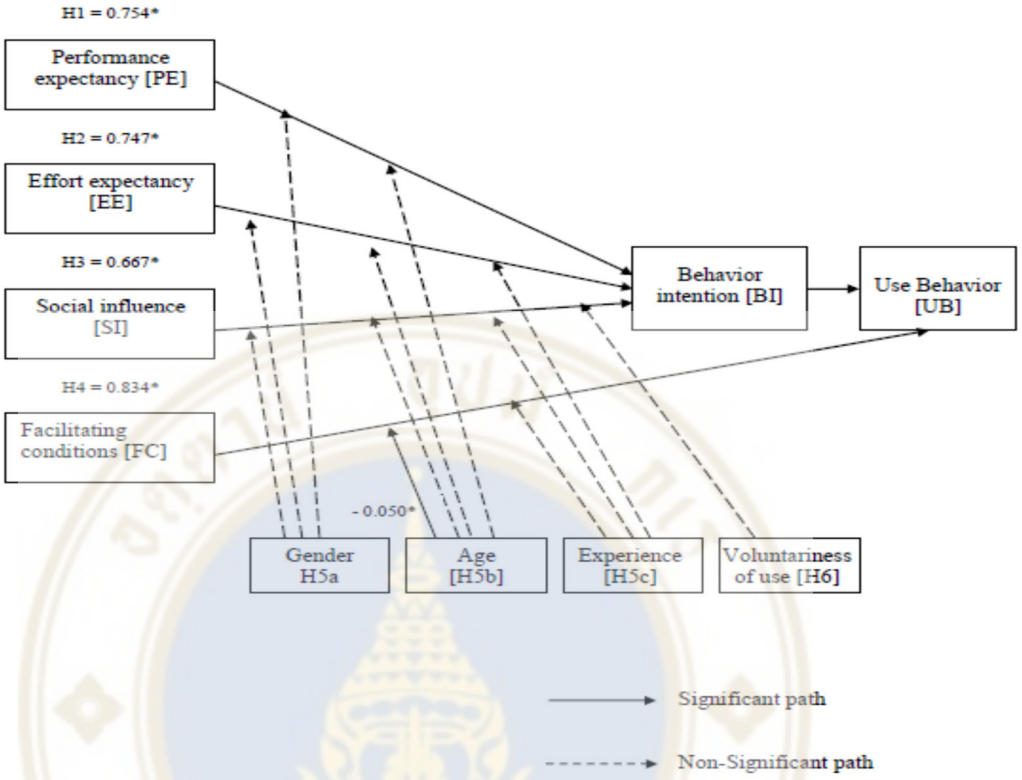

Figure 4.1 Structural model results.

Figure 4.1 show the structural model results with construct variables and modulators (gender, age, experience and voluntariness of use) included. Using the results of the total explained variance (R2), examined using behavior, which are 46 % respectively. These results indicate that the structural model is satisfactory, in that it confirmed the suggestion of Falk and Miller for level of variance explained (R2> 0.1 and predictor variable explaining ≥ 1.5 % of variance) (Falk and Miller, 1992). The majority of the hypotheses were strongly supported; hypothesis H1, H2, H3, H4. The results indicate that the technology acceptance of users with regards to performance expectancy (H1; β = 0.754), effort expectancy (H2; β = 0.747), and social influence (H3; β = 0.667) respectively, positively affected behavioral intention towards actual usage behavior of staff in accepting Hospital Information System. Regarding the facilitating conditions (H4; β = 0.834) were also found to positively affect actual to usage behavior among

hospital staff members. In addition, behavior intention also found to positively affect actual to usage behavior among the respondents.

The employee demographics consisted of gender, age, experience and voluntariness of use which define relationships with other moderators. For the modulators, founded that the moderator of gender and performance expectancy, effort expectancy and social influence has no affects to behavioral Intention to use HIS in hypothesis H5a1, H5a2 and H5a3. Regarding the moderator of age and performance expectancy, effort expectancy and social influence has no affects to behavioral intention to use HIS in hypothesis H5b1, H5b2 and H5b3. However, hypothesis H5b4; the moderator of age and facilitating condition has negatives affects to the use behavior to use HIS (t – test = -2.349, sig. = 0.019 < 0.05). Moreover, hypothesis H5c1, H5c2 and H5c3; the modulators of experience and effort expectancy, social influence and facilitating conditions has no affects to behavioral intention to use. In addition, hypotheses H6 rejected; the moderator of voluntaries of use and social influence has no affects to Behavioral Intention to use HIS.

In conclusion, of the 16 hypotheses tested in the initial model, 10 were deleted from the model, while 6 of the hypotheses were found to be significant

4.5 Qualitative data

By mixing both quantitative and qualitative research, the researcher gains in breadth and depth of understanding and corroboration, while offsetting the weaknesses inherent to using each approach by itself.

