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The Development of an Information Management System at the Custodian of the
Two Holy Mosques Institute of Hajj Research, Saudi Arabia

By
Mohammed S.O. Nojoum

A Doctoral Thesis

Submitted in partial fulfilment of the requirements for the award of
Doctor of Philosophy of Loughborough University

November 2005

Supervisor: Professor Ron Summers
Department of Information Science
Faculty of Science
Loughborough University

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All praise and gratitude be to Allah, the mighty and majestic, for enabling me to reach this stage of my studies.

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Above all, my utmost love and sincere gratitude go to my mother (God bless her), and to my father for his prayers for me. Thanks very much, Dad.
ABSTRACT

The main aim of the Two Holy Mosques Institute of the Hajj Research (CTHMIHR) is to establish an information resource about the pilgrimage to Makkah made by Muslims (Hajj) and services provided to them, which is one of the fifth pillar of Islam. In fact, that each Muslim should make the visit to Makkah at least once in his or her lifetime. When complete, this information resource will comprise a comprehensive scientific reference source that will provide factual evidence and anecdotes to assist in the planning of services and utilities required for the Hajj. Information management at CTHMIHR poses a number of problems; particularly in the rapid increase in the number of records (each individual making the Pilgrimage will have a record), duplication of records, disaggregated information throughout the Institute, and lack of information control. The Dean and Heads of Department are aware of these problems, but they cannot identify the root of the issues nor the people responsible for them.

This research study aims to develop and implement an Information Management System (IMS) at CTHMIHR. This IMS would help staff and users to access information about the Hajj easily and more effectively at a time when it is needed.

Soft Systems Methodology (SSM, mode 1) and Interpretive Structural Modelling (ISM) have been combined to develop a novel multi-methodology that has been applied to the problem issues exhibited within the CTHMIHR. The main reasons for combining methodologies (SSM and ISM) in this research study is to match the variety in the real world problem situation at CTHMIHR, which is highly complex and multi-dimensional. SSM (Mode 1) was applied to discover and express the problem situation (Stages 1 and 2), to develop conceptual models (11 separate systems are considered) and make comparisons with the real world (stages 2 and 5), and to study subsequent change (that is, change which is systemically desirable and culturally feasible) and then to take action to improve the problem situation (Stages 6 and 7). ISM was used to discover the relationships between these 11 systems in order to find a method of implementing them through interpretations with participants.
The model developed via the ISM can be interpreted as a structured order of precedence of action to achieve a goal, with elements in the model connected by the transitive relation ‘helps to achieve’. Thus, the element at the base of the hierarchical model (strategic planning system) should be tackled first, as it ‘helps to achieve’ all others elements of the model. Following the implementation of this system, both financial resources and information policy can be determined. When these factors are combined, the technology system can be described indicating the ICT required by CTHMIHR. Following implementation, both the staff development training system, which, in turn, will indicate the make-up of the staffing system, and the security system can be determined. When all of these are combined, the records management system can be described; this will indicate the design of the database management system, and consequently, this will satisfy user needs. Furthermore, the research study also suggests five types of change to improve the problem situation: structural, procedural, policy, attitudinal and cultural.

The major findings of this research study are that CTHMIHR not only needs to develop clear information strategies, but it also needs to develop a system for strategic planning. In this way information strategies to establish an information resource about Hajj can be formulated.

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<td>WAN</td>
<td>Wide Area Network</td>
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<td>WCA</td>
<td>Work-Centred Analysis</td>
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<td>WWW</td>
<td>World Wide Web</td>
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Chapter 1 | An Overview of the Research

1.1 Introduction

Information is very important to the life of any organisation. All types of organisation need information for both their internal and external processes. Thus, information is the life-blood of an organisation. However, everyone in any organisation uses information differently. It is very important for an organisation to manage its information successfully in order to get the right information, in the right form, to the right person, at the right time, so as to enable an organisation to benefit from the information it obtains.

Hajj (Pilgrimage) is an Arabic word that means "to visit the Holy places". The Longman Dictionary (1995) defines Hajj as a journey to Makkah for religious reasons that all Muslims try to make at least once in their lifetime. In other words, it is an obligation, once in a lifetime, upon every adult Muslim, male or female, who is physically and financially able to perform it. It is the fifth pillar of Islam. About two million Muslim people go to Makkah each year from every corner of the globe, providing a unique opportunity for those of different nations to meet one another. Although Makkah is always filled with visitors, their number increases in the twelfth month of the Islamic year, when the Hajj takes place. Muslims adopt the lunar calendar, so the Hajj and Ramadan sometimes can come in summer and sometimes in winter. Pilgrims wear special clothing—simple garments, which strip away distinctions of class and culture - so that all Muslims stand equal before Almighty God.
1.2 The Custodian of the Two Holy Mosques Institute of Hajj Research

The historical development of the Custodian of the Two Holy Mosques Institute of Hajj Research (CTHMIHR) can be traced back to 1975. Between 1975 to 1981 the Hajj Research Centre (HRC) existed in the form of a research team within King Abdulaziz University (KAU) in Jeddah. It was established officially at that time as a consultant authority for the High Committee of Hajj and other authorities working in Hajj affairs. The main aim of HRC was to establish an information bank about the Hajj. This information bank functions as a comprehensive scientific reference source that provides several different statistics, details, and facts to assist in the planning of utilities and services during the Pilgrimage. Al-Masoumi (1992) outlines the aims of HRC as the following:

1. Establishing an information (data) bank about the Hajj, which is designed to be a comprehensive scientific reference source for different statistics, details, and facts to assist in planning utilities and services of the Hajj.
2. Building a complete historical record of the documents, photographs, films, maps, and manuscripts about the Hajj, Makkah, and Madinah.
3. Preserving the natural and Islamic environment in the Holy places (Mashaer), Makkah, and Madinah.

In 1983 the HRC was officially transferred from KAU to Umm Al-Qura University (UQU) in Makkah. The Oversight Committee of the HRC was chaired by the Minister of the Interior, with other members comprising the Minister of the Hajj and the Minister of the Higher Education. This committee supervised the programmes related to the works of the HRC.

In 1998, the name of HRC was changed to the Custodian of the Two Holy Mosques Institute of Hajj Research (CTHMIHR) at Umm Al-Qura University in Makkah.
CTHMIHR has five research departments. These departments are:

1. Department of Administrative and Human Research
2. Department of Environmental and Health Research
3. Department of Architectural and Engineering Research
4. Department of Information and Technical Services
5. Department of Research and Information Affairs.

Additionally, there is the Administrative and Financial Affairs Department. CTHMIHR has a permanent exhibition, Chemical and Biological laboratory, a library, colour photography laboratory, two computer laboratories and print shop, a slide archive and film archive. These archives include a large collection of colour slides and a large number of cinema, video and sound recordings covering the Hajj activities and the Holy places since HRC was established. CTHMIHR uses the available information from relevant studies to help in organizing Hajj related activities. It is the concern of the CTHMIHR to provide all possible practical solutions for the different Hajj authorities and pilgrims to guarantee their safety and comfort.

Figure 1.1: shows that CTHMIHR has four types of Information Management. These are:

1. Top Management (Oversight Committee of the Institution), which is concerned with the development of overall goals of CTHMIHR and method of achieving these goals.
2. Middle Management (President of Umm Al-Qura University, Dean and Deputy Dean of the Institution) is responsible for the process of ensuring that the CTHMIHR goals are accomplished effectively and efficiently. Normally they have one meeting a year with top management. Middle Management reports to Top Management only after Ramadan and Hajj.
3. Low Management (Heads of Department and Heads of Units) makes sure that specific tasks are being well accomplished. They report to Middle Management only after Ramadan and Hajj.
4. Operational control (Finance, Accounting, Engineering, computer programming) controls the day-to-day operations, including reporting to the relevant management level.

In 1999, the Oversight Committee of the Institution officially accepted the managerial structure of CTHMIHR and related departments research and units (Figure 1.2). The managerial structure of CTHMIHR started with the Oversight Committee of the Institution, followed by the President of Umm Al-Qura University, followed by the Dean of CTHMIHR, followed by the Deputy Dean and supervisor of Madinah branch.
The oversight committee of the Institution that comprises members of the Ministry of Hajj and the Ministry of Higher Education, chaired by the Minister of the Interior

President of Umm Al-Quar University

Dean of the Institution

Supervisor of Madinah Branch

Deputy Dean of the Institution

Department of Administrative and Human Research
- Cultural, Geographical and Historical Research
- Social and Physiological Research
- Rites Research
- Administrative, Organisation and Disaster Recovery
- Economic and Tourism Research

Department of Environmental and Health Research
- Climate and Water Research
- Biological Research
- Chemical Research
- Physical Research
- Health Research
- Hady and Sacrificial Research

Department of Architectural and Engineering Research
- Planning Research
- Housing and Services
- Movement and Traffic
- Urban Research
- Engineering Improvement
- Research Assurance and Hazard Analysis

Department of Information and Technical Services
- Computer Statistics
- Follow up Research
- Publishing
- Data Bank
- Library
- Translation

Department of Research and Information Affairs
- General Relations
- Exhibition Hall
- General Information
- Picture Production
- Information and Guidance Research
- Distribution

Administrative and Financial Affairs
- General Affairs
- Finance Affairs
- Stores
- Copying
- Maintenance
1.3 Information Managements Problems

Information management at CTHMIHR has a number of problems, particularly the rapid increase in new records, duplication of existing records, information distribution in different departments, and lack of information control. For example information is distributed between departments and is in many forms. Staff find it difficult to manage information, particularly to store and retrieve it. Further, there are a limited number of users, and especially very few women users; it required more funding and electronic resources; and non-Arabic users find it difficult to access CTHMIHR information. Heads of Department complain that there is no clear strategic planning and staff do not have any training to index, store, retrieve or dispose of information; and the number of trained staff in the Departments is very limited due to the complexity of the management systems. Although there are many ICT resources (e.g. PCs), there is no integration between databases, so every Department creates their own database relevant to their own needs. Moreover, the expansion of information content created is rarely used, but still stored in the same offices; and information does not conform with Data Protection Law. Some users do not know what type of information they need and female users may find it difficult to access information due to cultural issues that exist in CTHMIHR.

IT staff complained that there is a limited number of IT operations and programmers; a lack of ICT management; no strategic planning for the development of IS; a lack of interest in training courses; some staff using illegal copies of software; and lack of policies on using the Internet. They added that Heads of Department have a limited knowledge about plans for virus problems and disaster prevention. Non-IT Staff complained that they do not now how to store and retrieve information; information is stored in an unsuitable environment; there is a duplication of information in different departments; lack of policies to handle information; and they find it difficult to up-date databases. There are further problems with information needs; lack of English language and training courses; and limited knowledge of IT and the Internet. The current system is very complex and focuses on IT rather than its uses; little support is offered in the use of hardware and software.
Users, particularly external users, complained that they do not know different types of CTHMIHR information; the process of accessing information takes a long time; CTHMIHR provides users with very limited information and not in the right format; information is not up-to-date; the website provides nothing to users; users find it difficult to exchange information and ideas (lack of communication); and users have limited knowledge of using IT. Female users, particularly researchers, believed that they face problems in accessing information because of religious culture; they do not know what kind of information CTHMIHR holds; and they do not have IT skills.

1.4 Aims and Objectives

Bearing in mind the IM problems described above, this research therefore aims to develop a comprehensive, integrated Information Management System (IMS) at CTHMIHR. This IMS would help staff and users (internal and external, particularly female) to access information about the Hajj easily and more effectively, when it is needed.

To achieve the aim of this research the following objectives have been formulated.

1. To examine the current status of IMS at CTHMIHR;
2. To determine the current problem situation related to IT, IS and IM;
3. To understand user needs of a comprehensive, integrated IMS at CTHMIHR; and
4. Suggestions and recommendations for implementing a comprehensive, integrated IMS at CTHMIHR.

1.5 Research Boundary

This research is concerned with the study of current IM problems at the CTHMIHR from perspective of the users and determining the current problem situation related to IT, IS and IM. Also this research is concerned with developing a comprehensive, integrated IMS at CTHMIHR and making necessary recommendations to achieve this.

The target population must be identified as the first task of the researcher and taken into account in the aim and objectives of the research. In this research, the target population
is staff and researchers at the CTHMIHR, staff and researchers at UQU, local authorities, and companies. The major reason behind selection of this population is because their view about the current information systems and their expectations of the new system are important change factors.

1.6 The Research Methods

To achieve the aim and objectives of this research, a case study approach was used and in this approach the Soft System Methodology (SSM, mode 1) and Interpretive Structural Modelling (ISM) have been combined to achieve the aim and objectives. Because the real world problem situation at CTHMIHR is highly complex and multidimensional SSM (Mode 1) was applied to discover and express the problem situation (Stages 1 and 2) to develop conceptual models (11 systems) and make comparisons with the real world (stages 3, 4, and 5), and to study subsequent change (that is systemically desirable and culturally feasible) and then to take action to improve the problem situation (Stages 6 and 7). While ISM was used to discover the relationships between these 11 conceptual systems in order to find a method of implementing them through an interpretative paradigm that encompasses the view of the population sample.

The research used five different techniques to express the current problem situation as primary data sources for gathering information. These techniques were: document analysis, interviews, focus groups, questionnaires and observations. The major strength of using these different techniques is that every technique can express the problem situation from a different angle. For example, document analysis was used to view formal information (document policies, CTHMIHR’s structure); semi-structured interviews were used to address managerial problems; focus groups were used to uncover problems with regard to practices related to information management; questionnaires were used to express the needs and problems of users related to the information they requested; and obtrusive observation was used to explore the problem situation relating to information processes, that is, the collection, processing, storing and retrieval of data.
1.7 Outline of the Research

The thesis is divided into nine chapters.

Chapter 1 aims to give an overview of the research. Therefore, it starts with the importance of information management in an organisation and definition of the Hajj. It moves to present background of CTHMIHR and its information management problems. The next part deals with the aim and objectives, and boundary of the research. The final part is an outline of the research.

Chapter 2 aims to present a general background review for the research. Thus, it starts with the location and history of Makkah, the pilgrimage, Saudi Arabia, and Umm Al-Qura University.

Chapter 3 introduces the methods of the research. This chapter starts with selecting the research method, and then moves to primary data sources (interviews, focus groups, questionnaires, observation, and document analysis). The third part deals with secondary data sources (journals, books, e-sources and dissertations). The fourth part evaluates the uses of SSM and ISM to develop and implement the IMS model to CTHMIHR. The final part of this chapter describes the process of the research which has been subdivided into twenty stages.

Chapter 4 is a review of the literature. This chapter has been divided into five main parts. Part 1 describes key elements of information management. Part 2 express records management. Part 3 evaluates the Internet, Intranet, and Extranet. Part 4 explain the Internet in Saudi Arabia. Part 5 previous studies related to information at CTHMIHR.

Chapter 5 presents the results of survey analysis and is divided into five parts: interview analysis; focus groups analysis, questionnaire analysis; observations; and document analysis.

Chapter 6 describes a system intervention for designing IMS at the CTHMIHR. The purpose of this chapter is to apply SSM for the design of IMS at the CTHMIHR, and it
An Overview of the Research

Chapter 1

is divided into seven stages: the problem situation unstructured, the problem situation expressed, Root definition (RD) for reference systems, building conceptual models, comparison of conceptual models with the real world (RW), desirable and feasible changes, and taking action.

Chapter 7 applies ISM to develop structured order of precedence of action to implement IMS at the CTHMIHR, and it is divided into seven stages: identifying issues to be studied, deciding on types of ISM to be constructed, selecting participant groups and facilitators, generating the element set, completing the matrix of the element interactions, displaying the ISM, and discussing structures and amending if necessary.

Chapter 8 discusses and summarizes several issues related to developing and implementing IMS at CTHMIHR. This chapter starts with a strategic dimension, IM and Records Management, and identification of Users, their opinions and needs. Then it moves on to staff/user training and development, infrastructure demands, change processes required, and limitations of the research study.

Chapter 9 presents the main conclusions of the research, the recommendations to develop and implement IMS to CTHMIHR and future studies.
Chapter 2 | General Background Review

2.1 Introduction

The purpose of this chapter is to give a general background review, starting with the location and history of Makkah, the pilgrimage, and Saudi Arabia. It then moves to a description of Umm Al-Qura University.

2.2 Location and History of Makkah

According to Makky (1978), Makkah is located at 21° 25' north of the Equator and 39° 44' 30" East of Greenwich. It is located in the Sirat Mountains, inland from the Red Sea. It is set in a rugged landscape consisting mostly of solid granite; with rocks sometimes reaching 300 meters (1,000 feet) above sea-level. Makkah stands at the half-way point on the caravan route between Yemen and Syria. Several roads go to Yemen in the south, to Jeddah in the west, and to Madinah in the north-west. There are also two routes leading to Ta’if in the south-east (Figure 2.1).

Muslims believe that the significance of Makkah is clear in its early history. God (Allah in Arabic) selected this place in the centre of the Islamic World to be the place where all Muslims visit and congregate to perform their pilgrimage. The history of Makkah started when Allah instructed Ibrahim (May Allah's peace be upon him) to take some of his family to go to Makkah. Makky (1978) states that obeying this instruction, Ibrahim, with his wife Hager and their infant son Ismail left Syria—a land renowned for its fruits, vegetables and rivers—and headed for Makkah to the site of what is today known as the Holy Mosque. Then, Ibrahim left them. No life whatsoever existed in that area, but Hagar's (Prophet Ibrahim's wife) search for water was eventually rewarded when she noticed water coming out of a well (later called Zam Zam), near where she had laid Ismail.
Tribes in the south heard about that spring and moved there to share with Hager and her son its water. Houses started to rise on the site as the tribes settled and houses around the place increased gradually (Al-Makky, 1965).

Later, Allah commanded Ibrahim to build the sacred house known as the Kabb’ah. He went to Makkah and found his son Ismail grown up and surrounded by tribes. When Islam was known, the mosque as a whole and the Kabb’ah in particular symbolised the unity and brotherhood of the Muslim community throughout the world. Muslims
believe that Allah has provided Makkah with a reason for growth and development as millions of Muslims continually visit Makkah in order to perform their Pilgrimage.

The Prophet Mohammed (Peace be upon him) was born in Makkah in the year 570. When he was 40 years old, he received his first revelation from Allah through the Angel Gabriel in the Cave of Hira near the summit of Jable Al-Nur (Mountain of Light), near Makkah. The revelation, which continued for twenty-three years, is known as the Qur'an.

2.3 The Pilgrimage

According to the Qur'an every Muslim is required to observe the Five Pillars of Islam: to profess that there is no God but Allah (Almighty God) and that Mohammed is His prophet; to pray five times daily; to give alms; to fast during the month of Ramadan; and to perform the Hajj, at least once in a lifetime, when possible.

Makky (1978) states that the Hajj is essentially a series of rites performed in Makkah, and in nearby Arafat, Muzdalifah and Mina (see Figure 2.2). The Hajj must be performed between the eighth and thirteenth days of the twelfth month, Dhu-al-Hijjah, of the Muslim lunar year.

Figure 2.2 Map of Makkah, Mina, Muzdalifah and Arafat (adapted from Makky, 1978)
Donning the Ihram This is the first step toward performing the pilgrimage. At the moment of donning the Ihram, the pilgrims enter a state of grace and purity in which they may not wear jewellery or perfume or other personal adornment.

Umrah The pilgrims then proceed directly to the Holy Mosque to circle the Kabb’ah. The Tawaf is the act of circling the Kabb’ah on foot seven times. After the pilgrims perform the Tawaf, they perform the Sa’y (running) where they run between the hill of Al-Safa and Al-Marwa, where Hagar (Prophet Ibrahim’s wife) searched for water for her child. She ran desperately back and forth seven times between the above hillocks, until the angel Gabriel appeared and, stamping the ground with his heel, brought water for her and her child. This is the origin of the well of Zam Zam. Pilgrims also run seven times in commemoration of this event.

Going to Mina and Arafat On the eighth day of Dhu-al-Hijjah the pilgrim begins the main rites of the Hajj by going to Mina, where s/he prays five prayers and then moves to Arafat. S/he may go directly to Arafat, however, where s/he must stay until sunset of the ninth day of Dhu-al-Hijjah. This period at Arafat is called the day of standing and this action is the single most essential act during the pilgrimage. In Arafat there is a hill called the Mount of Mercy, at the bottom of which the prophet Mohammed delivered a farewell sermon during his own pilgrimage. It is in that event that “standing” at Arafat is commemorated.

Toward Muzdalifah After sunset the pilgrims proceed in masses from Arafat to a place called Muzdalifah, a few miles away from Mina. In Muzdalifah the pilgrims worship and sleep. There they gather a number of pebbles for use during the rites on the following days.

Going to Mina After midnight on the ninth day, the pilgrims move from Muzdalifah to Mina, where they remain for three days. There they throw on the first day seven pebbles at one of three whitewashed, rectangular masonry pillars, which they stone on this occasion represent devils. The largest of the three pillars represents Satan who three times tried to persuade Ibrahim to disobey God's command to sacrifice his son.
The throwing of pebbles symbolises the pilgrims' repudiation of evil. On the succeeding days, the pilgrims throw twenty-one pebbles a day at those pillars.

**Eid al-adha** The feast of sacrifice starts the morning of the tenth day of Dhu-al-Hijjah, that is, the first day at Mina where the Pilgrims who can afford it sacrifice a sheep, cow, goat or other animal. Some pilgrims share in the sacrifice of a single animal. They all give a portion of the meat to the poor. The sacrifice has several meanings: it commemorates Ibrahim's willingness to sacrifice his son, it symbolises the believer's willingness to give up their worldly dearest acquisitions, it marks Muslim renunciation of idolatrous sacrifice, it offers thanksgiving to Allah, and it reminds the pilgrim to share his blessing with those who are less fortunate than him/her self. Muslims all over the world are on the same day performing an identical sacrifice; thus they share vicariously in the elation of pilgrims in Makkah. The sacrifice is therefore an integral part of a world-wide Muslim celebration that unites those who are performing their Hajj with those who are anywhere in the world.

**Releasing from the Ihram** After completion of the rites at Mina, the pilgrims complete a major part of the Hajj. Both men and women now cut off or clip some of their hair. For men it is recommended that they have their heads shaved. At this point the pilgrims remove the Ihram.

**Tawaf al-Ifadah** All pilgrims now go to the Holy Mosque and circle the Kabb'ah final seven times; this is called Tawaf al-Ifadah. Then the pilgrims return to Mina for three days. All of the rites of the Hajj are now completed and the atmosphere is more one of joy.

**Departure** After the three days at Mina pilgrims are free to return home after they finish their farewell Tawaf in Makkah. This final Tawaf is called the Tawaf al-Wida.

### 2.4 Saudi Arabia

The U.S.-Saudi Arabian Business Council (2004) outlines the following basic facts about Saudi Arabia.
2.4.1 Geography and Climate

Saudi Arabia is located in the South western corner of Asia, and covers an area of about 2,150,000 square kilometres (about 830,000 square miles). The country is bordered by the Red Sea and the Gulf of Aqaba on the west, by the Republic of Yemen and the Sultanate of Oman to the south, the Arabian Gulf, the United Arab Emirates and Qatar to the east, and Jordan, Iraq and Kuwait to the north (see Figure 2.3).

The climate in Saudi Arabia varies greatly from one region to another. The Kingdom's Red Sea coast has a sub-equatorial climate. Summer is hot and humid and the winter mild with light rains between November and February. In the central region summer temperatures can average 45°C (113°F) Fahrenheit), with dry and cool winter. The eastern region has high humidity, with temperatures rising to 43°C (110°F) Fahrenheit) during the warmest season, and moderate in winter months. Rainfall is light and occurs primarily during the winter season.
2.4.2 Government

Saudi Arabia is a monarchy headed by King Fahd Bin Abdul Aziz, Custodian of the Two Holy Mosques and Head of State. Assisting him in his duties are Crown Prince Abdullah Bin Abdul Aziz, the Deputy Premier and Commander of the National Guard; Prince Sultan Bin Abdul Aziz, the Second Deputy Premier, Minister of Defence and Aviation and Inspector General; and other ministers appointed to the Council of Ministers, which meets every Monday except during the two major holidays.

2.4.3 History

The modern Kingdom of Saudi Arabia was founded on 23 September 1932 by King Abdul Aziz Al-Saud. Shortly after the establishment of the Kingdom of Saudi Arabia, oil was discovered in commercial quantities and oil production began in 1938. Oil revenues would play an important role in the country's development as a modern industrial state.

Following his death in 1953, King Abdul Aziz was succeeded by his son Saud who ruled for 11 years and initiated an ambitious programme of economic and social reform. In 1964 King Saud was succeeded by his younger brother, Faisal, a capable leader who had acquired significant experience in diplomatic affairs and government management prior to his rise to the throne. During King Faisal's reign, the economy of Saudi Arabia was stabilized and wealth gained from oil was used to fund a massive national development programme. The programme was guided by the first five-year Development Plan, which started in 1970. The economy of the Kingdom grew rapidly following the implementation of the development plan, with real national income increasing at a rate of almost 45 percent per year.

King Khalid assumed leadership of Saudi Arabia after King Faisal's death in 1975. The Kingdom's infrastructure expanded rapidly during his reign, with roads, industries, universities, and even new cities emerging. At the end of King Khalid's reign, the country's economic base was becoming increasingly diversified. Crown Prince Fahd succeeded King Khalid in 1982. King Fahd's brother, Abdullah Bin Abdul Aziz, was named Crown Prince and Deputy Premier. The two have made a strong
commitment to the country's continued economic development, encouraging and overseeing programs of industrialization, agriculture, and education. King Fahd's reign has been marked by notable successes in expanding the country's increasingly modern infrastructure, diversifying the Kingdom's sources of income across a growing and profitable industrial base, and achieving self-sufficiency in many primary manufactured and agricultural commodities.

It should be noted that throughout the Saudi Era, Makkah expanded along the roads through the mountains and valleys, away from the city centre. Houses near the Holy Mosque were raised up to thirty levels, and were surrounded by open spaces and wide streets. Makkah is now of the shape of a star with Al-Masjed Al-Haram located in the centre. The Holy Mosque is located at a low part of the city. More than two million pilgrims performed their pilgrimage in the year 2003. To accommodate the increasing number of pilgrims, the Saudi Arabian Government has made changes in facilities, and has even made important changes in Al-Masjed Al-Haram itself and the other holy places. In previous centuries, the Hajj was an arduous undertaking. Today, however, Saudi Arabia provides millions of people with water, modern transport and up-to-date health facilities.

**2.5 Umm Al-Qura University**

According to the Ministry of Higher Education (2003), the history of this University can be traced back to 1949 where the Makkah-based college of Islamic Law (share'a) was founded. In 1981, the Council of Ministers decreed that Umm Al-Qura University should be founded in the holy city of Makkah. Since that date, the university has continued to grow academically. It comprises many colleges, departments, and scientific centres. Now it has nine colleges, with several different fields of specialisations in educational, social and scientific fields. The total number of its enrolled male and female students reached 20,600; they study in the following colleges:

1. College of Share'a and Islamic Studies
2. College of Education
3. College of Geometry and Islamic Constructional Designs
4. College of Arabic Language
5. College of Applied Sciences
6. College of Social Sciences
7. College of Daw'ah and Usul-Al-Din
8. Institute of Arabic Language
9. College of Medical Sciences

The university includes also the Custodian of the Two Holy Mosques Institute of Hajj Research, which specializes in studies, research and data collection related to Hajj and Umrah Affairs. It also gives suitable solutions to specific governmental authorities in the Kingdom of Saudi Arabia to serve pilgrims worldwide (See chapter 5).
Chapter 3 | The Research Methods

3.1 Introduction

There are several ways in which research methods can be classified. A common method is to make a distinction between quantitative and qualitative methods (Myers, 1997). In simplified terms, quantitative researchers understand facts and study the association between one set of gathered facts with another, while qualitative researchers are more interested in understanding individuals' (or groups') perceptions of their environment (Bell, 1992). Qualitative research methods are designed to aid researchers in understanding the social and cultural contexts within which subjects operate (Myers, 1997).

This research investigated developing an IMS at CTHMIHR. Given that there was a strong interest in finding out the opinions and thoughts of information users at CTHMIHR, it was apparent that the qualitative method approach would be more beneficial to this area of study. Initially, it is vital to understand not only the difference between method, methodology, and mulit-methdology but also the relationship between them.

The main difference between method and methodology is that a method is a set of procedures, models, tools, and techniques for gathering evidence, while methodology is a theory and analysis of how research does or should proceed. Research can consist of phases and these phases can consist of sub-phases. Methodology helps the selection of the techniques that might be suitable at each stage of a project (Avison and Fitzgerald, 2002). Jackson (2003) indicated that methodology concerns itself with the study of the principles of the use of method, in the sense that it sets out to describe and question the methods that might be applied in some activity. Thus, 'methodology' is a higher-order term than 'methods', and is more than procedures, models, tools, and techniques. For example Interpretive Structural Modelling (ISM) is simply a model employed to
understand and structure complex situations. The interactive management methodology establishes the principle(s) behind the use of this model.

The term 'multi-methodology' means employing more than one methodology in combination; this helps to address the different levels and dimensions of a problematic situation (Rosenhead and Mingers, 2001). For example, multi-methodology can be the combination of Checkland's SSM with Bear's Viable System Model (VSM). Multi-methodology possibly uses sources from different underlying paradigms within a single intervention or piece of research (Mingers, 2003). So, 'multi-methodology' is a higher level than 'methodology' and suggests ways in which methodologies can be combined. (Jackson, 2003). Rosenhead and Mingers (2001) outline four types of multi-methodology. These are: (1) Methodology combination, using two or more methodologies within an intervention; (2) Methodology enhancement, using one main methodology but enhancing it by importing methods from elsewhere; (3) Single-paradigm multi-methodology, combining parts of several methodologies all from the same paradigm; (4) Multi-paradigm multi-methodology, as above, but using methodology from different paradigms. The term of paradigm is now commonly used to refer to something like world view or a way of seeing things (Jackson, 2003). He added that a paradigm was a set of ideas, assumptions and beliefs that shaped and guided scientific activity.

In this chapter, the methods adopted in this research are highlighted. This chapter starts with selecting the research method. The next part describes the primary data sources used in this research. They include interviews, focus group, questionnaires, observations, and document analysis. The third part describes secondary sources that were used and is divided into journals, books, e-sources and dissertations. The fourth part describes methodologies which comprise Soft System Methodology (SSM) and Interpretive Structural Modelling (ISM). The final part describes the process of the research.
3.2 Selecting the Research Method

There are several research approaches that can be used concerning information systems. Galliers (1992), Al-Zahrani (2001), Al-Shehri (2003), and Denscombe (2003) identified eight main research approaches that are currently being used in the field of information systems. These are: (1) Laboratory Experiments; (2) Field Experiments; (3) Case Studies; (4) Action Research; (5) Simulation; (6) Phenomenological Studies; (7) Forecasting; and (8) Surveys.

Each research method can be used to deal with a particular problem, under particular situations, at a particular time, and no one method could be used to solve all problems in all situations. The aim of this research is to develop an IMS at CTHMIHR in the Kingdom of Saudi Arabia. This IMS would help staff and users to access information about the Hajj easily and more effectively when needed. A case study approach is the most suitable method for this research for the following major reasons:

- The case study is a research method which focuses on the characteristics, circumstances, and complexity of a single case, or a small number of cases, frequently using multiple methods (in this study SSM and ISM are used in conjunction with one other). While findings can raise awareness of general issues, the aim is not to generalise the findings to other cases;
- A case study has ability to present a comprehensive explanation and more detailed representation of a particular social event through the use of a variety of data collection techniques (e.g., Document analysis, Interviews, Questionnaires, Focus Groups, and Observations);
- A case study has the flexibility to provide a focus on single or multiple cases, and to examine different dependent variables at the same time (Denscombe, 2003);
- In a case study, interpretive analysis is used as both a collaborative and participative technique that requires the stakeholders to take part at some in all stages of the research depending on the method(s) used. Interpretive analysis considers the perceptions of all stakeholders in order to debate and bring about a desirable change or improvement; and
The main concept of a case study is that it combines theory with practice set within the environment of social system. This has been shown to involve a cyclic process of five major stages: diagnosis, planning, taking action, evaluating and specifying learning. The integration between theory and practice, and then the subsequent reflection, leads to an increased understanding of the problem situation, which may lead to appropriate action (Stowell and West, 1994).

For the case study in this research, a multi-methodology comprising SSM (Mode 1) and ISM was used. However, before elaborating on SSM and ISM, it is very important to remember the problem situation. CTHMIHR aims to establish an information bank about the Hajj. This information bank should function as a comprehensive scientific reference source that will provide statistics, details and facts to assist in planning the utilities and services of the Pilgrimage. IM at CTHMIHR has a number of problems, in particular the rapid increase in records, duplication of records, information distribution in different departments with different formats, insufficient information strategies, and a lack of information control. Therefore, IM problems in CTHMIHR are surrounded by confusing and sometimes conflicting views on whose domain the responsibility lies within. The Dean and Heads of Department with CTHMIHR are aware of these problems, but they cannot identify the source of the problems, the people responsible for them, and how to deal with them.

3.3 Primary Data Sources

Hawryszkiewycz (1994) and Kendall (1992) indicated that information gathering for a large and complex system can be an onerous task. All information must be gathered in an organised way to ensure that nothing is overlooked and that all detail is eventually retained. All users should be consulted to ensure that every system problem and user requirement is identified. There are a number of methods used to determine user requirements and to gather information. Therefore, this researcher used interviews, focus groups, questionnaires, document analysis and observations at CTHMIHR as primary data sources.
3.3.1 Interviews

Interviewing is used to analyse large structured systems and also to understand the system’s problems. There are many important factors that contribute to successful interviewing. The first is to choose people to interview. This is very important as the analyst must ensure that all key people within the study boundary are considered (Hawryszkiewycz, 1994). The next important factor is finding the right way to conduct an individual interview. Good interpersonal communication must be considered and the interviewer must establish some rapport with the interviewee to ensure the co-operation necessary to obtain all the relevant facts. According to Gorman and Clayton (1997) and Powell (1997), interview has the following advantages:

- Data gathering within an interview is immediate compared with other techniques for example questionnaires, that take a some time before data collection is completed;
- The interview all the interviewer to explain (some time in more detail) and make clarification for the interviewee in unclear questions;
- The interview allow a great amount of data to be collected in short time compared with other techniques such as questionnaires;
- It let the interviewer to explore causation, that is, to obtain from the interviewees their causes for acting in the way in which they say they do.

In other hand, there are some disadvantages that need to be taken into account when the researcher apply the interview. According to Gorman and Clayton (1997) and Powell (1997), There are:

- Interview techniques not only required fully planned and prepared, but also the cost and time of conducting a series of one to one interviews;
- Face to face contact between the interviewer and the interviewee make the respondent modify his/her responses to fit in with what s/he thinks the interviewer wants;
- Interview required more training and time for analysis and interpretation data.

Brookers (1982) explains that there are two categories of interview in an analytical environment:
The Research Methods Chapter 3

- Information gathering;
- Information feedback.

The information gathering interview attempts to collect information, not only on objective facts, such as the number of people in the department, but also on people’s attitudes, plans, personalities and values. The aim of an information feedback interview is to notify people, to share ideas with them, or to negotiate with them. In this situation, the interviewer is often exploring possibilities and observing the interviewee’s reactions or looking for suggestions to problems. The feedback of information is a very important tool in the interview process.

According to Brookers (1982), there are several points that the researcher should take into account before conducting a series of interviews:

- Planning the interviews in a top-down sequence. In other words, the researcher starts the interview with upper management and works down through the Heads of Department to the operational staff at CTHMIHR;
- Making interview appointments in advance;
- Being aware of interpersonal communication, for example, hand movements, eye contact and facial expressions;
- Using open questions, which can create a better atmosphere for effective communication than closed questions. Also, open questions provide the best way to explore the experience of the interviewees;
- The researcher must control the interview time.

Gorman and Clayton (1997) and Powell (1997) outlined three type of interview, the structured interview, unstructured interview, and semi structured interview. Structured interviews consist of the interviewer asking each respondent the same questions in the same way. The key feature of structured interview is preplanning of all questions to be asked; comparisons can be made between subjects; and results are easy to interpret and analyse. An unstructured interview is used when the researcher aims to discuss a limited number of issues and frames the questions on the basis of the interviewee's previous response. The strength of this method is that the researcher discussed a limited number
(one or two) of issues in more detail. The main disadvantage of an unstructured interview is the researcher do not have structured or preconceived plan or expectation as to how s/he will deal with the issues.

In a semi structured interview, the researcher has a set of broad questions to ask and may also have some prompts to help the interviewee but the researcher has the time to respond to the interviewee's responses. The major strength of this method is that it lets the interviewee develop ideas and speak more widely on the issues raised by the researcher. A semi structured interview is a good way of discovering things about complex issues.

Therefore, the researcher used semi structured interviews to understand the experience of other people and to provide access to the context of their behaviour. Furthermore, this method was used to take advantage of any information that interviewees could provide. So, the purpose of the semi structured interviews in this research was to collect information about CTHMIHR and its departments' needs, functions, activities, the relationships between the departments inside and outside CTHMIHR, existing IMS practices, as well as suggestions towards improving IMS at CTHMIHR. Thus the researcher conducted discussions with the Dean and four Heads of Department in order to establish the current status of IMS at CTHMIHR. Each recorded interviews take two hours. The researcher conducted these semi structured interviews to collect qualitative data from CTHMIHR staff, especially high-level managers and to address managerial problems.

The qualitative data from five semi structured interviews were analysed manually according to different aspects included in the interview schedule. The two types of interviews results were represent in chapter five.

3.3.2 Focus Groups

Focus groups collect information from groups of people contemporaneously rather than from a series of individuals at different times. Focus groups can be useful to obtain certain types of information or when situations make it difficult to collect information
using other data collection methods. They are best conducted with six to nine participants, who have similar experiences to each other, and this homogeneity can be reinforced in the introduction to the focus group discussion (Krurger, 1998).

The major strength of this method is that people influence each other with their comments, discussion, and opinions. Moreover it is a useful way of exploring attitudes on non-sensitive, non-controversial issues (Desnscembe, 2001). On the other hand, the main limitations of focus group are, according to Krurger (1998) and Desnscembe (2001) that the focus group facilitator may have less control in the group interview, irrelevant issues can emerge, the data collected are sometimes difficult to analyse, and this method requires a trained facilitator whose function is to achieve the objectives of the discussion.

Focus groups were used in this study to produce qualitative data that provided insight into attitudes, perceptions and opinions of proposed IMS. The focus group discussion was divided into two main parts: current issues and requirements to improve the system (see Appendix 3).

The researcher conducted three focus groups (two in Makhah and one in Madinah Branch). The first focus group was conduct in Makkah which contains five operation staff (one from the Department of Information and Technical Services, one from the Department of Administrative and Human Research, two from Department of Administrative and Financial Affairs, and one from Department of Research and Information Affairs) which took three hours. The second focus group (two hours) was conduct in Madinah which contain three operation staff (one from the Department of Information and Technical Services, and two from Department of Administrative and Financial Affairs). The final focus group (three hours) was conduct in Makkah which contains six operation staff (one from the Department of Information and Technical Services, one Department of Environmental and Health Research, one from Department of Architectural and Engineering Research, two from Department of Administrative and Financial Affairs, and one from Department of Research and Information Affairs).
The researcher allowed the respondents to talk about what they thought was significant and ensured that all topics which were considered crucial to study are covered. All focus groups were recorded and notes have been taken. The focus groups started with a brief description from the researcher about the research aims and objectives. Then the researcher arising some problems issues related to information management and allows the participants to responds, by identifying the sources of these problems and suggesting to improving problem situations. The results of focus groups were representing in chapter five after manual analysis.

3.3.3 Questionnaires

Questionnaires (in an information systems field) often include many questions which are designed to find out information about the architecture of the system and obtain an idea about its quality and performance (Myers, 1997). However, Kendall (1992) states that questionnaires are an information-gathering technique that allow a researcher to gather information about attitudes, beliefs, behaviour and characteristics from a number of key people in the organisation who may be affected by the current and proposed systems. Attitudes are what people in the organisation say they want (in a new system, for instance); beliefs are what people think is actually true; behaviour is what organisational members do; and characteristics are properties of people or things. Questionnaires can be used to survey a large sample of system users in order to sense problems or raise important issues. Brookers (1982) notes that the questionnaire should conform to the following general rules:

- It should not be too long. The longer the questionnaire, the less likely people are to complete it;
- Confidentiality of responses (where necessary) should be ensured and communicated to the respondents; and,
- The use and purpose of the questionnaire should be explained to the respondents.

According to Busha and Harter (1980), Gorman and Clayton (1997), Powell (1997) and Denscombe (2003) the questionnaire has the following advantages:
• It is economical, in the sense that it can supply considerable amount of research data for low cost in term of material, money and time;
• It is easier to arrange, collect, and analysis than, for example interviews;
• It can supply standardised answers and techniques to collect large amount of data in a short time;
• It can cover a wide range and distribution of the sample; and,
• It can help to product frank answers and help to eliminate variations in the questioning process.

On the other hand, questionnaires have some disadvantages according to Busha and Harter (1980), Gorman and Clayton (1997), Powell (1997), and Denscombe (2003). These are:

• The response rates generated by questionnaires are lower than those generated by interview even when the questionnaires are completed;
• Lack of immediate clarification, inaccurate or incomplete information; and,
• The researcher may find (some time) difficulty to check the truth of the answer.

Questionnaires can be used to supplement other techniques. They are useful for gathering numerical data or getting relatively simple opinions from a number of people, but they are not very effective for in-depth searches or for identifying system problems or solutions. Interviews tend to be more successful for this purpose (Hawryszkiewycz, 1994).

3.3.3.1 Population and sampling in this research

The target population must be identified as the first task of the research study. In this study the target population is staff at CTHMIHR, and external users in the staff at UQU, local authorities, and the public sector.

Powell (1997), and Denscombe (2003) defined a population sample as a subset of the target population that accords with the research. Generally, there are two processes by which population samples can be obtained. Firstly, non-probability or non-random
sampling which can be defined as giving the researcher no clear indication of who will be selected and the use of exclusion criteria to define the population sample (Gorman and Clayton, 1997). They added that, in the latter method, the researcher uses that own judgment to chose a sample that is suitable for the research study. The major types of non-probability sampling are quota sampling, multi-purpose sampling, network or snowball sampling, outcropping sampling, and advertising sampling (Powell, 1997). The second process is probability sampling (random sampling), where each member of the target population has an identical probability to be selected. In other words, every element in the target population has a chance of being selected which is known in advance.

3.3.3.2 Sampling Selection

A stratified random sampling method was adopted in this study to ensure that the resulting population sample was distributed in the same way as the population. In practice, in order to apply the stratified random sampling, the target population under investigation was divided into four main groups:

a) CTHMIHR (staff and researcher)
b) Umm Al-Qura University (staff and researchers)
c) Local Authorities
d) Companies (Islamic Tourism)

500 questionnaires were distributed by researcher, after an official letter was received from the head or manager of the organisation. The researcher used personal communication to distribute the questionnaires to staff respondents (from July to September 2002). There were 345 responses to this survey, which is equivalent to 69% of the total number of questionnaires distributed. Furthermore, according to the Head of Information and Technical Services at CTHMIHR, the number of users of information at CTHMIHR in 2001 was not more than 1000. Therefore the respondents of this survey were at least 34.5% of the total user population (See chapter 7, section 5.3).
3.3.4 Observation

Observation is an important tool for gathering qualitative information. It can include watching, listening and noting current processes. Basager (2001) and Brewerton and Millward (2001) stated that there are two types of observation. These are obtrusive observation and unobtrusive observation. Obtrusive observation is when the researcher participates in the environment s/he is observing; whereas in unobtrusive observation, the researcher remains removed from the system of interest and watches and records what is going on, whilst the people being studied are not aware that they are being observed. The major strength of obtrusive observation is that the researcher can enter the social world of the organisation and interact with the people being observed. In other words, the researcher has the opportunity to get close to people in their social settings for extended periods of time, observing behaviour, listening to what is said in conversation both between others and with the field worker, asking questions, and recording information (Bryman 2004). A major weakness of obtrusive observation is that people change their behaviour when they know they are being observed, thus ‘true’ record of activities may not be captured.

Unobtrusive observation does not disrupt normal activity. The weakness of this method is that problems may occur from the interpretation of observations by the researcher; and it cannot measure the meanings of individual or group behaviour (Brewerton and Millward, 2001).

The researcher used obtrusive observation to understand the current system, the flow of information, and test records at CTHMIHR. This type of observation can be very helpful in drawing a Rich Picture (RP) and in examining the process of information management in every department and in CTHMIHR as a whole. The unobtrusive observations took place between 3rd August and 12th September 2002 (2-3 hours per day). The researcher observed (and take notes) information flows at several levels in the organisation. For example, between the Dean and Deputy-Dean of CTHMIHR and through the Heads of Department interpretation with files or electronic records. The researcher focused on: the work involved in each department, the information held in each department, any information-keeping problems, information held in store, a
physical examination of the information, the space used for storing information, and the
purpose/significance of the information held in each department. The qualitative data
from unobtrusive observations were analysed manually and chapter five (see section
5.4) represent these results. The diagrams (RP) were used to describe the process of the
information.

3.3.5 Document Analysis
Interviews and questionnaires can be useful tools for gathering information in both the
formal and informal systems of an organisation. Searching an organisation's documents
can help to discover those formal systems which are often the only source by which to
obtain a full description of many of the organisation's activities (Myers, 1997). Brookers
(1982) outlines types of document that can be searched for:

- Policy and procedure documents;
- Organisational charts;
- Files of reports and forms currently used;
- Systems documentation.

Kendall (1992) points out that organisational policy and procedure documents can
provide information ranging from the general (the organisation's aims) to the specific
(job descriptions), and can therefore be used as background information before any
interviewing commences. Organisational charts provide a picture of the structure of the
organisation. This structure may be in terms of responsibility and authority, or it may be
in terms of reporting structures. These forms can be a background to the interview
environment and should be checked for accuracy during the interviews. Files of reports
and forms currently in use provide much information on the current system's input and
output and are, consequently, a very good starting point for analysing the current
system. The researcher needs to determine the use or non-use of these forms and
reports in the interviews and personal observations, as well as determining their
perceived strengths and weaknesses. System documents provide the researcher with at
least a system overview, input and output layouts, program specifications, file layouts,
and user procedures.
Searching the documents is a very important activity that helps the researcher to gather information about the current system. By searching CTHMIHR documents and records, the researcher was able to discover a formal description of many CTHMIHR activities. The researcher examined the policy and procedure documents, charts, files of reports and forms currently used, and system documents. This information can provide background information and give the researcher information about the environment of the current system. Searching for documents or records is a very good starting-point for analysing the current system.

The information obtained from document analysis, interviews, questionnaires and observation played an extremely important part in the research in describing the current situation and in developing the IMS.

3.3.6 Pilot Study
Copies of the initial draft of the questionnaire and the interview schedules (Arabic version) were sent to CTHMIHR and distributed to 20 randomly selected staff taken from an employee list (staff and researchers) at CTHMIHR in May to June 2000. The objectives of the pilot study were:

- To determine the validity and reliability of the two instruments;
- To determine clarity of the two instruments; and
- To determine the statistical method to analyse the collected data.

This was accomplished while the researcher was still in the UK. All the participants in this pilot study returned the questionnaires and interviews with their valuable comments and these were used to enhance the clarity of the questionnaire and to make it reasonable with regard to length and the time required to complete it. The pilot study added value to the final version of the questionnaire and interviews, and assisted the researcher in adding further questions and in taking out others in order to suit the objectives of the research. This process confirmed the validity the questionnaire while SPSS (Statistical Package for the Social Sciences) software was used to calculate coefficient alpha (a measure of the variance in the test, sometimes referred to as the equivalence, or internal consistency of the test) (Giles, 2002). Giles indicated that a test
is said to be reliable if there is little variance that is specific to certain items. An alpha value then gives a reliability measure for the scale as a whole. The overall alpha value of this pilot study was 0.72; this represents an inter-item correlation (correlations between items). In addition, Giles (2002) stated that an alpha value between 0.7 and 0.8 was often accepted as indicating a reliable test. For more information about conducting surveys, see Chapter 6.

3.4 Secondary Data Sources

The researcher also used secondary data sources. These sources included journals, paper-based literature, electronic sources and dissertations. The main reasons for using secondary data sources (see below) were related to the subject of the research, and particularly those which focused on developing information systems, information technology, Soft Systems Methodology, records management, information management, managing electronic records, people training, centralising and decentralising of information, and establishing Record Centres and Call Centres, were used.

3.4.1 Journals

The researcher used a variety of different sources held at Loughborough University and searched used subject terms related to this research. For example, relevant search terms used were 'information management', 'records management', 'information system'. Abstracting sources were: Information Science Abstracts (ISA), Library and Information Science Abstracts (LISA), British Humanities Index (BHI), and Computing Reviews.

3.4.2 E-sources

There are a large number of articles in electronic form on the Internet and in databases. The researcher used the services provided by Loughborough University. The major electronic sources for this research were the Social Sciences Information Gateway (SOSIG), Search engines (such as Google, Northern Light, Alta Vista), MetaLib, Electronic Journals, and ERIC. The steps that were used by the researcher to search these electronic resources included: (1) establishing the number of terms (keywords)
related to the subject of the research and producing a concept map include synonyms, broader or narrower terms, acronyms and technical terms; (2) identifying the appropriate electronic sources which produce the best results; (3) searching for terms or keywords or concepts individually; (4) using OR to expand the search; (5) displaying a selection of the results to determine relevancy; (6) modifying the search by adding additional or new terms; and (7) printing or saving/downloading the relevant results. Furthermore, the research evaluated Internet resources carefully with regard to the information, author(s), dates of publication, and the type of organisation producing the site before using the information as a secondary source.

3.4.3 Books
The researcher used the Loughborough University Catalogue (OPAC) and COPAC to search for books relevant to the subject of this research.

3.4.4 Dissertations
The researcher surveyed dissertations, particularly those related to developing Information Management Systems at CTHMIHR, Saudi Arabia. The major sources for dissertations are CTHMIHR, King Abdulaziz City for Science and Technology (Saudi Arabia), Loughborough University theses, and Index to Theses. The terms that were used to search dissertation sources were Hajj, information system, Saudi Arabia, and Hajj Research Centre. The researcher read the abstracts of the dissertations carefully and used department theses or interlibrary loan services to obtain entire theses. The dissertations used included:

The next two sections give descriptions of SSM and ISM. The first section presents the definition and history of SSM. Then, it describes SSM in its seven stages. The other section of this part offers a definition and history of ISM, and then the process of ISM is outlined.

3.5 SSM and ISM

3.5.1 Soft System Methodology (SSM)

SSM was developed by Peter Checkland and his colleagues at the University of Lancaster. It has been described as a broad approach to examine problem situations in a way which would lead to decisions on action at the level of both 'what' and 'how' (Checkland & Scholes 1990). Burton (1997) indicated that SSM was expressly developed as a method which allows the users of information systems (and other application as used) to express their views about the nature of the problem, their attitudes to work, and their suggestions for improving the situation.

3.5.1.1 History of SSM

The purpose of this part is to give general background about SSM history, which has been subdivided into 1972- block and arrows, 1981-seven stages, 1988- two streams, and 1990- four main activities.

a) Block and Arrows - 1972

According to Checkland and Scholes (1999 the first account of what became SSM (though that phrase was not used at the time) was published three years after the first studies (Checkland 1972).
The method was presented as a sequence of stages with iteration back to previous stages, the sequence being: analysis; root definition of relevant system; conceptualisation; comparison and definition of changes; selection of change to implement; design of change and implementation; appraisal.

b) Seven Stages – 1981 (Mode 1)
In the late 1980s, the seven stage model was developed (Figure 3.1). The first two stages entailed entering the problem situation, finding out about it and expressing its nature. Enough of this has to be done to enable some first choices to be made of relevant activity systems. These are expressed as root definition in stage three and modelled in stage four. The next stages use the models to structure the further questioning of the situation (the stage five 'comparison') and to seek to define the changes which could improve the situation, the changes meeting the two criteria of 'desirable in principle' and `feasible to implement' (stage six). Stage seven then takes the action to improve the problem situation, so changing it and enabling the cycle to begin again (Checkland and Scholes, 1999).

Figure 3.1 The conventional seven-stage model of SSM (Adapted from Checkland and Scholes 1999)
c) Two Streams – 1988 (Mode 2)

The main reasons for calling the two streams (Mode 2) is all of its process were implied in the basic seven-stage procedure by way of activity models. This two-stream model of SSM (Figure 3.2) was first expounded at a plenary session of the Annual Meeting of the International Society for General Systems Research in 1987, and was published the following year (Checkland, 1988).

Bulow (1989) summarized SSM (Mode 2) as a methodology that aims to bring about improvement in an area of social concern by activating in the people involved in the
situation a learning cycle which is ideally never-ending. The learning takes place through the iterative process of using systems concepts to reflect upon and debate perceptions of the real world, taking action in the real world, and again reflecting on the happenings using system concepts. The reflection and debate is structured by a number of systemic models. These are conceived as holistic ideal types of certain aspects of the problem situation rather than as accounts of it. It is taken as given that no objective and complete account of a problem situation can be provided.

Checkland and Scholes (1999) states that this version of SSM recognises the crucially important role of history in human affairs. It is their history which determines, for given group of people, both what will be noticed as significant and how what is noticed will be judged. It reminds us that in working in real situations we are dealing with something which is both perceived differently by different people and is continually changing.

d) Four Main Activities - 1990
Checkland and Scholes (1999) said that the version of SSM presented was the four-activity model (figure 3.3). The four activities are:

1. Finding out about a problem situation, including culturally/ politically;
2. Formulating some relevant purposeful activity models;
3. Debating the situation, using the models, seeking from that debate both
   (i) changes which would improve the situation and are regarded as both desirable and (culturally) feasible, and
   (ii) accommodation between conflicting interests which will enable action-to-improve to be taken;
4. Taking action in the situation to bring about improvement.

The first activity finding out about the problem situation, Checkland and Scholes (1999) suggests the building of "rich pictures" as a starting point in the exploratory discussion with people in a problem situation. The second activity involves building conceptual models of the various systems that exist to structure an exploration of the problem situation. The third activity involves comparing the conceptual systems models with the
real situation and using the comparison to define desirable, feasible changes in the real world. The final activity is taking action to change or improve the problem situation.

3.5.1.2 Reasons for adopting SSM (Mode 1)

Certain reasons stand behind the decision for selecting SSM (Mode 1) rather than Mode 2:

- SSM (Mode 1) has been adopted successfully in various projects and studies include issues related to education, industry, health care services, information systems, government services, business and library information services...
SSM (Mode 1) “intervention” is methodology driven and prescribe certain activities that need to be carried out. While, SSM (Mode 2) “interaction” are situation driven and allow manager to make sense of what is going on (Jackson 2000).

Whereas SSM Mode 2 is preferred when the researcher becomes an actor in the study, Mode 1 is used when the researcher is external to the study. As this research study was carried out in the UK and CTHMIHR is based in Saudi Arabia, it is clear that the researcher acted external to the system under investigation throughout. Thus SSM Model was adopted.

The main steps in SSM are illustrated in Figure 3.1. The diagram is divided into two halves. The upper half (Stages 1, 2, 5, 6, and 7) are activities that take place in the ‘real world’ and therefore should involve people in the problem situation. The bottom half (Stages 3, 4a, 4b) are ‘systems thinking’ activities which are carried out in the language of systems and may or may not involve people in the problem situation, depending on the circumstances of study.

**Stages 1 & 2** - Find out what makes the situation problematic. Observe processes taking place, interview people, examine documents; create / administer a questionnaire; and draw a rich picture (a technique to show a summary of main structures and activities, people and their concerns). It also shows a boundary to the system. In these two stages the researcher is interested in:

- Structure - formal or informal information flows; relationships and exchanges between people;
- Process - what is done, the activities, deciding, doing, monitoring, controlling;
- People - who is involved, where in the structure, in what processes, or outside;
- Debate, alternative views and conflict - what do the different people have to say about the situation?
Stage 3 - Root definitions of relevant systems. In this stage, the researcher carves out some part or parts of the situation (as seen in the rich picture) and frames them as systems (does some systems thinking). In subsequent stages, these root definitions are used to generate systems models (stage 4), and possible change (stage 6). A root definition can be defined as “a concise description of a human activity system, which captures a particular view of it”. Checkland and Scholes (1999) stated the acronym CATWOE can be used to construct a root definition:

<table>
<thead>
<tr>
<th>Customers</th>
<th>the beneficiaries or victims of the system;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actors</td>
<td>the agents who carry out the main activities of the system;</td>
</tr>
<tr>
<td>Transformation</td>
<td>the means by which defined inputs are transformed into defined outputs;</td>
</tr>
<tr>
<td>Worldview</td>
<td>the viewpoint that makes this root definition meaningful;</td>
</tr>
<tr>
<td>Ownership</td>
<td>the people with the power of life and death over the system;</td>
</tr>
<tr>
<td>Environmental Constraints</td>
<td>features that have to be taken as given.</td>
</tr>
</tbody>
</table>

Various root definitions may be offered such as: the primary task definition giving the official version; issue-based definitions homing in on contentious elements; or people-focused root definitions expressing the viewpoints of particular actors.

Stage 4 - Building conceptual models

Root definitions can then be developed into conceptual models of possible future systems. This is done by assembling a minimum set of verbs that describe the actions needed to fulfil the root definition. Structure them in a sequence according to logic. These verbs are usually arranged in a diagram and show the boundary of the system, and the control elements. It is then possible to check the model against the ‘formal systems’ model to ensure that it meets the general criteria for a viable system. Checkland and Scholes (1999) outline the Formal System Model serves as a guideline for checking the conceptual model we draw. Let S represent a human activity system.
Under the Formal System model, S is a formal system if and only if it meets the following criteria:

- S must have some mission.
- S must have a measure of performance.
- S must have a decision making process
- S must have components which interact with each other such that the effects and actions are transmitted through the system.
- S must be part of a wider system with which it interacts.
- S must be bounded from the wider system, based on the area where its decision making process has power to enforce an action.
- S must have resources at the disposal of its decision making process.
- S must either have long term stability, or the ability to recover in event of a disturbance.
- Components of S must be systems having all the properties of S (subsystems).

**Stage 5 - Comparing conceptual models with reality**

Here the analysts take the conceptual models back into the real world, and exposes them. Do they accord with what happens or what is agreed should happen? Do they lead to debate? Techniques can include informal discussions, formal questioning or simulations (see Chapter 6).

**Stages 6 and 7 - Implementing feasible and desirable changes**

Debate should lead (hopefully) to some sense of what might be done. The changes involved may be: a big change, a small change, a new system, a change to an existing system, new responsibilities, changed reporting structures and even an information systems project.
3.5.2 Interpretive Structural Modelling (ISM)

Interpretive Structural Modelling (ISM) was developed in the period 1973 to 1976 by John N. Warfield at the Battelle Memorial Institute, USA. It has been described as a method for dealing with complex issues that include the interrelations between the issue and group, and between content, context, process and product (Janes, 1988). He outlines ISM as a powerful method for structuring complex issues which draws on discrete or finite mathematics. ISM involves a mathematical language applicable to many complex issues, which can be analysed in terms of sets of elements and relations. In other words, ISM can enable individuals or groups to develop a map of the complex relationships between the many elements involved in a complex situation. ISM can be used to provide fundamental understanding of complex situations, as well as to put together a course of action for solving a problem. It has been used worldwide by many prestigious organizations, including NASA in the USA (Janes, 1988).

3.5.2.1 The ISM Process

ISM involves a number of activities that are used to explore a complex issue with a participant group using a computer. Janes (1988) summarised these activities in seven sequences of steps that will vary from situation to situation. These steps are:

**Step 1: Identifying the issue to be studied**

It is necessary to identify fairly clearly the particular issue which is to be explored using ISM. An organisation may, for example, be concerned about the inadequacies of its strategic planning. It may see ISM as a method which can be used to involve managers in examining the interrelations between a set of organisational objectives in order to set priorities or assist in organisational design.

**Step 2: Deciding on types of ISM to be constructed**

At this stage, it is usually important to decide on the type of structure which is to be produced during the ISM session. This will help to determine the form in which the elements are to be generated, if they are not already known, and the likely wording of the contextual relations which will be used to interrelate the elements. Janes (1988)
The Research Methods Chapter 3

outlines two application types of ISM: Intent Structure – “would help to achieve” – used to scope systems of interest; and Priority Structure – “is more important than” – used to (typically) prioritise use of limited resources.

**Step 3: Selecting a participant group and facilitator**

It is often both necessary and desirable to assemble a group of people of diverse background who can work together as a team. The team may include the following four categories of people. First, specialists, with content knowledge relevant to different aspects of the situation. Second, stakeholders, who may be affected in some way by the outcome of the investigation. Third, structural modeller, who can work with the participants in structuring the issue. Fourth, a facilitator, who can take the participants through the steps of whatever formal group processes are adopted. The selection of particular individuals will depend on the situation.

**Step 4: Generating the element set**

In some cases, the set of elements to be structured may already be defined. However, in many cases, it will be desirable and necessary for the participant group to generate the elements. The use of the structured idea-generation method is one way which can produce the necessary set of elements. Nominal Group Technique (NGT), invented by Delbecq et al (1975), is a process that has been found to work particularly well in conjunction with ISM (Moore, 1987). Warfield (1982) outlines NGT as an efficient method for generating ideas in groups, for clarifying the generated ideas, for editing the generated ideas, and for developing a preliminary ranking of the set of ideas. There are five basic steps that may describe the process:

1. clarification of a trigger question
2. silent generation of ideas in writing by each participant
3. round-robin recording of the ideas on a flip-chart
4. serial discussion of each idea for clarification and editing, and
5. voting to obtain a preliminary ranking of the ideas in terms of importance.
Step 5: Completing matrix of element interactions

At this stage, ISM software can be used. The set of elements to be structured is entered into a computer and the group is asked to respond to a series of questions put by the computer. The group discusses the question under the guidance of the facilitator and a ‘Yes’ or a ‘No’ answer is agreed upon after a vote has been taken by the participants. When the group votes for a ‘Yes’ a ‘1’ is entered in the appropriate cell of the matrix. A ‘No’ vote results in a ‘0’ being entered. The binary matrix being constructed represents a binary relation of sets on itself. As the process proceeds, the computer makes logical inferences, based upon the answers already given, which speeds up the process and leads to the construction of the reachability matrix (a binary matrix) which shows the interaction between elements in the matrix (Warfield, 1976). An example is shown in Figure 3.4:

\[
\begin{array}{cccc}
  & e_1 & e_2 & e_3 & e_4 \\
E_1 & 1 & 1 & 0 & 1 \\
E_2 & 0 & 1 & 0 & 0 \\
E_3 & 1 & 1 & 1 & 1 \\
E_4 & 1 & 1 & 0 & 1 \\
\end{array}
\]

Figure 3.4 The reachability matrix

Here, E1 would help to achieve (i.e. Intent Structure) e1, e2 and e4, but not e3.

Step 6: Displaying the ISM

When all necessary questions have been answered by the group and a reachability matrix (a binary matrix) constructed, the computer can extract a multi-level graph from the matrix (see Figure 3.5). The ISM may now be displayed to the group. This involves substituting the full elements in words for the numbered circles in the digraph. It is desirable that the display be discussed and amended, if necessary. This can be done by, for example, writing each element on a separate ‘Post-it’ sticker or index card and displaying the structure on a large whiteboard.
Step 7: Discussing structure and amending if necessary
At this stage, the session facilitator, or another member of the modelling team, should take the group through a discussion of the ISM. The purpose of this is to explain the structure to the participants so that they understand clearly how to interpret it, and to allow them to express their views on it.

3.5.2.2 Reasons for adopting ISM
The main reasons for using ISM in this research were: (1) ISM helps the researcher to understand complex situations and find solutions to complex problems. (2) ISM is a powerful method dealing with complex issues, including the interrelations between the issue and the group, and between content, context, process and product (Janes, 1988). (3) ISM is a technique that allows groups to create structured models of qualitatively defined elements and relations among these elements. (4) ISM enables individuals or groups to develop a map of the complex relationships between the many elements involved in a complex situation. (5) ISM forces participants to relate the issues to the larger problem, explicitly defining their interrelations. It builds directed graphs of these issues, based on a previously agreed relationship. (6) ISM helps participants to analyse complex situations in a way that can make decisions more productive. (7) ISM breaks a complex subject into manageable pieces and significantly speeds up the process of decision taking ((Warfield, 1976 and Janes, 1988).
3.6 Research Process

Figure 3.6 shows the research process used to develop the IMS at CTHMIHR.

Stage 1: Top Management Approval

In order to develop the IMS at CTHMIHR, it is very important to obtain the support of the Dean of the Institute and/or his Deputy by explaining the benefits that the IMS would bring to the Institute. Thus, the Dean was informed of the reasons for the development of an IMS at the Institute before the research study commenced. The reasons included:

- Information management is a key process that is often neglected currently;
- Centralising the information used by all departments in the Institute;
- Ensuring that all information is kept safe and in an ideal environment;
- Controlling the creation and growth of information;
- Saving money, time and effort in accessing specific documents;
- Reducing the cost of information storage;
- Avoiding duplication of the same information; and
- Integrating the information at the Institute.

In January 2001, a proposal of the research was given to the Dean (see Appendix 10). This proposal contained:

- Aims of the Research;
- Research Objectives;
- Background; and
- The Research Methods.
Figure 3.6: Research process used to develop and implement IMS at CTHMIHR
The advantages of this were:

1. to minimise resistance from staff in disclosing the information they have;
2. to ensure that the survey was taken seriously; and
3. to get management support when it was needed.

Stage 2: Assigning a Co-ordinator in every Department

The researcher asked the Dean to send a letter to every department explaining the following:

1. the reasons for developing an IMS at CTHMIHR;
2. formally assigning the responsibility to the present researcher;
3. facilitating the procedures for interviewing the Heads of Department;
4. appointing an information co-ordinator in each department;
5. stating that the co-ordinator should have good overall knowledge of the operations of the department concerned;
6. meeting the co-ordinator so that this researcher could explain his responsibilities; and
7. stating that these data will be used in the development of an IMS at CTHMIHR.

Stage 3: Investigation and Survey

The researcher decided to use observation (2-3 hours in every department) to understand the current system and flow of information at CTHMIHR. Such observation can be very helpful in drawing a RP of the process of information management in every department and in CTHMIHR as a whole. The unobtrusive observations took place between 3rd August and 12th September 2002.

Stage 4, SSM Phase 1: The Problem Situation Unstructured

The purpose of this stage was to describe the problem situation. Therefore, the researcher started by carrying out interviews with the Dean of the Institute, who represents the senior management (see Appendix 1). Also, each department was revisited but, in the revisit, more time was allocated to each department so that the researcher was able to monitor the operations of each department relatively thoroughly (a two- to three-day period was allocated for each department depending on the work involved). In each department, the following methods of data collection were used:
1. Interviewing the Head of each Department and operation control by using the semi-structured interview method (August 2002: see Appendix 2)
2. Using group discussion (August and September 2002: see Appendix 3)
3. Using direct unobtrusive observation and paying close attention to information about “how things are done” in the departments (August and September 2002)
4. Distributing the questionnaire to the staff in the departments (July to September 2002).

Stage 5, SSM Phase 2: Problem Situation Expressed and the Drawing of the RP
The purpose of this stage was to express the problem situation in a way that helps relevant systems to be chosen in Stage 6 (SS Phase 3). RP was used to describe Stage 4 (SSM Phase 1). So, the researcher analysed the data collected by way of the interviews, questionnaires and by direct observation. The researcher's aim was to ascertain the current processes of information management and to draw the RP.

Stage 6, SSM Phase 3: Root Definition of Relevant Systems
This stage aimed to enable the selection of systems which might be relevant to the problem situations and to choose a primary task from the RP. Thus, the researcher used a Root Definition (RD) (the transformation process from input to output) in order to achieve the target. The researcher conducted CATWOE to test the RD.

Stage 7, SSM Phase 4: Building the Conceptual Model
The purpose of this stage was concerned with the logical expansion of RD into activities that the system should undertake in order to be the system.

Stage 8, SSM Phase 5: Comparing Conceptual Models with Reality
In this stage, the researcher took the conceptual models back to real world expression in Stage 6. The work in this step may lead to a reiteration of Stages 6 and Stage 7. In this stage (8), it is very important to know when to stop building a conceptual model and move on to real world comparisons.
Stage 9, SSM Phase 6: Implementing Feasible and Desirable Changes
At this stage, feasible and desirable changes were identified, discussed and put into action. The purpose of this stage was to generate debate about possible changes that might be made within the perceived problem situation.

Stage 10, SSM Phase 7: Action to Improve the Problem Situation.
The purpose of this stage was to recommend change and action to improve the problem situation according to the changes identified in Stage 9.

Stage 11: Applying ISM to Implementing the IMS
In this stage the researcher applied ISM methodology to implement the IMS at CTHMIHR. ISM helps to identify the proper structure for implementing the IMS and the interrelation between the elements.

Stage 1, ISM Phase 1: Identifying Issues to be Studied
The researcher determined all issues regarding the design and implementation of an IMS at CTHMIHR. Thus, it is important to list all elements that improve the problem situation (the result of SSM).

Stage 13, ISM Phase 2: Deciding on Types of ISM to be Constructed
In this stage, the researcher decided on the types of structure to be produced during the ISM session. There are two application types of ISM: Intent Structure—"would help to achieve"—used to scope systems of interest; and Priority Structure—"is more important than"—used (typically) to prioritise the use of limited resources (Summers, 1992).

Stage 14, ISM Phase 3: Selecting a Participant Group and Facilitator
In this research, the elements were generated by the use of SSM, based on questionnaires, interviews, document analysis and observation. Although this is a departure from SSM, it adds a richness that individual members cannot emulate. The facilitator was an academic member of staff who has past experience in using ISM tools in industry.
Stage 1, ISM Phase 4: Generating the Element Set
In this stage, the participants focused on the key relations between those elements and states and whether that relation exists in each of the two possible directions.

Stage 16, ISM Phase 5: Completing a Matrix of Element Interactions
The relation was expressed simply on a "Yes" (1) or "No" (0) basis. This could then be entered in the appropriate cell of the matrix.

Stage 17, ISM Phase 6: Displaying the ISM
When all questions had been answered by the participants and the matrix completed, the participants could extract a multi-level digraph from the matrix. Displaying the ISM could be done by writing each element on a separate 'post-it' sticker and displaying the structure on a large whiteboard.

Stage 18, ISM Phase 7: Discussing the Structure and Amending if Necessary
The purpose of this stage was to explain the structure of the model to participants, making sure that everyone understood clearly how to interpret it and allowing them to express their views on it. Changes could be made if there was a reasonably strong desire among the participants to do so.

Stage 19: Discussion of the Findings
This stage presented a summary of the findings related to documents, observations, interviews and questionnaire analysis, as well as SSM and ISM methodologies.

Stage 20: Conclusions and Recommendations
In this final stage, the researcher presented the main conclusions of the research work which had been developed as a result of applying SSM and ISM methodologies to develop and implement an IMS at CTHMIHR. This stage also presented certain recommendations to implement the system, as well as allowing suggestions to be made for further research.
Chapter 4 | Literature Review

4.1 Introduction
The purpose of this literature review is to give an insight into policies and practices utilised in information management systems. This would give the researcher an overview of and guidelines for the development of an IMS at CTHMIHR. The literature review presented here is divided into four sections: key elements of Information Management (IM), Records Management, the Internet and Intranet, and previous studies.

4.2 Key Elements of Information Management
Information and the technologies and systems used to process information are ubiquitous. Unfortunately, the terminology surrounding information systems is changing fast and is often applied in a loose or conflicting manner. It is therefore very important to define the terms that will be used throughout this research.

4.2.1 Data
Data can be defined as a line of numbers and/or character strings, which represent unstructured facts (Bellinger et al., 1997). In line with this, Martin (1992) and Choo et al. (2000) described ‘data’ as the raw materials of organisational life which contain disconnected numbers, words, symbols and syllables relating to the events and processes of the organisations. Expressing another view, Setzer (2001) defines data as a sequence of quantified or quantifiable symbols. Therefore, a text is a piece of data. In fact, letters and characters are quantified symbols because text contains a finite number of them and any alphabet (including digits and special characters) may be considered as a numbering system. Pictures, figures, recorded sounds and animation are also examples of data, because they may be quantified to the point that it is ultimately difficult to make a distinction between their originals and their reproductions made from the quantified representation (Setzer, 2001). It is very important to note that any text represents a piece of data.
4.2.2 Data Repositories

A database can be defined as an organized collection of related data stored in a computer which can be easily and quickly retrieved. A Database Management System (DBMS) is a software computer which organizes data in a way that allows high-speed and simple access to the data. In a DBMS, data can be entered, modified, stored and retrieved in a variety of ways.

There are different types of database which can be classified according to their context; for example, documents, digital pictures or videos. A universal database can be defined as a database or as a data management system which links corporate information such as videos, sales, forms, digital images, text and spreadsheets to the Web (Prabhakaran, 1997). Prabhakaran added that the advantages of using universal databases include: obtaining access to any quantity of information without traditional sources and locations; working with video, images, audio and text as part of a database; managing data quickly and easily; running the same software across desktops, PCs, workgroups and enterprises; providing the engine to run a business; allowing users to access and view with ease the latest business information; helping customers to conduct business through the Internet, intranet and local network to solve problems; and reducing cost and creating new markets.

These days, the Internet and Intranets provide excellent services to access information by using the Web and the Semantic Web (Chesem, et al., 2002). The Web is a system where users (people) have to read Web pages, while the Semantic Web is a system where the machine reads and understands the Web pages. Thus, a Semantic Web can be defined as a collection of Extensible Markup Language (XML) documents, semi-structured databases, and millions of objects on the Web with semantics needing to be described (Thuraisinggham, 2002).

Unfortunately, most Saudi Arabia organisations still use HTML for the design of their Web pages. There are a number of common problems with these Web pages. These include: the users may experience difficulty in finding and requesting information by reading all the web pages, the huge of number of links may cause the user to get lost moving between these links, the information in the Web pages may not be up-to-date,
and the number of images on the Web pages is very high so, as a consequence, accessing information may take a long time, as well as being costly (Nojoum, 1999).