Explanatory designs are described as a two stages design which sees quantitative data being used as the basis on which to build and explain qualitative data. The quantitative data informs the qualitative data selection process which, is a great strength in that it enables researchers to specifically pinpoint data that is relevant to specific research project.

There are a variety of methods of data collection in qualitative research, including observations, textual or visual analysis (eg. from books or videos) and interviews (individual or group). However, methods use particularly in this research are semi-structured interviews and focusing group.

After finished hypothesis testing on quantitative method, qualitative method places emphasis to measure the user's perception toward Hospital Information System and to explore the relationship between the factors and user's intention toward using which could constrain the technology adoption. Semi-structured interviews consist of several key questions that help to define the areas to be explored, but also allows the interviewer or interviewee to diverge in order to pursue an idea or response in more detail. The flexibility of this approach, also allows for the discovery or elaboration of information that is important to participants but may not have previously been thought of as pertinent by the researcher.

4.5.1 The interview's respondents

The total of interviewee are 11 staffs, 9 from public hospital and 2 from private hospital. and separated in to five group by job title in the following:

Group 1 Management level: the respondents1, the respondents2

Group 2 Medical staff: the respondents3, the respondents4

Group 3: The nurse: the respondents5, the respondents6

Group 4: Medical Support: the respondents7, the respondents8, the respondents9

Group 5: General Staffs: the respondents10, the respondents11.

4.5.2 The interview's guide

The interview guide has following the results of quantitative research indicate the technology acceptance of users with regards to performance expectancy (hypothesis H1), effort expectancy (hypothesis H2), and social influence (hypothesis H3) respectively, positively affected behavioral intention towards actual usage behavior of staff in accepting Hospital Information System. Regarding the facilitating conditions (hypothesis H4) were also found to positively affect actual to usage behavior among hospital staff members.

Table 4.28 The interview's guide

Variable	Question
General question	1.Do you know HIS system and how do you think about HIS?
	2. You familiar with HIS system?
Performance expectancy	1. Using HIS enhance your work's performance?
Effort expectancy	1. HIS can easily be learned and how this system supports your work?
Social influence.	1. Your colleague believe that the HIS is very useful for your organization?
Facilitating conditions	1. Your technological professional has an IT department influences you to use HIS?

4.5.3 The interview's result

Of the 6 questions asked to participate, 2 questions are general issue and 4 questions were examined the acceptance HIS technology in term of performance expectancy, effort expectancy, social influence and facilitating conditions. Sampling continued to the saturation stage. The accuracy and quality of the results were guaranteed through maintaining the methodological similarity by the experienced operators to analyze the obtained contents. All the meetings of the focus groups were facilitated by an experienced operator and with the assistance of information resources expert.

4.5.3.1 Performance expectancy

Table 4.29 Using HIS enhance your work's performance?

Participant	Response
The respondents1	"…HIS improve clinical management, patient outcomes, customer satisfaction and enhances cost-benefit of hospital, in terms of diagnosis and treatment…"
The respondents3	"…HIS has the potential to substantially improve performance of care by bringing decision support to the point of care, by providing vital links and closing open loop systems, and by allowing routine quality measurement to become reality…"

Table 4.29 Using HIS enhance your work's performance? (cont.)

Participant	Response
The respondents5	"…Using HIS enhances accessibility and communication with my patient in the delivery of patient care…"
The respondents7	"…Technology in HIS improved utilization of radiology tests…"
The respondents8	"…HIS helps speed up the process of laboratory; in term of pre-analytical process, analytical and post-analytical process…"
The respondents9	"…For my organization; computerized physician order entry has been shown also to improve patient safety by reducing adverse drug events and drug interactions…"
The respondents11	"…Using HIS enhances the efficiency of medical record in my daily work…"

From table 4.29, the performance expectancy to be gained from HIS into the clinical decision-making process include increased efficiency of work for doctors and nurses, better information for decision making, better product/service customization, higher quality patient outcomes, and better service.

Hospital Information System enhance the cost-benefit of hospital, improved utilization of radiology tests, helps speed up the process of laboratory and improve patient safety by reducing adverse drug events and drug interactions.

4.5.3.2 Effort expectancy

Table 4.30 HIS can easily be learned and how this system supports your work?