4.2.3 Information and Communication Technology

Information and Communication Technology (ICT) is one of the most powerful forces in modern development. With ICT, people can live in a global village and overcome the barriers of distance and national and international boundaries. ICT is the result of the union of computers and communication technologies (both hardware and software) and the term is usually reserved for the technical aspects of information handling. In line with this, Haag et al. (1998) define ICT as any computer-based tool that users use to work with information and support the information and information processing needs of an organisation. So, ICT covers any products including the storage, retrieval, control, handling and receiving of information electronically in a digital form. In this perspective, ICT can be recognized as technologies which can process different kinds of information such as text, data, image, voice and video, and which will facilitate different forms of communication between people and information systems. Advances in ICT bring all the people of the planet closer together and give them faster access to all the information and benefits that the world may have.

Gupta (2000) notes that most organisations use ICT in three ways: (1) to support information-processing tasks; (2) as an enabler of innovation; and (3) in order to collapse time and space. It is important to understand the relation between IS and ICT. An IS uses and integrates ICT to meet the information needs of different users so organisations need the right ICT to build an IS that can meet the aims of the organisation. It is also important to address people’s fears, concerns, insecurities and other sentiments when considering technology investment (Gupta, 2000). On the other hand, ICT can bring some risks to the organisation which may include the following: it may cost more, in terms of money and time, for development or improvement, and it requires new skills and information professionals to manage and control the information. One of the major problems that may face an organisation after developing ICT is information overload. Feather (1998) stated that: “the technological developments of the last 50 years have made more information more available to
more people than at any other time in human history", while Lewis (1996) pointed out that information overload can lead to stress, loss of job satisfaction, and physical ill health. Information overload can be described as the point where there is so much information that it is no longer possible effectively to use it (Feather, 1998). Edmunds and Morris (2000) described the term information overload thus: “There cannot be many people who have not experienced the feeling of having too much information which uses up too much of their time, causing them to feel stressed which, in turn, affects their decision-making. Concurrent with these phenomena is the anxiety generated by worrying whether an important piece of information has been missed in the volume of material that is being processed.”

However, over the last 25 years Saudi Arabia has experienced rapid growth in Information Technology because of the requirement of the various development plans initiated by the Saudi government (Al Zahrani, 2001). Consequently, the Saudi government has encouraged organisations to develop and implement ICT. So, many organisations have introduced ICT in some form or another to support and improve the efficiency and effectiveness of their operations. Unfortunately, some Saudi government departments have failed to achieve their objective of using ICT, for a variety of reasons. These reasons may relate to: lack of an information strategy, lack of information professionals, paying no attention to the users of the system when the organisation develops IS, and lack of training and IT skills. From the researcher’s knowledge and experience, most Saudi organisations have planned and developed their information systems without any co-ordination with similar organisations. This can create a number of information problems: for example, the duplication of the same information, high costs and wasting time, and wasting the organisation’s resources.

4.2.4 Information Systems

In the literature, the word ‘system’ has been defined in different ways. For instance, Wetherbe et al., (1988) define a system as a group of interrelated parts which is integrated by design to achieve one or more objectives, while Maier and Rechtin (2000) offer the definition of a system as a collection of different things which together produce results unachievable by the elements alone. Beynon-Davies (2002)
state that a system “might be defined as a coherent set of interdependent components that exists for some purpose, has some stability, and can be usefully viewed as a whole.” From above definitions, it can be concluded that all agree that a system is a collection of entities that are linked to each other to achieve one or more objectives. In reality, there are different types of system, such as the family system and the social system. In addition, various systems have been created to serve different purposes and to provide different ways of achieving their objectives. Wilson (1990) classified systems into three main types: (1) Natural or physical systems such as animal systems and human systems; (2) Designed or man-made systems, such as car and computer systems; and (3) Human activity systems such as political and economic systems. Hoffer et al., (1999) explained that any complex system contains a number of sub-systems consisting of entities grouped together to achieve specific tasks that contribute to the overall objectives of the whole system. Every system has boundaries and the system environment is the outside of the system. In line with this, Beynon-Davies (2002) declares that: “the environment of a system might be defined as anything outside the system that has an effect on the way the system operates.” So, in order to analyse and design a system it is vital to understand the system environment as well as the entities (technology, human activities) inside the system.

Avgerou and Cornford (1998) defined information systems as information and data handling activities in human organisations. Information handling includes the activities of gathering information, storing it, directing it to suitable places and people, and utilising it in different tasks within the organisation. Vidgen et al., (2002) described an information system as ‘a set of interacting components - people, procedures, and technology - that together collect, process, store, and distribute information to support control, decision-making and management in organisations’. From the above definitions, it can be said that the information system can consist of people (such as operations, users), technology (hardware and software), data and information, and types of network communications. It can also be noted that the information system is a social system because we refer to the people in the organisation, their concerns and needs, and how technology can be used to help them achieve the organisation’s objectives.
4.2.5 Information as a Resource
An acceptance of the idea that information is a resource, to be managed like other resources (people, money, land, equipment, etc.), has considerable consequences for the information professional (Eaton and Bawden, 1991). In line with this, Buchanan and Gibb (1998) state that “traditional industrial economics has accepted three fundamental resources: money, labour and machines, supplemented by additional resources such as materials and land. Each of these has been supported by the development of appropriate resource management regulations”. They add that the shift from an industrial to an information economy assumes that the strengths of an organisation or a nation lie in their intellectual assets rather than their land, capital, physical labour or raw materials. Thus, information is being considered more and more as a primary economic resource or commodity. The study by Best (1996) underpins the views of Buchanan and Gibb (1998) and describes information as the most important element in virtual organisations because it is the intellect, knowledge and skills of its members which are the organisation's most valuable resource. This means that information and its use will become of major importance and, for this reason, information will be recognised as the primary resource. Sangway (1989) estimated that nearly half of the cost of running government agencies was consumed in handling information, and it has even been suggested by Best (1996), that anyone not wielding a tool or pushing buttons must be an information worker.

In contrast to this view, Horton (1985) and Middleton (2002) provided a more mechanistic appreciation. They stated that the industrial philosophy has been to program the person to maximise the productivity of the machine. Information, if considered at all, is seen as merely an overhead, the unavoidable cost of co-ordinating production processes. They continue to put forward a view of information management philosophy, which is to program the machine to maximise the productivity of the person. This change to viewing information as a resource involves being prepared to adopt new accounting practices, to restructure tasks and procedures, and to take a composite view of information resources. One of the aims of information management should be to distinguish and separate the basic reservoirs that supply the data, information and knowledge that are critical to an organisation's success. These
reservoirs can only be identified through an understanding of the detailed context of the organisation and its environment.

4.2.6 The Information Life Cycle
Information has a 'life cycle' similar to that of a biological organism in that it is born (creation), it lives (maintenance and use), and dies (disposal or archive). This concept gives the basic elements upon which modern information management is built (Hodge, 2000). Buchanan and Gibb (1998) describe the life cycle of information in another way, which is completely different from the description offered by Hodge. They outline the life cycle from the creation and analysis of new information and/or the identification and capture of existing information, through to its distribution and communication, or disposal (see Figure 4.1).

4.2.7 Organisational Processes
An organisation needs to identify, design, implement and manage the key processes that will be used to achieve organisational objectives. In line with this, Buchanan and Gibb (1998) stated that any organisation exists to create and capture value, whether this value is economic or social in nature. Thus, these processes take inputs, transform them, and create value-added outputs, which finally represent the products and services offered by the organisation.

An organisational process is a group of steps, functions or activities that use people, information and other resources to create value for internal or external users (Alter, 1996). Buchanan and Gibb (1998), however, state that a process can be defined as the controlled series of activities by which an early input of resources is transformed into a pre-specified output, such as a product, service or processed information. So, it can be summarised that organisational processes can consist of a number of steps related to each other in time and place; have input and output; and use people, information and other resources to make value for the users (internal and external).
Alter (1996) set up a clear framework to support organisational processes and IS. He called this framework the Work-Centred Analysis (WCA). The idea of WCA is based on the idea that informational professionals can analyse systems according to the work being done. Any work can be defined as the application of people, money, equipment and information to generate products used by internal and external users. Alter (1996) asserted that the WCA framework consists of combining ideas from different sources including total quality management, business process reengineering, and systems theory. The basic elements of Alter's framework includes (see Figure 4.2): (1) the users (internal or external) of the organisational process; (2) the products or services (output) created by the organisational process; (3) the organisational process or steps that are used; (4) the people and participants in the organisational

Figure 4.1: The Information Life Cycle (adapted from Buchanan and Gibb, 1998)
process; (5) the information created and used by the organisational process; and (6) the technology used in the organisational process.

The WCA framework (Figure 4.2) involves technologies, people and information as a major part of the organisational process. The output of this process is normally products or services that are required and used by both internal and external users. All links in the WCA framework are shown by two-way arrows, demonstrating that the elements should balance and affect each other.

Furthermore, Buchanan and Gibb (1998) not only outline the broad characteristics of a organisational process, including having customers (external or internal); crossing organisational boundaries (external or internal); having inputs and outputs from many parts of the organisation; and being highly informative and ICT dependent, they also point out that organisational processes can be clustered under four main types: core processes (servicing external customers through order fulfilment, manufacturing, insurance policy processing, etc); support processes (servicing internal customers and providing administrative back-up for core processes, e.g., accounts payable, purchasing, data processing); business network processes (crossing company boundaries and supporting just in time ordering, remote diagnostics, etc); and management processes (for planning, organising and controlling resources, etc).
It is clear that it is vital for informational professionals, when they develop information systems, to think carefully about the organisational processes before thinking about information systems to support the processes. Many organisations in Saudi Arabia have failed to do this and have used IT to automate organisational processes but, in the end, have found themselves in confusion and with more automated and complex processes than they started with.

4.2.8 Information Audit
An information audit is an excellent tool for understanding who in the organisation is using information, how it is used, how the information flows, and where there are gaps, inconsistencies and duplication (Buchanan and Gibb, 1998). Robertson (1994) defines an information audit as a regular process of information gathering, sometimes limited to creating an inventory of information resources. This may include hard copy information itself, online services, applications software or even particular individuals with special knowledge and expertise. The information audit provides a method for drawing and exploring information channels within organisations. An information audit can identify duplication or gaps in information and communication flows, both within an organisation and with the outside world. So, an information audit can be defined as a process of discovering, monitoring and evaluating an organisation's information flows and resources in order to implement, maintain or improve the organisation's management of information (Buchanan and Gibb, 1998). In line with the view of Buchanan and Gibb, Knowledge and Information Management Network of Aslib (KMNET) defines an information audit as a systematic examination of information use, resources and flows, with verification by reference to both people and existing documents, in order to establish the extent to which they are contributing to an organisation's objectives (Orna, 1999). Both Buchanan and Gibb (1998) and Orna (1999) outline the benefits of the information audit as:

- Identifying an organisation's information resources and requirements,
- Identifying the costs and benefits of information resources,
- Identifying opportunities to use information resources for strategic competitive advantage,
- Integrating IT investment with strategic business plans and developing an integrated information policy,
- Identifying information flows and processes, building awareness of the importance of Information Resources Management (IRM), and defining the role of management, and
- Monitoring and evaluating conformance with information-related standards, legislation, and policy guidelines.

Therefore, the information audit should consist of all of the above points to give a complete and integrated strategic approach. There are several methods for carrying out an information audit. The most commonly used methods are Henczel’s seven-stage information audit and Orna’s Information Flow Analysis. The seven-stage model developed by Henczel (2001) provides a stage-by-stage process to discover the use of, need for and evaluation of information resources. Henczel’s seven stages are: (1) Planning, (2) Data Collection, (3) Data analysis, (4) Data Evaluation, (5) Communicating Recommendations, (6) Implementing Recommendations, and (7) the Information Audit as a Continuum.

The major strengths of Henczel’s seven-stage method are that it can help to identify all formal and informal information resources, it may provide some measurement of the cost and value of information resources, it describes problems related to information management and policies, and it creates understanding regarding the importance of IRM in the organisation.

Orna’s Information Flow Analysis (1990) is concerned with the importance of organisational analysis. There are four main stages to this method:
Stage 1 - Initial exploration: a top-down analysis which starts from an organisation’s objectives to structure and culture.
Stage 2 - Information audit: to identify information flows, human resources and ICT in relation to information management.
Stage 3 - Balance sheet: the results of the information audit analysis should be evaluated to identify strengths and weakness related to the organisation’s objectives.
Stage 4 - Policy development: the development of an organisation’s information policy to provide strategic direction and guidelines for the organisation’s future use of information.

The major advantages of Orna’s Information Flow Analysis method are that it is a top-down method for carrying out organisational analysis and identifying dynamic information flow, with the final product being an organisation’s information policy. The key problems with Henczel’s seven stages and Orna’s method is that the first stages require a number of research skills, such as interview techniques, qualitative data analysis and organisational tools to identify the mission, environment, structure and culture, as well as the cost in terms of time and money. The major difference between the above two methods is that Henczel’s seven stages method is a “bottom-up” method, while Orna’s method is a “top-down” method. In addition, Henczel’s seven-stage method focuses on information resource entities, whereas Orna’s method focuses on dynamic information flows. Furthermore, while the final product of Henczel’s seven stages is information audit, the product of the closing stages of Orna’s method is an organisational information policy.

However, Henczel (2001) concludes that the information audit means that the information resources and services can be identified and aligned with organisational objectives. The outcome of the information audit can be used to develop a comprehensive information policy.

4.2.9 Information Policy

Information policy has been defined as a set of interrelated principles, laws, guidelines, rules, regulations, and procedures directing the oversight and management of the information life cycle: the creation, collection, organization, distribution/dissemination, retrieval, use and preservation of information (Hernon and Relyea, 1991). They pointed out that the heart of information policy is the fundamental rule of access to, and use of, information. Information policy therefore deal with specific issues, and that effective compromises have to be made between competing interests (Rowlands, 1996). He also stated that such policies should be flexible, dynamic and responsive to changing circumstances.
Mansell and Wehn (1998) declare that information policy not only relates to ICT, material resources and skills, but also complement other societal policies. Oppenheim (1998) confirmed that information policy is any component of policy making at local, national and international level that has an impact on information flow, whether in electronic or any other form. Furthermore, the Canadian International Development Research Centre (IDRC) (2001) notes that the term ‘information policy’ has been used to refer to policy initiatives that support the use of tools and concepts related with the ‘global information society’, with a view to understanding their possibilities in achieving national, social and economic development objectives. So, the protection of personal privacy, privatisation and distribution of government information, freedom of information, access control and intellectual freedom, copyright, information literacy, telecommunications and broadcasting are all important aspects of information policy (Mansell and When, 1998).

Rowlands (1996) indicated that information policy not only shapes events (proactive information policy), but also responds to events (reactive information policy). For example, the fast growth of e-business in many countries around the world has led to different responses from governments. These range from developed participative policy processes, to implementation strategies involving rapid formulation of legislation to accommodate digital signatures, changing tax structures, and the security risk surrounding online business transactions (Rowlands, 1996). He proposed three hierarchical models for information policy (see Figure 4.3) which includes:

1. **Infrastructural Policies** deals with the development of national infrastructures required to support an information society. Without the infrastructural policies and implementation strategies, delivery of on any other vertical or horizontal ICT-related policies would be nearly impossible.

2. **Vertical Information Policies** include sectoral policies such as education, tourism, manufacturing, and health.

3. **Horizontal Information Policies** refers to those policies that impact on broad aspects of society, e.g., policies relating to freedom of information, tariffs and pricing, and the use of ICTs by government internally and in its relationships with citizens, business, labour, and academia.
There are several ways to classify information policy. Moore and Steele (1991) classify the policies by the audience they are meant to affect, for example, local government, health services, and manufacturing industry. Moore (1995; 1996) has developed a matrix for classifying and identifying national information policy. Three levels of policy are recognised: Industrial; Organisational; and Social. At each level, four elements need to be considered: Information technology; Information makers; Human resources; and Legislation and regulation, see Table 4.1. Moore has applied this matrix to a number of countries, and in going so, has pointed out inconsistencies between stated policies and reality, as well as differences between countries. Oppenheim and MacMorrow (1997) divided policies into six policy approaches: legislation; regulation; infrastructure development; services provision; education policies; and cultural information policies. However, information policy faces many difficulties in order to achieve acceptance in countries around the world. Acceptance is related to each country creating its own local regulations and laws. Other difficulties may relate to the fact that information can be transferred and downloaded across national boundaries through internet services. Therefore, each country should resist any temptation to develop national policies that are incompatible with policy consensuses developing around the world (Oppenheim 1998).
In the field of ICT, IDRC (2001) has pointed out the need for integrating national ICT strategies overlapping in four well-established policy fields: technology, industry, telecommunications and media (Figure 4.4). Sectoral policies (education, employment, health, welfare, etc.) increasingly have to address issues relating to ICTs and the increasing interdependence between the development of ICT policies and sectoral policies. In absence of an existing national ICT policy, the tendency is towards the creation of sector-dependent policy that addresses only domain specific ICT needs. These policies become firmly entrenched within the sector and later attempts to integrate them into a broad all-encompassing ICT policy become difficult.

IDRC (2001) stated that a country’s aims on pursuing the development of an integrated ICT policy have to include methods for ensuring that there is a high level of co-operation from all relevant government departments, and from the much larger group of stakeholders impacted by, and impacting on, the ICT policy to be enacted. Failure to provide integrative mechanisms for addressing ICT policy formulation, and implementation, has been one of the major stumbling blocks in many countries.
In the level of organisation, Orna (1999) defined organisational information policy as a policy founded on an organisation’s overall objectives and the main concerns within them. This defines at a general level: (1) the objectives of information use in the organisation and the priorities among them; (2) what ‘information’ means in the context of whatever the organisation is in business for; (3) the principles on which it will manage information; (4) principles for the use of human resources in managing information; (5) principles for the use of technology to support information management; and (6) principles it will apply in relation to establishing the cost-effectiveness of information and knowledge. Henczel (2001) asserted that an information policy provides the guidelines for both the information manager and the information user. It provides the information manager with a framework within which to work since it details the organisational principles in relation to information, its use and its management. As well as this, it guarantees the necessary allocation of resources for the ongoing management of information. She added that from the information user’s perspective, an information policy is an assurance that the organisation has a commitment to provide the information that s/he requires to do her/his job. Thus, Orna (1999) and Henczel (2001) recognized that information policy is a vital part of information resource management, and that information audit is an essential section of information policy development.
4.2.10 Information Strategy

Three overlapping information strategy initiatives may exist within an organisation: IT Strategy, IS strategy and IM Strategy. Buchanan and Gibb (1998) built on the work of Earl (1989) to make a number of distinctions between IT, IS and IM strategies, which are reflected in Figure 4.5. An IT strategy is concerned mainly with technological issues such as architecture, technical standards and physical security. They state also that the key goal of strategy is to ensure that there is a strong but flexible infrastructure, which can carry out the range of applications required to satisfy organisational objectives. Increasingly, there will be only one IT strategy in organisations as more open technologies are used, integrated systems become the standard, and infrastructure management becomes more centralised.

Buchanan and Gibb view IS strategy as being concerned with supporting IS development with organisational needs and with seeking competitive advantage from IT. IS strategy will focus on enterprise-wide application needs and systems which help to join the various functions of the organisation together and provide opportunities for synergy and team building. IM strategy is the management framework that is used to guide how the organisation should run its IS and IT functions and activities (see Figure 4.6). It should also be concerned with the co-ordination of the wider information resource and the establishment of appropriate controls, guidelines and processes which are necessary to ensure the quality, availability, production and timeliness of information.

Buchanan and Gibb (1998) added that one criticism of Earl's model is that it focuses on the management of electronic information, such as structured information, which is stored on computers. In practice, however, organisations will have to deal with other types of information: structured information on paper (as stored in libraries, archives, registries, etc.); unstructured information held on paper and in computers; and intellectual capital (such as copyright and patents). The extended roles and responsibilities, which fall under each of Earl's strategic components, are shown in Figure 4.6.
Figure 4.5: Characteristics of IT, IS and IM Strategy (adapted from Earl, 1989)

Figure 4.6: Roles and Responsibilities (adapted from Buchanan and Gibb, 1998)
4.2.11 Information Security

Information security is a common name for the protection of information against unauthorized disclosure, transfer, modification or destruction, whether accidental or intentional (Information Technology Encyclopedia, 2002). The Institute of Internal Auditors (2003) states that the objective of information security is the protection of the interests of those relying on information, and the information systems and communications that deliver the information from harm resulting from failures of availability, confidentiality and integrity. For any organisation, the security objective is met when: information systems are available and usable when required (availability), data and information are disclosed only to those who have a right to know it (confidentiality), and data and information are protected against unauthorised modification (integrity).

The Institute of Internal Auditors (2003) states that threats to information systems may arise from intentional or unintentional acts and may come from internal or external sources. The threats may emanate from, among others, technical conditions (program bugs, disk crashes); natural disasters (fires, floods); environmental conditions (electrical surges); human factors (lack of training, errors and omissions); unauthorised access (hacking); or viruses. In addition, other threats, such as business dependencies (reliance on third party communications, carriers, outsourced operations, etc.) that can potentially result in a loss of management control and oversight are increasing in significance. The relative priority and significance of availability, confidentiality and integrity vary according to the data within the information system and the business context in which they are used.

Data protection legislation plays an important role in information security and is designed to prevent abuse of computerised personal data. Lancaster University Data Protection Project (2001) outlines the Data Protection principles under UK law. These include:

1.) Personal data shall be processed fairly and lawfully and, in particular, shall not be processed unless:
   a. At least one of the conditions in Schedule 2 of the 1998 Act is met, and
b. In the case of sensitive personal data, at least one of the conditions in Schedule 3 of the 1998 Act is also met.

To meet principle 1, Oppenheim (2001) outlined two requirements of the schedule: ‘fair obtaining’ and ‘conditions for legitimising processing’. ‘Fair obtaining’ means that the data controller must inform each individual at the time of obtaining any personal information directly from him/her, or when obtaining it from a third party, that such information is being collected. Oppenheim (2001) explained that at least one of the following legitimising conditions must be apply to fulfil principle 1:

a) the data subject must consent to the processing, or processing for various contractual or legal and statutory purposes; or,

b) if processing is necessary: ‘... for the purposes of legitimate interests pursued by the data controller or by the third party or parties to whom the data are disclosed, except where the processing is unwarranted in any particular case by reason of prejudice to the rights and freedoms or legitimate interests of the data subject.’

2) Personal data shall be obtained only for one or more specified and lawful purposes, and shall not be further processed in any manner incompatible with that purpose or those purposes.

In data protection, it is important to identify the legal purpose or purposes for collecting data. This forces managers and data collectors to be clear about what they are collecting data for (Oppenheim, 2001). Oppenheim also stated that they must relay these purposes to the data subjects and the official data protection authority.

3) Personal data shall be adequate, relevant, and not excessive in relation to the purpose or purposes for which they are processed.

Any data that is collected should be sufficient, without being excessive, and must be related to the purpose or purposes for which it is being used.

4) Personal data shall be accurate and, where necessary, kept up to date.

The UK Act demands that the data controller takes practical steps to ensure the accuracy of any data that are obtained and to keep these up to date (Oppenheim, 2001). He also states that the UK Act provides that ‘the fourth principle is not to be
regarded as being contravened by reason of any inaccuracy in personal data which accurately record information obtained by the data controller from the data subject or a third party in a case where:

- the data controller has taken reasonable steps to ensure the accuracy of the data, and
- if the data subject has notified the data controller of the data subject's view that the data are inaccurate, the data indicate that fact.

5) **Personal data processed for any purpose or purposes shall not be kept for longer than is necessary for that purpose or those purposes.**

The UK Act requires that the data controller does not keep the data that has been collected for longer than the purpose or purposes it has been collected for. Oppenheim (2001) declares that: “in some instances, the length of time involved may be quite a long time: it will depend upon the data and its application. The importance of keeping data for research is recognised within the Act”.

6) **Personal data shall be processed in accordance with the rights of data subjects under this Act.**

7) **Appropriate technical and organisational measures shall be taken against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data.**

It is very important that the data controller, in order to maintain the integrity of the data, puts in place appropriate security regarding the access, processing and disclosure of any data that has been obtained. This principle points out that it is not only a matter of technology but also managing data, operations, people, services and other actions (Oppenheim, 2001). He also notes that: “the data controller must take reasonable steps to ensure the reliability of any employees of his who have access to personal data”.

8) **Personal data shall not be transferred to a country or territory outside the EEA (European Economic Area) unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data.**
It is very important that the data controller does not transferred personal data to any countries outside the European Economic Area (EEA) that do not have adequate protection.

Unfortunately, Saudi Arabia does not have a Data Protection Act. Nonetheless, the researcher believes that all CTTHMIHR information should be compatible with the basic components of data protection legislation mentioned above to avoid any threats related to privacy. The major reason for CTTHMIHR to follow the Data Protection Act (UK) is because the current Saudi Law does not include clear Data Protection legislation related to electronic information. Furthermore, the UK has much expertise in this field since the Data Protection Act was developed following many studies and much discussion.

Oppenheim (2001) added some practical steps for organisations to prepare for the Data Protection Act (UK). These include: (1) The organisation must be aware of all the information it is responsible for. (2) It is essential to inform the data protection official about what information the organisation processes. (3) The organisation should study in detail its legal responsibilities. (4) The organisation should review all its collections of and practices regarding personal data. (5) The information manager must study the relevant textbooks concerning data protection. (6) Notices must be created and issued to inform staff and users of the information that the organisation may be collecting about them, together with the reasons for doing this. (7) It is vital to make sure that all other organisations with whom the organisation has a relationship are also aware of their responsibilities. (8) The organisation should establish access procedures to respond readily to users’ requests for information. (9) The organisation must ensure that information processes fall within the law. (10) Codes of practice must be developed for the organisation to follow and it must be a disciplinary offence if someone does not fulfil such codes of practice. (11) The organisation must select certain professional(s) to take responsibility for data protection within the organisation. (12) Data security should be checked.
4.2.12 The Systems Development Life Cycle

The Systems Development Life Cycle (SDLC) methodology has been defined by Avison and Fitzgerald (2002) as a collection of procedures, techniques, tools and documentation aids which will help system developers in their efforts to implement a new information system. Figure 4.7 illustrates the waterfall model methodology, which is the SDLC method, and describes the various stages involved in development (Startvbdotnet, 2004).

Stage 1: Feasibility study - This stage is concerned with defining the aims and purpose of the new system. The feasibility study creates a plan for the new system and estimates the funds needed for future stages of development.

Stage 2: Analysis - This stage analyses the requirements of the system.

Stage 3: Design - This stage is concerned with a) high level design features: for example, what programs are needed and how they are going to interact; b) the low level design: for example, how the individual programs are going to work; c) interface design: for example, what the interfaces are going to look like; and d) data design: for example, what data will be required.

Stage 4: Implementation - At this stage, the designs are converted into code. For example, a computer program is written using a conventional programming language.
Stage 5: Testing - Programs are written as a sequence of individual modules: these are subject to separate and detailed tests. The system is then tested as a whole and separate modules are brought together and tested as a complete system.

Stage 6: Maintenance – This is concerned with changes can happen during installation or could happen because of some unexpected input values into the system.

However, the major limitation of the waterfall life-cycle is that it has its roots in hardware and software engineering and is less appropriate for human activity systems. In addition, any change in requirements after the system is finished will be expensive. Furthermore, if errors occur at any stage it may be difficult to go back; there are also no clear stages for implantation.

Kendall & Kendall (1999) outlined another type of SDLC that is divided into seven phases, as shown in Figure 4.8. They state that, in the first phase of SDLC, the analyst is concerned with identifying problems, opportunities and objectives. The first phase requires that the analyst looks honestly at what is occurring in a business. Then, together with other organisational members, the analyst pinpoints problems. Opportunities are situations that the analyst believes can be improved upon through the use of computerized information systems. Identifying objectives is also an important component of the first phase. The analyst must discover what the business is trying to do. The people involved in this phase are users, analysts and the systems managers coordinating the project. Activities in this phase consist of interviewing user management, summarising the knowledge obtained, estimating the scope of the project, and documenting the results. So, the output of this phase is a feasibility report containing a problem definition and summarising the objectives.

The next phase is determining information requirements. Among the tools used to define information requirements in the business are: sampling and investigating hard data, interviewing, questionnaires, observations, and office environments. The people involved in this phase are the analysts and users, operations managers and operations workers.

The third phase is analysing system needs. Special tools and techniques are used, such as data flow diagrams, to chart the input, processes and output of the business’s functions in a structured graphical form.
Chapter 4

The fourth phase is **Designing the recommended system**. The systems analyst uses the information collected earlier to accomplish the logical design of the information system.

The fifth phase is **Developing and documenting software**. The analyst works with programmers to develop any original software that is needed. Also, the analyst works with users to develop effective documentation for software, including procedure manuals, online help, and websites featuring Frequently Asked Questions on “Read Me” files shipped with new software. Such documentation tells users how to use the software and also what to do if software problems occur.

The sixth phase is **Testing and maintaining the system**. Before the information system can be used, it must be tested. It is much less costly to catch problems before the system is signed over to users.

The final phase is **Implementing and evaluating the system**. This involves training users to handle the system. Also, the analyst needs to plan for a smooth conversion from the old system to the new one. Actually, evaluation takes place during every phase. A key criterion that must be satisfied is whether the intended users are indeed using the system (Kendall & Kendall, 1999). The researchers noted that systems work is often cyclical. When an analyst finishes one phase of system development and
proceeds to the next, the discovery of a problem may force the analyst to return to a previous phase and modify the work done there.

4.2.13 Help Desks and Call Centres
A Help Desk can be defined as a group of technical people whose prime responsibility is to answer, as quickly as possible and by any method, questions related to technical problems, usually via a telephone. The Central Computer and Telecommunication Agency (CCTA) (1989), Brooke (2002), and Brown and Maxwell (2002) argued that a Help Desk is a vital part of the interface between the ICT Division and its user community. The Help Desk provides: first line incident support, effective day-to-day contact between the ICT Division and users, business system support/help with using the ICT-based business systems, and management reporting on ICT service quality. Moreover, these studies point out that the benefits gained from a comprehensive Help Desk vary according to the type of business operation but include: better utilisation and increased productivity of skilled ICT staff, fewer incidents and user difficulties with business systems, reduction in times to resolve incidents and difficulties with business systems, financial benefits from each of the above, more effective identification of problem areas, higher levels of ICT service availability, higher general quality of ICT services, and comprehensive and accurate management information about the quality services and user support. They also strongly recommend that all IT Divisions consider implementing a Help Desk.

On the other hand, the major problems with traditional Help Desks have been summarised by Foo et al. (2000). They state that: (1) the process is time-consuming and expensive; ICT staff are required to travel to the user's site for an on-site service even for a small problem. In addition, as the users communicate with the Help Desk via telephone calls, they incur long distance telephone charges. (2) To provide a good quality services to users, the Help Desk needs to keep on training ICT staff in new services, and at the same time, come up with new incentive schemes to keep experienced ICT staff. (3) The database of service records is only used by the ICT staff. As these records contain past experiences of service engineers on how to fix machine problems, customers may also use this information for fixing their machine faults. Therefore, such a database can be made available online for customer access.
for a more efficient machine diagnosis. (4) Expert advice on the problem is given, either through the experience of the ICT staff, or through the available past service information in the service database. No automatic provision of expert advice is available.

Therefore, as Foo et al. (2000) point out, “a number of research questions arise from the above scenario. Given the amount of time and cost that is devoted by organisations to providing customer support, can computers and their related technologies be used to improve this important function of the organisation? What important existing knowledge and technology are useful for the delivery of such a computerized system? To what extent can such knowledge and technology be harnessed together and integrated to provide a value-added service that is superior to that of the telephone-based system? Can a proposed system be developed so that it can remain relevant and applicable for time to come?”

Call centres were first developed in the USA in the 1980s and were adopted in Australia and the UK a few years later (Oak, 2004). A Call Centre can be defined as a business function, usually comprising a set of agent groups, dedicated to servicing telephone transactions. So, a Call Centre can be described as a set of functions or actions that can be carried out in any number of ways using multiple delivery channels such as the telephone, fax, e-mail or the Internet to provide and receive information to and from organisations and users. In other words, it can be described as a central information point which the rest of the organisation can use to gather data about other organisations, suppliers, products and customers.

The success of a Call Centre depends only on the users’ perceptions of the service they receive. According to Brown and Maxwell (2002), users of a Call Centre assess service quality by comparing what they request or expect from the service they received. Consequently, for Call Centres to achieve a good reputation for service quality, staff must consistently perform at levels which users perceive as meeting or surpassing their expectations (Brown and Maxwell, 2002). As Call Centres are a recent phenomenon, it is important to establish users’ expectations of Call Centre services. The general parameters of users’ perceptions of good quality service, such as
staff reaction, establish the importance of staff in users' satisfaction (Brown and Maxwell, 2002). However, there is much evidence that the expectations of Call Centre users extend further than these general satisfiers. Haymarket (1998) pointed out that there are three features of Call Centre operations that users feel are crucial to quality service: convenience and fast call handling, friendliness of the staff, and consistency in staff providing a reliable and accurate service. Users' satisfaction may be based on another three dimensions: access, including the staff's communication skills; timeliness, including staff resolution of queries; and quality, which includes the accuracy, consistency and comprehensiveness of the staff advice, in addition to the knowledge and politeness of the agents (Brown and Maxwell, 2002). Therefore the role of the front-line staff assumes a heightened importance in achieving user satisfaction. The staff-user relationship is not only important but also sensitive. There is evidence that positive staff attitudes appear to be linked to increased user satisfaction and the service gap between what staff believe a user wants and what a user actually expects can lead to a reduction in service quality (Brown and Maxwell, 2002).

Providing a Call Centre with a computer and telephone-based technology with constant data will increase staff productivity and performance (Haymarket, 1998). So, Call Centre services must consist of an integrated system between computers, telephones and data. The services provided by a Call Centre must be evaluated according to: the length of time spent on each call, types of calls being dealt with, staff productivity, agent sales, and the number of staff errors (Brown and Maxwell, 2002).

According to Nojoum (1999), establishing a Call Centre at CTHMIHR has number of benefits including: providing multiple delivery channels to support multiple lines of process; enabling the standardisation of products and services across all channels; improving communication between the organisation and users, particularly between the Call Centre and users in remote locations; saving users' time in getting the information they need from the organisation; identifying those non-users who might become valuable users; and maximising the opportunity to service users at each interaction point. Nojoum (1999) also adds that the following advantages will be of
significant benefit to CTHMIHR: giving help and guidelines to users; maximising the production and minimising the cost of interaction; collecting information for users from different departments in the organisation; helping top management to do routine work; providing real-time statistics and reporting which will help top management in decision-making with regard to IM; centralising information; contributing to the integration and updating of information; gathering as much information about users as possible, thus helping to build and strengthen the relationships; and providing this valuable information to anyone in the organisation who can use it.

4.2.14 Human Resources

An additional factor in the successful use of IT is the degree to which human issues are recognised. Buchanan and Gibb (1998) state that there is often a gulf between users and centralised IT functions and many organisations do not have an effective strategy to develop the computer skills of personnel. They therefore undervalue two of their main assets: human resources and the information resources they use at the desktop. This may involve giving users unnecessary or inappropriate tools and/or successive upgrades to versions of software. In particular, badly trained or poorly supported users will not be able to use software to its full potential and will waste time and effort trying to solve relatively simple problems. Poorly informed users also attract high opportunity costs. The lack of effective documentation on systems and services makes it difficult for users to locate and process information. Manuals are often written by technologists in the language of technology with little appreciation of the needs of users (Buchanan and Gibb, 1998).

As a result, the emphasis will tend to be towards a comprehensive specification of system functionality rather than on the ways that users wish to interact with the system. Costs are also associated with the non-availability, or lack of knowledge about, the right information to do the job. Users need tools to locate the appropriate information resources to support their tasks. A Touche Ross survey (1996) found that over 80% of respondents had difficulties retrieving relevant information. The other side of the coin is that users experience high levels of information overload and lack the tools for filtering information to ensure that they process only that which is relevant to the task at hand. Users are also increasingly involved in local systems'
development as they feel that they have a better understanding of the business issues than the IT professional. Although development tools are becoming easier to use, not everyone has the appropriate skills to complete the task effectively.

Jayaratna (1990) and Gubta (2000) asserted that a number of information systems developed at a great cost have failed to satisfy users or have had to be revised before they have become acceptable to users. This finding also sheds light on the importance of training people to be able to use the ever-increasing number of programs, hence the significance of training manpower in any organisation. Thus, training people is a crucial issue for every IS. However, all types of staff should adopt a plan for continued professional development. The Management Assistance Program (MAP) (1999) outlines the benefits of training as: increasing productivity, providing management with accurate information, improving the skills of staff, and improving the existing methods of information collection. Added to that, it can be said that training can contribute to employees' satisfaction and may, consequently, help to minimise employee turnover.

It is vital to understand that a number of Information System (IS) design research studies have been conducted by Western researchers based on their observations in Western organisations. This means that most of these results of IS design research in Western society do not necessarily apply to other cultures such as Saudi culture because the general values, thinking and beliefs of managers in Western organisations can be completely different from those in other countries. In addition, since general values and ways of thinking affect the types of information demanded, managers' information requirements may be expected to be culturally influenced and determined (Cheo, 2004). Therefore, it can be assumed that different cultures require different kinds of information, processed differently and, in the end, require different design configurations of their information systems.

4.3 Records Management

Before starting to define records management, it is important to distinguish between records and information. Prytherch (2000) define records as "all created information, irrespective of date or medium, created, used and kept by organisation or person, in
pursuance of their normal business and legal obligations." Sprehe (2002) declares that "records contain information in a particular physical or electronic form; they are the setting down of information in the context of the business operations of an agency. It is the agency context, its mission and programs that gives reality to the records." This researcher, however, defines records as organised data that should be processed or interpreted to produce information (see Section 4.2.1).