Participant	Response
The respondents2	"…For opinion, HIS system of our organization can be used easily and helps facilitate service…"
The respondents4	"…HIS can be used easily; Physicians can operate HIS to access diagnostic data or to prescribe medicine for transactions via this technology…"
The respondents5	"…Technology in HIS supports my current work, the results from lab tests can be immediately sent to my ward and too easy to open that result…"
The respondents10	"…I think this system is better than paper-based that we used in the past 20 years because HIS is always up-to-date by IT person and easy for me to learn and used this system for accountant department…"

From table 4.30, in term of ease of use, all of the respondents agree with this term because they think HIS system of their organization can be used easily, user-friendly and helps facilitate their service. Hospital Information System supports their current work and easy to learn for the new user.

4.5.3.3 Social influence

Table 4.31 Your colleague believed that the HIS is very useful for your organization?

Participant	Response
The respondents1	"…Yes, my colleague and I definitely expect that our hospital's service is better by using the HIS system…"
The respondents4	"…Hospital management and legislative references still refer to use HIS and consider the computerized document valid…"
The respondents6	"…My boss supports training and attending seminars on new technology of HIS…"
The respondents7	"…Yes, so my top management of hospital hire IT specialists staff members to look after the IT system…"
The respondents11	"…My colleague told me that our new version of HIS enhance the efficiency of medical record…"

Regarding the opinion of social influence from table 4.31, the user's perception that most people who are important to them think they should use HIS in their work. The top management level of organization supports the training and attending seminars on new technology of HIS. Including, monitor and look after the system.

4.5.3.4 Facilitating conditions

Table 4.32 Your technological professional has an IT department influences you to use HIS?

Participant	Response
The respondents2	"… We support the capital investment in the system and the training program for new employees run by a professional trainer…"
The respondents3	"…I think I'd definitely feel more comfortable to use HIS because my IT department help to support me 24 hours…"
The respondents5	"…Very impactful, their settle the training program when the new version of HIS has launch…"

Table 4.32 Your technological professional has an IT department influences you to use HIS? (cont.)

Participant	Response
The respondents11	"…Technology of HIS enhance a real-time system for recording data, such as medical imaging records, patients' history files, and past medical prescriptions…"

From table 4.32, in term of facilitating conditions that the supporting from the top management of hospital influence new employee to joined the training program. Regarding the supporting from the technological professional has an IT department that available 24 hours make the user feel comfortable to use HIS.

4.6 Summary

For summary, the most of the respondents are female (77.1%) the most age ranges of the respondents are aged 28 to 35 years old (57%). The majority education levels are Bachelor's degree (65.5%) and the majority job titles are medical support (61.9%). Most of the hospital type is the public hospital (80.8%) and the hospital size is big (more than 91 beds of IPD patient) which hold percentage at77.3%. The most respondents employed 0-5 years (33.2%), the majority of respondents have experience with HIS last version (91.3%). The most of the usage hours are 7-8 hours per day (35.6%). However, there are respondents (43.2%) who never trained in term of HIS before.

The majority of the hypotheses were strongly supported; hypothesis H1, H2, H3, H4. The results indicate that the technology acceptance of users with regards to performance expectancy (H1; $\beta = 0.754$), effort expectancy (H2; $\beta = 0.747$), and social influence (H3; $\beta = 0.667$) respectively, positively affected behavioral intention towards actual usage behavior of staff in accepting Hospital Information System. Regarding the facilitating conditions (H4; $\beta = 0.834$) were also found to positively affect actual to usage behavior among hospital staff members. In addition, behavior intention also found to positively affect actual to usage behavior among the respondents.

The employee demographics consisted of gender, age, experience and voluntariness of use which define relationships with other moderators. For the modulators,

founded that the moderator of gender and performance expectancy, effort expectancy and social influence has no affects to behavioral Intention to use HIS in hypothesis H5a1, H5a2 and H5a3. Regarding the moderator of age and performance expectancy, effort expectancy and social influence has no affects to behavioral intention to use HIS in hypothesis H5b1, H5b2 and H5b3. However, hypothesis H5b4; the moderator of age and facilitating condition has negatives affects to the use behavior to use HIS (t – test = -2.349, sig. = 0.019 < 0.05). Moreover, hypothesis H5c1, H5c2 and H5c3; the modulators of experience and effort expectancy, social influence and facilitating conditions has no affects to behavioral intention to use. In addition, hypotheses H6 rejected; the moderator of voluntaries of use and social influence has no affects to Behavioral Intention to use HIS. In conclusion, of the 16 hypotheses tested in the initial model, 10 were deleted from the model, while 6 of the hypotheses were found to be significant.

CHAPTER V
CONCLUSIONS

According to the findings from previous chapter, this chapter presents a discussion of the significant finding related to result obtained from the study of the extended technology acceptance model for Hospital Information System (HIS) and presents implication, suggestions and limitation from this research.