A definition of records management is suggested by Penn (1994), who states that "records management is the management of any information captured in reproducible form that is required for conducting business." The Memorial University of Newfoundland (2002), however, defined records management "as the application of a systematic method, or set of techniques, to manage the records and documentation of an organisational unit" while New York State Archives (2004) defined records management "as a field of management which is responsible for the systematic control of all records created by or transmitted to a local government or agency." So, from the above definitions, it can be concluded that records management is the management of any data (paper or electronic) to produce and reproduce information in proper way, as well as keeping those records in a secure environment to achieve the organisation's objectives.

New York State Archives (2004) pointed out that the objective of records management is to ensure the proper creation, receipt, use, storage, short- and long-term retention and disposal, protection and maintenance of records during and after their operational usefulness. The University of Essex (2004), on the other hand, indicated that good records management provides a route to ensuring that the organisation adheres to its legal, professional and ethical responsibilities. It improves efficiency by cutting down retrieval time and maintaining control over what is held, and over how and why it is held. An organisation's costs are reduced because resources are not wasted on retaining unnecessary records. It also ensures information and records are not duplicated needlessly, which not only provides cost savings, but also maintains version control and accuracy. Finally, good records management ensures that historically significant records are preserved for permanent use. However, it appears to the researcher that the main aim of records management is to
ensure that the data necessary to run an organisation can be stored in the right place with the right technology of the right quality and retrieved efficiently to the right person at the right time and at the lowest possible cost.

4.3.1 Information Management and Records Management

Some studies, such as those of Taylor and Farrell (1992), Al-Biqami (1997), Chen, (1998), Al-Zahrani (2001), and Al-Sheheri (2003), used information management as a synonym for information systems, information technology, data management, and systems engineering, among other expressions. In fact, information management is more than this. Dias (2001) states that “modern information management uses information technology, cybernetics, systems engineering, concepts of information and computer sciences, management information systems, engineering, office automation, business and management principles, to plan, manage and control one of the most important resources for survival of an enterprise on the current market—Information.” Butcher and Rowley (1998), however, believe that “information management a discipline that includes organisation-wide information policy planning, development and maintenance of integrated systems and services, optimization of information flows, and the harnessing of leading edge technologies to end-users’ requirements, regardless of their status or role in the organisation”. Thus, Butcher and Rowley (1998) planned the “7 Rs model of information management”. In this model, the Rs represent the information cycle, from information reading to recognition, reinterpretation, reviewing, release, restructuring, and finally, retrieval. (See Figure 4.9)

Figure 4.9 The information management cycle (adapted from Butcher & Rowley, 1998).
However, IM and records management are clearly linked closely together though different people define IM in various ways. Librarians and information scientists are more likely to focus on information being managed. In line with this, TFPL (2003) states that the task of IM is to get the right information, in the right form, to the right people, at the right time, and in the right place. TFPL adds that the aim of IM is to enable easy access to relevant information, at the time when it is valuable to the person who needs it, in the most usable format available, within an appropriately secure environment, to enable the building and sharing of knowledge. Thus, records management can play a vital part of IM, particularly because that part deals with local information pertaining to a particular organisation.

4.3.2 The Benefits of Records Management

Records management can provide a number of benefits to any organisation. JISC infoNet (2004) identifies the benefits of records management as follows: "information can always be retrieved quickly and reliably; information is available to support strategic decision-making; access to the collective memory of an institution provides precedents for actions and therefore should prevent the need to 're-invent the wheel'; business processes can be streamlined (functional analysis is a core part of a systematic records management programme); compliance and regulatory retrieval costs are reduced; there is better utilisation of prime office space (characterised by reducing the number of filing cabinets full of obsolete paper in offices resulting in increased people space); and the overhead costs of storage and retrieval of information are reduced". JISC infoNet adds that the competitive advantages gained by effective records management include: long-term management of physical assets, improved public image from the ability to respond quickly and appropriately to requests for information, and the ability to respond quickly to new situations.

4.3.3 Records Centres

The Records Centre plays an important part in every organisation. Ketelaar (1985) defined a Records Centre as a building, usually designed and constructed to provide low cost storage, maintenance and communication of present and related-to-present records, pending their disposition. Later, Clubb (1991) and Fisher (1998) stated that the Records Centre can play a significant role in the utilisation of a Records
management programme, thus providing low-cost, high density storage and control over the inflow and outflow of records. Furthermore, Ricks (1988) and Kemoni (1998) pointed out that the Records Centre has two major purposes: serving as low-cost storage for inactive records and being a reference service centre. Thus, in constructing a new structure or designing a Records Centre, the architect will need to study well the requirements of the records manager. The opinion of Diamond (1991) and Kemoni (1998), however, was the index should be computerised because the speed of retrieval cuts down on the manpower needed for a Records Centre and also improves control over the records stored in the centre.

4.3.4 Records Management Problems
Patterson and Sprehe (2002) pointed out that the biggest single issue for many organisations around the world today in the field of records management is to capture and control e-mail records. All organisations recognise that e-mail is a great source of information. Normally, when an important record is received, it is printed out and saved in a paper format. So, when staff members find an e-mail related to their work, they print it out or save it as a file on their computer. Consequently, most organisations suffer from a rapid increase in the number of records and from the duplication of the same file in different departments (Nojoum, 1999). In addition, Patterson and Sprehe (2002) stated that the volume of e-mails for business transactions has grown to the point that some organisations have to process one million e-mail messages per business day. They also added that many organisations have a policy of deleting all e-mails from users' in-boxes after the number of messages reaches a certain volume or date limit. Then, these e-mail records are lost unless the users transfer records from their in-boxes to records management systems.

Another problem with records management is that many organisations have not set up a suitable system of integration between ICT and organisation information resources to develop proper records management systems. Patterson and Sprehe (2002) outlined the reasons for this problem when they said that this may be related to the fact that "when ICT managers sit down to figure out what kind of systems they will need to manage organisation information resources, they do not take records into account. They are not trained to think that the eventual automated retirement and disposition of
data in ICT systems is an ICT planning and design function, as well as an integral part of program planning and design. Neither ICT nor program personnel understand the business and legal imperative of separating record information from non-record information, the importance of disposing of record materials in a prescribed manner and of destroying non-record materials. Saving information the enterprise should have destroyed can be just as harmful as destroying information that should have been saved."

4.4 Previous Studies within CTHMIHR

There are a number of previous studies related to information at CTHMIHR. Al-Masoumi (1992) describes records at CTHMIHR saying that, during the previous sixteen years, CTHMIHR conducted a number of studies, reports, researches and maps which were gathered and arranged in the index in Arabic and English. The index was classified according to the department and years of issue. A single page was devoted to each work containing the titles, the names of researchers, the language of the writing, a brief description of the nature of the work, and the contents of each item of material.

The total number of works in the period 1975- 1991 reached 213: 106 of these studies were conducted by the Department of Information and Computers. These were as follows: 46 by the Department of Urban Studies, 34 by the Department of Environmental Studies, and 26 by the Department of Cultural Studies.

Al-Masoumi (1992) describes the records and information inventory form as a means of collecting the works of CTHMIHR. This form includes a brief description of the work and its place of storage. He used computer technology to input and retrieve these records, all of which have been stored in different departments (non-centralised records). However, Al-Masoumi's description did not give any information about the lifecycle of the records at CTHMIHR, its records policy, and the types of hardware and software that were used in the storage of these records. Moreover, in practice, Al-Masoumi used Dbase IV as a Data Base Management System (DBMS) without any documents for updating the databases or maintaining the programmes (Nojoum, 1999).
Al-Biqami (1997) had, as the main objective of his research work, the design and implementation of a website for the Hajj Research Centre (HRC). The project involved the following:

1. Carrying out a needs analysis of information for Hajj performers.
2. Investigating the process of designing a website and the considerations that needed to be taken into account by web designers. The results of this investigation were used to design the Hajj website.
3. Reviewing similar websites in order to get ideas of what is desirable or undesirable for the site in the design process.
4. Designing the Hajj website that would meet the needs of Hajj performers.
5. Implementing the website design.

Al-Biqami used the user-centred design approach to ensure that the design process met users’ needs. This approach comprises four main phases: analysis, design, evaluation and implementation. Additionally, he used a questionnaire, which aimed to determine the information needs of the pilgrims who are the potential users of the HRC website. The sample of the study was drawn from among pilgrims worldwide who come to perform Hajj in Makkah, the total number of the sample being 1500 pilgrims. Al-Biqami used semi-structured interviews to interview the people in charge of the HRC because they are the source of the overall information about the Hajj.

The general conclusion of these investigations was that there was a need for a comprehensive source of information on Hajj which would satisfy the needs of Hajj performers from different countries, backgrounds, cultures, educational backgrounds and languages. Results show that religious information is the most important information that Hajj performers need. It has been found that the majority of Hajj performers arrange their trip through Hajj travel agents and therefore there should be a focus on providing these agents with all the information needed so that they can pass it on to the Hajj performers. Although the results of the questionnaire showed that less than 4% of the Hajj performers used the Internet for finding out information about the Hajj, 84% would consider using the Internet in the future. This shows enthusiasm for
the idea of using the Internet for providing Hajj related information and further suggests that the Internet could be very useful as a source of such information since most travel agents today have access to the Internet.

Al-Biqami used HTML to design and implement the website for CTHMIHR. The major limitation of using such a system is that a user has to read all the web pages to answer his/her particular query while, when using a Semantic Web, the computer reads and understands the web pages (see Section 4.2.2). In addition, Al-Biqami in his dissertation did not address the important question of information security and policies regarding this when users accessed CTHMIHR information through the Internet. Furthermore, Al-Biqami did not refer to using Intranet services in a LAN and Extranet in a WAN.

Nojoum (1999) aimed to evaluate records management practices at the CTHMIHR, Saudi Arabia. Such an evaluation was intended to help staff and users to access information about the Hajj easily and more effectively when it was needed. The research was conducted to achieve the following objectives:

1. To review the literature on the evaluation of records management practices and to develop a records management programme.
2. To survey and report on the current status of records at CTHMIHR.
3. To document all records at CTHMIHR.
4. To study and report on the feasibility of centralising records management at CTHMIHR.
5. To improve records management and establish a Records Centre at CTHMIHR.
6. To make some necessary recommendations.

Nojoum (1999) outlined the methods adopted in his research in two parts. The first part covered the background of CTHMIHR, its users, resources, the structure of Information Management, and the structure of CTHMIHR. The second part described the process of the research which was further subdivided into six parts: top-management approval, assigning a co-ordinator in every department, carrying out a
detailed survey and data analysis, improving records management, and implementing a Records Centre at CTHMIHR.

From the analysis, Noujoum (1999) refers to records management problems at CTHMIHR. The most astonishing fact is that the staff there are aware of the problems but cannot identify the root cause of these problems or the people responsible for them. The researcher has observed that some records management problems come from information management and Information Technology at CTHMIHR. Other problems come from users. Thus, records management problems can be divided into three primary sources:

1. Information Management (IM)
2. Users
3. Information Technology (IT)

Towards the end of Nojoum’s dissertation, he states that it is worth noting that the research has taken up the hypothesis that it is necessary for CTHMIHR to establish an information bank about Hajj. Thus, the researcher has emphasised, on numerous occasions, because of the findings he obtained, the necessity of improving records management and establishing a Records Centre at CTHMIHR. It has also been found that CTHMIHR is one of many organisations which does not place significant importance on records management until it either loses sight of vital records or loses track of papers desperately needed in a convenient space and at an appropriate time.

It is generally agreed that the aim of records management is to ensure that the necessary information for the smooth running of an organisation is stored in the right place, on appropriate technology of the right quality, and retrieved efficiently to the right person, at the right time, and at the lowest possible cost. Therefore, CTHMIHR should improve its records management in many aspects, starting by establishing a records management strategy and other managerial activities related to the creation, distribution, storage, retrieval, security and disposal of information, the training of staff, and the evaluation of the strategies that have been formulated. Moreover, the implementation of a Records Centre would be helpful in improving records management at CTHMIHR. However, Nojoum aimed to evaluate records
management practices at the CTHMIHR, Saudi Arabia. The main limitation of Nojoum’s dissertation was that he did not take into account the external users of CTHMIHR information, particularly female users.

The current research takes previous studies as a basis for developing a comprehensive IMS at the CTHMIHR in Makkah and aims to develop and organise stages for the implementation of such a system. This IMS can help staff and users to access information about the Hajj more efficiently and more effectively when it is needed.
Chapter 5 | Results

5.1 Introduction
This chapter presents the results in four parts: interview analysis, questionnaire analysis, observation, and documents analysis.

5.2 Interview Analysis
The interviews were conducted in order to understand the experience of a cross-section of staff and provide access to the context of their behaviour. The purpose of the interviews in this research was to collect information about CTHMIHR and their department's needs, functions, activities, the relationships between the departments inside and outside, relationships existing IMS and practices, and suggestions towards improving IMS. Interviews were conducted with the Dean, Heads of Departments (four interviews).

5.2.1 Dean of CTHMIHR
5.2.1.1 CTHMIHR needs
The Dean indicated that there are a number of functions and all of them can be found in the literature base of the centre. These functions include: doing research and surveys in the fields of Hajj, Services, Umrah, and population movement; statistics and other factual documentation; historical records; and preserving the natural and Islamic environment in the Holy places, Makkah, and Madinah. He also added that there were a number of activities aimed at achieving the functions, which included: doing research and surveys during the year and seasons (Hajj, Ramadan, Umrah, and Holidays); providing documentary evidence (electronic counting, video taping, and photography); providing practical counselling to local authorities and companies which have relationships with CTHMIHR; and collecting information and indexing it.

The Dean indicated that these activities were achieved by the researchers who are employed throughout the year, and supplemented by assistant researchers at crisis
points such as the Hajj and Ramadan. Research was taking place at CTHMIHR in Makkah and Madinah as well as residences and camps at Arafat and Mina. Specific examples of data collection points are airports, motorways and at immigration points throughout Saudi Arabia. To enhance the efficiency and effectiveness of data collection, CTHMIHR has a good working relationship with all local authorities in Saudi Arabia, which includes exchanging information, experiences and knowledge.

5.2.1.2 Existing information and practices
The Dean indicated that existing information could be defined as: statistical information, for example, the number of pilgrims, vehicles, the temperature and humidity; surveys and cumulative research in different subjects such as Zam-Zam, pilgrims’ reception, and population movement; and video tapes and photography. This information has very high significance as it provides the resource base for all research. The Dean added that Heads of Departments were formally responsible for the management of information from creation to storage and its retrieval. Information engineers in the departments are responsible for the design, development, implementation, and maintenance of the information.

The Dean stated that the operating system had been in use since 2000, and the present IMS can fulfil the requirements of the CTHMIHR needs because of the low number of users.

5.2.1.3 Requirement to improve IMS at CTHMIHR
The Dean suggested that the IMS could be improved by accessing the Internet to allow all users access to information from inside and outside Saudi Arabia. He also added that establishing a Records Centre and Call Centre was very necessary, particularly in an organisation like CTHMIHR that interfaces with many users.

The Dean stated that a numbers of steps could be used to improve information management. These steps include ICT training programmes in order to know what the system requires; updated hardware that includes computers, communication infrastructure, printers, plotters, scanners, and other devices; updated software to help
users to access the information from inside and outside Saudi Arabia easily and efficiently; and that the IMS must be compatible with all legislation of national information policy.

5.2.2 Heads of CTHMIHR Departments

5.2.2.1 Departmental needs

Heads of Departments indicated that all the functions of the departments were contained in seasonal (Hajj and Ramadan) reports. The Head of the Environmental and Health Research Department indicated that there were a number of functions which were in place to achieve these aims. These functions were: environmental studies, climate factors, drinking water, liquid and solid waste, air quality and pollution, noise and water analysis. The Head of the Research and Information Affairs Department stated that the functions of the Department were: the provision of information to CTHMIHR, doing research in information affairs related to the Hajj and Umrah, and the provision of information hardware (sound, picture and video). The Head of the Administrative and Financial Affairs Department outlined that the functions of his Department were: dealing with all information both in and out of CTHMIHR (Administrative), filing, storage, dealing with all financial affairs, storehouse working, and maintenance (cars, buildings); while the Head of the Information and Technical Services Department stated that the functions of his Department were: providing computers (hardware and software) to departments, data entry, publishing information, and creating a data bank.

A number of activities are undertaken by departments to achieve these functions. The Head of the Environmental and Health Research Department stated that he achieved these functions through recording the climate at Makkah and the holy places by weather stations and collecting these data by modems or by weather maps. Examples of environmental health monitoring include chemical and microbial analysis through laboratories or removable devices taken in field studies. These activities were achieved by special devices in the laboratories at Makkah, the holy places and in field research. Operators worked on these devices to provide data to the researchers in order to achieve the aims of CTHMIHR.
The Head of the Research and Information Affairs Department indicated that he achieved these functions through contact with researchers in information affairs doing studies in this field and providing them with equipment, and carrying on building the information library which includes slides, pictures, and video tapes. These activities were achieved by providing equipment to researchers and helping them to collect their required information.

The Head of the Administrative and Financial Affairs Department also outlined that he achieved these functions by recording all information coming and going out of CTHMIHR, passing the incoming information to the Dean or Deputy Dean and to the departments; passing the information to the users outside; creating new files every year, recording all stock coming in and going and out of the storehouse, providing special workers for maintenance. These activities were achieved through providing researchers with the equipment required to achieve their goals, giving the researchers support when they need it, and providing staff and users with the information they need. He also added that these activities were done around the year but were concentrated at the time of Hajj and Ramadan. All these activities were done by staff in the Department and part-time staff to achieve the aims of CTHMIHR.

The Head of the Information and Technical Services Department indicated that he achieves these functions by: initiating and developing the “Data Entry and Analysis” system for research work, initiating the car “Traffic Counting System” in Makkah and Madinah; developing several programmes for other departments; developing and designing several databases that achieve one of the major goals of the Institute. These databases are an essential facility for the researchers and a basic requirement for the studies done in the Institute. This is disseminated through a network of nodes distributed through the Institute. The most relevant database applications were: pilgrims' statistics; environmental data collection and analysis; guide map information for several sites; database for research references in the universities throughout the Kingdom of Saudi Arabia; and database design for Institute related administrative work, research work, film information, slide collections, library books and traffic flow. These
Results

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activities were achieved through a computer programmer (a person who make computer programs) and operation systems in the department.

Heads of Department stated that all inter-departmental CTHMIHR relationships are excellent, and this fact is found to improve the quality and quantity of information services. The nature of the relationships between departments is generally formal, although some may be informal.

The Head of the Environmental and Health Research Department indicated that the Departments of Research and Information Affairs provide equipment and technicians to researchers to help them produce their reports. Further examples are the Department of Information and Technical Services, who provide the researchers with information they need, and also the Department of Environmental and Health Research, who provide data and information to the Department of Information and Technical Services to expand the CTHMIHR data bank.

The Head of the Research and Information Affairs Department indicated that there were formal relationships between the Departments. For example, if any user (researcher or staff) from a different department needs equipment or help s/he is required to fill in an application form.

The Head of the Administrative and Financial Affairs Department outlined that the relationships between his Department and other Departments are friendly, but the relationship becomes more formal in the case of financial matters.

The Head of the Information and Technical Services Department indicated that the department played a vital part in CTHMIHR, providing all other departments with information or technical services particularly during Hajj and Ramadan. Examples are inputting and analysing research data, providing special computer programs or computer hardware, and providing researchers with their information needs.
5.2.2.2 Existing information and practices
The Heads of Department stated that the information used in the departments could be defined as: initial and final reports prepared by individual departments; computers connected with devices used to analyse materials; electronic sources from the Internet; letters and application forms stored in files; video tapes and pictures; files used for full/part-time staff; and research proposals and studies.

The Heads of Department indicated that the information held in the departments plays a vital part in creating databases about CTHMIHR particularly concerning research and studies, climate factors, drinking water, liquid and solid waste, air quality and pollution, noise and water analysis, pictures and video tapes. These databases could help users and the senior management with information they need to achieve CTHMIHR objectives.

All of the Heads of Department indicated that they were personally formally responsible for the management of the information as well as the design, development, implementation and maintenance of this information.

All of the Heads of Department stated that they had been using their operating system since the establishment of the departments (2000). They added that every year, there is improvement in the information system depending on the development of IT and the requirements of the departments.

Some of the Heads of Department thought that the IMS could fulfil the requirements of the departments because the departments had few operations to deal with the new ICT. Others stated that the current IMS do not fulfil their requirements, because they need a new information system that connects computers together (Local Area Network). This could help the departments to communicate together and integrate information as well as exchange ideas.

5.2.2.3 Requirement to improve IMS at CTHMIHR Departments
The Heads of Department stated that there was an idea to create databases in CTHMIHR by using Oracle, but that this idea had not been approved because lack of
information professionals. They suggested developing a plan to establish a new information system that could use Internet technology to exchange information between the departments and other organisations or centres in Saudi Arabia or in the world. To deal with this type of IT, it would be important to provide CTHMIHR with professional staff and consultants to deal with IT and information management as a whole.

The Heads of Department stated that establishing the Records Centre could help to improve information management, integrate information, provide low-cost and high density storage, control the growth of information, and avoid the duplication of information.

The Heads of Department stated that establishing a Records Centre could:

- Improve communication between CTHMIHR and users, particularly between the Call Centre and users in remote locations;
- Save users’ time in getting the information they need from CTHMIHR;
- Give help and guidelines to users;
- Maximise the production and minimise the cost of interactions;
- Collect information for users from different departments;
- Help top management to do most of the usual routine work;
- Create real-time statistics and reporting which could help top management in decision-making with regard to IM;
- Centralise information; and
- Create multiple delivery channels to enable the support of multiple lines of process, enabling the standardisation of products and services across all channels.

The Heads of Department stated that there were a number of steps that could be used to improve IM:

- Developing databases in the departments that used the Oracle software system;
- Delivering new IT with a high speed and a large capacity as well as software;
- Developing strategies related to information;
- Increasing the number of staff to deal with the workload;
• Increasing fund resources;
• Training programmes and courses for staff motivation;
• Increasing work space and co-operation between the staff;
• Increasing the numbers of system analysts, computer programmers, and operations systems;
• Improving the local area network (LAN) and wide area network (WAN);
• Using Internet technology and creating standard databases that could be accessed by all departments and users; and
• Centralising the information to avoid duplication and improve record maintenance.

5.2.3 Focus Groups
The researcher conducted three focus groups (two in Makhah and one in Madinah Branch). Between three to six operations staff attended the focus groups, which took between two to three hours. The researcher allowed the respondents to talk about what they thought was significant and ensured that all topics which were considered crucial to study are covered. All focus groups were recorded. The focus groups started with a brief description from the researcher about the research aims and objectives.

5.2.3.1 Current problems
The focus groups were asked about the current problems that related to IM. The discussion group outlined a number of problems facing staff, including:
• Workload was excessive for the number of staff currently employed;
• There were a limited number of training courses available to staff and they were difficult to attend; moreover, there were no personal benefits from attendance at these courses;
• Although there is a ‘core’ staff of about 50 at CTHMIHR, this increases to 350 during the Hajj and Ramadan periods; thus at key times the majority of staff have temporary contracts;
• Head of department posts rotate on a two-year cycle;
• Lack of fund management;
• Work space can be inappropriate, with the majority of space going to shelving and inadequate desktop space;
• Lack of information policy;
• Lack of IT, IS, and IM strategies;
• Some staff were not satisfied with their work, and they complained about poor pay;
• Files are only opened when work is needed to be done on them; there is no system for replacing them in their correct place, therefore there are many files open in an environment with poor record management;
• Lack of a clear policy on using the Internet;
• All departments have at least one copy machine, which leads to an increased number of records as well as duplication of the same records in different departments;
• Most of the IT technology (software and hardware) needs to be updated;
• The LAN network does not work properly;
• Different types of programme software are used such as Basic, DBASE IV, ACCESS, and Oracle;
• Two different computer platforms are used, that is IBM and Mac, and there is no connection between them;
• Few people actually use their computers. Some staff only use them to write formal letters;
• Difficulty in using databases and lack of support when staff tried to use them;
• The CTHMIHR information is not compatible with Data Protection law;
• Lack of English language in most CTHMIHR staff;
• Every Head of department came with new ideas and from a different background and often felt he could do better than his predecessors;
• It is very difficult to update CTHMIHR information;
• Information came to the staff in different formats and they did not know how to deal with this information. This information is consequently stored but not acted on;
• It is very difficult to find information and answers to any question. ‘I do not know, could you please ask other departments, where you may find what you need’. This was a common staff response to questions;
• There is a lack of electronic records;
• There is a lack of a clear policy on using hardware and software; and
• There is no plan for disaster prevention and recovery at CTHMIHR.

5.2.3.2 Requirements to improve IMS
The focus groups were asked about the steps that should be taken to improve IMS at CTHMIHR. The groups outlined that:
• Middle management, particularly the Dean and Heads of the department need an understanding of the importance of IM. So it is very important to develop a clear plan for IMS.
• Developing a Records Centre and a Call Centre could play a vital part in improving IMS.
• Centralising copy machines could decrease the number of records and avoid the duplication of the same records.
• Providing CTHMIHR with professional support staff.
• Using short training programmes to help staff to use databases.
• Increasing the motivation of CTHMIHR staff, particularly during Hajj and Ramadan.
• Improving the LAN and WAN network by using Internet protocols.
• Developing a complete information system which could help staff and users to access information smoothly and without problems.
• Increasing electronic records and decreasing paperwork by using e-mail.
• Providing the departments with up-to-date IT in order to help them do their jobs easily and smoothly.
5.3 Questionnaire Analysis

This part of the analysis presented the results of the survey questionnaire concerning the users of CTHMIHR information. The purpose of the questionnaire was to collect data about the users of the information. The questionnaires were designed to allow the respondents to answer by simply ticking or numbering the appropriate boxes after reading the question carefully (see appendix 4). The respondents could also add comments or observations. This part has been divided into five main sections: data analysis, users of information, users' needs, users' skills, and users' opinions.

The users who use the information available at CTHMIHR are:

- Staff in/out side of CTHMIHR;
- Researchers and academic staff;
- Local governments and companies;
- Pilgrims and visitors of the Holy places in Makkah and Madinah.

5.3.1 Data Analysis

5.3.1.1 Respondents to the questionnaires

The information in Table 5.1 shows the number of questionnaires distributed and the respondents as a function of the different organisations that used the information. The responses from this survey were 345, which is equivalent to 69% of the total number of questionnaires distributed. Furthermore, according to the Head of Information and Technical Services at CTHMIHR, the number of users of information at CTHMIHR in 2001 was not more than 1000. Therefore the respondents of this survey were at least 34.5% of the total user population.
Table 5.1: Questionnaires distributed by the organisations that used CTHMIHR information

<table>
<thead>
<tr>
<th>Organisations</th>
<th>Number of questionnaires set at</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Umm Al-Qura University</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. College of Share'a and Islamic Studies</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>b. College of Education</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>c. College of Geometry and Islamic</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>d. Constructional Designs</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>e. College of Arabic Language</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>f. College of Applied Sciences</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>g. College of Social Sciences</td>
<td>25</td>
<td>19</td>
</tr>
<tr>
<td>h. College of Daw'ah and Usul-Al-Din</td>
<td>25</td>
<td>18</td>
</tr>
<tr>
<td>i. Institute of Arabic Languages.</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>j. College of Medical Sciences.</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>2) The Custodian of the Two Holy Mosques Institute of Hajj Research (CTHMIHR)</td>
<td>100</td>
<td>78</td>
</tr>
<tr>
<td>3) Local Authorities</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>4) Companies (Islamic Tourism)</td>
<td>60</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>500</strong></td>
<td><strong>345</strong></td>
</tr>
</tbody>
</table>

Figure 5.1: Type of the respondents to the questionnaires
5.3.1.2 Respondent types

The questionnaires distributed consisted of five parts:

- Part I - Questions about information that users get from CTHMIHR;
- Part II - Current information technology skill for the users of information;
- Part III - Personal information;
- Part IV - Current IT skills for staff at CTHMIR; and
- Part V - Respondent’s opinion.

The respondents of these questionnaires can be divided into three types:

1. Internal users (IU);
2. External users (EU); and
3. Non-users of the IMS (Internal and External users) (NU).

The information contained in Table 5.2 and Figure 5.2 shows the respondent types and parts of the questionnaires that they answered. This information reveals that part-time and full-time internal (CTHMIHR) users (IU) answered all parts of the questionnaire (N=146). External users of the information management system at CTHMIHR (EU) responded to parts I, II, III, and V of the questionnaire only (N=118), whereas, non-users of the IMS (NU) responded only to parts II, III, and V of the questionnaire (N=81). Figure 5.1 show that the total number of respondents (TR) was 345. Total users respondents (TU) was 264, which is equivalent to 76.5% of the total, and total external respondents (TE) was 199, which is equivalent to 57.7% of the total.

<table>
<thead>
<tr>
<th>Questionnaire section</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal user (IU)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>146</td>
<td>42.3%</td>
</tr>
<tr>
<td>External user (EU)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>118</td>
<td>34.2%</td>
</tr>
<tr>
<td>Non-users (NU)</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td>81</td>
<td>23.5%</td>
</tr>
<tr>
<td>Total</td>
<td>264</td>
<td>345</td>
<td>345</td>
<td>118</td>
<td>345</td>
<td>345</td>
<td>100%</td>
</tr>
</tbody>
</table>
5.3.1.3 Software used

The researcher used SPSS (Statistical Package for the Social Sciences) software for the statistical analysis as it is an example of generic statistical software that has a high user base and can provide many examples of tabulating, analyzing and visualising data and information.

In the analysis of the data collected by questionnaires, the researcher used descriptive statistics for all responses that included Mean, Median, Mode, Standard deviation, and Variance. The descriptive statistics were used to examine the basic features of single variables. Also, cross-tabulation was used to examine the influence of one variable on another; the Chi-Squared test ($\chi^2$-test) was used to test the level of significance in the variables. Furthermore, Excel software was used to visualize the results of these analyses.
5.3.2 Users of Information

5.3.2.1 Users’ age

Table 5.3 shows the percentages of respondent age and user type. This information reveals that the highest percentage of IU and EU was aged between 35 and less than 40 (IU=23.3%, EU=27.1%), followed by the 40 and less than 45 age-group of which 20.5% was of IU and 22.0% of EU. In other words, more than 43% of IU and EU used CTHMIHR information between the ages of 35 and less than 45. The table also shows that the percentages of NU respondents’ age were highest between 45 and less than 50 (39.5%) followed by 21.0% between ages 40 and less than 45. These indicate that around 60% of NU respondents were aged between 40 and less than 50.

Figure 5.3 shows the percentages of age and TR. The highest percentage of TR was 21.2% between ages 40 and less than 45, and the next highest percent was 19.7% between ages 35 and less than 40. This means that around 40% of TR ages were between 35 and less than 45 years old. In contrast, much lesser percentages of TR respondents were 50 + (7.5%) or less than 20 years old (0.6%).

<table>
<thead>
<tr>
<th>Age</th>
<th>IU N=146</th>
<th>EU N=118</th>
<th>NU N=81</th>
<th>TR N=345</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 20</td>
<td>1.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>20 and less than 30</td>
<td>9.6</td>
<td>15.3</td>
<td>19.8</td>
<td>13.9</td>
</tr>
<tr>
<td>30 and less than 35</td>
<td>17.8</td>
<td>18.6</td>
<td>17.3</td>
<td>18.0</td>
</tr>
<tr>
<td>35 and less than 40</td>
<td>23.3</td>
<td>27.1</td>
<td>2.5</td>
<td>19.7</td>
</tr>
<tr>
<td>40 and less than 45</td>
<td>20.5</td>
<td>22.0</td>
<td>21.0</td>
<td>21.2</td>
</tr>
<tr>
<td>45 and less than 50</td>
<td>13.7</td>
<td>11.9</td>
<td>39.5</td>
<td>19.1</td>
</tr>
<tr>
<td>50 and less than 55</td>
<td>9.6</td>
<td>1.7</td>
<td>0.0</td>
<td>4.6</td>
</tr>
<tr>
<td>More than 55</td>
<td>4.1</td>
<td>3.4</td>
<td>0.0</td>
<td>2.9</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents
5.3.2.2 Users’ education

The information in Table 5.4 and Figure 5.4 shows the percentages of the respondents and their education. The majority of TR respondents had a PhD degree (28.7%), followed by a master’s (24.9%) and a bachelor’s (24.3%) degree, while only 5.8% of TR respondents had professor status.

Table 5.4: The education of respondents (percent)

<table>
<thead>
<tr>
<th>User type</th>
<th>IU N=146</th>
<th>EU N=118</th>
<th>NU N=81</th>
<th>TR N=345</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary or middle school</td>
<td>1.4</td>
<td>3.4</td>
<td>4.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Secondary</td>
<td>9.6</td>
<td>5.1</td>
<td>0.0</td>
<td>5.8</td>
</tr>
<tr>
<td>Diploma</td>
<td>15.1</td>
<td>3.4</td>
<td>0.0</td>
<td>7.5</td>
</tr>
<tr>
<td>Bachelor’s</td>
<td>32.9</td>
<td>20.3</td>
<td>14.8</td>
<td>24.3</td>
</tr>
<tr>
<td>Master’s</td>
<td>17.8</td>
<td>35.6</td>
<td>22.2</td>
<td>24.9</td>
</tr>
<tr>
<td>PhD</td>
<td>16.4</td>
<td>23.7</td>
<td>58.0</td>
<td>28.7</td>
</tr>
<tr>
<td>Professor</td>
<td>6.8</td>
<td>8.5</td>
<td>0.0</td>
<td>5.8</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* NU = Non-users
* TE = EU and NU
* TU = IU and EU
* TR = Total Respondents
5.3.2.3 Users' gender

Table 5.5 shows that the majority of TR were male (74.2%), whereas just 25.8% of the total respondents were female. This may be related to the fact that females find it very difficult to access CTHMIHR information because of religious and cultural regulations.

Table 5.5: The sex of respondents (percent)

<table>
<thead>
<tr>
<th>User type Status</th>
<th>IU N=146</th>
<th>EU N=118</th>
<th>NU N=81</th>
<th>TR N=345</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>98.6</td>
<td>84.7</td>
<td>14.8</td>
<td>74.2</td>
</tr>
<tr>
<td>Female</td>
<td>1.4</td>
<td>15.3</td>
<td>85.2</td>
<td>25.8</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents

5.3.2.4 User type respondents

The information contained in Table 5.6 and Figure 5.5 shows the type of users of CTHMIHR information. The Table and Figure indicate that the majority of users came from Umm Al-Qura University where there were 125 responses from researchers (36.2%) and 70 responses from staff (20.3%). As indicated, when these populations
are combined, 56.5% of respondents come from this source. The second highest response rate came from CTHMIHR employees, which consisted of 9.9% from researchers (n=34) and 12.8% from staff (n=44). The remainder of the respondents were staff at local authorities (n=40, 11.6%) and companies (n=32, 9.3%). Thus 79.1% of the total respondents were from Umm Al-Qura University, as can be seen in Figure 5.5.

Table 5.6: User type respondents

<table>
<thead>
<tr>
<th>User type</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff at CTHMIHR</td>
<td>44</td>
<td>9.9</td>
</tr>
<tr>
<td>Researcher inside CTHMIHR</td>
<td>34</td>
<td>12.8</td>
</tr>
<tr>
<td>Researcher out side CTHMIHR</td>
<td>125</td>
<td>36.2</td>
</tr>
<tr>
<td>Staff at Umm-Al-Qura University</td>
<td>70</td>
<td>20.0</td>
</tr>
<tr>
<td>Local authority staff</td>
<td>40</td>
<td>11.6</td>
</tr>
<tr>
<td>Company staff</td>
<td>32</td>
<td>9.3</td>
</tr>
<tr>
<td>Total</td>
<td>345</td>
<td>100%</td>
</tr>
</tbody>
</table>

Figure 5.5: Percentages of user type respondents

5.3.2.5 Type of IU

Figure 5.5 shows that the majority of IU respondents were fulltime employees (n=78, 53.4%), whereas the remainder of the respondents were part-time (n= 68, 46.6%).
5.3.2.6 Department of IU respondents

Table 5.7 shows the IU type respondents and CTHMIHR departments. The information contained in the figure indicates that the majority of IU respondents (n=48, 33%) were at the Dept. of Financial and Administrative Affairs, followed by the Dept. of Information and Technical Services (n=32, 22%) and the Dept. of Environmental and Health Research (n=24, 16%). The lowest (n=10, 7%) IU respondents were from the Dept. of Research and Information Affairs and the Dept. of Administrative and Human Research, and only (n=22, 15%) of IU respondents were from the Dept. of Architectural and Engineering Research.

<table>
<thead>
<tr>
<th>Departments</th>
<th>Full-time</th>
<th>Part-time</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services</td>
<td>22</td>
<td>10</td>
<td>32</td>
<td>22.0</td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research</td>
<td>2</td>
<td>8</td>
<td>10</td>
<td>7.0</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research</td>
<td>20</td>
<td>4</td>
<td>24</td>
<td>16.0</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research</td>
<td>14</td>
<td>8</td>
<td>22</td>
<td>15.0</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>7.0</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs</td>
<td>14</td>
<td>34</td>
<td>48</td>
<td>33.0</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>68</td>
<td>146</td>
<td>100%</td>
</tr>
</tbody>
</table>

5.3.2.7 IU respondents who have a PC at home

The IU respondents in every department were asked if they had a PC at home (Table 6.8). The highest percentage of IU respondents was 83.3% at the Dept. of Environmental and Health Research who stated that they had a PC at home, while the second highest percentage was the Dept. of Information and Technical Services (81.3%), followed by the Dept. of Architectural and Engineering Research (72.7%). The lowest percents were the Dept. of Research and Information Affairs (40.0%), followed by the Dept. of Financial and Administrative Affairs (58.3%) and the Dept. of Administrative and Human Research (60.0%). The table also indicates that the majority of IU respondents had a PC at home (n=100, 68.5%).
Table 5.8: IU respondents in departments and who have a PC at home (percent)

<table>
<thead>
<tr>
<th>Departments</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services</td>
<td>81.3</td>
<td>18.7</td>
<td>32</td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research</td>
<td>60.0</td>
<td>40.0</td>
<td>10</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research</td>
<td>83.3</td>
<td>16.7</td>
<td>24</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research</td>
<td>72.7</td>
<td>27.3</td>
<td>22</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs</td>
<td>40.0</td>
<td>60.0</td>
<td>10</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs</td>
<td>58.3</td>
<td>41.7</td>
<td>48</td>
</tr>
<tr>
<td>Overall percentages</td>
<td>68.5</td>
<td>31.5</td>
<td>146</td>
</tr>
</tbody>
</table>

5.3.2.8 IU respondents who have a PC at work
The IU respondents in every department were asked if they had a PC at work (table 5.9). The highest percentage of IU respondents was 100% at the Dept. of Environmental and Health Research who stated that they had a PC at work, followed by the Dept. of Financial and Administrative Affairs (83.3%) and the Dept. of Information and Technical Services (81.3%). The lowest percentages were the Dept. of Research and Information Affairs (60.0%). The table also indicates that an average of 82.2% of IU respondents had a PC at work.

Table 5.9: IU respondents in departments and who have a PC at work (percent)

<table>
<thead>
<tr>
<th>Departments</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services</td>
<td>81.3</td>
<td>18.7</td>
<td>32</td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research</td>
<td>80.0</td>
<td>20.0</td>
<td>10</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research</td>
<td>100</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research</td>
<td>72.7</td>
<td>27.3</td>
<td>22</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs</td>
<td>60.0</td>
<td>40.0</td>
<td>10</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs</td>
<td>83.3</td>
<td>16.7</td>
<td>48</td>
</tr>
<tr>
<td>Overall percentages</td>
<td>82.2</td>
<td>17.8</td>
<td>146</td>
</tr>
</tbody>
</table>
5.3.2.9 Learning to use a PC

IU respondents to this research questionnaire were asked how they learned to use a PC (Table 5.10). More than half of the full-time staff learnt to use a PC as part of their studies (59.0%) or on their own (51.3%). Amongst part-time staff, 44.1% learned as a part of their studies and 52.9% on their own. The table also indicates that only 20.5% of full time staff and 11.8% of part-time staff learned to use a PC at CTHMIHR.

Table 5.10: IU respondents and learn to use a PC (percent)

<table>
<thead>
<tr>
<th>learn to use a PC</th>
<th>Full-time %</th>
<th>Part-time%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>On my own</td>
<td>51.3</td>
<td>48.7</td>
</tr>
<tr>
<td>As part of my study</td>
<td>59.0</td>
<td>41.0</td>
</tr>
<tr>
<td>Friend</td>
<td>17.9</td>
<td>82.1</td>
</tr>
<tr>
<td>CTHMIHR</td>
<td>20.5</td>
<td>79.5</td>
</tr>
<tr>
<td>Total respondents</td>
<td>78</td>
<td>68</td>
</tr>
</tbody>
</table>

5.3.2.10 Aim of using a PC in the departments

The information contained in Table 5.11 shows the percentage of IU respondents and the aim of using a PC in CTHMIHR departments. As can be seen from the table, the Dept. of Information and Technical Services had the highest percentage (75.0%) of IU using a PC to contact CTHMIHR databases, followed by the Dept. of Research and Information Affairs (60.0%) and the Dept. of Environmental and Health Research (58.3%). Followed by Dept. of Administrative and Human Research (20.0%) and the Dept. of Financial and Administrative Affairs (16.7%). The Dept. of Architectural and Engineering Research had the lowest percentages (9.1%).

The table reveals that the highest percentages of IU using a PC to use the Internet were in the Dept. of Environmental and Health Research (91.7%). The second highest percentages were in the Dept. of Information and Technical Services (75.0%), followed by the Dept. of Architectural and Engineering Research (63.6%), followed by the Dept. of Administrative and Human Research and the Dept. of Research and Information Affairs.
The lowest percentages of IU using a PC to contact with Internet were at the Dept. of Financial and Administrative Affairs (37.5%).

The table shows that only 39.9% of the respondents used a PC to contact CTHMIHR databases, and 57.9% used a PC to contact the Internet. The majority of the respondents used PCs to write letters (65.7%) or to write reports and do research (57.8%).

Table 5.11: IU respondents using a PC in each department (percent)

<table>
<thead>
<tr>
<th>IU=146</th>
<th>Contact with CTHMIHR databases</th>
<th>Contact with Internet</th>
<th>Write reports and do research</th>
<th>Write letters</th>
<th>Create my own database</th>
<th>Draw maps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services n=32</td>
<td>75.0</td>
<td>75.0</td>
<td>75.0</td>
<td>68.8</td>
<td>56.3</td>
<td></td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research n=10</td>
<td>20.0</td>
<td>40.0</td>
<td>40.0</td>
<td>60.0</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research n=24</td>
<td>58.3</td>
<td>91.7</td>
<td>91.7</td>
<td>75.0</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research n=22</td>
<td>9.1</td>
<td>63.6</td>
<td>54.5</td>
<td>81.8</td>
<td>45.5</td>
<td>63.6</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs n=10</td>
<td>60.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs n=48</td>
<td>16.7</td>
<td>37.5</td>
<td>45.8</td>
<td>62.5</td>
<td>16.7</td>
<td>4.2</td>
</tr>
<tr>
<td>Overall percentages n=146</td>
<td>39.9</td>
<td>57.9</td>
<td>57.8</td>
<td>65.7</td>
<td>34.1</td>
<td>41.8</td>
</tr>
</tbody>
</table>

5.3.2.11 Attendance at training programmes

Table 5.12 shows the percentage of IU respondents who attended training programmes in CTHMIHR departments. The table indicates that IU respondents were limited in attending training programmes particularly in records management and information management (less than 17%). The table also shows that Internet services, software packages, windows features, and English language packages had limited attendance (less than 32%).

Also, the table reveals that the highest percentage of IU attending Internet services training programmes was in the Dept. of Environmental and Health Research (n=24, 50.0%). The second highest percentage was the Dept. of Architectural and Engineering
Research (n=22, 45%), followed by the Dept. of Administrative and Human Research (n=10, 40%). Only 20.8% of IU (n=48) from the Dept. of Financial and Administrative Affairs used this training course.

Table 5.13 indicates that the highest percentages (only 37.5%) of 32 staff in the Dept. of Information and Technical Services attended software package training programmes, followed by just (27.3%) of the 22 staff in the Dept. of Architectural and Engineering Research. In both the Dept. of Administrative and Human Research (n=10) and the Dept. of Research and Information Affairs (n=10) only 20.0% of IU attended software packages training programmes. The lowest percentages were 8.3% in the Dept. of Financial and Administrative Affairs (n=48) and only 16.7% in the Dept. of Environmental and Health Research (n=24).

**Table 5.12: IU respondents who attended training programmes (percent)**

<table>
<thead>
<tr>
<th>IU=146</th>
<th>Internet services</th>
<th>Software packages</th>
<th>Windows Feature</th>
<th>English language</th>
<th>Records management</th>
<th>Information management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services n=32</td>
<td>31.3</td>
<td>37.5</td>
<td>37.5</td>
<td>18.8</td>
<td>6.3</td>
<td>18.8</td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research n=10</td>
<td>40.0</td>
<td>20.0</td>
<td>20.0</td>
<td>40.0</td>
<td>0</td>
<td>40.0</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research n=24</td>
<td>50.0</td>
<td>16.7</td>
<td>50.0</td>
<td>33.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research n=22</td>
<td>45.5</td>
<td>27.3</td>
<td>18.2</td>
<td>0</td>
<td>18.2</td>
<td>18.2</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs n=10</td>
<td>0</td>
<td>20.0</td>
<td>20.0</td>
<td>60.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs n=48</td>
<td>20.8</td>
<td>8.3</td>
<td>37.5</td>
<td>16.7</td>
<td>8.3</td>
<td>4.2</td>
</tr>
<tr>
<td>Overall percentages n=146</td>
<td>31.3</td>
<td>21.6</td>
<td>30.5</td>
<td>28.1</td>
<td>8.8</td>
<td>16.9</td>
</tr>
</tbody>
</table>

### 5.3.2.12 IU and their problems

Table 5.13 shows the percentage of IU respondents’ problems and their CTHMIHR departments. The percentage of IU respondents’ problems in the CTHMIHR departments were: up-to-date information 38.5%, process of information 35.2%, store
information 34.2%, information came in different format 32%, indexing of information 27.8%, retrieve information 26.9%, and duplication of information 23.0%.

Table 5.13 indicates that the greatest problem for IU in the Dept. of Information and Technical Services was the fact that the information came in a different format (68.8%), followed by indexing information (43.8%). The Dept. of Administrative and Human Research had 100% problem in up-to-date information. The highest percentage of IU problems in the Dept. of Environmental and Health Research was in duplication of information (33.3%), followed by up-to-date information and process of information (25.0%). The highest percentage of IU problems in the Dept. of Architectural and Engineering Research was 45.5% in up-to-date information, process of information; information came in a different format and indexing of information. In the Dept. of Research and Information Affairs the highest percent was storing information (60.0%) followed by process of information (40.0 %). Finally, the highest percent of IU problems in the Dept. of Financial and Administrative Affairs were 29.2% in up-to-date information, process of information; and information came in different format.

<table>
<thead>
<tr>
<th>IU=146</th>
<th>Store information</th>
<th>Retrieve information</th>
<th>Up-to-date information</th>
<th>Process of information</th>
<th>Information came in different format</th>
<th>Duplication of information</th>
<th>Indexing of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services n=32</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>31.3</td>
<td>68.8</td>
<td>31.3</td>
<td>43.8</td>
</tr>
<tr>
<td>Dept. of Administrative and Human Research n=10</td>
<td>40.0</td>
<td>40.0</td>
<td>100</td>
<td>40.0</td>
<td>20.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research n=24</td>
<td>16.7</td>
<td>16.7</td>
<td>25.0</td>
<td>25.0</td>
<td>8.3</td>
<td>33.3</td>
<td>16.7</td>
</tr>
<tr>
<td>Dept. of Architectural and Engineering Research n=22</td>
<td>36.4</td>
<td>36.4</td>
<td>45.5</td>
<td>45.5</td>
<td>45.5</td>
<td>36.4</td>
<td>45.5</td>
</tr>
<tr>
<td>Dept. of Research and Information Affairs n=10</td>
<td>60.0</td>
<td>20.0</td>
<td>0</td>
<td>40.0</td>
<td>20.0</td>
<td>0</td>
<td>20.0</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs n=48</td>
<td>20.8</td>
<td>16.7</td>
<td>29.2</td>
<td>29.2</td>
<td>29.2</td>
<td>16.7</td>
<td>20.8</td>
</tr>
<tr>
<td>Overall percentages n=146</td>
<td>34.2</td>
<td>26.9</td>
<td>38.5</td>
<td>35.2</td>
<td>32.0</td>
<td>23.0</td>
<td>27.8</td>
</tr>
</tbody>
</table>
### 5.3.3 Users Needs

#### 5.3.3.1 Users start using information from CTHMIHR

Figure 5.6 shows the percentage of users who have started using information from CTHMIHR. The figure indicates that the highest percentage of TU who used CTHMIHR information were those with less than two years’ experience (38.6%) followed by the users with more than seven years’ experience (28.8%). On the other hand, the lowest percentage of TU at CTHMIHR were those with greater than four but less than seven years’ experience (10.6%). The highest percent of IU had more than seven years’ experience (37.0%) followed by less than two years’ experience (34.2%). This can be compared with 44.1% of EU who used CTHMIHR with less than two years’ experience followed by two with less than four years’ experience (25.4%). The lowest percent was 9.6% in IU, and 11.9% in EU. The main reasons for this low percentage may relate to a change in the location of CTHMIHR and the arrival of a new middle management. Moreover, Figure 5.6 shows that 66.0% of TU with less than four years’ experience started using information from CTHMIHR.

![Figure 5.6: Users who have started using information from CTHMIHR](image)

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Less than two years experience</th>
<th>Two - less than four years experience</th>
<th>Four - less than seven years experience</th>
<th>Seven years experience and more</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>27.6%</td>
<td>24.2%</td>
<td>18.6%</td>
<td>28.5%</td>
</tr>
<tr>
<td>EU</td>
<td>25.4%</td>
<td>19.2%</td>
<td>25.4%</td>
<td>28.5%</td>
</tr>
<tr>
<td>TU</td>
<td>28.6%</td>
<td>28.6%</td>
<td>26.0%</td>
<td>22.6%</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* TU = IU and EU
5.3.3.2 The number of times the users get information from CTHMIHR

Table 5.14 shows the percentage of times the respondents got information from CTHMIHR. The table indicates that the majority of TU respondents (47.7%) got the information at any time from CTHMIHR, followed by Ramadan and Hajj (25.8%) periods. Less than 5% of TU respondents state that they got the information they needed daily, weekly or monthly.

In more detail, 49.3% of IU respondents got the information at any time following Ramadan and Hajj (28.8%). It is interesting that less than 5% of IU respondents got the CTHMIHR information they needed daily, weekly, or monthly. This indicates that IU obtained all the information they needed in their departments or that they did not know about the information held in other departments. Also, only 13.7% of IU use the information in Hajj and 1.4% in Ramadan.

The highest percentage of EU respondents was at any time (45.8%) and the next highest percentage was during Ramadan and the Hajj (22%). Around 17.0% of EU respondents used CTHMIHR information daily, weekly and monthly. This may be because accessing the information at CTHMIHR was easier during Ramadan and Hajj. On the other hand, the EU found difficulty in accessing records without permission from the dean of CTHMIHR or Heads of the Departments. After a lengthy and complicated application procedure, the EU may find that the information is not available for public use.

Table 5.14: Times users got information from CTHMIHR (percent)

<table>
<thead>
<tr>
<th>Times</th>
<th>IU % N=146</th>
<th>EU % N=118</th>
<th>TU % N=264</th>
</tr>
</thead>
<tbody>
<tr>
<td>At any time</td>
<td>49.3</td>
<td>45.8</td>
<td>47.7</td>
</tr>
<tr>
<td>Daily</td>
<td>4.1</td>
<td>3.4</td>
<td>3.8</td>
</tr>
<tr>
<td>Weekly</td>
<td>0.0</td>
<td>10.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Monthly</td>
<td>2.7</td>
<td>3.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Ramadan</td>
<td>1.4</td>
<td>8.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Hajj</td>
<td>13.7</td>
<td>6.8</td>
<td>10.6</td>
</tr>
<tr>
<td>Ramadan and Hajj</td>
<td>28.8</td>
<td>22.0</td>
<td>25.8</td>
</tr>
</tbody>
</table>

* IU = Internal users  * EU = External users  * TU= IU and EU
5.3.3.3 Methods of requesting information from CTHMIHR

Table 5.15 shows the percentage of respondents’ methods of requesting information from CTHMIHR. As can be seen from the table, more than 62% of the TU respondents used word of mouth (known and unknown contacts) at CTHMIHR, followed by 47.7% of TU respondents who used the telephone to contact CTHMIHR and to access their required information. Less than 19% of the TU respondents used post, fax and e-mail as a way of contacting CTHMIHR. This means that the users of information at CTHMIHR used informal channels (telephone, word of mouth, or friends at CTHMIHR) to access information, and if that failed the users tended to use more formal channels (post, fax, or e-mail).

Table 5.15 shows that the highest percentage of IU respondents did not use e-mail (93.2%), which can be compared with 76.3% in EU as a ways to request information from CTHMIHR. This may relate to the fact that accessing the Internet started in 1998 and CTHMIHR have a limited number of computers that can access the Internet. Also, most of CTHMIHR staff have limited knowledge of Internet services, particularly e-mail. Furthermore, CTHMIHR staff do not have proper training in using Internet services.

Also from Table 5.15, it can be seen that the percentage of EU respondents using informal channels to access CTHMIHR was high (word of mouth - known or unknown contact - and telephone), whereas the percentage was low when formal channels were considered: 23.7% each for email & fax, 28.8% for post.

Table 5.15: Ways in which the respondents required information

<table>
<thead>
<tr>
<th>Ways of requesting information from CTHMIHR</th>
<th>IU % N=146</th>
<th>EU % N=118</th>
<th>TU % N=264</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>11.0</td>
<td>28.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Fax</td>
<td>15.1</td>
<td>23.7</td>
<td>18.9</td>
</tr>
<tr>
<td>E-mail</td>
<td>6.8</td>
<td>23.7</td>
<td>14.4</td>
</tr>
<tr>
<td>Telephone</td>
<td>50.7</td>
<td>44.1</td>
<td>47.7</td>
</tr>
<tr>
<td>Word of mouth (unknown contact)</td>
<td>76.7</td>
<td>45.8</td>
<td>62.9</td>
</tr>
<tr>
<td>Word of mouth (known contact)</td>
<td>37.0</td>
<td>39.0</td>
<td>62.1</td>
</tr>
</tbody>
</table>

* IU = Internal users  * EU = External users  * TU = IU and EU
5.3.3.4 Follow-up information needed

The respondents were asked if they required follow-up information from CTHMIHR (Table 5.16). 91.5% of EU respondents indicated that they needed follow-up information, while 87.7% of IU respondents indicated that they required follow-up information. The result indicated that 89.4% of TU respondents at CTHMIHR required follow-up information, whereas only 10.6% of them indicated that they did not need follow-up information. This related to the long process which was needed to process the information.

Table 5.16: Users who required follow-up the information (percent)

<table>
<thead>
<tr>
<th>Required to follow up</th>
<th>IU %</th>
<th>EU %</th>
<th>TU %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=146</td>
<td>N=118</td>
<td>N=264</td>
</tr>
<tr>
<td>Yes</td>
<td>87.7</td>
<td>91.5</td>
<td>89.4</td>
</tr>
<tr>
<td>No</td>
<td>12.3</td>
<td>8.5</td>
<td>10.6</td>
</tr>
</tbody>
</table>

IU = Internal users  EU = External users  TU = IU and EU

5.3.3.5 Users’ ways to follow up the information required from CTHMIHR

When respondents to this research questionnaire were asked which method they used to gain follow-up information (Table 5.17), 57.6% of TU respondents said that they gained it informally from word of mouth (unknown contact), followed by telephone (47.7%), and by word of mouth (known contact) (40.9%). Less than 13% of TU respondents indicated that they used e-mail, fax, or post (formal communication).

From Table 5.17, it can be seen that there was a high percentage of IU respondents used word of mouth (unknown contact) (67.1%), followed by telephone (46.6%), while less than 10% of IU respondents used formal channels to communicate with departments at CTHMIHR. 50.8% of EU respondents used word of mouth (known contact) to follow up the information by telephone (49.2%), while only 11.9% of EU respondents indicated that they used e-mail.
Table 5.17: Method of gaining follow up information from CTHMIHR (percent)

<table>
<thead>
<tr>
<th>Ways the information is requested</th>
<th>IU % N=146</th>
<th>EU % N=118</th>
<th>TU % N=264</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Post</td>
<td>5.5</td>
<td>94.5</td>
<td>18.6</td>
</tr>
<tr>
<td>Fax</td>
<td>6.8</td>
<td>93.2</td>
<td>18.6</td>
</tr>
<tr>
<td>E-mail</td>
<td>9.6</td>
<td>90.4</td>
<td>11.9</td>
</tr>
<tr>
<td>Telephone</td>
<td>46.6</td>
<td>53.4</td>
<td>49.2</td>
</tr>
<tr>
<td>Word of mouth (unknown contact)</td>
<td>67.1</td>
<td>32.9</td>
<td>45.8</td>
</tr>
<tr>
<td>Word of mouth (known contact)</td>
<td>32.9</td>
<td>67.1</td>
<td>50.8</td>
</tr>
</tbody>
</table>

IU = Internal users  
EU = External users  
TU = IU and EU

5.3.3.6 Times to get Information

The information contained in Figure 5.7 shows the percentages of how much time the respondents took to get information from CTHMIHR. The majority of TU respondents (53.8%) indicated that the information gained from CTHMIHR took at least a day or more, while only 8.3% of TU respondents indicated that they got their information in less than an hour. The highest percentages (57.6% of EU and 50.7% of IU) of respondents indicated that they received the information request from CTHMIHR at least a day later or more. Very few (5.1% of EU and 11% of IU) respondents stated that they received the information in less than one hour.
5.3.3.7 Type of media used to get the information required from CTHMIHR

When the respondents were asked what type of multimedia they used to get the information they required from CTHMIHR (Table 5.18 and table 5.18A), 87% of TU respondents (80.3% of Male and 6.7% of Female) indicated paper sources; 51.5% (48.5% of Male and 3.0% of Female) through albums; 22.0% through video-tape, 21.2% through disk, 14.4% through e-mail, and 10.6% through tape-recording and slides (the respondents from the latter five categories were all Male). This suggests that most of the information held at CTHMIHR was stored in a paper source which took time to retrieve and space for storage.

Also both Tables indicate that only a very limited number of IU respondents are experienced in handling electronic information (less than 27% - all of them are Male). The reasons for CTHMIHR not using electronic information very effectively was due to the disaggregated databases which were programmed in different languages such as Basic, Dbase IV, or Access. Moreover the staff at CTHMIHR have very limited IT skills, and had no proper training to deal with such information. Furthermore, Table 5.18A indicates the fact that CTHMIHR clearly needs to set up a section to deal with requests from Females and provide them with proper training.

A total of 91.5% of EU respondents (76.3% Male and 15.3% Female) indicated that they got the information from a paper source, followed by an album (42.4% of Male and 5.1% of Female). The lowest media source used was from a tape-recorder (5.1% of Male), slides (8.5% of Male), and video-tape (15.3% of Male). This low take up of media sources may indicate that CTHMIHR do not have an adequate information system to search this type of multimedia.
### Table 5.18: The percentage of respondents obtaining information from the media

<table>
<thead>
<tr>
<th>Type of media</th>
<th>IU%</th>
<th>EU%</th>
<th>TU%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=146</td>
<td>N=118</td>
<td>N=264</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Paper</td>
<td>83.6</td>
<td>16.4</td>
<td>91.5</td>
</tr>
<tr>
<td>Disk</td>
<td>26.0</td>
<td>74.0</td>
<td>15.3</td>
</tr>
<tr>
<td>E-mail</td>
<td>12.3</td>
<td>87.7</td>
<td>16.9</td>
</tr>
<tr>
<td>Video-tape</td>
<td>27.4</td>
<td>72.6</td>
<td>15.3</td>
</tr>
<tr>
<td>Tape-record</td>
<td>15.1</td>
<td>84.9</td>
<td>5.1</td>
</tr>
<tr>
<td>Album</td>
<td>54.8</td>
<td>45.2</td>
<td>47.5</td>
</tr>
<tr>
<td>Slides</td>
<td>12.3</td>
<td>87.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>

* IU = Internal users  * EU = External users  * TU = IU and EU

### Table 5.18A: The Gender percentage of users obtaining information from the media

<table>
<thead>
<tr>
<th>Type of media</th>
<th>IU%</th>
<th>EU%</th>
<th>TU%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=146</td>
<td>N=118</td>
<td>N=264</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Paper</td>
<td>83.6</td>
<td>0.0</td>
<td>76.3</td>
</tr>
<tr>
<td>Disk</td>
<td>26.0</td>
<td>0.0</td>
<td>15.3</td>
</tr>
<tr>
<td>E-mail</td>
<td>12.3</td>
<td>0.0</td>
<td>16.9</td>
</tr>
<tr>
<td>Video-tape</td>
<td>27.4</td>
<td>0.0</td>
<td>15.3</td>
</tr>
<tr>
<td>Tape-record</td>
<td>15.1</td>
<td>0.0</td>
<td>5.1</td>
</tr>
<tr>
<td>Album</td>
<td>53.4</td>
<td>1.4</td>
<td>42.4</td>
</tr>
<tr>
<td>Slides</td>
<td>12.3</td>
<td>0.0</td>
<td>8.5</td>
</tr>
</tbody>
</table>

* IU = Internal users  * EU = External users  * TU = IU and EU
The information contained in table 5.18B shows the age profile of TU (N=264) who obtained information from the media. This information reveals that the age group with the highest percentage from TU was aged between 35 and less than 40 (22.0).

Table 5.18B: The Age percentage of total users obtaining information from the media

<table>
<thead>
<tr>
<th>Type of media</th>
<th>Age Less than 20</th>
<th>20 and less than 30</th>
<th>30 and less than 35</th>
<th>35 and less than 40</th>
<th>40 and less than 45</th>
<th>45 and less than 50</th>
<th>50 and less than 55</th>
<th>More than 55</th>
<th>TU = TU and EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>0.8</td>
<td>12.1</td>
<td>15.2</td>
<td>22.0</td>
<td>17.4</td>
<td>12.1</td>
<td>4.5</td>
<td>3.0</td>
<td>87.1</td>
</tr>
<tr>
<td>Disk</td>
<td>0.0</td>
<td>3.8</td>
<td>5.3</td>
<td>5.3</td>
<td>3.0</td>
<td>3.8</td>
<td>0.0</td>
<td>0.0</td>
<td>21.2</td>
</tr>
<tr>
<td>E-mail</td>
<td>0.0</td>
<td>2.3</td>
<td>6.8</td>
<td>3.0</td>
<td>1.5</td>
<td>0</td>
<td>0.8</td>
<td>0.0</td>
<td>14.4</td>
</tr>
<tr>
<td>Video-tape</td>
<td>0.0</td>
<td>4.5</td>
<td>3.0</td>
<td>6.8</td>
<td>3.0</td>
<td>2.3</td>
<td>2.3</td>
<td>0.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Tape-record</td>
<td>0.0</td>
<td>2.3</td>
<td>0.8</td>
<td>3.0</td>
<td>3.0</td>
<td>0.0</td>
<td>1.5</td>
<td>0.0</td>
<td>10.6</td>
</tr>
<tr>
<td>Album</td>
<td>0.0</td>
<td>4.5</td>
<td>10.6</td>
<td>15.2</td>
<td>9.1</td>
<td>4.5</td>
<td>4.5</td>
<td>3.0</td>
<td>51.5</td>
</tr>
<tr>
<td>Slides</td>
<td>0.0</td>
<td>2.3</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>2.3</td>
<td>0.8</td>
<td>0.8</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Table 5.18C shows the highest level of education attained against the type of media used. There is little difference in the distribution where looking at responders will degrees (Bachelor’s, Master or PhD), whereas those respondents without a degree tend to use paper and album with less emphasis an electronic resources.
Table 5.18C: The education percentage of total users obtaining information from the media

<table>
<thead>
<tr>
<th>Type of media</th>
<th>Primary or middle school</th>
<th>Secondary</th>
<th>Diploma</th>
<th>Bachelor’s</th>
<th>Master’s</th>
<th>PhD</th>
<th>Professor</th>
<th>TU = IU and EU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>1.5</td>
<td>6.1</td>
<td>8.3</td>
<td>23.5</td>
<td>23.5</td>
<td>17.4</td>
<td>6.8</td>
<td>87.1</td>
</tr>
<tr>
<td>Disk</td>
<td>0.0</td>
<td>1.5</td>
<td>1.5</td>
<td>8.3</td>
<td>3.8</td>
<td>4.5</td>
<td>1.5</td>
<td>21.2</td>
</tr>
<tr>
<td>E-mail</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>5.3</td>
<td>4.5</td>
<td>1.5</td>
<td>0.8</td>
<td>14.4</td>
</tr>
<tr>
<td>Video-tape</td>
<td>0.0</td>
<td>2.3</td>
<td>2.3</td>
<td>7.6</td>
<td>4.5</td>
<td>3.8</td>
<td>1.5</td>
<td>22.0</td>
</tr>
<tr>
<td>Tape-record</td>
<td>0.0</td>
<td>0.0</td>
<td>0.8</td>
<td>2.3</td>
<td>3.0</td>
<td>4.5</td>
<td>0.0</td>
<td>10.6</td>
</tr>
<tr>
<td>Album</td>
<td>0.0</td>
<td>5.3</td>
<td>6.1</td>
<td>13.6</td>
<td>12.9</td>
<td>11.4</td>
<td>2.3</td>
<td>51.5</td>
</tr>
<tr>
<td>Slides</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>3.8</td>
<td>2.3</td>
<td>3.8</td>
<td>0.8</td>
<td>10.6</td>
</tr>
</tbody>
</table>

5.3.3.8 The way the information was delivered

Table 5.19 shows the percentage of respondents and the way the information was delivered. TU respondents using e-mail and fax were limited (16.7%) while visits or contact with friends at CTHMIHR was the largest percentage (visit 59.8% followed by friends at CTHMIHR 53.8%). This is probably because the user felt a need to personally obtain the information.

The table also indicates that the largest percentage 58.9% of IU respondents used visiting, followed by 53.4% using friends at CTHMIHR, compared with the largest percentage 61.0% of EU respondents using visiting followed by 54.2% using friends at CTHMIHR. Of IU respondents, the lowest percentage 12.3% used e-mail, 15.1% used fax, and 20.5% used post. Of EU respondents 18.6% used fax, followed by e-mail 22.0%. It is interesting that less than 50% of EU respondents indicated that the post was
the method of information delivery. This is because the post system at CTHMIHR takes a long time and is costly.

The table also shows that the percentage of EU respondents (22.0) who used e-mail was greater than the percentage of IU respondents (12.3%). This shows that external users had more IT skills than internal users, but on the whole both groups have very limited internet skills and IT skills.

Table 5.19: Respondents and the way the information was delivered (percent)

<table>
<thead>
<tr>
<th>Way of Information Delivered</th>
<th>IU % N=146</th>
<th>EU % N=118</th>
<th>TU % N=264</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>NO</td>
<td>Yes</td>
</tr>
<tr>
<td>Post</td>
<td>20.5</td>
<td>79.5</td>
<td>47.5</td>
</tr>
<tr>
<td>Fax</td>
<td>15.1</td>
<td>84.9</td>
<td>18.6</td>
</tr>
<tr>
<td>E-mail</td>
<td>12.3</td>
<td>87.7</td>
<td>22.0</td>
</tr>
<tr>
<td>Friend at CTHMIHR</td>
<td>53.4</td>
<td>46.6</td>
<td>54.2</td>
</tr>
<tr>
<td>Visit</td>
<td>58.9</td>
<td>41.1</td>
<td>61.0</td>
</tr>
</tbody>
</table>

* IU = Internal users  * EU = External users  * TU = IU and EU

5.3.4 Users Skills

Table 5.20 shows the percentage of respondents with IT skills. The table represents groups EU and NU under TE, in order test the relationships between IU and TE. The table indicates that 57.9% of TR use Word Processing, the most popular software package. The second highest percentage used Spreadsheets (44.0%), followed by PowerPoint (39.5%). The least popular software package was Database (32.4%). In Internet services, the table indicates that the percentage of TR respondents using E-mail was the highest percentage (56.2%), followed by Web Search (53.4%), Discussion Group (34.2%) and creating a Web Page (29.6%).

Table 5.20 indicates the same order of preference amongst of IU respondents. Word Processing (69.8%) is the most popular software package followed by Spreadsheet (54.8%), and PowerPoint (42.5%) while Database was the least popular (41.3%). In Internet services, the table indicates that the percentage of IU respondents using E-mail was the highest (65.8%), followed by Web Search (61.6%). Discussion Groups use (37.0%), while the lowest percentage was for creating a Web Page (32.9%).
According to Table 5.20, among TE respondents, Word Processing (39.3%) was the most popular software package, followed by PowerPoint (37.2%), while Spreadsheet and Database were the lowest (26.2%). Of Internet Services, the table indicates that the percentage of TE respondents using E-mail was the highest (49.3%), followed by Web Search (47.3%), Discussion Group (32.2%), and Create Web Page (27.2%). (See Appendix 5 for tables A5.1 to A5.7)
Table 5.20: Respondents with IT skills (percent)

<table>
<thead>
<tr>
<th>Software Packages:</th>
<th>IU=146, TE(EU+NU)=199</th>
<th>TR=345</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Word Processing (e.g. Word)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>49.3</td>
<td>20.5</td>
</tr>
<tr>
<td>TE</td>
<td>31.2</td>
<td>18.1</td>
</tr>
<tr>
<td>TR</td>
<td>38.8</td>
<td>19.1</td>
</tr>
<tr>
<td>b) Spreadsheet (e.g. Excel)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>35.6</td>
<td>19.2</td>
</tr>
<tr>
<td>TE</td>
<td>16.1</td>
<td>20.1</td>
</tr>
<tr>
<td>TR</td>
<td>24.3</td>
<td>19.7</td>
</tr>
<tr>
<td>c) Presentation (e.g. PowerPoint)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>31.5</td>
<td>11.0</td>
</tr>
<tr>
<td>TE</td>
<td>13.1</td>
<td>24.1</td>
</tr>
<tr>
<td>TR</td>
<td>20.9</td>
<td>18.6</td>
</tr>
<tr>
<td>d) Database (e.g. Access)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>24.7</td>
<td>16.4</td>
</tr>
<tr>
<td>TE</td>
<td>10.1</td>
<td>16.1</td>
</tr>
<tr>
<td>TR</td>
<td>16.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Internet services:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) E-mail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>50.7</td>
<td>15.1</td>
</tr>
<tr>
<td>TE</td>
<td>35.2</td>
<td>14.1</td>
</tr>
<tr>
<td>TR</td>
<td>41.7</td>
<td>14.5</td>
</tr>
<tr>
<td>b) Web search</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>45.2</td>
<td>16.4</td>
</tr>
<tr>
<td>TE</td>
<td>32.2</td>
<td>15.1</td>
</tr>
<tr>
<td>TR</td>
<td>37.7</td>
<td>15.7</td>
</tr>
<tr>
<td>c) Discussion Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>17.8</td>
<td>19.2</td>
</tr>
<tr>
<td>TE</td>
<td>15.1</td>
<td>17.1</td>
</tr>
<tr>
<td>TR</td>
<td>16.2</td>
<td>18.0</td>
</tr>
<tr>
<td>d) Create web page</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IU</td>
<td>13.7</td>
<td>19.2</td>
</tr>
<tr>
<td>TE</td>
<td>10.1</td>
<td>17.1</td>
</tr>
<tr>
<td>TR</td>
<td>11.6</td>
<td>18.0</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* NU = Non-users
* TR = Total Respondents
5.3.5 Users Opinions

5.3.5.1 Users' Impressions of CTHMIHR Information

Table 5.21 and Figure 5.8 illustrate the respondents' impression of CTHMIHR information. The overwhelming majority of respondents (94.7%) had a positive impression of the quality of information: 31.1% thought it was excellent, 40.9% good and 22.7% acceptable. As regards the quantity of information, there were similarly positive impressions: 15.9% thought the quantity was excellent, 43.9% thought it was good, and 30.3 thought it was acceptable.

As regards the display of information, a large proportion of TU respondents thought it was good (42.4%), and 17.4% found it excellent. 21.2% thought it was acceptable, and less than 20% of TU respondents indicated that it was not good or that they did not know. Opinion about the accuracy of information was similar: 41.7% indicated that it was good, 18.2% thought it was excellent, and 16.7% thought it was acceptable, while 20% of TU respondents stated that it was not good or that they did not know. This means that the respondents' impression of displaying and accuracy of information was very good (more than 80%).