5.1 Discussion

Hospital Information System (HIS) has been defined as "The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making.(Brailer, 2004) This definition includes such applications as: electronic health record, personal health record, electronic billing, electronic discharging and telemedicine. By implementing the electronic health record, hospitals can save expense associated with record keeping, improved workflows, practice management and billing including one-time electronic order entry and the elimination of transcription.

The adoption of information system in hospitals can transform the health care system thereby simultaneously improving quality and productivity. Desires motivating the adoption of information technology in hospitals include achieving productivity growth evident in other industries that have made extensive use of information technology. The adoption of technology would change the way businesses operate in this era of globalization by changing business structures and increasing competition, creating competitive advantage for businesses and by changing business operations.

However, according to previous study (Abdul Hamid & N.B., 2010), although Hospital Information System offers various benefits to hospitals and patients, the implementation of HIS is not an easy task. This is because HIS implementation is

complex and it is a difficult multidisciplinary effort that will influence an organization skills and capacity for change. This situation might bring challenges and stressful continuous learning experience. Moreover, it might create various HIS problems in the future. Though HIS can provide various advantages to a hospital but still failure, however more commonly seen in the domain of health informatics. HIS implementation requires proper planning and considerable investment in funding, effort and time for implementation. Something must be done to minimize the potential of failure for any HIS implementation but more so in developing countries where funding is difficult to get and often limited, success must be assured to the best of foreseeable instances.

5.1.1 Predictors of Technology Acceptance for Hospital Information System

The purpose of this research was to identify the factors influencing the adoption of information systems in hospital. A review of prior information systems adoption literature provided support for the proposal of an empirical model of UTAUT theory to explore the determinants which influence adoption and this model has been empirically verified by the results of a survey of 449 hospital's staffs who working in Thailand. The results indicate that the main factors are performance expectancy, effort expectancy and social influence which act as significant determinants to users' behavioral intention, moreover facilitating conditions which act as significant determinants to usage behavior. However, the modulators included gender, age, experience and voluntariness of use has no affects to behavioral Intention to use HIS.

5.1.1.1 Performance expectancy.

Performance expectancy was found to have the strong direct effect on behavioral intention, as well as the strong direct effect was found on effort expectancy and social influence too. Moreover, facilitating conditions was found to have the strongest direct effect on usage behavior. However, gender and age, are modulators which have no effect on performance expectancy, effort expectancy and social influence. While age, are modulators which have negative effect on facilitating conditions. In addition, the modulators of experience and effort expectancy, social influence and facilitating conditions has no affects to behavioral intention to use. Moreover, the

modulators of voluntaries of use and social influence has no affects to behavioral intention to use Hospital Information System.

The results showed that performance expectancy had the strong effect on behavioral intention to use HIS. The results are consistent with previous studies (Chang I-C & Hwang H-G, 2007; Venkatesh et al., 2003; Yi MY & Jackson JD, 2006). HIS implementation aims to enhance healthcare quality, boost productivity and enable easy data obtainment and data recording. HIS can also decrease errors in comparison to the manual system and increase communication among the staffs. The HIS is characterized as a coordinated electronic framework that gather, store, recover and show general patients' information and data, for example, history of patients' data, consequences of research center test, judgments, charging and others related clinic's strategies which are utilized as a part of a few offices inside healing center. Similar findings were also made by (Chang I-C & Hwang H-G, 2007). Their study indicated that physicians' trust in their prescriptions will be truly accepted. Healthcare staff members will adopt healthcare technology for services which they perceive will be useful, based on actual usage. Therefore, when users believe that using healthcare technology will increase efficiency, they will make use of it to provide good service for patients. Staff received a high degree of usefulness from Hospital Information System. These results suggest that this technology influences actual usage of services within hospitals. Thus, staff should be motivated to make use of HIS since it improves performance by decreasing errors and time necessary for treatment. Accordingly, choice of HIS and training should be a point of focus. From the beginning of its use, hospital staff members should participate in the choice of technology. Once chosen, Hospital Information System becomes implemented within the hospital process. Training is also needed to explain the usefulness of these medical staffs or hospital staffs to perceive value so that they benefit more highly.

5.1.1.2 Effort expectancy.

The results of the research show that impact of effort expectancy on behavioral intention to use HIS was found to be a factor with strong positively affect nearly the performance expectancy. According to prior findings were made by (Miller RH & I., 2004); in the literature considered even highly regarded, industry leading HIS to be challenging to use because of the multiplicity of screens, options and navigational aids. Problems with HIS usability especially for documenting progress notes and other

labor intensive components caused physicians to spend extra work time to learn effective ways to use the HIS. These substantial initial time costs are considered an important barrier to obtaining benefits, as greater burdens on physicians' time decrease their use of HIS and increase their resistance, which lowers the potential for achieving quality improvement. Similar findings were also made by (McDonald, 1997); Inadequate electronic data exchange and weak integration between different HIS modules and other electronic systems was defined as another barrier to HIS implementation and use, such as the lack of integration between the HIS and other clinical data systems such as laboratory, radiology or referral systems. Working with both electronic and paper-based systems in parallel, usually forces healthcare professionals to switch during their work tasks between these systems, thereby slowing workflow, requiring more time to manually enter data from external systems, and increasing healthcare professionals' resistance to EMR use.

On the other hand, prior findings were made by (Chen & Hsiao, 2012) investigated that physicians' acceptance of HISs in Taiwan. This study shows that system quality and information quality are significant factors influencing perceived ease of use of HIS while information quality and service quality are key factors affecting perceived usefulness of HIS. A Hospital Information System should also be easy to learn and to use. This research is consistent with the results of previous research conducted by (Kijsanayotin B & Ingun P, 2013) and (Chang I-C & Hwang H-G, 2007). Thus, this study uses satisfaction to measure system acceptance. When users perceive it is easier to learn how to use a system, they will have a more positive attitude towards accepting the system. When users perceive the degree of system usefulness as sufficiently high, they become more positive towards and willing to accept the system. The results of the research demonstrate that the staff should have perceive ease of use regarding Hospital Information System. The system should be simply and easy to use, making it easier to remember how to perform system tasks, and improving flexibility of use. The function of the system should be user friendly, uncomplicated and flexible according to learn and usage.

5.1.1.3 Social influence.

Social cognitive theory explains human behavior in a triple cross-linking structure or interactions between behavior, environment, and individual

factors. A key assumption of social cognitive theory is that people tend to control the events that affect their lives and they consider themselves as the Impact Factor. This sense of influence in the actions' cognitive and emotional processes are called self-efficacy.(Deutsch & M., 1995)

Social influences were found to have significant effects on behavioral intentions, which do show direct similarities to the findings on Hospital Information System acceptance research. The result is consistent with a many previous studies have shown self-efficacy as a strong predictor of health behavioral intention. However, few studies have used self-efficacy in order to promote information systems. According to prior findings were made by (Farzandipour & M., 2016); in the literature suggest that source credibility stimulated the affective response. In other words, employees who have a higher level of source credibility should excite affective response users to continue using the HIS.

In today's organizations, managers, as well as their expertise fields, should be familiar with the techniques of the influence process with others. Managers, through influence on the attitudes and beliefs of their personnel, are better able to achieve their organizational goals. Social influence is a process in which before individuals intend to use a new information system will emulate the experiences of other people. Managers within the organization are able to encourage their staff to use technology. However, all information sources are not equally effective in shaping user's perceptions of information system implementation. Managers need to provide the appropriate data about the user's level of participation and information-processing routes, and use this knowledge to move employees toward successful information system implementation. Plausible strategies must be delivered to the employees based on their characteristics. Source credibility of the convincing message has significant effects on normative social influence. In other words, Employees who have a higher level of source credibility should excite normative social influence users to continue using the HIS. Social influence is defined as a change in an individual's thoughts, feelings, attitudes, or behavior that is resulted from interaction with another individual or a group. When a person is in a situation where they are unsure of the accurate way to behave, they will often look to others for cues concerning the right behavior. When the people gain more information, they can adhere to do behavior with more confidence.

The informational social influence is more influential than the normative social influence. When employees understand and experience high levels of the informational social influence of the benefit and ease of use of their Hospital Information System, they will be more likely to use the HIS.

5.1.1.4 Facilitating conditions.

The results showed that facilitating conditions had the strongest effect on behavioral intention of all the main determinants. Facilitating conditions refers to which extent people believe that an organizational and technical infrastructure exists to support the system (Venkatesh et al., 2003) . In the literature found that facilitating conditions without adding any moderator is not significant to predict intention to use system when the construct of effort expectancy is used in the same model, but when it is moderated by age and experience; it had a strong effect for older workers with increasing experience. In study (Al-Shafi & S.H, 2009) facilitating conditions was correlated positively to e-government adoption but not significantly. Many scholars (Chang I-C & Hwang H-G, 2007); (Chau P.Y. & Hu, 2002) found that facilitating conditions have a positive effect on the use of innovation. This is in line with the results of previous studies (Kijsanayotin & Ingun, 2013; Rouibah & Hamdy, 2009; Zhou & Lu, 2010). This implies that infrastructure support, such as computer systems or knowledge are necessary. Internal and external organizations encourage physicians to allow healthcare technology to affect their behavior. Health information technology policy includes important aspects which support adoption by healthcare staff (Menachemi N, 2011). The internal organizations involved in hospital support provide technical assistance for using healthcare technology through IT staff. IT staff in hospital work as technology support assistants for physicians and medical professionals. Some physicians may have part of the knowledge necessary to operate Hospital Information System, but not enough. Therefore, IT staff should also be employed. External organizations, such as the Ministry of Public Health, can help to improve IT in terms of Hospital Information System, prices, and providers. They can support software centralization provided by the Ministry of Public Health for HIS that has been chosen to be suitable in the country for training purposes. Finally, staff members accept HIS into hospitals. Thus, it helps reducing barriers to use new information technology for healthcare services (Chang I-C & Hwang H-G, 2007). The study theoretical proposition is confirmed in the survey findings that are gained in this research and provides evidence that facilitating