In timeliness of information, 31.8% of TU stated that it was good or acceptable, 12.1% thought it was excellent, and 25% indicated that it was not good or that they did not know. 30.3% of TU respondents indicated that the information was up to-date, 27.3% thought it was acceptable and 9.8% thought it was excellent. 32.6% of them indicated that it was not good or that they did not know. This means that the respondents' impression of timeliness and topicality of information was good (around 68%). (See appendix 6 for tables A6.1 to A6.6)
Table 5.21: TU impressions of CTHMIHR information (percent)

<table>
<thead>
<tr>
<th>Impression</th>
<th>a) Quality of information</th>
<th>b) Quantity of information</th>
<th>c) Display of information</th>
<th>d) Accuracy of information</th>
<th>e) Timeliness of information</th>
<th>f) Up-to-date nature of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>31.1</td>
<td>15.9</td>
<td>17.4</td>
<td>18.2</td>
<td>12.1</td>
<td>9.8</td>
</tr>
<tr>
<td>Good</td>
<td>40.9</td>
<td>43.9</td>
<td>42.4</td>
<td>41.7</td>
<td>31.8</td>
<td>30.3</td>
</tr>
<tr>
<td>Acceptable</td>
<td>22.7</td>
<td>30.3</td>
<td>21.2</td>
<td>16.7</td>
<td>31.8</td>
<td>27.3</td>
</tr>
<tr>
<td>Not good</td>
<td>3.0</td>
<td>6.1</td>
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<td>16.7</td>
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* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents
5.3.5.2 Users’ opinions of IT

Table 5.22 shows the percentage of respondents’ opinions about the ability of CTHMIHR staff to deal with IT. The table indicates that the majority of respondents agree that CTHMIHR should increase their co-operation between staff (82%). The second highest percentage of TR opinion agrees that facilities should be improved in CTHMIHR (80.8%), and 80.3% agree that it is easy to use IT services there. 79.4% of TR agree that CTHMIHR should have knowledge of the English language, and 78.6% believe in increased incentives to undertake training. The lowest percentages of TR opinion commented on bureaucracy and the centralisation of administration in the departments (47.6%) and in CTHMIHR (52.8%), followed by the mobility at work (66.1%). (See appendix 7 for tables A7.1 to A7.8)
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<td><strong>h) Mobility at work</strong></td>
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* IU = Internal users  * TE = EU and NU  * TR = Total Respondents
5.3.5.3 Users’ opinion of IM

Table 5.23 shows respondents’ opinions about the effectiveness of IM at CTHMIHR. The table indicates that overwhelming majority (90.2%) agree to the understanding of IM. The second largest group (83.2%) agrees on improving electronic records as well as controlling record creation and growth. Moreover, other large groups believe in developing a clear policy for IM, IT, and IS (80.9%), the compatibility of databases with Data Protection laws (80.9%), and the integration of databases (80.8%). There was support for developing a Call Centre (78.6%), a Records Centre (76.2%), and investigation into IT rather than IM (71.9%). The was less support for the statement that the information was not up-to-date (47.5%), that information was not held at CTHMIHR (46.7%), and that there was duplication of the same records in different departments (44.9%).
Table 5.23: User opinion about the effectiveness of IM at CTHMIHR

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* IU = Internal users  * EU = External users  * NU = Non-users  
* TE = EU and NU  * TR = Total Respondents
Table 5.23: User opinion about the effectiveness of IM at CTHMIHR (continued)

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<tr>
<td></td>
<td>TE</td>
<td>25.6</td>
<td>21.1</td>
<td>45.2</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>TR</td>
<td>24.6</td>
<td>20.9</td>
<td>41.2</td>
<td>9.9</td>
</tr>
<tr>
<td>k) Duplication of the same records in different departments</td>
<td>IU</td>
<td>24.7</td>
<td>21.9</td>
<td>24.7</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>28.6</td>
<td>18.1</td>
<td>35.2</td>
<td>13.1</td>
</tr>
<tr>
<td></td>
<td>TR</td>
<td>27.0</td>
<td>19.7</td>
<td>30.7</td>
<td>15.7</td>
</tr>
<tr>
<td>l) Information is not held at CTHMIHR</td>
<td>IU</td>
<td>23.3</td>
<td>21.9</td>
<td>28.8</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>26.1</td>
<td>23.1</td>
<td>35.7</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>TR</td>
<td>24.9</td>
<td>22.6</td>
<td>32.8</td>
<td>14.5</td>
</tr>
<tr>
<td>m) Information is not up-to-date</td>
<td>IU</td>
<td>23.3</td>
<td>21.9</td>
<td>28.8</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>TE</td>
<td>23.3</td>
<td>21.9</td>
<td>28.8</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>TR</td>
<td>24.9</td>
<td>22.6</td>
<td>32.8</td>
<td>14.5</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TR = Total Respondents
The respondents were asked their opinion about how the understanding of IM would affect IM at CTHMIHR. Table 5.24 indicates that more TE (91.0%) agreed about the understanding of IM than the IU (79.1%). Only 5.5% of IU and no TE respondents disagreed about the understanding of IM.

Table 5.24 shows the difference between IU and TE, and their perception of IM. The $\chi^2$-test was used to test the significance of association between these relationships.

Table 5.24: User types and their opinion about how their understanding of IM would affect IM at CTHMIH

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>82</td>
<td>48</td>
<td>8</td>
<td>8</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>149</td>
<td>32</td>
<td>18</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>231</td>
<td>80</td>
<td>26</td>
<td>8</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the understanding of IM. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of the understanding of IM.

The result of the $\chi^2$-test shows that there is significant difference between IU and TE and their impression of the understanding of IM. The calculated test value ($\chi^2 = 26.97$, df =3, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may be related to IU knowing IM problems and not knowing how to deal with them, which include information overload, lack of an information strategy, lack of IS, lack of IT, lack of creation and maintenance of databases, duplication of records in different departments, and no plan for disaster prevention and recovery. However, TE feel the importance of IM to CTHMIHR starting with the creation of records and
indexing, through storage and retrieval of information, to presenting and destroying information. Improving information management will improve information services and satisfy user needs. For the rest of user opinion about the effectiveness of IM analysis extra analysis see appendix 8 for tables A8.1 to A8.12.

5.3.6 Summary of the Questionnaire Analyses
The majority of respondents came from Umm Al-Qura University, and others came from CTHMIHR, local authorities, and companies. The majority of respondents possess postgraduate qualifications (Professor, PhD, and Master's), and the majority of IU respondents were full-time employees (n=78, 53.4%); the remainder of the respondents were part-time (n= 68, 46.6%).

Respondents mentioned informal channels (telephone, direct talk, or friends at CTHMIHR) as ways of accessing information, and if that failed they used formal channels (post, fax, or e-mail). When the respondents were asked how much time they took to get information from CTHMIHR, the majority of TU respondents indicated that it was at least a day or more, while few TU respondents indicated that they got their information in less than an hour. The majority of TU respondents were required to follow up the information they needed, whereas a few indicated that they did not need to do so.

The respondents indicated that Word Processing is the function with the highest percentages of use, followed by using a Spreadsheet. The lowest percentage of use of software packages was Databases, followed by using presentation graphics. Also the respondents indicated that using E-mail was the highest percentage of Internet Service usage, followed by Web Search; while the lowest percentage was Creating a Web Page followed by use of a Discussion Group.

The majority of TU (67.4%) respondents indicated that the impressions about quality, quantity, display, accuracy, timeliness, and the up-to-date nature of information were good.
In the respondents' opinion about the ability of CTHMIHR staff to deal with IT, the most important point is to increase co-operation between CTHMIHR staff. The second most important point is an improvement of IT facilities and the ease of use of IT services at CTHMIHR, followed by the knowledge of English language and an increase in incentives to undertake training.

Finally, in all the respondents' opinions about the ability of functions to affect IM at CTHMIHR, there was strong agreement about the importance of understanding IM and improving electronic records as well as controlling record creation and growth, also in developing a clear policy of IM, IT, and IS. It was also agreed that databases must be compatible with Data Protection mechanism, and the integration of databases is very important. Moreover, the development of a Call Centre and a Records Centre are also very important.

5.4 Observations analysis

5.4.1 The Resources

In recent years, CTHMIHR has completed a number of Arabic and English resources. These resources are:

- The first descriptive and cumulative index of studies, reports, research, and maps;
- A statistical database for pilgrims and analytical studies about the well of Zam Zam, for drinking water;
- Databases for video tapes, slides, and pictures at CTHMIHR;
- Database design for CTHMIHR related to administrative work;
- Guide map information for several sites;
- Databases for temperature and humidity in Makkah and other Holy places;
- Database for research consultants in the universities throughout the Kingdom of Saudi Arabia;
- Historical pictures about Makkah, Madinah and Holy places;
- Final results and recommendations of researchers and studies;
- Final reports and evolution of the services that are provided to pilgrims.
5.4.2 Process of Information

The process of the information at CTHMIHR can be divided into two basics processes, the external and internal.

5.4.2.1 External processes

The information contained in Figure 5.9 shows the users' ways of requesting information or services from CTHMIHR (external process). Usually, users request information by using informal channels, such as a visit (by word of mouth or face to face communication) or friends (by telephone or e-mail), but if the informal channel fails the users use formal channels to communicate with high and middle management, such as a formal letter sent by post, fax, or e-mail. The external process using a formal channel will take time and the process they last between one day and several weeks, while the informal channel may be very quick (not more than one day or sometimes less than an hour). Most users use both channels (formal and informal) at the same time to speed access to CTHMIHR information.

Figure 5.9: The direction of external process in CTHMIHR
5.4.2.2 Internal processes

The internal process of information at CTHMIHR can be divided into four basic processes (See Figure 5.10):

1. The Downward process
2. The Upward process
3. The Horizontal process
4. The Diagonal process

**Downward process**

Usually information flows from high level management to operation control staff at the low level of CTHMIHR (Figure 5.10). This type of downward process can be effected by different types of communication, such as formal letters, direct talk, telephone, meetings. A large amount of information can be conveyed by the downward process, such as policies, research, and studies to be done, hours of work.

**Upward process**

Information flows up from operational controls to high level managements (Figure 5.10). Upper management is required to know specifically about the results of research and evaluating services that are provided to users, particularly pilgrims. Here is some information can be passed from operational controls, such as reports, suggestions, recommendations and ideas, results of research and studies.

**Horizontal process**

The information exchanged in this type of horizontal process happens between heads of the CTHMIHR departments, on the roughly equivalent rank or on the same level, either in the same units within departments or in different departments (Figure 5.10). This horizontal process is normally used for cooperation and coordination of their activities. The horizontal process can be used to communicate by direct talk, by telephone, between friends, general meeting or face-to-face interviews.
Figure 5.10: The four directions of internal processes in CTHMIHR

Diagonal process
The information exchange may develop amongst staff at different levels who have no direct reporting relationships. Such informal relationships may develop between staff within and between departments (Figure 5.10). This results from frequent contact in the performance of work. The diagonal process can increase and speed up information flow and also help to improve understanding and coordinate effort for the achievements of CTHMIHR objectives. On the other hand, using the diagonal process may affect Heads of Departments if they do not know anything about their staff’s work.
5.4.3 Means of Communication

Different means of communications are used to request and deliver information from CTHMIHR. These are:

- Post
- Telephone and
- E-mail
- Visit (word of mouth or face-to-face communication)
- Friends at CTHMIHR (telephone or e-mail)
- Others, for example Mobile telephone

Most communications at CTHMIHR can be divided into two types, formal communication such as letters sent by post or fax, and informal such as telephone, e-mail, visit or friends at CTHMIHR.

5.4.3.1 Communication between offices

Formal communications received at the Department of Financial and Administrative Affairs are collected on the same day and passed to the Dean’s office. After the Dean or Deputy Dean has seen all the papers, he orders them to be passed to relevant department(s). Then the Head of Department(s) passes the papers to the specific employees to do their job and return the papers. These processes will take between 1-4 days. Staff at CTHMIHR can access the sources of information by using the local network and downloading the information. Only the Dean, Deputy Dean, Heads of department, and some staff have access to the Internet and send and receive e-mails.

The other type is informal communication, such as telephone, face-to-face meetings, or calling friend(s) at CTHMIHR. These processes take between 15 - 60 minutes, depending on the type and storage media of information.

5.4.3.2 Between branches

A letter will take at least seven days by post to move from the main branch in Makkah to the other branch in Madinah, which increases the time of communication between offices. However, the Madinah branch does not have access to a local network or the Internet.
5.4.4 Types of Media Information Storage

The information type that is held at CTHMIHR includes:

**Paper Files**: a file can be defined as a folder that is used to store related papers on a particular subject in the proper order.

**Forms**: a form is an official document used inside CTHMIHR with spaces where users answer questions and provide information. The main purpose of the form is to collect information. Each form has different functions, such as a questionnaire or request for facilities, reports, and devices from other departments. These forms are stored in files with a serial number and a date. These files are labelled by the name of the forms and year, and then they are put together with papers files in shelves or cabinets.

**Reports**: a report is a formal document which discusses a particular subject or states what happened. The main purpose of the report is to keep high management up to date with relevant developments within and outside CTHMIHR. There are different types of reports used in CTHMIHR that could be annual, quarterly, monthly or seasonal (Hajj, Ramadan, and holidays).

**Studies**: a study is a piece of work created by CTHMIHR to find out more about a particular subject or problem and usually results in a written report.

**Research**: research is used in CTHMIHR to study a subject in detail, particularly in order to find out new facts or ideas.

**Video tapes**: a video tape is a type of media used to record moving pictures about study or research.

**Audio tape**: Audio tape is used to store spoken records used in CTHMIHR studies or research fields.
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**Album collection:** an album collection is a book used to store CTHIMHR studies or research photographs. This Album can store an average of 36 photographs to keep them clean, safe and easy to access.

**Slides storage:** a slide is a small piece of film in a frame that shows a picture on screen. A group of an average 36 slides can be stored in a plastic box to keep them clean, safe and easy to access.

**Microfiches:** a microfiche is known as a small sheet of photographic film that can be used to store information in very small print. CTHMIHR uses microfiche to store a huge number of historical documents related to Hajj, Umrah, and the Holy places.

These video tapes, audio tapes, album collections, slides storage and microfiches are stored in drawers, on shelves or in cabinets and labelled by the name and year. Some departments put every type of media together in any order. For example the department of Research and Information Affairs puts every type of media together in special cabinets sorted by year.

**E-Sources:** a collection of electronic information stored in the computers such as databases, e-mail, and computer files.

**Books:** CTHMIHR has a large number of books related to the Hajj, Umrah, and Holy places. CTHMIHR also has a number of specific and science books related to the area of the research work.

**Pictures:** photographs created by CTHMIHR staff are used to distribute in different sizes and are free to users of CTHMIHR information.

**5.4.5 Departments and Type of Media Storage**

Table 5.26 shows the types of media storage that are held as information in every department at CTHMIHR. All departments have at least between 8 and 11 types of media storage. Only the department of Administrative and Human Research has
microfiche and only three departments of CTHMIHR have pictures and four departments have tape records.

Table 5.25: Departments and types of media storage

<table>
<thead>
<tr>
<th>Departments</th>
<th>Paper Files</th>
<th>Forms</th>
<th>Reports</th>
<th>Studies and research reports</th>
<th>Video tapes</th>
<th>Audio Tapes</th>
<th>Album collections</th>
<th>Pictures</th>
<th>Slide storage</th>
<th>Microfiche</th>
<th>E-Sources</th>
<th>Books</th>
<th>Total types of media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. of Information and Technical Services</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td></td>
<td>11</td>
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<tr>
<td>Dept. of Administrative and Human Research</td>
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<td>✓</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Dept. of Environmental and Health Research</td>
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<td>✓</td>
<td></td>
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<tr>
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<td></td>
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</tr>
<tr>
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<td></td>
<td>10</td>
</tr>
<tr>
<td>Dept. of Financial and Administrative Affairs</td>
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<td>✓</td>
<td></td>
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<tr>
<td>Al- Madinah Branch</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Number of Departments</td>
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<td>7</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
<td>145</td>
</tr>
</tbody>
</table>

5.4.5.1 Observations on paper filing and forms

- The files can fit in drawers, shelves or cabinets and all files are labelled on the outside by the name of the file and the year;
- The files can be opened and related to the subject and the papers in the file sorted by serial number and the date the paper arrived;
- It should be noted that the number of files that have been created has increased substantially and every department creates files without proper control;
- There is an increase in the number of files created but never used and still stored in the same offices;
- Some departments, such as Financial and Administrative Affairs and Environmental and Health Research, create new files every year, although the files are the same as those created in the previous year;
- It should be noted that there is a mixture between original and copy papers in the files, which indicates that there is a large number of duplication papers distributed around CTHMIHR;
- More than 14 copy machines are scattered in different departments in CTHMIHR, which leads to an increased number of records and also duplication of papers;
- The CTHMIHR does not tend to propagate duplications of paper files. If there is a situation in the future when all paper files are lost (e.g., fire, earthquake), then there will be no history available.
- Around 70% of papers files have been used for historical purposes.
- Limited back ups of CTHMIHR information is available from the source files in the Department of Financial and Administrative Affairs; but only correspondence between this Department and other CTHMIHR Departments.
- Current untrained staff have difficulty with filling and record management systems, especially where data refers to numerous sources simultaneously.
- As the staff find it difficult to store files, it follows that they have difficulty in retrieving papers, particularly those papers related to a numbers of subjects.
- There is no master plan for records management, each department is responsible for taking care of own information and storing or archiving.

5.4.5.2 Observations on video tapes, audio tapes, album collection, slide storage and microfiche

- These video tapes, audio tapes, album collection, slide storage and microfiche are stored in drawers, shelves or cabinets, and then labelled by the name and year.
Most of the departments put every type of media together in any order. The department of Research and Information Affairs puts every type of media together in special cabinets sorted by year.

Some types of media were found in every department such as video tapes, album collections and slide storage, but most are originals and there are no duplicates.

5.4.5.3 Observations on reports, studies and research

These reports, studies and research reports are stored in drawers, on shelves or in cabinets, without any order. Some departments mix together studies, research, manuals, books, and magazines. Other departments store every type together sorted by year of establishment.

The Publishing Unit works to make copies from reports, studies or research. It can be noted that all original and copy matters have been stored in moveable cabinets with a serial number and departments. The room also has shelves to store unwanted copies or those with old type of binding.

5.4.5.4 Observation on E-sources

Every department creates its own databases by using programs from the Department of Information and Technical services to create departmental databases. That means there is no clear plan for integrating these databases and clarifying what these databases should contain.

Some departmental databases are used only on the departmental PCs and not on the LAN. Users, particularly internal users, find difficulty in accessing these databases without permission from the Head of the department or from the Dean.

Lack of database integration: CTHMIHR uses at least four types of software to create their databases (Basic, Dbase VI, Access, Oracle), which are used in programming most Arabic databases. In addition, different types of software are used in the above databases to accept Arabic words, including Al-Msaed Al-Arabic, Al-Nafitha, and Arabic for Windows. That is why it is difficult to switch between these databases.
• Most of the databases are created without any documentation that help the programmer to maintain them or keep them up-to-date.
• Some staff bring their own software which is usually a copy.
• There is a lot of unnecessary output, such as paper, tapes, CDs, and disks (both 5.5 and 3.5 inch), the major reason for that is lack of information professionals.
• No back-up procedures are regularly used.
• There is no clear plan for virus problems and disaster prevention.
• There is no automatic security alarm in place.
• There is no control of static electricity near computers.
• There is no clear policy regarding using Internet services.

5.5 Documents analysis
An organisation's documents can help to reveal the formal system which is underlies many of the organisation's activities. Therefore, such documents play a very important role in helping the researcher to gather information about the current system. Policy and procedure documents, charts, files of reports and forms currently used, and system documents can provide background information about current system, plus a system overview. The objectives of CTHMIHR were presented and managerial structured in chapter 1, and this part of the document analysis is the major areas of CTHMIHR studies.

CTHMIHR carries out its studies and research work throughout the whole year, reaching a peak during the Hajj and Ramadan seasons. As a research consulting body, the Institute provides research results and recommendations to the different authorities, which may choose to effect partial or complete implementation. Over the years, CTHMIHR has carried out many studies covering the different aspects of the Hajj relevant to planning and construction of projects in Makkah, Holy places and Madinah. These studies are made using the latest techniques and equipment in addition to the aerial photography that proved effective in providing solutions to organise pilgrims' movements. The major areas of these studies are:
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- **Sacrifice of animals**: CTHMIHR has paid special attention to the studies related to the sacrifice of animals. These studies have included statistical surveys, testing a number of alternative techniques for meat preservation, and selecting the most efficient. These studies were the basis for the Kingdom of Saudi Arabia's Project for the Utilization of Hady (Islamic name) and Sacrificial Meat.

- **Movement of pilgrims**: These may be classified into three groups.
  1. Inter-city pilgrim movement, comprising movement studies between Makkah and Jeddah and also between Makkah and Madinah.
  2. Local pilgrim movement. These studies include aspects of local movement between Holy places, i.e., Arafat-Muzdalifa, Muzdalifa-Mina and Mina-Makkah. In addition these studies have also differentiated between pedestrian and vehicular movement.
  3. Special area movement. These are pilgrim movements in special areas such as Jamarat bridge, and Tawaf in the Holy Mosque. By their very nature, these are exclusively pedestrian areas.

These studies aim at solving the problem of overcrowding in different areas during the holy month of Ramadan and Hajj periods. The suggestion made by CTHMIHR of banning small private cars from entering the Hajj areas during the Hajj period proved to be effective in dealing with this problem.

CTHMIHR carries out field studies, produces TV films, performs questionnaires to identify the problems facing pilgrims during their movement and to study measures of solution. CTHMIHR continues to record all changes in pilgrim movement resulting from Holy places development projects through automatic vehicle counters, field surveys and aerial photography during the Hajj season.

- **Urban, Environmental and Planning studies**: various studies may be noted, e.g., a land-use study in Mina which aims at improving the efficiency of land use and increasing the total capacity in the valley to accommodate the increasing number of pilgrims. The study of the climatic and environmental conditions,
drinking water, liquid and solid waste, air quality and pollution are all included in this area. The development of the traditional tents to provide greater fire resistance and better thermal conditions, are examples of the studies made on tents as well as developing new forms of suitable accommodation. CTHMIHR contributed in urban re-planning projects of Makkah and Madinah and Holy places and continues to follow up these projects. Urban studies included recording and documenting many old traditional buildings before demolition. The Institute issues every year a guide map for Mina and Arafat illustrating the locations of all Towafa institutions and public official facilities.

- **Cultural, Historical and Social studies**: These studies aim at preserving the natural and Islamic environmental setting in Makkah and Madinah and the Holy places. They include documenting the spoken history of Hajj and Makkah through interviewing old pilgrims and old residents of Makkah, and recording and preserving old traditions and traditional arts and crafts that may be lost in time. The studies also address the level of services provided to pilgrims as well as studying pilgrim accommodation in Makkah and Madinah. The CTHMIHR gathers basic statistical data every year on pilgrims.

Periodic studies are issued by CTHMIHR including the demographic characteristics of pilgrims and vehicular movements round the year. The Institute also regularly carries out specially requested research work.
Chapter 6 | SSM Application for Design
IMS at the CTHMIHR

6.1 Introduction
The purpose of this chapter is to apply SSM to design IMS at the CTHMIHR. It is divided into seven parts: the problem situation unstructured, problem situation expressed, Root definition (RD) for reference systems, building conceptual models, comparison of conceptual models with the real world (RW), desirable and feasible changes, and taking action.

6.2 Stage 1: The Problem Situation Unstructured
The use of the words ‘problem situation’ rather than ‘problem’, and ‘unstructured’ indicate that the researcher examined this situation in as open a way as possible, without trying to pre-cast it in a particular mode (Naughton, 1984).

The main aim of CTHMIHR is to establish an information bank about the Hajj. This information bank should function as a comprehensive scientific reference source that provides statistics, details, and facts to assist in planning the utilities and services of the Pilgrimage. IM at CTHMIHR has a number of problems in particular the rapid increase in records, duplication of records, information distribution in different departments with different formats, insufficient information strategies, and lack of information control. Therefore, IM problems in CTHMIHR are surrounded by confusing and sometimes conflicting views on whose domain the responsibility lies within.

The Dean complains that information comes to CTHMIHR in many forms to and from different departments, therefore the information is scattered between departments, so staff find it difficult to manage information, particularly to store and retrieve it. The Dean adds that there are not many external users, and especially very few women; lack of funds and E-sources; and non Arabic users find it difficult to access CTHMIHR information.
Heads of department complain that staff do not have any training to index, store, retrieve or dispose of information; and the number of trained staff in the departments is very limited in view of the large number of jobs to do. Furthermore, there is a lack of IT or IS use at CTHMIHR; and no master plan for bought technologies. The result is a large collection of computers (PC, Mac), printers (PC, Mac), and plotters that are not used; IT/IS personnel do not understand the department needs; there are no written manuals for the current IS; and the local area network (LAN) does not work properly. The Heads of department state that there is no integration between databases, so every department creates their own database relevant to its needs, without any integration with other databases. Moreover, the Heads of department complained of an increase in the number of files that are created but never used, but still stored in the same offices; and no information conforms with Data Protection law. The Heads of department noted that some users do not know what type of information they need and female users may find it difficult to access information. This may be because there is no suitably segregated section where female enquirers may access information.

IT staff complained that there is a lack of IT management; no master plan for the development of IS; a limited number of IT operations and programmers; a lack of interest in training courses; some staff using illegal copies of software; and there are no clear policies on using the Internet. They added that Heads of department have a limited knowledge about different types of media; there is a lack of automatic security alarm in places; and no control of static electricity; no clear plan for virus problems and disaster prevention. Furthermore, the IT staff complained that there is no understanding of the importance of users in IS design.

Non-IT Staff complained that they do not now how to store and retrieve information; information is stored in an unsuitable environment; there is a duplication of information in different departments; and they find it difficult to up-date databases. In addition, staff do not know what information is held in other departments and they cannot access other departments’ information without permission. There are further problems with information needs; lack of English language and training courses; and limited
knowledge of IT and the Internet. The current system is very complex and focuses on IT rather than its uses; little support is offered in the use of hardware and software.

Users complained that they do not know different types of CTHMIHR information; the process of accessing information takes a long time; it is difficult to access information without permission from high management; CTHMIHR provides users with very limited information and not in the right format; information is not up-to-date; the website provides nothing to users; users find it difficult to exchange information and ideas (lack of communication); users require electronic information; and users have limited knowledge of using IT. Female users, particularly researchers, believed that they face problems in accessing information because of religious culture; they do not know what kind of information CTHMIHR holds; they do not have IT skills; and CTHMIHR does not have a female section to deal with their requirements.

It is clear that there is a lot of unnecessary output such as papers, tapes, and disks; there is a lack of electronic back-up and files can be put anywhere on the shelves or in cabinets, in any order; there is a lack of security; there are more than 14 copy machines which increase record duplication; originals and copies are mixed in the same file; there are incompatible systems within CTHMIHR; some databases are stored in the departmental PCs but not on the LAN; and there is only one member of IT staff dealing with all IT and IS issues. It is also clear that reports, studies, and research are stored in drawers, shelves, or cabinets in any order, and some departments mix them together with manuals, books, and magazines. There is a lack of a clear information strategy, and no master plan to create and manage paper files. Investment in IT has been piecemeal, leading to technical incompatibilities; and staff see no benefits in learning more, but have extra jobs to do.

The Dean and Heads of Department are aware of these problems, but they cannot identify the source of those problems or the people responsible for them and do not know how to deal with the problems.
6.3 Stage 2: Problem Situation Expressed

In this stage, the researcher aimed to express the problem situation in a way that helps relevant systems to be chosen in stage 3. Rich Picture (RP) was used to describe stage 1 by analysing the data collected by interviews, questionnaires, and through direct observation. So the researcher fulfilled his aim of addressing all internal and external users, information technologies, and conflicts between them (See Figure 6.1).

6.4 Stage 3: Root Definition (RD) for Relevant Systems

The researcher isolated some part or parts of the problem situation (as seen in the RP) and framed them as a system model.

Summers (1992) outlined the steps involved in generating RD as:

1. Identify problem themes;
2. Decide which problem themes go forward;
3. Construct RD for each problem theme chosen; and
4. Test RD via CATWOE.

Steps I and II: the researcher looks at the RP and finds out the action areas that stand out. The problems could be related to CTHMIIHR's services, technology development, relations with users; and with the departments as a whole. The researcher grouped these into 11 structure problem themes which are:

1) Strategic planning   6) Staffing
2) Financial resources  7) Staff development and training
3) Information policy   8) Records management system
4) Technical system     9) Database system
5) Information Communication Technology (ICT) system 10) Security system
6) User needs

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- CTMHR does not have a formal system to answer any request for information.
- Staff do not have any IT skills.
- Users do not know what types of information they need.
- Some users do not know what type of information they need.
- Some users do not have IT skills.
- There are users that have machines, but there is no system to support them.
- There is no clear plan for user training.
- There is no IT policy.
- Some users do not have a database.
- The system is difficult to understand.
- Staff do not have skills to use the system.
- There is a lack of training.
- Information is scattered in different departments.
- There is no clear information strategy.
- Information is not updated regularly.
- There is a lack of information about users.
- Some users do not have access to information.
- Some users do not have access to the system.
- There is no information about users.
- There is no information about the system.
- There is no information about the users.
- There is no information about the system.
- There is no information about the users.
- There is no information about the system.
- There is no information about the users.
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- There is no information about the users.
- There is no information about the system.
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- There is no information about the system.
- There is no information about the users.
1) **Strategic planning:** the need for
   - IT, IS and IM strategies
   - A master plan for the development of IS, security of information, bought technologies, and disaster prevention and recovery
   - A master plan to create and manage paper files, maintain databases, to maintain IT and IS, and to collect and store information, and
   - A master plan to educate staff and users in using technologies (training), fund management, and communication and information security.

2) **Financial resources:** the need for
   - More financial resources, and
   - Fund management.

3) **Information policy:** the need for a clear policy on:
   - Using the Internet
   - Compatibility with Data Protection law
   - Accessing CTHMIHR information
   - Bought technologies
   - Using hardware and software
   - Accessing communication rooms
   - Creating files, and
   - Staff use of illegal software.

4) **Technical system:** the need for
   - Writing manuals for the current IS
   - Arabic applications
   - Compatible and integrating IT/IS systems
   - Focusing on IM rather than using IT applications
   - Designing a system which takes account of information handling behaviors
   - Knowledge of experts in IT, and
5) ICT system: the need for
   - Proper working LAN
   - Accessing information easily and smoothly
   - Creating a female section
   - Simplifying information process, and
   - Encouraging users to use formal communication channels.

6) Staffing: the need for
   - Training on how to deal with information
   - More IT and IS operational staff
   - Increased IT skills
   - Support staff for IT and IS
   - Staff motivation for learning IT skills
   - Sharing information across departments, and
   - Knowing how to store and retrieve information.

7) Staff development and training: the need for
   - English language training
   - IM, IS, and IT training
   - Records management training, and
   - Understanding of departmental needs.

8) Records management system: the need for
   - Organizing files
   - Controlling record creation
   - Separating paper originals and copies
   - A clear and easy method of indexing, storing, and retrieving information
   - Minimizing files created but never used
   - Limiting information overload, and
• Classifying and separating research reports and studies from books, manuals and magazines.

9) **Database system:** the need for

• Integration between databases
• Centralizing of databases
• Using LAN for stored databases
• Increasing electronic resources, and
• Improving the database managing system.

10) **Security system:** the need to

• Destroy unnecessary output
• Provide a good and secure environment for information
• Use regular time for backup
• Develop a clear virus protection plan
• Develop an automatic security alarm
• Control static electricity, and
• Develop a security system to access LAN.

11) **User needs:** the need to

• Inform users about CTHMIHR systems
• Simplify the process for accessing information
• Increase female IT skills
• Evaluate and up-date the CTHMIHR website
• Simplify the exchanging of ideas and information
• Increase the number of users
• Understand why CTHMIHR is not used more, and
• Provide information in other languages such as French, German and English.
The researcher use Data Flow Diagram (DFD) to discover the interaction between those 11 problems themes. So, figure 6.2 shows the structure of the 11 problems themes. It can be seen from this structure that the strategic planning problem theme (PT1) is the basis of all other problem themes; therefore it affects directly problems related to financial resources and information policy. Consequently, financial resources problem theme (PT2) leads to technical systems, ICT systems and staffing problem themes. In addition, information policy problem theme (PT3) leads to other problems themes which are the technical system, ICT system, staffing, and staff development and training. While technical system problem theme (PT4) leads to problems related to ICT system (PT5), which consequently affect problems related to staffing.
The staffing problem theme (PT6) is related to the database management system as well as user needs, whereas the staff development and training problem themes (PT7) leads to the staffing theme problem. Moreover, Records management system problem theme (PT8) is connected to problems dealing with the database management system as well as the security system, and the database system problem theme (PT9) directly affects the security system (PT10), consequently affecting problem related to user needs (PT11).
Let us now consider steps III and IV as defined in Summers (1992). In these two steps the researcher constructs RD for each problem theme chosen and tests RD via CATWOE.

1) Strategic planning system

“A Strategic planning system owned by Umm Al-Qura University for CTHMIHR to develop and operate information strategies, by means of the consensus of high management of CTHMIHR in order to achieve CTHMIHR aims for establishing an information (data) bank about the Hajj.”

C: CTHMIHR users of the Hajj data bank
A: High and middle management of CTHMIHR, users of Hajj data bank.
T: Lack of IT, IS and IM strategic planning → Developed IT, IS, IM strategy
W: High management of CTHMIHR must have high professional skills and experience in developing and generating information strategies.
O: Umm Al-Qura University
E: Saudi culture, regulation, management structures, change of technology (IT), IS and IM

2) Financial resources system

“A financial resources system owned by the Dept. of Administrative and Financial Affairs at CTHMIHR to provide financial resources to all CTHMIHR operations, by allocating flexible operating finance in order to achieve sufficient support for all CTHMIHR plans.”

C: CTHMIHR users.
A: High and middle management, financial staff at CTHMIHR, Users.
T: Lack of managed funds resources → sufficient managed fund resource.
W: Financial staff at CTHMIHR must have high professional skills and experience in managing and increasing fund resources as well as searching for alternative resources of funds.
O: Dept. of Administrative and Financial Affairs
E: Saudi culture, policies, financial management structure, technology, security, availability of funds and staff at CTHMIHR.

3) Information policy system

"An information policy system owned by the Dept. of Administrative and Financial Affairs at CTHMIHR aims to provide Policy resources to all CTHMIHR operations, by allocating flexible operating systems in order to achieve sufficient support for all CTHMIHR plans."

C: CTHMIHR users.
A: Middle and lower management CTHMIHR.
T: No clear policies using IT, IS and IM → clear working policies covering IT, IS and IM.
W: Middle management staff at CTHMIHR must have high professional skills and experience in IT, IS and IM.
O: Dept. of Administrative and Financial Affairs
E: Saudi culture, policies, plans, middle management structure, technology and communication systems, security, information strategies.

4) Technical system

"A Technical system owned by the Dept. of Information and Technical Services at CTHMIHR to provide hardware and software (IT/IS) to all CTHMIHR operations, by using information strategies, policies, plans, and funds in order to achieve integrated information system at CTHMIHR."

C: CTHMIHR users.
A: IT, IS and IM staff at CTHMIHR, Users.
T: Stand-alone hardware and associated software → network computer system with integrated software.
W: IT, IS and IM staff at CTHMIHR must have high professional skills and experience in IT, IS and IM.
5) ICT system

"An ICT system owned by the Dept. of Information and Technical Services at CTHMIHR to exchange information between users, by using technology, information strategies, policies, plans, and funds in order to achieve better communication between users of information and CTHMIHR."

C: CTHMIHR users.
A: IT, IS and IM staff at CTHMIHR, Users.
T: Difficult to exchange information → easy to exchange information.
W: IT, IS and IM staff at CTHMIHR must have high professional skills and experience in IT, IS and IM.
O: Dept. of Information and Technical Services.
E: Saudi culture, policies, plans, funds, technology and communication systems, security, information strategies.

6) Staffing system

"A Staffing system owned by the Dept. of Administrative and Financial Affairs at CTHMIHR to provide employees or manpower to CTHMIHR, by using technology, information strategies, policies, plans, funds and communication in order to achieve better qualified staff at CTHMIHR."

C: Internal users at CTHMIHR.
A: Middle management
T: Poor quality of staff at CTHMIHR → better qualified staff.
W: Middle management must have high professional skills, experience of management of Human resources; knowledge about recruitment and retention techniques.
O: Dept. of Administrative and Financial Affairs.
E: Saudi culture, policies, plans, funds, technology and communication systems, security, information strategies, structures of middle management.

7) Staff development and training system
“A Staff development and training system owned by the Dept. of Administrative and Financial Affairs at CTHMIHR to provide users with proper skills and competencies, by using appropriate staff development and training materials in order to achieve a better skilled workforce.”

C: Users of information.
A: IT and IS instructors at CTHMIHR, internal users.
T: Limited training courses → proper training courses in the right time.
W: IT and IS instructors must have high professional skills and experience of teaching with proper course material.
O: Dept. of Administrative and Financial Affairs.
E: Saudi culture, policies, plans, funds, technology and communication systems, course materials, at the right time and place, information strategies, and instructors.

8) Records management system
“A Record management system owned by the Dept. of Information and Technical Services and Dept. of Administrative and Financial Affairs at CTHMIHR to create, manage and preserve CTHMIHR records, by means of an operated Records management system in order to achieve a full data set that can be retrieved at any time in the future.”

C: Users of information.
A: IT, IS and IM staff at CTHMIHR, and internal users.
T: Lack of Records management system → use of fully operational record management system.
W: IT, IS and IM staff must have high professional skills and experience of managing CTHMIHR records.
9) Database system

“A Database system owned by the Dept. of Information and Technical Services at CTHMIHR to create and manage CTHMIHR Databases, by means of an up-to-date database in order to maintain proper database records”

C: Users of information.
A: Middle management, IT, IS and IM staff at CTHMIHR.
T: Lack of database management → proper database management.
W: Middle management, IT, IS and IM staff must have high professional skills and experience of creating and managing databases.
O: Dept. of Information and Technical Services.
E: Saudi culture, policies, plans, funds, technology and communication systems, staff, training courses at the right time and place, and clear information strategies.

10) Security system

“A Security system owned by the Dept. of Information and Technical Services at CTHMIHR to keep secure paper and electronic records, by using authentication and firewalls in order to provide a secure electronic environment for CTHMIHR information.”

C: Users of information.
A: Middle management, IT, IS and IM staff at CTHMIHR.
T: Lack of security of paper and e-records → high security of paper and e-records.
W: Middle management, IT, IS and IM staff must have high professional skills and experience of providing high electronic security for all CTHMIHR information.
O: Dept. of Information and Technical Services.
E: Saudi culture, policies, plans, funds, technology and communication systems,
staff, training courses at the right time and place, clear information strategies, and type of information media.