conditions have a significant positive influence on the staff's intention to adopt HIS. This result leads to suggest that the management of organizations have to provide assistance and the important resource to the staffs to support them performing their job. In addition, staffs should be trained on using all the available facilities of Hospital Information System including implement the emergency plan for emergency situations such as HIS downtime or unavailable of system or created the guideline which staffs can follow and solve the minor problems by themselves when system failed.

5.1.1.5 The moderators consisted of age, gender, experience and voluntariness of use.

For the results, the modulators are demographics and voluntariness of use. Almost of the findings demonstrated that all hypothesis of the moderator rejected. The moderator of gender and performance expectancy, effort expectancy and social influence has no affects to behavioral Intention to use HIS. Regarding the moderator of age and performance expectancy, effort expectancy and social influence has no affects to behavioral intention to use. Moreover, the modulators of experience and effort expectancy, social influence and facilitating conditions has no affects to behavioral intention to use. In addition, the moderator of voluntaries of use and social influence has no affects to Behavioral Intention to use HIS. By the way the moderator of age and facilitating condition has negatives affects to the use behavior to use HIS, the older user who unfamiliar with using computer or no computer skills and uncomfortable when using the new program which adoption of HIS. Unproper of facilitating issue are the main cause resistance of technology; the number of the computers was less than the number of the users in the different departments of the hospital. Computer was not used in all the departments and for all the matters. The personnel were not familiar with the comprehensive and advanced capabilities of the program. Information was not timely updated. Old and inexperienced staff trained the new personnel not by specialized staff. The personnel were trained late, so the training time was not commensurate with the time of department's need so the older staffs has negative affect with the inconvenient of the technology.

According to HIS are widely used in hospital, mostly of user familiar with this system and play a role on culture of using HIS program. And finally, staff members must also acquire serious training regarding perceived understanding as

technology increases. After staff members have been trained to use the technology, they will be able to perceive its ease to use by themselves. They will feel convenient with actual usage, and their acceptance will also increase.

5.2 Implications and Future Research Directions

5.2.1 Implications of the Findings

The results of this study have implications for Hospital Information System (HIS) adoption. First, the study highlights the importance of raising the information systems literacy of the organizations employees, employees who understands information systems easily learn new information systems and are able to work with it with ease and information system must offer a better alternative to existing practices in the hospital. Second, the quality and performance of technology helps hospital employees to perceive its usefulness. Therefore, technology in HIS should provide support with good quality, through service and information technology that perform data processing well. HIS ensures the patient satisfaction, improve hospital processes and to provide high quality services with reduced cost. HIS implementation in hospitals is considered to be complex as compared to the other information systems in other different organizations. (Sagiroglu. & Ozturan., 2006) have pointed out the following areas to be concerned with the implementation of HIS:

- Lack of information about HIS implementation.
- Ignorance of administrative needs of hospital.
- Infrastructure and planning of implementation process.
- Balance between different departments and end users.
- Redundancy and inaccuracy of master data.

This research has made significant contributions and the implications to researcher. It presents the strongest effect of the facilitating conditions on usage behavior of all the main determinants. Facilitating conditions, such as required resources, knowledge of IT and technical support will remove the barriers to using new systems. From the result of research have pointed out the following areas to be concerned with the implementation of HIS:

- Requirements of stockholders should be properly understood and then proper planning should be started.
- Failure and success factors from others should be considered.
- Proper training of the user groups should be ensured for successful implementation of HIS.
- End users should be involved in the implementation.
- While implementation of HIS, hardware infrastructure planning must be effective.

This result leads to suggest that the management of organizations have to provide assistance and the important resource to the staffs to support them to improving performing of job. Support from hospital management is very critical for the sustainability of HIS implementation, in particular for the hospitals that do not have sufficient funds and human resources. Strong commitment from the hospital management needs to be secured to ensure the continuity of HIS implementation. Strong support from the hospital management can ensure that all workstreams would be smoothly in place, from planning to training, as well as HIS evaluation. In addition, strong support from the hospital management can legitimize the HIS so that staff use HIS even in the absence of policies on HIS utilization. This type of legitimacy of HIS and other relevant regulations is in dispensable. In order to develop HIS that is user friendly and creates benefits to the users, it should be designed to meet user requirements and expectations, for example, by involving users during the communication, design, and implementation phases of development. If HIS is suitable to the existing users' working environment, they will have more confidence to use HIS, increasing the users' acceptance on HIS in the long term.