11) User needs system

“A User needs system owned by the Dept. of Information and Technical Services and Dept. of Administrative and Financial Affairs at CTHMIHR to investigate user needs, by using user questionnaires and interviews in order to provide users with the right information, at the right time, in the right format.”

C: Users of CTHMIHR information.
A: Middle and lower management, IT, IS and IM staff at CTHMIHR, Users
T: Lack of users’ services → provide users with high standard of services
W: Middle and lower management, IT, IS and IM staff must have high professional skills and experience to look for users’ needs.
O: Dept. of Information and Technical Services and Dept. of Administrative and Financial Affairs.
E: Saudi culture, policies, plans, funds, technology and communication systems, staff, training courses at the right time and place, and clear information strategies.

6.5 Stage 4: Building Conceptual Models

The aim of this stage is to develop proper conceptual models from the root definition. In line with this Checkland and Scholes (1999) states that this stage (building conceptual models) is a logical model of the key activities and processes that must be carried out in order to satisfy the root definition. Therefore, building conceptual models can be done by assembling a minimum set of verbs that describe the actions needed to fulfil the root definition, and structuring them in a logical sequence. These verbs are usually arranged in a diagram and show the boundary of the system, and the control elements. It is then possible to check the model against the ‘formal systems’ model to ensure that it meets the general criteria for a viable system.
1. to develop an information strategy

2. to forecast the information needs of CTHMIHR

3. to produce a strategic plans

4. to obtain consensus between high and middle management

5. to agree on the strategic plans

6. to operate the strategic plans

7. to establish an information data bank about Hajj

8. to monitor stages 1-7

9. to define performance management criteria

10. to take control action

Figure 6.3: Conceptual model – Strategic planning system
1. to procure financial resources
2. to work according to a strategic plans
3. to obtain consensus between high and middle management
4. to allocate financial resources available
5. to decide on real allocation requirements
6. to operate financial resources
7. to manage any mismatch in financial resource allocation
8. to achieve sufficient support for all CTHMIHR plans
9. to monitor stages 1-8
10. to define performance management criteria
11. to take control action

Figure 6.4: Conceptual model – Financial resources system
SSM Application for Design IMS at the CTHMIHR

Chapter 6

1. to procure information policy
2. to work according to a strategic plans
3. to obtain consensus between middle management
4. to allocate operations required policies
5. to operationalise the information policy system
6. to achieve sufficient support for all CTHMIHR plans
7. to monitor stages 1-6
8. to define performance management criteria
9. to take control action

Figure 6.5: Conceptual model – Information policy system
1. to determine need for IT/IS
2. to work according to a strategic plans
3. to identify the types of technologies needed
4. to obtain consensus between IT, IS and IM staff as well as lower and middle management
5. to procure technologies required
7. to procure the information infrastructure
6. to operationalise the IT/IS procured
8. to operationalise information infrastructure
9. to achieve integrated information system
10. to monitor stages 1-9
12. to take control action
11. to define performance management criteria

Figure 6.6: Conceptual model – Technical system
1. to identify user needs re communication of information
2. to work according to a strategic plans
3. to procure ICT
4. to obtain consensus between IT, IS, IM staff and lower and middle management
5. to achieve access to ICT
6. to achieve better communication
7. to monitor stages 1-6
8. to define performance management criteria
9. to take control action

Figure 6.7: Conceptual model – ICT system
1. to determine skill-set requirements
2. to work according to a strategic plans
3. to procure a staffing policy document
4. to obtain consensus between middle management
5. to achieve better qualified staff at CTHMIHR
6. to monitor stages 1-5
7. to define performance management criteria
8. to take control action

Figure 6.8: Conceptual model – Staffing system
1. to identify skills mix required in CTHMIHR
2. to work according to a strategic plans
3. to provide staff with additional skills and competencies
4. to use appropriate staff development
5. to use appropriate training materials
6. to operate training programmes
7. to achieve a better skilled workforce
8. to monitor stages 1-7
9. to define performance management criteria
10. to take control action

Figure 6.9: Conceptual model – Staff development and training system
1. to determine record keeping needs
2. to work according to a strategic plans
3. to produce a Records management policy
4. to obtain consensus between IT, IS, IM staff and internal users
5. to procure a Records management system
6. to implement a Records Management system
7. to achieve a full data set that can be retrieved at any time in the future
8. to monitor stages 1-7
9. to define performance management criteria
10. to take control action

Figure 6.10: Conceptual model – Records management system
1. to determine database needs
2. to work according to a strategic plans
3. to produce a policy for database procurement
4. to obtain consensus between middle and lower management
5. to procure an agreed database system
6. to implement the database system
7. to maintain proper database records
8. to monitor stages 1-7
9. to define performance management criteria
10. to take control action

Figure 6.11: Conceptual model – Database system
1. to identify information security requirements
2. to work according to a strategic plan
3. to procure security system
4. to obtain consensus between middle management and IT, IS, IM staff and users
5. to implement an agreed security system
6. to provide a secure environment for CTHMIHR information
7. to monitor stages 1-6
8. to define performance management criteria
9. to take control action

Figure 6.12: Conceptual model – Security system
Figure 6.13: Conceptual model – User needs system
6.6 Stage 5: Comparison of Conceptual Models with Real World

In this stage the research aim is to take the output of the conceptual models and compare them with real world activity. The research is concerned with problem identification and not with problem solution. Table 6.1 outlines the comparison between conceptual models and the real world. The table contains five columns for each conceptual model. These columns are:

1. *Activities in the conceptual model* (stage 4)
2. Is this activity *present in the real world* (stage 2)
3. If the activity is not present in the real world, *how* will it be integrated within the system?
4. *Who* will be responsible for adding the activity to the system?
5. A list of contextual *comments*, if appropriate.
<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to develop an</td>
<td>RP indicates lack of information strategy</td>
<td>Identify and evaluate current strategy.</td>
<td>High and middle management at CTHMIHR</td>
<td>Information strategy must be re-evaluated at least every 5 years according to CTHMIHR needs</td>
</tr>
<tr>
<td>information strategy</td>
<td></td>
<td>Develop and propose a new information strategy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. to forecast the</td>
<td>RP indicates a concern in short term needs only</td>
<td>By applying scientific research and methodology.</td>
<td>Consultants, researchers and experts</td>
<td>Develop not only short term but also long term needs for every department and CTHMIHR as whole.</td>
</tr>
<tr>
<td>information needs</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>of CTHMIHR</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. to produce</td>
<td>No</td>
<td>By suggesting and developing clear strategic plans.</td>
<td>Middle and lower management, consultants, and experts</td>
<td>All strategic plans must be clear and integrated to each other. Also, strategic plans must be according to scientific methodology.</td>
</tr>
<tr>
<td>strategic plans</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4. to obtain</td>
<td>RP indicates normally the high management have one meeting a year.</td>
<td>By meeting middle and high management at least twice a year.</td>
<td>High and middle management.</td>
<td>Increase the number of meetings between high and middle management to ensure that CTHMIHR is achieving its information strategy.</td>
</tr>
<tr>
<td>consensus within</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>high management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. to agree on the</td>
<td>Partially</td>
<td>Understanding the importance of these strategic plan.</td>
<td>High and middle management.</td>
<td>Middle management should have support from high management when they need it.</td>
</tr>
<tr>
<td>strategic plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. to operate the</td>
<td>RP indicates every department creates their own strategic plan.</td>
<td>By implementing and operating strategic plans.</td>
<td>Middle and lower management</td>
<td>Scientific methodologies need to implement these strategic plans.</td>
</tr>
<tr>
<td>strategic plans</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. to establish an</td>
<td>RP indicates every department creates their own information without any integration.</td>
<td>By working according to a clear strategic plans.</td>
<td>Middle and lower management as well as operational control.</td>
<td>Information bank must be in a professional environment.</td>
</tr>
<tr>
<td>information data bank</td>
<td></td>
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<td></td>
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<tr>
<td>about Hajj</td>
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</tr>
<tr>
<td>Activity in CM</td>
<td>Present in real world</td>
<td>How?</td>
<td>Who?</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
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<td>----------</td>
</tr>
<tr>
<td>1. to procure financial resources</td>
<td>RP indicates a lack of funds</td>
<td>Search for alternative sources of funds</td>
<td>High and middle management</td>
<td>Display the important of scientific research and CTHMIHR information to local authorities as well as companies</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management</td>
<td>It is very important to develop a strategic plan to increase management funds</td>
</tr>
<tr>
<td>3. to obtain consensus between high and middle management</td>
<td>Partially</td>
<td>By meeting middle and high management at least twice a year</td>
<td>High and middle management</td>
<td>Middle management should have support from high management when they need it, particularly in increasing fund resources</td>
</tr>
<tr>
<td>4. to allocate financial resources available</td>
<td>RP indicates that normally, CTHMIHR finds difficulty to allocate fund resources.</td>
<td>By making the financial process simple and flexible</td>
<td>Middle and lower management and financial staff</td>
<td>Private fund support section is very important to increase financial resources</td>
</tr>
<tr>
<td>5. to decide on real allocation requirements</td>
<td>No</td>
<td>Look carefully at most important requirements</td>
<td>Middle and lower management and financial staff</td>
<td>Financial resources can be shared between local authorities and companies as well as the private sector</td>
</tr>
<tr>
<td>6. to operate financial resources</td>
<td>RP indicates a lack of management of the funds</td>
<td>By managing and operating financial resources carefully and successfully</td>
<td>Lower management and financial staff.</td>
<td></td>
</tr>
<tr>
<td>7. to manage any mismatch in financial resource allocation</td>
<td>No</td>
<td>Deal carefully and flexibly with any mismatch in fund resources.</td>
<td>Middle and lower management and financial staff</td>
<td></td>
</tr>
<tr>
<td>8. to achieve sufficient support for all CTHMIHR plans</td>
<td>No</td>
<td>Evaluate the process of financial resources</td>
<td>Middle and lower management and financial staff</td>
<td>Set up clear criteria for the evaluation</td>
</tr>
</tbody>
</table>
### Table 6.3 Comparison of conceptual model with real world – Information policy system

<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to procure information policy</td>
<td>No</td>
<td>Suggest and write a report about information policy needs</td>
<td>Middle and lower management</td>
<td>Develop clear information policy covering IT, IS and IM</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for information policy.</td>
</tr>
<tr>
<td>3. to obtain consensus between middle and lower management</td>
<td>No</td>
<td>Decide on proposal about information policy</td>
<td>Middle and lower management.</td>
<td>Make changes as appropriate</td>
</tr>
<tr>
<td>4. to allocate the operation of required policies</td>
<td>No</td>
<td>To determine all operations by required policies.</td>
<td>Middle and lower management.</td>
<td>It is vital to allocate operations with proper policy needs.</td>
</tr>
<tr>
<td>5. to operationalise the information policy system</td>
<td>No</td>
<td>Implement and manage information policy system</td>
<td>Lower management and operational controls.</td>
<td>Proceed in clear steps.</td>
</tr>
<tr>
<td>6. to achieve sufficient support for all CTHMIHR plans</td>
<td>No</td>
<td>Evaluate the information policy system.</td>
<td>Lower management and operational controls.</td>
<td>Set up clear criteria for the evaluation</td>
</tr>
<tr>
<td>Activity in CM</td>
<td>Present in real world</td>
<td>How?</td>
<td>Who?</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------------------------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>-------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. to determine need for IT/IS</td>
<td>RP indicates that there is a lack of Arabic applications</td>
<td>Analyse current IT/IS and review all IT/IS functions.</td>
<td>Lower management, IT, IS, and IM staff</td>
<td>It is important to involve staff as well as users in determining needs from IT/IS.</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>No strategic plans.</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for IT/IS.</td>
</tr>
<tr>
<td>3. to identify the types of technologies needed</td>
<td>RP indicates that systems are incompatible</td>
<td>Every department identifies types of technologies needed.</td>
<td>Middle and Lower management, IT, IS, and IM staff</td>
<td>These technologies must be integrated and work as complete system.</td>
</tr>
<tr>
<td>4. to obtain consensus between IT, IS and IM staff as well as lower and middle management</td>
<td>RP indicates a lack of knowledge and expertise</td>
<td>Agree about departmental needs for IT/IS.</td>
<td>Middle and Lower management, IT, IS, and IM staff</td>
<td>Work according to a clear strategic plan and infrastructure.</td>
</tr>
<tr>
<td>5. to procure technologies required</td>
<td>Insufficient in the RW</td>
<td>Write a complete and integrated proposal about technologies required.</td>
<td>IT, IS, and IM staff</td>
<td>This proposal must include maintenance as well as upgrades.</td>
</tr>
<tr>
<td>6. to procure technologies required</td>
<td>Insufficient in the RW</td>
<td>Implement and manage technologies carefully.</td>
<td>IT, IS, and IM staff</td>
<td>Implementation and management must be according to scientific methods.</td>
</tr>
<tr>
<td>7. to procure the information infrastructure</td>
<td>RP indicates the level of complexity involved in procuring the information infrastructure</td>
<td>Write a clear proposal about the information infrastructure.</td>
<td>Middle and Lower management, IT, IS, and IM staff</td>
<td>Write a clear report about the information infrastructure.</td>
</tr>
<tr>
<td>8. to operationalise information infrastructure</td>
<td>Limitations of IT/IS professionals</td>
<td>Implement and manage information infrastructure.</td>
<td>Middle and Lower management, IT, IS, and IM staff</td>
<td>Developing Help desk at CTHMIHR will improve the operations system.</td>
</tr>
<tr>
<td>9. to achieve integrated IS</td>
<td>Very difficult to use IT/IS</td>
<td>Evaluate information system according to clear criteria.</td>
<td>Technical staff other than CTHMIHR staff</td>
<td>Technologies must be integrated with each other and work as complete system.</td>
</tr>
</tbody>
</table>
Table 6.5 Comparison of conceptual model with real world – ICT system

<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify user needs and communication of information</td>
<td>Insufficient in RW</td>
<td>Analyse and evaluate current ICT</td>
<td>Lower management, operation staff and users</td>
<td>Use scientific methods to analyse and evaluate current ICT.</td>
</tr>
<tr>
<td>2. to work according to a strategic plan</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for ICT.</td>
</tr>
<tr>
<td>3. to procure ICT</td>
<td>Insufficient in RW</td>
<td>Write and present a report about ICT needs</td>
<td>lower management and IT, IS, IM staff</td>
<td>Evaluate the use Internet and Intranet services at CTHMIHR.</td>
</tr>
<tr>
<td>4. to obtain consensus between IT, IS, IM staff and lower and middle management</td>
<td>No</td>
<td>Agree about ICT system</td>
<td>Middle and Lower management, IT, IS, and IM staff</td>
<td>Set criteria to achieve operation staff and user needs. Develop a clear information policy covering IT, IS and IM.</td>
</tr>
<tr>
<td>5. to achieve access to ICT</td>
<td>RP indicates that LAN not working properly</td>
<td>Use Internet and Intranet services.</td>
<td>Lower management, IS, IT, and IM staff</td>
<td>Easy to exchange information by using TCP/IP and HTTP communication protocols, HTML language.</td>
</tr>
<tr>
<td>6. to achieve better communication</td>
<td>Insufficient in RW</td>
<td>Evaluate ICT system according to clear criteria.</td>
<td>Middle and lower management, technical staff and users</td>
<td>Set up clear information policy to use Internet and Intranet.</td>
</tr>
</tbody>
</table>
**Table 6.6 Comparison of conceptual model with real world - Staffing system**

<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine skill-set</td>
<td>Insufficient in RW</td>
<td>Every department defines their skill</td>
<td>Lower management and</td>
<td>Information management requires high-level experience particularly in IT, IS and IM.</td>
</tr>
<tr>
<td>requirements</td>
<td></td>
<td>needs</td>
<td>operational control.</td>
<td></td>
</tr>
<tr>
<td>2. to work according to a</td>
<td>No</td>
<td>Develop clear strategic plan</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for staffing.</td>
</tr>
<tr>
<td>strategic plans</td>
<td></td>
<td>related to staffing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. to procure a staffing policy</td>
<td>Insufficient in RW</td>
<td>Suggest and write proposal</td>
<td>Lower management and</td>
<td>This document should be clear and easy to implement.</td>
</tr>
<tr>
<td>document</td>
<td></td>
<td>about staffing at CTHMIHR.</td>
<td>operational control.</td>
<td></td>
</tr>
<tr>
<td>4. to obtain consensus between</td>
<td>No</td>
<td>Agree about the staffing</td>
<td>Middle and lower management</td>
<td>It is important to get approval from middle management, so that the lower management will get support when they need it.</td>
</tr>
<tr>
<td>middle and lower management</td>
<td></td>
<td>proposal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. to achieve better qualified</td>
<td>Insufficient in RW</td>
<td>Evaluate the staff working</td>
<td>Middle and lower management</td>
<td>These criteria should be developed according to scientific bases.</td>
</tr>
<tr>
<td>staff at CTHMIHR</td>
<td></td>
<td>according to basic criteria.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity in CM</td>
<td>Present in real world</td>
<td>How?</td>
<td>Who?</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
</tr>
<tr>
<td>1. to identify skills mix required in CTHMIHR</td>
<td>Insufficient in RW</td>
<td>Search for required skills in every department.</td>
<td>Lower management and operational control staff.</td>
<td>Use scientific methods to evaluate current skills needed in every department.</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>No</td>
<td>Develop clear strategic plan</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for Staff development and training.</td>
</tr>
<tr>
<td>3. to provide staff with additional skills and competencies</td>
<td>Insufficient in RW</td>
<td>Suggest and write proposal.</td>
<td>Lower management and operational control staff.</td>
<td>This proposal built according to the evolution and needs of the departments.</td>
</tr>
<tr>
<td>4. to use appropriate staff development</td>
<td>Insufficient in RW</td>
<td>Use expertise and professionals for staff development</td>
<td>Lower management and operational control staff.</td>
<td>Well qualified lecturers are a vital part of staff development.</td>
</tr>
<tr>
<td>5. to use appropriate training materials</td>
<td>Insufficient in RW</td>
<td>Use better training materials and technologies.</td>
<td>Lower management and operational control staff.</td>
<td>Staff will be more motivated by investment in training.</td>
</tr>
<tr>
<td>6. to operate training programmes</td>
<td>Insufficient in RW</td>
<td>Implement and run training programmes according to clear plan.</td>
<td>Lower management and operational control staff.</td>
<td>Proper management for training programmes.</td>
</tr>
<tr>
<td>7. to achieve a better skilled workforce</td>
<td>Insufficient in RW</td>
<td>Evaluate these training programmes according to clear criteria.</td>
<td>Middle and lower management.</td>
<td>Use scientific methods to evaluate the training programmes.</td>
</tr>
<tr>
<td>Activity in CM</td>
<td>Present in real world</td>
<td>How?</td>
<td>Who?</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------</td>
<td>----------------------------------------------</td>
<td>--------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. to determine record needs</td>
<td>No</td>
<td>Identify active and inactive records in departments</td>
<td>Lower management and operational control staff</td>
<td>Use scientific methods to evaluate current records management.</td>
</tr>
<tr>
<td>2. to work according to a strategic plan</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for record management.</td>
</tr>
<tr>
<td>3. to produce a Records management policy</td>
<td>No</td>
<td>Suggest and write proposal about records and how CTHMIHR will manage these records.</td>
<td>Lower management and operational control staff</td>
<td>Write proposal to develop Records management policy.</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management IT, IS, IM staff</td>
<td>No</td>
<td>Decide about the development of a Record Centre and Records management system</td>
<td>Middle and Lower management and operational control staff</td>
<td>Make any changes needed according to strategic plan.</td>
</tr>
<tr>
<td>5. to procure a Records management system</td>
<td>No</td>
<td>Outline the requirements of Records management system.</td>
<td>Lower management and operational control staff</td>
<td>Use clear steps to implement Records management system and Record Centre.</td>
</tr>
<tr>
<td>6. to implement a Records management system</td>
<td>No</td>
<td>Use scientific methods to implement Records management system</td>
<td>Lower management and operational control staff</td>
<td>Run proper methods for implementation of Records management system.</td>
</tr>
<tr>
<td>7. to achieve a full data set that can be retrieved at any time in the future</td>
<td>No</td>
<td>Set up clear criteria to evaluate Records management system</td>
<td>Middle and lower management</td>
<td>Use proper methods to evaluate Records management and Record Centre.</td>
</tr>
</tbody>
</table>
Table 6.9 Comparison of conceptual model with real world - Database system

<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine database needs</td>
<td>Insufficient in RW</td>
<td>Identify the importance of Databases in every department.</td>
<td>Lower management and operational control staff.</td>
<td>Use proper methods to evaluate current Database system at CTHMIHR.</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for the Database system.</td>
</tr>
<tr>
<td>3. to produce a policy for database procurement</td>
<td>No</td>
<td>Write a proposal to create and manage Database system according to strategic plans</td>
<td>Lower management and operational control staff.</td>
<td>Every department writes a proposal about their requirements from the Database.</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management IT, IS, IM staff</td>
<td>No</td>
<td>Look carefully at the proposal and make necessary changes.</td>
<td>Middle and lower management and operational control staff.</td>
<td>Work according to a clear strategic plan for Database system.</td>
</tr>
<tr>
<td>5. to procure an agreed database system</td>
<td>No</td>
<td>Agree about Database system.</td>
<td>Lower management and operational control staff.</td>
<td>Outline the steps to implement Database system</td>
</tr>
<tr>
<td>6. to implement the database system</td>
<td>Insufficient in RW</td>
<td>Outline the procedure to implement and manage these Databases.</td>
<td>Lower management and operational control staff.</td>
<td>Use scientific methods to implement and manage Database system.</td>
</tr>
<tr>
<td>7. to maintain proper database records</td>
<td>Insufficient in RW</td>
<td>Outline the procedure to maintain these Databases.</td>
<td>Lower management and operational control staff.</td>
<td>These procedures include, edit, delete, add, and update Database records.</td>
</tr>
<tr>
<td>Activity in CM</td>
<td>Present in real world</td>
<td>How?</td>
<td>Who?</td>
<td>Comments</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-----------------------</td>
<td>-----------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1. to identify information security requirements</td>
<td>No</td>
<td>Search for the information needs security.</td>
<td>Lower management and operational control staff.</td>
<td>Evaluate current security system at CTHMIHR</td>
</tr>
<tr>
<td>2. to work according to a strategic plan</td>
<td>No</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan for security needs.</td>
</tr>
<tr>
<td>3. to procure a security system</td>
<td>No</td>
<td>Write over all proposal for the security system needed</td>
<td>Lower management and operational control staff.</td>
<td>Every department need to writes a proposal about information security needed.</td>
</tr>
<tr>
<td>4 to obtain consensus between middle and lower management IT, IS, IM staff</td>
<td>No</td>
<td>Look carefully at the proposal and make necessary changes.</td>
<td>Middle and lower management and operational control staff.</td>
<td>Work according to a clear strategic plan.</td>
</tr>
<tr>
<td>5. to implement an agreed security system</td>
<td>No</td>
<td>Agree a security system.</td>
<td>Middle and Lower management, and operational control staff.</td>
<td>Outline the steps to implement security system.</td>
</tr>
<tr>
<td>6. to provide a secure environment for CTHMIHR information</td>
<td>No</td>
<td>Set up clear criteria to evaluate security system</td>
<td>Middle and lower management</td>
<td>Use proper methods to evaluate security system.</td>
</tr>
</tbody>
</table>
Table 6.11 Comparison of conceptual model with real world - User needs system

<table>
<thead>
<tr>
<th>Activity in CM</th>
<th>Present in real world</th>
<th>How?</th>
<th>Who?</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify user needs</td>
<td>Users do not use CTHMIHR information</td>
<td>Search for user needs from CTHMIHR</td>
<td>Middle and lower management, and operational control staff</td>
<td>Use proper methods to find out user needs from CTHMIHR.</td>
</tr>
<tr>
<td>2. to work according to a strategic plans</td>
<td>RP indicates that there is concern only with the short term.</td>
<td>Develop clear strategic plans.</td>
<td>High and middle management.</td>
<td>It is very important to develop a strategic plan to increase the number of users.</td>
</tr>
<tr>
<td>3. to satisfy user needs</td>
<td>Females find difficulty in accessing information.</td>
<td>Write proposal for user needs</td>
<td>Lower management and operational control staff.</td>
<td>Evaluate the benefits of developing a Call Centre at CTHMIHR.</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management</td>
<td>Insufficient in RW</td>
<td>Look carefully at the proposal and make necessary changes.</td>
<td>Middle and lower management and operational control staff.</td>
<td>Work according to a clear strategic plan.</td>
</tr>
<tr>
<td>5. to use integrated CTHMIHR systems to enact user requests for up-to-date technology</td>
<td>Users find it difficult to exchanging information</td>
<td>Developing Call Centre will help to improve user satisfaction.</td>
<td>Lower management and operational control staff</td>
<td>Use proper type of ICT, training staff, and clear policies for the Call Centre.</td>
</tr>
<tr>
<td>6. to provide users with the right information</td>
<td>Lack of concern for non-users of information and non-Arab Muslims.</td>
<td>Set up criteria to evaluate Call Centre</td>
<td>Middle and lower management and operational control staff.</td>
<td>Use scientific methods to evaluate the Call Centre.</td>
</tr>
</tbody>
</table>
6.7 Stage 6: Desirable and Feasible Changes

The purpose of this stage is to put ideas about possible changes in the problem situation and to identify those ideas to be both systemically desirable and culturally feasible. So stage 6 focuses on ideas to solve problems, bearing in mind what is systemically desirable and culturally feasible. The research follows on from analysis based on (stage 5) the agenda of comparison of conceptual model with the real world.

6.7.1 Strategic planning system

Table 6.12 outlines the list of both systemically desirable and culturally feasible changes according to activities of the strategic planning system.

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to develop an information strategy.</td>
<td>RP indicates lack of information strategy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to forecast the information needs of CTHMIHR.</td>
<td>RP indicates a concern in short term needs only</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to produce a strategic plan.</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between high and middle management.</td>
<td>RP indicates normally the high management have one meeting a year.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to agree on the strategic plan.</td>
<td>Partially</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to operate the strategic plan.</td>
<td>RP indicates every department creates their own strategic plan.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to establish information data bank about Hajj.</td>
<td>RP indicates every department creates their own information without any integration.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the strategic planning system is to develop a system and operate information strategies to establish an information bank about Hajj. Therefore, the activities of the system are:
6.7.1.1 To develop an information strategy
High and middle management at CTHMIHR should work together to identify and evaluate current strategies particularly those related to information (IS strategy, IT strategy and IM strategy). IT strategy is concerned basically with issues such as architecture, technical standards, physical security, etc. IS strategy is concerned with aligning IS development with CTHMIHR needs and seeking competitive advantage through IT. IM strategy on the other hand, is the management framework that is used to guide how the CTHMIHR should run its IS and IT function and activities. So, it is of vital importance that IT, IS, and IM strategy remain closely integrated with CTHMIHR strategy. Furthermore, they should be re-evaluating this information strategy at least every 5 years.

6.7.1.2 To forecast the information needs of CTHMIHR
Forecasting the needs of CTHMIHR can play a vital part in developing the strategic planning system. This can be run by consultants, researchers and experts from inside or outside CTHMIHR by using and applying scientific research and methodology. Needs forecasting can be started from the departments’ information needs and extending to CTHMIHR’s information needs as a whole.

6.7.1.3 To produce a strategic plan
The strategic plan focuses on where the CTHMIHR wants to be in 5 years’ time. So, middle and lower management, consultants, and experts should suggest and write reports for the strategic plan by using scientific methodology to consider information strategy and to forecast the information needs. The strategic plan should include: Financial resources, Information policy, Technical system, ICT system, Staffing, Staff development and training, Records management system, Database system, Security system, and User needs. These strategic plans should be clear and integrated with each other.

6.7.1.4 To obtain consensus between high and middle management
The approval of high management is an essential part of developing the strategic planning system. Consensus between high and middle management can be achieved by
increasing the number of meetings to at least twice a year. This will also ensure that CTHMIHR is achieving its information goals. Thus, not only is communication at each hierarchical level improved, but also communication between hierarchical levels.

6.7.1.5 To agree on the strategic plans
High and middle management should understand the importance of developing a strategic plan for CTHMIHR. Agreeing to the strategic plan is an essential way for middle management to get support from high management when needed. Moreover, the strategic plan must be adequately documented and cover the appropriate operational levels and areas.

6.7.1.6 To operate the strategic plans
Middle and lower management should work to implement and manage the strategic plan by using scientific methodologies bases. Middle management is responsible for ensuring that CTHMIHR goals are accomplished effectively and efficiently, whereas lower management makes sure that specific tasks are well accomplished. Implementation of the strategic plan needs to be monitored and compared with the target of the plans. Each department needs to contribute an operational plan to indicate how the CTHMIHR strategic plan will be implemented.

6.7.1.7 To establish an information data bank about Hajj
Establishing an information data bank is one of the aims of CTHMIHR. This information data bank should include comprehensive scientific reference sources for different statistics, details, and facts to assist in planning utilities and services of the Hajj. So, the information held in this information data bank must be evaluated and re-evaluated according to clear criteria or measures for effectiveness. It is also important that the information data bank is in a secure and professional environment.

6.7.2 Financial resources system
The information contained in Table 6.13 outlines the list of systemically desirable and culturally feasible changes according to the activities of the financial resources system.
Table 6.13 Desirable and feasible changes - Financial resources system

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to procure financial resources</td>
<td>RP indicates a lack of funds</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to obtain consensus between high and middle management</td>
<td>Partially</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to allocate financial resources available</td>
<td>RP indicates that normally, CTHMIHR finds difficulty to allocate funds</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to decide on real allocation requirements</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to operate financial resources</td>
<td>RP indicates a lack of management of the funds.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to manage any mismatch in financial resource allocation</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8. to achieve sufficient support for all CTHMIHR plans.</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the financial resources system is to provide financial resources to all CTHMIHR operations in order to achieve sufficient support for all CTHMIHR plans. Therefore the activities of the system are:

6.7.2.1 To procure financial resources

High and middle management at CTHMIHR should search for funds not only from Umm Al-Qura University but also from alternative sources. This can be done by making important scientific research and CTHMIHR information available local authorities as well as companies. So, it is important for middle management to formally present that to the private sectors and local authorities. Consequently, the private sector and local authorities should provide funds to the CTHMIHR information system, since they benefit from this information system.
6.7.2.2 To work according to a strategic plan
Developing a strategic plan, particularly regarding financial resources is very important. This strategic plan should work not only to obtain funds for CTHMIHR but also to find alternative funding sources. The strategic plan must satisfy the demands and expectations of CTHMIHR sponsors.

6.7.2.3 To obtain consensus between high and middle management
It is very important to obtain consensus between high and middle management about alternative resources and increased funding. A greater number of meetings between high and middle management (at least two times every year) would provide much support to CTHMIHR when needed. This would also enable high management to make sure that CTHMIHR achieves its goals.

6.7.2.4 To allocate financial resources available
Middle and lower management find it difficult to allocate funds, but high management can increase funds by allowing the private sector and local authorities to give financial support to CTHMIHR. Also, high and middle management can increase the number of subscriptions to CTHMIHR by stressing the importance of the scientific research and CTHMIHR information for the improvement of the facilities and services to pilgrims and visitors to the holy places in Makkah and Al-Madinah. Moreover, the financial staff should use their skills in financial management to make the financial process simple and flexible. So, CTHMIHR can satisfy the demand and expectation of sponsors (local authorities and companies). Prioritising limited funding is difficult when the high and middle management decision makers do not meet frequently.

6.7.2.5 To decide on real allocation requirements
Every department displays its requirements according to clear plans, both short term and long term. The requirements of the departments can be divided into a number of levels. The basic level of cost requirement could be staff training, software and hardware, implementation, maintenance, and evolution. So, it is vital to look carefully at the most important requirements of middle and lower management as well as financial staff. The
funding can be shared between local authorities and the private sector. The financial staff should consider not just on the short-term but also the long-term.

6.7.2.6 To operate financial resources
Lower management and financial staff must use their skills to manage and operate financial resources carefully and sufficiently. This can work by applying the right scientific methodology with the right financial management: the maximum advantage can be gained by implementing and managing financial resources using professional IT with equipment and skills.

6.7.2.7 To manage any mismatch in financial resource allocation
Middle and lower management and financial staff should manage any mismatching in financial resources allocation carefully and flexibly, using their professional skills.

6.7.2.8 To achieve sufficient support for all CTHMIHR plans.
Middle and lower management as well as financial staff must evaluate the process of financial resourcing and involve the private sector for contributions. It is very important to satisfy the demand and expectation of sponsors. Middle and lower management should give support to all CTHMIHR plans and set up criteria for development and performance evaluation.

6.7.3 Information policy system
The information contained in Table 6.14 outlines the list of systemically desirable and culturally feasible changes according to activities of the information policy system.
Table 6.14 Desirable and feasible changes - Information policy system

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to procure information policy</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to obtain consensus between middle and lower management</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to allocate the operation of required policies</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to operationalise the information policy system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to achieve sufficient support for all CTHMIHR plans</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the information policy system is to provide policy resources for all CTHMIHR operations in order to achieve sufficient support for all CTHMIHR plans. Therefore the activities of the system are:

**6.7.3.1 To procure information policy**
Making suggestions and writing reports about information policy needed by middle and lower management are a vital part of the information management system. Such reports must emphasize aims and objectives, as well as benefits to CTHMIHR and users of adopting information policy. Such policies should cover IT, IS, IM, using the Internet, data protection and copyright, access to information and communication rooms, bought technologies, using hardware and software, and creating files.

**6.7.3.1 To work according to a strategic plan**
High and middle management must develop a clear strategic plan related to information policy. This strategic plan must include overall policies related to operating and implementing the information management system. Information policy must be clear to internal and external users, and staff. Furthermore, information policy must not only be concerned with the current situation but also with the future (five-year).
6.7.3.2 To obtain consensus between middle and lower management
Obtaining consensus between middle and lower management about information policy adapted is very important. This can be done by increasing the number of meeting between middle and lower management (at least one every month) thus giving lower and operational staff guidance and clear path to deal with CTHMIHR information. Getting approval from upper management can help the information polices team implement, manage, and evaluate information policy easily, smoothly without any problems, particularly from internal users.

6.7.3.3 To allocate the operation of required policies
Middle and lower management should determine the operations requirement policies according to a clear plan. It is vital to provide operations with clear policies in order to make processes easy and flexible. These policies must be written and available to everyone who needs them, including people who have access to information, data protection and copyright, and staff who use hardware and software, and who create and manage files.

6.7.3.4 To operationalise the information policy system
Lower and operational control should implement and apply this information policy carefully. The information policy must be written and communicated to all CTHMIHR staff as well as users of the information. All CTHMIHR information must be compatible with the data protection law. All software must be original and no illegal software may be used in CTHMIHR.

6.7.3.5 To achieve sufficient support for all CTHMIHR plans
Lower management as well as operational control must evaluate the information policy adopted by setting up clear criteria for development, which must be built on a scientific basis and include performance for appraisal. Moreover, the information must be evaluated at least once every year to make sure that information policy conform to all CTHMIHR plans.
6.7.4 Technical system

Table 6.15 outlines the list of systemically desirable and culturally feasible changes according to activities of the technical system.

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine need for IT/IS</td>
<td>RP indicates that there is a lack of Arabic applications</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to identify the types of technologies needed</td>
<td>RP indicates that systems are incompatible</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between IT, IS and IM staff as well as lower and middle management</td>
<td>RP indicates a lack of knowledge and expertise</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to procure technologies required</td>
<td>Lacking in the RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to procure technologies required</td>
<td>Lacking in the RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to procure the information infrastructure</td>
<td>RP indicates the level of complexity involved in procuring the information infrastructure</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8. to operationalise information infrastructure</td>
<td>Limitations of IT/IS professionals</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>9. to achieve integrated IS</td>
<td>Very difficult to use IT/IS</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the technical system is to provide hardware and software (IT) to all CTHMIHR operations in order to achieve an integrated information system. Therefore, the activities of the system are:

6.7.4.1 To determine need for IT/IS

Lower management, IT, IS, and IM staff should understand and determine the IT needs of CTHMIHR. This can be done by analysis of internal and external environmental factors that affect departments as well as CTHMIHR as a whole. It is vital to analyse
current IT/IS in order to know its strengths and weaknesses, and to assess the needs of IT/IS. The analysis of the current IT/IS can help to review all existing IT/IS functions, including applications, hardware, software, operation systems, WAN, LAN, and maintenance procedures.

6.7.4.2 To work according to a strategic plan
High and middle management should develop a clear strategic plan for IT/IS. This strategic plan must aim to achieve integrated IS and provide easy access for internal and external users of CTHMIHR information by using proper IT including computers, WAN, LAN, and applications. The strategic plan for IT/IS should also include managing the data, information and knowledge resources of CTHMIHR. Furthermore, these strategic plan (IT/IS) must be concerned both with the short term and also the long term (five-year).

6.7.4.3 To identify the types of technologies needed
Middle and lower management as well as IT, IS, and IM staff must work as a close team to identify every department’s needs for hardware and software, and to ensure that CTHMIHR will benefit from IT/IS. This can be done by using interviews, questionnaires, documentation, and observations to collect information on staff, attitudes, plans, objective of IT/IS information, and departmental needs. One of the reasons for identifying the types of technologies needed is the new requirement that came from new processes or services such as the Internet. All technologies at CTHMIHR must be integrated and work as a complete system.