In summary, the users in the hospital have also realized the importance of security issues in the HIS. Based on this analysis, hospital management should; Firstly, an organization whose top managements understands the benefits of information systems adoption and is willing to invest scarce resources in the information systems project will be able to take advantage of the promised benefits of information systems adoption. Improve the quality of the HIS by making it easy and safe to use and launch this vision and value to the hospital staffs to follows, staff members will adopt HIS for services which they perceive will be useful, based on actual usage. Therefore, when users believe that using HIS will increase efficiency, they will make use of it to provide good service for patients.

Secondly, take training and mentoring during HIS implementation to increase users' confidence of HIS. Old and inexperienced staff trained the new personnel not by specialized staff. The personnel were trained late, so the training time was not commensurate with the time of department's need. Solve this problem by provide training program to the newest staff of hospital by IT department or IT supervisor all of the available facilities of Hospital Information System. Including the information of emergency plan for emergency situations such as HIS downtime, unavailable of system or created the guideline which staffs can follow and solve the minor problems by themselves when system failed. Provide self- learning applications which contain all of available interesting and importance facilitating issue of Hospital Information System for the newest staffs can learn by themselves after working hours or for the permanent staff who would like to refresh their skill and knowledge. Especially, the guideline for problem solving of all routine and when system failed.

Lastly, according to support provide technical assistance for using HIS through IT staff. IT staff in hospital work as technology support assistants for physicians and staffs. Some physicians or staffs may have part of the knowledge necessary to operate HIS by training program, but not enough. Therefore, IT staff should also be employed in order to provide support 24 hours because hospital are available all the times. Additionally, the proper of IT utilization facilitates noted that the importance issue too, computer software and hardware must be availably all of department with better speed and anti-virus updated.

5.2.2 Future Research Directions

This study focused on four factors that were considered to influence the adoption of information systems, this research recommends that future research should look into more factors that may influence adoption of information systems especially the patients. Patient's satisfaction is very important, health care quality is so important and needs to improve more. HIS benefits not only for the medical records, security, less error but also for time management in the hospital, waiting time and how they serve more patients in a day. Even though HIS's significance, there are also some issue that government facing such funding and also lack of skill of the users of HIS. Knowing the information of HIS, really hope there is more hospitals will adopt HIS time by time. The future research may study the efficiency of service with the adoption of

HIS because the user acceptance and user satisfaction of HIS will increase to the health care quality become better than before.

5.3 Limitations

The limitations of this research is the sampling technique used in this research. The samples are selected based on the combination of convenient-based and snowball through social media friend network in order to reach global sample target, therefore, the results may have bias and influences that beyond the control and may not be generalizable to a broader population. The cluster sampling with geographic subgroup and a larger sample size may be used to provide a more generalization.

5.4 Conclusion

The purpose of this research was to identify the factors influencing the adoption of Hospital Information System. A review of prior HIS adoption literature provided support for the proposal of an empirical model of UTAUT and this model has been empirically verified by the results of a survey of 449 respondents and the 11 the respondents from semi-structure interviews method.

The results reveal that four main factors; performance expectancy, effort expectancy, social influence and facilitating conditions are significantly influences adoption of HIS. While the demographic; gender, age and experience including to the voluntariness of use was found to have no significant influence on the adoption of HIS. The factors identified by this research can hopefully provide substantial help to the hospital managements and academics.

The results of this study have implications for the adopting Hospital Information System, the organizations must ensure the quality and the performance of information, as it is closely related to the perception of staffs regarding the usefulness and ease of use. Therefore, technology in HIS should provide support with good quality, through service and information that perform data processing well. They should feel the perceived usefulness of HIS.

To encourage individuals to adopt and use HIS, the top management of hospital must facilitate the conditions, training, usefulness, and ease of use of the HIS. The study highlights that importance of raising the information systems literacy of the hospital staffs, staffs who understands information systems easily learn new information systems and are able to work with it with ease.

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APPENDICES

Appendix A: Questionnaire

Understanding the adoption of Hospital Information System (HIS): Unified Theory of Acceptance and Use of Technology.

This questionnaire is conducted in partial fulfilment of the requirement for the Master of Management's Degree, College of Management Mahidol University. The research project entitled "Understanding the adoption of Hospital Information System (HIS) : Unified Theory of Acceptance and Use of Technology" aims to explore the factors that affect the intended adoption or rejection of Hospital Information System (HIS) and their correlation on socio-demographic characteristics and experiences from Medical professionals and hospital's staffs who work in public and private hospitals in Thailand.

The survey composts of:

Part I: Socio-demographic

Part II: Perception of Hospital Information System (HIS)

This research project has no funding obtained nor applied for, and also no compensation nor cost in the participation. You have no obligation to participate. All data collected in this research will be kept confidential and will only be included in the research report as part of the overall results.

Chutchadaporn Chuaysathit

Researcher

Part I: Socio-demographic

1. What is your gender?

   ☐ Male ☐ Female

2. How old are you?

   ☐ 21-27 years ☐ 28-35 years ☐ 36-43 years

   ☐ 44-51 years ☐ 52-60 years

3. What is your highest level of education completed?

   ☐ Below High Vocational Certificate ☐ High Vocational Certificate

   ☐ Bachelor's degree ☐ Master's degree

   ☐ Ph.D. (Doctor of Philosophy)

4. Which of following matches your job title the most?

   ☐ Management level (Administrative, Executive Positions, Director, Managerial Positions)

   ☐ Medical staff (Medical Physician, Dentist, Registered Nurse and Technical Nurse)

   ☐ Medical Support (Radiological Technologist, Physiotherapist, Medical Technologist, Medical Scientist, Pharmacist, etc.)

   ☐ General Staffs (Finance and Accounting Officer, Pharmaceutical Assistant, Office Clerk, Dental Assistant, etc.)

5. Type of your hospital?

   ☐ Public hospital ☐ Private hospital

6. Which of the following best describes your hospital size?

   ☐ Big; being general hospitals having not fewer than 91 beds

   ☐ Medium; being general hospitals having not fewer than 31 beds but no more than 90 beds

   ☐ Small; being general hospitals having more than 30 beds

7. How many years have you worked in current workplaces?

   ☐ 0-5 years ☐ 6-10 years ☐ 11-15 years

   ☐ 16-20 years ☐ more than 20 years

8. Have you ever use Hospital Information System (HIS)?

   ☐ No ☐ Yes

9. How many hours in a day do you use the Hospital Information System at work?

☐ 0 hours ☐ 1-2 hours

☐ 3-4 hours ☐ 5-6 hours

☐ 7-8 hours

10. Have you ever trained in the topic of Hospital Information System?

☐ No ☐ Yes

Part II: Please answer the following questions based on your PERCEPTION of Hospital Information System

Opinion in term of technology acceptance	**Strongly Disagree**				**Strongly Agree**
11 .You intend to use HIS to serve your patients.	1	2	3	4	5
12. You want to use the new technology of HIS.	1	2	3	4	5
13 .Your intention to use HIS at work motivates you to learn faster.	1	2	3	4	5
14. Your work experience is beneficial and contributes to or support to use HIS.	1	2	3	4	5
15 .Your work experience plays a role in the acknowledgement of HIS's advantage	1	2	3	4	5
16 .Your work experience helps to use HIS easier.	1	2	3	4	5
17 .Your education level has an impact on using HIS.	1	2	3	4	5
18 .Your education level plays a role in acknowledgement of HIS's advantage.	1	2	3	4	5
19 .Your education experience helps to use HIS easier.	1	2	3	4	5
20 .The information of HIS enhances the benefits of work.	1	2	3	4	5
21 .Technology in HIS helps facilitate your service.	1	2	3	4	5

Opinion in term of technology acceptance	Strongly Disagree				Strongly Agree
22 .Using HIS enhance work's performance.	1	2	3	4	5
23 .HIS improves the quality and performance of work.	1	2	3	4	5
24 .HIS gives benefit to work driven by technology.	1	2	3	4	5
25. You have the knowledge necessary to use HIS.	1	2	3	4	5
26. Are you interested to use the new technology of HIS.	1	2	3	4	5
27.Organization's culture, vision and values have impacts on HIS usage.	1	2	3	4	5
28 .Your colleague expects that your service is better by using HIS.	1	2	3	4	5
29 .Your technological professional has an IT department influences you to use HIS.	1	2	3	4	5
30.Supporting from organizations affects to your perception about the advantage of HIS.	1	2	3	4	5
31. The perception on ease of using HIS benefits technology adoption.	1	2	3	4	5
32 .Technology in HIS helps speed up your workflow.	1	2	3	4	5
33 .Using HIS enables workers to work faster.	1	2	3	4	5
34 .You perceive the usefulness of HIS technology.	1	2	3	4	5
35 .HIS can easily be learned.	1	2	3	4	5
36.The use of HIS has become a habit for me.	1	2	3	4	5
37 .You familiar with this system .	1	2	3	4	5