6.7.4.4 To obtain consensus between IT, IS and IM staff as well as lower and middle management
The success of technical projects can be achieved if the decision-making team consists of IT, IS, and IM staff. So, it is important to obtain consensus between IT, IS, and IM staff as well as lower and middle management which plays an active role in setting up technical projects. IT staff are concerned with any computer and communications technologies (both hardware and software). IS staff are concerned with CTHMIHR needs and with seeking competitive advantage from IT. IM staff are concerned with
how CTHMIHR should run its IS and IT functions and activities. Lower and middle management will provide project teams with great support when and where they need it.

6.7.4.5 To procure technologies required

IT, IS, and IM staff should write a complete and integrated report about the technologies required. This report must use scientific analysis and address the needs of CTHMIHR departments. Therefore the proposal report may include:

- The aims and objectives of the reports
- A description of technologies, programs and system needs
- A plan for implement technologies, required resources, and costs
- A plan for security and policy
- A clear plan for staffing and staff training, and
- Suitable criteria for implementing, maintaining, upgrading and evaluating technologies.

6.7.4.6 To procure the information infrastructure

The CTHMIHR had not yet developed its information strategies (IT/IS and IM). Traditionally, information professionals have not been remunerated and promoted in the same manner as administrative and engineering personnel. In many cases, many graduates of computer courses join private business after joining local authorities to obtain initial experience. CTHMIHR has limited skilled IT/IS personnel at the operational level, and only one was skilled in managing small software development and implementation database systems. Most users with only basic IT skills have been facing many problems which include: lack of Arabic applications, too much hardware and software, system focus on IT/IS rather than using it, and the system is very difficult to use.

Middle and lower management together with IT, IS, and IM staff, should write a clear report about the information infrastructure. This report should cover the development and maintenance of the IT/IS, and address the implementation of staffing and training system for CTHMIHR. The report should also give technical support and help internal and external users when and where they need it. Once technical staff with the right
integrated technologies are in place, the implementation and maintenance of systems will be successful.

6.7.4.7 To operationalise information infrastructure

Lower management, IT, IS, and IM staff should implement and operate the information infrastructure carefully, making sure that hardware and software do their jobs effectively and efficiency. This can be done by correcting current technical problems, delivering up-to-date applications (particularly Arabic version), and increasing the number of technical staff particularly those with postgraduate education in IT, IS, and IM.

In addition, developing a Help desk at CTHMIHR will improve the operation of the system. The main aim of the Help desk is ongoing development and maintenance of the IT/IS. The benefits will include:

- Ensuring better control over IT/IS services and CTHMIHR infrastructure
- Giving technical support to users of IT/IS and enabling them to solve their problems within the shortest time
- Decreasing service maintenance costs considerably
- Enabling users to adapt to the fast technological changes within information systems and software
- Preventing problems before appearance, and
- Maintaining permanent quality services for users of IT/IS.

6.7.4.8 To achieve an integrated information system

Technical staff (IT, IS, IM) other than CTHMIHR technical staff set up clear measuring criteria for evaluate the information system. The evolution of IT/IS should not only include integration of IT/IS but also compare with what is actually happening, whether the requirements have been met and whether the benefits from the IT/IS have been realized. However, the evaluators of the IS will need to gather statistics, interviews, questionnaires, and observation in order to assess system functioning and user satisfaction.
SSM Application for Design IMS at the CTHMIHR

Chapter 6

6.7.5 ICT system

Table 6.16 outlines the list of systemically desirable and culturally feasible changes according to the activities of the ICT system.

Table 6.16 Desirable and feasible changes –ICT system

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify user needs re communication of information</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to procure ICT</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between IT, IS, IM staff and lower and middle management</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to achieve access to ICT</td>
<td>RP indicates that LAN not working properly</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to achieve better communication</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the ICT system is to exchange information between users and to achieve communication between users of information and CTHMIHR. Therefore, the activities of the system are:

6.7.5.1 To identify user needs re communication of information

In this activity, IT, IS and IM staff compare the existing ICT system with the communication needs of users, and identify any gaps. The analysis should cover users' impression of CTHMIHR information, including: quality, quantity, timeliness, accuracy, and up-to-date nature of information. So, IT, IS, and IM staff need to see the ICT system through the users' eyes in order to provide adequately for user needs. Furthermore, IT, IS, and IM staff may be use writing documents, interviews, questionnaires, and observation to gather information.
6.7.5.2 To work according to a strategic plan
In fact, it is essential to follow a clear ICT strategic plan, which must support the aims and directions of the CTHMIHR in order to facilitate the exchange of information between users and CTHMIHR. The strategic plan must be developed by high and middle management and contain clear policies regarding information exchange between users and CTHMIHR, covering both the short term and the long term (five-year).

6.7.5.3 To procure ICT
It is vital that the report analysing the ICT is presented to upper management. It must summarize the problems found in the current ICT, describe the requirements for an improved or new ICT system, and evaluate the benefits of using Internet and Intranet facilities as types of communication. It may be they need to make a formal presentation in order to get clear approval from upper management.

6.7.5.4 To obtain consensus between IT, IS, IM staff and lower and middle management
After the completion of the report and the formal presentation, it is vitally important to obtain a consensus between middle and lower management as well as IT, IS, and IM staff about the ICT system. Getting approval about the ICT system can help technical staff and the rest of ICT system team to have support when and where they need it.

6.7.5.5 To achieve access to ICT
The aim of this activity is to develop ICT system as a system team analysis. Using Internet and Intranet services will increase the number of users and exchange information between users and CTHMIHR. Using Internet and Intranet to access CTHMIHR information can satisfy users’ needs including:

- Improving communication and sharing information between users and CTHMIHR
- Single interface with CTHMIHR information resources
- Downloading information and software
- Sending and receiving e-mail
- Effective cost and remote access to CTHMIHR information
- 24 hour availability, particularly for researchers

6.7.5.6 To achieve better communication
Middle and lower management, and technical staff at CTHMIHR need to set up a clear information policy for using the ICT system, particularly the Internet and Intranet. The ICT system should evaluate through internal and external users and non-CTHMIHR technical staff. The evaluator of the ICT system should use scientific methods to gather information as well as to set up clear measurement criteria for evaluations.

6.7.6 Staffing system
Table 6.17 outlines the list of both systemically desirable and culturally feasible changes according to activities of the staffing system.

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine skill-set requirements</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to procure a staffing policy document</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to achieve better qualified staff at CTHMIHR</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the staffing system is to provide employees or manpower to CTHMIHR to achieve better qualified staff at CTHMIHR. Therefore, the activities of the system are:

6.7.6.1 To determine skill-set requirements
The purpose of this activity is to define future staff requirements and determine the specification necessary to recruit quality people, particularly in CTHMIHR
departments. Therefore lower management and operational control staff need to be able to:

- Identify, define and assess the current staff working in CTHMIHR departments
- Analyse the content of the current jobs under their control
- Draw up a detailed job description for each member of staff
- Determine future competence requirements in relation to current and future work demands and job roles
- Draw up an employee specification for new jobs, and
- Inform and consult with other CTHMIHR staff about recruitment problems and encourage them to offer their ideas and views.

6.7.6.2 To work according to a strategic plan

High and middle management must develop a clear strategic plan for short-term and long-term staffing, taking into account what the CTHMIHR expects to achieve in the future, and the ways in which these achievements can be realized. Middle management should identify the number of jobs which will exist if CTHMIHR is to achieve its objectives and the types of skills and knowledge the jobholders will require.

6.7.6.3 To procure a staffing policy document

Lower management and operational control staff should write a clear staffing policy document which aims to locate and attract good quality applicants and to make valid, reliable, and cost effective decisions about whom to select. According to Cowling and Mailer (1998), the factors which impress good quality applicants include:

- The reputation of the company as a good employer
- How well the vacancy has been advertised
- The attractiveness of the salary and conditions of service
- Whether potential applicants think they can do the job, and
- Whether the job looks interesting and satisfying.

However, lower management and operational control staff should write a job description under the following headings:

1. The title of the job
2. The main purpose of the job
3. The main tasks of the job
4. The scope of the job
5. Employee specification (skills, knowledge, experience, attitudes)

6.7.6.4 To obtain consensus between middle and lower management
Lower management and operational control staff should do a formal presentation to middle management to get clear approval. The formal presentation should contain the mission of the staffing system which helps to provide staff to CTHMIHR, and the process that is used to achieve better qualified staff. The importance for lower management and operational control staff is to obtain consensus between middle management and to get support from them as needed.

6.7.6.5 To achieve better qualified staff at CTHMIHR.
Every job has specific demands and staff that carry out the job will need certain skills and abilities to achieve the expected level of performance. It follows that middle and lower management should set up clear criteria to measure performance against the objective of the staffing system. Middle and lower management should have a good idea of the skills, knowledge, experience and attitudes of the existing CTHMIHR staff and it may make more sense to promote someone internally or move someone from another department. The aim of this is to allocate the proper person with the right knowledge and skills for the job in order to achieve CTHMIHR objectives.

6.7.7 Staffing development and training system
Table 6.18 outlines the list of both systemically desirable and culturally feasible changes to the staff development and training system.
<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify skills mix required in CTHMIHR</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to provide staff with additional skills and competencies</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to use appropriate staff development</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to use appropriate training materials</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to operate training programmes</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to achieve a better skilled workforce</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of staffing development and training system is to provide users with proper skills and competencies to achieve a better skilled workforce. So, the activities of the system are:

**6.7.7.1 To identify skills mix required in CTHMIHR**

The aim of this activity is to identify the training needs of departments as well as CTHMIHR staff in order to determine the difference between actual and required performance. Lower management and operational control staff need to assess the present skills problems and future challenges that can be met through training. Therefore it is important to identify the knowledge, skills, and abilities which staff need in the present and in the future. The first step is to analyse human resources data to show training weaknesses: departments or areas with high turnover, high absenteeism, and low performance. Other resources may need to be analysed such as, staff and user complaints, manager complaints, interviews, observations and accident records. In addition, jobs, skills, tasks as well as personal analysis are very important to identify training needs.
6.7.7.2 To work according to a strategic plan

Staffing development and training should be a part of the overall strategy. Therefore high and middle management must develop a strategic plan for staff development and training by using scientific methods to forecast for future needs according to present and past information. The staffing development and training strategic plan should be viewed from both a short term and long term (five-year) perspective. Therefore, high and middle management need to analyse the internal and external information environment to produce a better strategic plan about staff development and training.

6.7.7.3 To provide staff with additional skills and competencies

The need of training has been identified, and the next stage it to set up training objectives. The objective of training is a specific outcome that the training programme is intended to achieve. Therefore, lower management and operational control staff should set up clear training objectives that include providing CTHMIHR users (internal and external) with proper training courses with proper information technology, within a suitable time-frame for users, to achieve better skills and competencies. Motivating users before, through, and after training courses is very important, particularly if they feel that they will then enjoy benefits such as increased salary, recognition from others, and better working conditions.

6.7.7.4 To use appropriate staff development

Lower management and operational control staff should provide training courses with proper staff development, which must be delivered using good quality teaching methods and IT. Therefore, staff development can expand existing knowledge and skills by using explanation and demonstration. The efficacy of staff training and development can be assessed by asking participants to undertake a practical exercise. It is important to use feedback from staff training to make sure that understanding has taken place.

6.7.7.5 To use appropriate training materials

Lower management and operational control staff should select training methods depending on the number of training staff, type of courses, material needs, time, technology and cost effectiveness. There are two main methods that can be used in
training, both internal and external. To carry out internal training, it is vital to provide suitable classrooms with IT technology (computers, projectors, video, and Internet access), course handouts, books, white board, etc. Several organisations provide free external training, to local authority staff such as Umm Al-Qura University and general public Institute. Staff with a high level of education, knowledge, and skills in specific areas can be sent abroad for training.

6.7.7.6 To operate training programmes
The aim of this activity is to implement, manage and operate training programmes. Regarding timing, it is important to consider not only when the training should start and finish, but also what is the best time of day to take the time away from the workplace. It is also important to make sure that any equipment that might be needed is available in order to make the trainer feel comfortable. However, the training programmes should include all areas that help and improve staff skills as well as meet all CTHMIHR function systems needs. To succeed, all systems depend on comprehensive training programmes that show staff how to operate these systems. Using Internet services for on-line courses will greatly improve IT skills for the users of CTHMIHR information (internal and external). The training courses should include: IT skills, record management, information security, financial management, information policy, customer services, as well as languages such as English, French, and non-Arabic Muslim languages such as Bengali, Urdu and Farsi.

6.7.7.7 To achieve a better skilled workforce
Middle and lower management should evaluate training outcome by setting up clear criteria in order to achieve a better skilled workforce. It is also important that users are trained to use the system. The evaluated outcome must be built on scientific method of measurement, determining the type of changes taking place in skills, knowledge and the attitudes of users (internal and external) as a result of training and how far this training will help to achieve CTHMIHR system objectives. Cowing and Mailer (1998) state that evolution is an attempt to improve the quality of training, mechanisms to prove that this is done, as well as determining what learning has taken place.
6.7.8 Records management system

Table 6.19 outlines the list of both systemically desirable and culturally feasible changes according to the activities of the records management system.

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine record needs</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to produce a records management policy</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management IT, IS, IM staff</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to procure a records management system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to implement a records management system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to achieve a full data set that can be retrieved at any time in the future</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the records management system is to create, manage and preserve CTHMIHR records to achieve a full data set that can be retrieved at any time in the future. Therefore, the activities of the system are:

6.7.8.1 To determine records needs

Records are one of the most vital resources to CTHMIHR. Many critical records are distributed throughout departments. Each department has its own way of dealing with these records. Therefore, lower management and operational control staff should use scientific methods to gather and evaluate current record management. Inventory forms can by used which aim to obtain as much of the required data as possible through physical examination of individual records series (Emmerson, 1989). Interviewing records supervisors can be an effective method for determining records needs.
Furthermore, users of the CTHMIHR records must be involved and make a list of expectations that are satisfactory to all participants.

However the aim of this activity is to investigate records management problems. So, lower management and operational control staff should not only analyse and understand the current records management system but also identify record problems, user needs, and describe them very specifically in reports.

6.7.8.2 To work according to a strategic plan
Working according to a clear records management strategic plan is very important. This strategic plan should not only focus on the short term but also on the long term (five-year). High and middle management can use scientific methodologies to facilitate CTHMIHR forecasts for the future depending on present and past data available. Furthermore, high and middle management need to make a careful analysis of external and internal environment to build up a strong Records management strategic plan and minimize weaknesses.

6.7.8.3 To produce a records management policy
Lower management and operational control staff should write a report describing the records management policy. This report should contain a brief summary of the records management system and explain clearly and simply the responsibilities of each section and of record supervisors. The policy should cover the management of current records; reviewing records; retention scheduling; using the Record Centre; storing the records; listing the records and destroying unnecessary information.

6.7.8.4 To obtain consensus between middle and lower management
Lower management and operational control staff may need to make formal presentations about the records management system to get clear approval from upper management. The advantage of getting approval from upper management is that it will minimise resistance from staff in disclosing information, ensure that the system is taken seriously, and get management support when it is needed.
6.7.8.5 To procure a records management system

Lower management and operational control staff should write a clear process of the records management system. The Records Centre at CTHMIHR can play a significant role in the utilisation of the records management system, including:

- Centralising the records used by all departments in CTHMIHR
- Ensuring that all records are kept safe and in an ideal environment
- Controlling the creation and growth of records
- Saving money, time and effort in accessing specific documents
- Reducing the cost of information storage
- Avoiding duplication of the same records
- Reducing paperwork
- Making information at CTHMIHR more secure
- Making records more controlled and easily managed and maintained, and
- Integrating the records at CTHMIHR.

6.7.8.6 To implement the records management system

Lower management and operational control staff should use scientific methods to implement the records management system as well as the Record Centre. The key point in the implementation is that users of the records management system are now going to switch to the new system. Criteria must be set up for testing the new records management system and the system is actually ready to be converted. The convention of the new records management system must be planned carefully. The implementation of the records management system should cover training users, converting files, and converting the system.

6.7.8.7 To achieve a full data set that can be retrieved at any time in the future

When a new system of records management has been established, it is important to bring in evaluators from an independent consulting firm. The system must also be evaluated by the users of the system who are the key evaluators. The evaluators need to gather information by interviewing users and records supervisors, and by observation. The main aim of the evaluation is to achieve a full data set that can be retrieved at any time in the future as well as the satisfaction of users of the records management system.
6.7.9 Database system

Table 6.20 outlines the systemically desirable and culturally feasible changes according to the activities of the databases system.

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to determine database needs</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to produce a policy for database procurement</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management IT, IS, IM staff</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to procure an agreed database system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to implement the database system</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>7. to maintain proper database records</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the database system is to create and manage CTHMIHR databases to maintain proper database records. Therefore, the activities of the system are:

6.7.9.1 To determine database needs

Lower management as well as operational control staff must understand the current database system before they can do anything to improve it or develop a new database system. It is important to involve users to analyse the current database system, because most users (internal and external) have a good knowledge about the current database system. Moreover, users play an active and vital role through making a list of users' expectations from the new database system. Lower management and operational control staff can gather information by using interviews with databases managers and operational, observe the system during operation, and gather written material related to the database system.
The reasons for developing a database system include:

- avoid duplication and reduce amount of data
- integrated data and easy to update
- increase sharing data between different applications
- data is centrally controlled, which leads to better data management by enforcing standards for all database users
- improve security and decrease storage requirements, and
- a faster and cheaper facility for producing information to users.

A universal database management system which links corporate information such as videos, forms, digital images, texts, and spreadsheets to the web, will enable users to contact CTHMIHR from anywhere in the world.

6.7.9.2 To work according to a strategic plan

High and middle management should use scientific methods to forecast futures according to present and past information. Setting up an active and vital strategic plan for database system is very importance. This strategic plan should focus not only on short term but also on the long term (five-year). Therefore, high and middle management are required to analyse the internal and external databases environment to produce a better strategic plan for the database system.

6.7.9.3 To produce a policy for database procurement

Producing a written policy for the databases by lower management and operational control staff is very important. The report should contain the description of database system and should also explain clearly and simply the responsibilities of each section and database manager. The policy should cover all operational management of database development, how to access databases, how to update databases, data protection, copyright, security, back up, and destroying unnecessary information.

6.7.9.4 To obtain consensus between middle and lower management

It is very important for lower management and operational control staff to present the database system in a formal presentation to middle management to obtain approval from
them. The presentation should contain an overall statement of purpose of the database system. The mission of the database system should support the goals of CTHMIHR and how the database system will improve information management and achieve users' satisfaction. The main benefits from obtaining consensus between middle and lower management is to push all the staff to help the teams and get support from upper management.

6.7.9.5 To procure an agreed database system
Lower management and operational control staff should design the database system according to scientific methodologies. The aim of this activity is to agree the design of the database system, including:

- **Conceptual design.** Lower management and operational control staff try to represent the information content of databases, without considering how this information will be implemented or which software (programs) should be used in the system. The product of this phase is called the conceptual schema which provides a high-level representation of the databases and can be very useful for documentation.

- **Logical design.** The team in this phase should translate the conceptual schema into a data model that can be adopted by database management system. The product of this phase is called the logical schema. It provides a description of the contents of the databases and is very useful as a reference for writing queries and updates.

- **Physical design.** After completion of the logical schema, the team will translate it into a physical data model which depends on the specific database management system chosen. The product of this phase is called the physical schema.

6.7.9.7 To implement the database system
Lower management and operational control staff must prepare a written plan regarding how implementation will progress. The plan should contain the general categories of activities, and a detailed list of tasks that need to be performed. It is vital to write the
name of the person or group responsible and the expected completion time. The categories of an activity are as follows:

- Training
- Equipment installation
- File conversion
- Procedure conversion
- System conversion, and
- Evolution and further evaluation.

6.7.9.8 To maintain proper database records
The point at which the implementation is finished and maintenance begins is not clear. Maintenance of the database system is a major activity, particularly in an organisation like CTHMIHR. Therefore, lower management and operational control staff must prepare a written plan for continuing the process of correcting, modifying and improving the database system.

6.7.10 Security system
Table 6.21 outlines the list of both systemically desirable and culturally feasible changes according to the activities of the security system.
Table 6.21 Desirable and feasible changes – Security system

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify information security requirements</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to a strategic plan</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to procure a security system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management and IT, IS, IM staff</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to implement an agreed security system</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to provide a secure environment for CTHMIHR information</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the security system is to keep track of electronic records, by means of authentication and firewalls in order to provide a secure environment for CTHMIHR information. Therefore, the activities of the system are:

6.7.10.1 To identify information security requirements

CTHMIHR must determine what information is the most valuable and then take reasonable steps to protect that information. Therefore, lower management and operational control staff must carefully analyse what is really important and what can provide better security and reduce the cost of security. The first task is to identify information that should fall into one of the following classifications:

- Registered (highest classification). This includes information that, if improperly disclosed, could cause serious damage to CTHMIHR operations.
- Private (middle classification). This includes information that, if improperly disclosed, could have substantially detrimental effects on CTHMIHR operations.
- Personal (special classification). This is information that an individual might find embarrassing or detrimental, if improperly exposed.
However, lower management and operational control staff must understand the current security system and identify the current security problems, security system needs, and describe it very specifically in written reports.

6.7.10.2 To work according to a strategic plan
It is very important to work according to a clear strategic plan for the security system developed by high and middle management. This strategic plan must be concerned not only with the short term, but also the long term (five-year). High and middle management may use scientific techniques to facilitate CTHMIHR forecasts, particularly in the security system, depending on current and past data. A careful analysis of the external and internal environment is advisable, in order to build up a strong security system and minimize weaknesses.

6.7.10.3 To procure a security system
The report analysing the security system must be presented to upper management. It must summarize the aims and objectives of the security system, the problems found in the current security system, and it must describe the requirements for improving or developing a new security system. The report must contain a security system design which includes physical, software, and data security (data protection). Physical security problems include computer failure, theft, LAN failure, power failure, flood, and fire while, software security problems include be viruses, user errors, software errors, and operating errors. Data security problems include illegal copying of software, staff misuse of data, infringement of personal privacy, and unauthorised access to the organisation's information without permission. The report must include a master plan for prevention and for recovery from any impact of security problems. The cost and information policy of the security system must also be covered in the report. The clear approval of upper management will be required before implementation.

6.7.10.4 To obtain consensus between middle and lower management
After completing the report and making a formal presentation, it is important to gain consensus between middle and lower management regarding the security system. Getting approval from upper management for the security system can help the technical
team to have support when they need it, and make sure that security will move smoothly.

6.7.10.5 To implement the agreed security system

To implement the security system at CTHMIHR, lower management and operational control staff must prepare a written implementation plan. The plan must include team structures. The implementation of the plan should involve the distribution and determination of required resources and budgeting of time and money. The plan must also include general categories of activities, and a detailed list of tasks that need to be performed. It is vital to write the name of the person or group responsible and expected completion date. The categories of the activity are as follows:

- Training (staff, programme, method, lectures, demonstration)
- Equipment installation (room access, CCTV, restricted areas, lighting and blinds, reinforced glass, air conditioning, compartments for protecting magnetic media and reports)
- File conversion (paper and electronic files to the system)
- System conversion (from old system to new system)
- Evaluation (using proper research techniques for example interviews, questionnaires and focus discussion group to evaluate the security system)

6.7.10.6 To provide a secure environment for CTHMIHR information

The activity aims to evaluate the security system. So, middle and lower management should establish a set of criteria, and evaluation mechanism operating by an independent body (not CTHMIHR). It is very importance to make sure that CTHMIHR information has been kept in a secure environment and has a clear plan for prevention and recovery from any disasters.

6.7.11 User needs system

Table 6.22 outlines the list of both systemically desirable and culturally feasible changes according to the activities of the user needs system.
### Table 6.22 Desirable and feasible changes – User needs system

<table>
<thead>
<tr>
<th>Activity in Conceptual Model</th>
<th>Present in Real World</th>
<th>Systemically desirable</th>
<th>Culturally feasible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. to identify user needs</td>
<td>Users do not use CTHMIHR information</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2. to work according to strategic plan</td>
<td>RP indicates that there is concern only with the short term.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3. to satisfy user needs</td>
<td>Females find difficulty in accessing information.</td>
<td>Yes</td>
<td>Partially</td>
</tr>
<tr>
<td>4. to obtain consensus between middle and lower management</td>
<td>Insufficient in RW</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5. to use integrated CTHMIHR systems to enact user requests for up-to-date technology</td>
<td>Users find difficulty in exchanging information</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>6. to provide users with the right information</td>
<td>Lack of concern for non-users of information and non-Arab Muslims.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The aim of the user needs system is to investigate user needs and provide users with the right information, at the right time, in the right format. Therefore, the activities of the system are:

### 6.7.11.1 To identify user needs

Users of CTHMIHR information play a significant role in the success or failure of the system. So, it is very important for staff to investigate user needs, using suitable techniques (interviews, questionnaires and focus discussion group for example) to gather data. The staff must understand the current system in order to help users and provide quality information. It is also important to investigate non-users (by using suitable techniques such as questionnaires and interviews) of information or services for the following reasons:

- To increase the number of CTHMIHR users
- To extend the system and service coverage
- To compete effectively with other resources, and
• To improve the current CTHMIHR information system and services.

6.7.11.2 To work according to a strategic plan

It is important to develop a strategic plan related to user needs. This strategic plan should satisfy the demand and expectation of users who play an important role in the success of the information system. The strategic plan for user needs should cover the short term and also the long term. Forecasting user needs and increasing the number of users is also important. Therefore, the developer of the information strategic plan should have the following skills:

- Understanding of information resources and access to them
- Understanding of the flow of information and its problems
- Evaluating information resources, and
- Knowledge of technologies.

6.7.11.3 To satisfy user needs

When the lower management and operational control staff finish their investigation of user needs, they should present their report to upper management. The report should summarize the aims and objectives of investigating user needs, the current problems, and the process and requirements to improve the service and satisfy user needs. The report should consider female users, such as training for accessing CTHMIHR information and they should be a females section to deal with all females’ requests. The report should have a plan about the process that can be used to improve the current IS, including the benefits of developing a Call Centre for users and CTHMIHR as well. Moreover, lower management and operational control staff may need to make a formal presentation to get clear approval from upper management.

6.7.11.4 To obtain consensus between middle and lower management

It is very important for lower management and operational control staff to present the analysis of the information gathered from interviews, questionnaires and observation about the user needs in a formal presentation to middle management to obtain approval from them. The presentation should include the aims and objectives of the investigation about user needs, current problems, how CTHMIHR will improve services, and achieve
user satisfaction. The main benefits from obtaining consensus between middle and lower management is to encourage all staff helping the teams, getting support from upper management when and where the team needs it.

6.7.11.5 To use integrated CTHMIHR systems to enact user requests for up-to-date technology

Developing a Call Centre at CTHMIHR will greatly help to satisfy user needs. The benefits from establishing a Call Centre for users and CTHMIHR will include:

- Improving communication between the CTHMIHR and users, particularly between the Call Centre and users in remote locations
- Saving users’ time in getting the information they need from the CTHMIHR
- Giving great help and guidelines to users
- Maximising the services and minimising the cost of interactions
- Collecting information for users from different departments at the CTHMIHR
- Real-time statistics and reporting which help upper management in decision-making with regard to IM
- Contributing to the integration and updating of information at the CTHMIHR
- Gathering as much information about the users as possible, to build and strengthen the relationship between users and CTHMIHR
- Providing this valuable information to anyone in the CTHMIHR who can use it, and
- Multiple delivery channels enabling the support of multiple lines of process, and the standardisation of products and services across all channels.

The Call Centre can be organized in any number of ways using multiple delivery channels such as the telephone, fax, e-mail or Internet as well as Intranet. In other words, the Call Centre can use telephone facilities and computer technology to provide and receive information between CTHMIHR and the users. Therefore it is very important to provide the Call Centre with a proper integrated system, up-to-date ICT, information policy documents as well as proper staff training.
6.7.11.6 To provide users with the right information

When the Call Centre is established, it is vital to evaluate it and the services provided to users using evaluators from an independent consulting firm. The evaluators need to gather information from users’ access to CTHMIHR information by using interviews, questionnaires and observation in order to provide users with the right information. Therefore, it is important to set up clear criteria to evaluate Call Centre services.

6.8 Stage 7: Taking Action

In stage 6, feasible and desirable changes are identified and discussed, and they will be put into action in stage 7. The purpose of stage 7 is to implement the changes at CTHMIHR which might be made to improve the problem situation. There are five kinds of possible changes: structural, procedural, policy, attitudes, and culture.

The information in Tables 6.23 and 6.24 shows the relationships between the changes at CTHMIHR that can be made to implement systems.

6.8.1 Structural changes

The structural changes that should be implemented to improve the problem situation include the following:

- Establishing a Help desk and Records Centre as part of the Department of Information and Technical Services. This can play a vital and active part to improve the problem situation, particularly problems related to hardware and software. So middle and lower management should develop a Help desk and Record Centre with a clear mission and objectives.

- CTHMIHR should establish a Call Centre to improve communication between users of information and CTHMIHR and provide users with the requested information in a short time. Therefore, high and middle management should develop a mission and objectives Call Centre and make sure that the Call Centre achieves the objectives. For the latter, appropriate performance management criteria should be developed in consultation with users.
CTHMIHR should create a number of teams to establish and implement these systems. These teams should have high skill, knowledge, and experience related to the aims and objectives of the systems. Moreover, establishing master teams to review all systems is important. The mission of the master teams is to make sure that all system teams achieve their aims and objectives. Master teams may have members from outside CTHMIHR or from outside Saudi Arabia.

Table 6.23 The relationship between systems and action changes

<table>
<thead>
<tr>
<th>Systems</th>
<th>Changes</th>
<th>Structural</th>
<th>Procedural</th>
<th>Policy</th>
<th>Attitude</th>
<th>Cultural</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Planning system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>High and middle management</td>
</tr>
<tr>
<td>Financial resources system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Middle and lower management as well as</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>financial staff</td>
</tr>
<tr>
<td>Information policy system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Middle and lower management</td>
</tr>
<tr>
<td>Technical system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Lower management and IT, IS, and IM staff</td>
</tr>
<tr>
<td>ICT system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Lower management and IT, IS, and IM staff</td>
</tr>
<tr>
<td>Staffing system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Middle and lower management as well as</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>operational control staff</td>
</tr>
<tr>
<td>Staff development and training</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Middle and lower management as well as</td>
</tr>
<tr>
<td>system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>operational control staff</td>
</tr>
<tr>
<td>Records management system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Lower management and IT, IS, and IM staff</td>
</tr>
<tr>
<td>Database system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Lower management and IT, IS, and IM staff</td>
</tr>
<tr>
<td>Security system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Middle and lower management, IT, IS, and IM staff</td>
</tr>
<tr>
<td>User needs system</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td></td>
<td>✔️</td>
<td>Middle and lower management</td>
</tr>
</tbody>
</table>

224
Table 6.24 Departments needs, systems and action

<table>
<thead>
<tr>
<th>CTHMIHR Departments needs</th>
<th>Dept. of Information and Technical Services</th>
<th>Dept. of Administrative and Human Research</th>
<th>Dept. of Environmental and Health Research</th>
<th>Dept. of Architectural and Engineering Research</th>
<th>Dept. of Research Affairs</th>
<th>Dept. of Financial and Administrative Affairs</th>
<th>How</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Planning system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Strategic planning team</td>
</tr>
<tr>
<td><strong>Financial resources system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Financial team</td>
</tr>
<tr>
<td><strong>Information policy adopted system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td><strong>Technical system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Help desk</td>
</tr>
<tr>
<td><strong>ICT system</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Uses Intranet services</td>
</tr>
<tr>
<td><strong>Staff system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Staffing and training team</td>
</tr>
<tr>
<td><strong>Staffing development and training system</strong></td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Staffing and training team</td>
</tr>
<tr>
<td><strong>Records management system</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Record Centre</td>
</tr>
<tr>
<td><strong>Database system</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Universal databases</td>
</tr>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Security team</td>
</tr>
<tr>
<td><strong>User needs system</strong></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>Call Centre</td>
</tr>
</tbody>
</table>

6.8.2 Procedural changes

The procedural changes should be taken include:

- The number of meeting between high and middle management should be increased (at least twice every year) to ensure that CTHMIHR is achieving its goals and not only giving support to middle management when they need it but also improving communication within each hierarchical level and between hierarchical levels.
• The teams should use proper research techniques (interviews, questionnaires and focus discussion group for example) to analyse and evaluate their system bases through the eyes of the system users. The evolution and measurement of performance can be done by setting up criteria for evaluation and some of the evaluators should be outside the system teams.

• Head of Units at CTHMIHR should report to lower management every month and introduce a reporting system for the first time. Consequently, Heads of Departments should report to middle management every three months instead of reporting only after Rammadan and Hajj. Furthermore, middle management should report to high management every four months instead of reporting after Rammadan and Hajj.

• The technical team (lower management, IT, IS and IM staff) should make sure that hardware (computers, LAN, WAN, communication technologies) and software (Arabic applications) do their jobs effectively and efficiently. They should provide the Help desk staff with proper guidelines and procedures to operate and manage the Help desk.

• Using the Internet and Intranet services as a form of communication will increase the number of users and the exchange information between users and CTHMIHR.

• Staffing and training team should provide staff to CTHMIHR with the right education, skills, and knowledge according to departmental needs now and in the future.

• Staffing and training team should provide staff with proper training programmes, at the right time suitable for staff, with the proper information technologies, and with the proper staff development to achieve better skills and competencies.

• The Records management team should have a clear plan to operate and implement the Records Centre that includes: moving records from departments, converting records to e-records, evaluating the Records Centre, and maintaining records.
Using Semantic Web at CHMIHR is a vital part of managing the database. Therefore the database team must have a written plan to implement and maintain the CTHMIHR database.

The user needs team should keep on evaluating services and investigating user needs, particularly those of outsiders, to make sure that CTHMIHR services satisfy user needs.

Middle and lower management should provide the Call Centre with an integrated system, state of the art technology ICT, information policy documents and proper training of staff.

6.8.3 Policy changes
The policy changes should include:

- Establishing a clear strategic plan related to information policy (national and international) by high and middle management.
- Establishing an information policy team with a clear mission and objectives. The team should be concerned basically not only with developing overall policies related to management, operation, and implementation of IMS at CTHMIHR, but also concerned with evaluation and setting up clear criteria for measurement.
- Middle management should present to the private sector, companies and local authorities the importance of CTHMIHR information and scientific research, in formal reports or presentations.
- The information policy team should evaluate and improve financial resources policy both short term and long term.
- CTHMIHR should establish a clear information policy for using the Internet and Intranet, access to Records Centre and Call Centre, using hardware and software, and access to communication rooms.
- Changes in current staffing policy according to CTHMIHR departments needs (skills, knowledge education as well as experience). Also establishing information policy related to staffing developing and training which includes: training programmes, motivation, appropriate staff development, and training materials.
Establish a Records management policy that includes: creating, reviewing, retention, scheduling, using the Record Centre, storing, listing records, and destroying unnecessary information.

Changes in database policy, explaining clearly the responsibility of developing, data entering, accessing, maintaining, data protection, copyright, security, storage, and destroying unwanted information.

Establish a security policy that includes: internal and external user access to information through the Internet or Intranet, Call Centre, physical access to Record Centre, and prevention and recovery from the impact of security problems.

The security team must have a master plan to prevent and recover data from the impact of security problems.

6.8.4 Attitudinal changes

The information in Table 6.23 indicates that CTHMIHR needs to effect attitudinal changes including:

- High management should encourage the private sector, local authorities and companies to provide funds to CTHMIHR since they benefit from the services.

- A clear information policy should be written which covers all sections of the information system that will change the attitude of CTHMIHR users (internal and external).

- IT/IS will changes users' attitudes, so the implementation of IT/IS at CTHMIHR should work according to proper research techniques (interviews, questionnaires and focus discussion group for example) and achieve better attitude changes.

- Developing a Help desk at CTHMIHR with proper operational staff will help employees to use IT easily.

- More training programmes particularly IT skills, English language, record management, information security, and customer services.

- Using appropriate training materials with appropriate staff development in appropriate IT will achieve a better skilled workforce.

- Using on-line courses, by using internet services to train internal and external users IT skills as well as attitudes.
Motivating staff to attend training courses, particularly if they get individual benefits such as increased salary, recognition from others, and better working conditions.

Involving users’ views through developing a system to avoid negative attitudes such as non-use of the system.

6.8.5 Cultural changes

The information in Table 6.25 indicates that CTHMIHR needs to effect cultural changes including:

- High and middle management should develop a strategic plan for national and international services.
- Establish project management teams with a clear mission and objectives, with proper skills, knowledge, experience and education, with the right technologies and sufficient funds. These teams should include: the strategic planning team, the financial team, the information policy team, the technical team, the staffing and training team, the security team, and the user needs team.
- The information process will encourage users to use formal communication instead of informal communication.
- The security team should be concerned not only with physical security but also with software and data security.
- CTHMIHR needs to translate the information into different languages to satisfy non-Arabic users.
- Using Internet services at CTHMIHR will help females to access information at any time.
- Using on-line courses will help users, particularly, females to improve their IT skills.
- CTHMIHR should provide the Call Centre with trained staff to deal with multi-language problems.
Chapter 7 | Interpretive Structural Modelling

7.1 Introduction
This chapter covers the application of ISM to develop a structured order of precedence of action to implement IMS at the CTHMIHR. It is divided into seven stages: identifying issues to be studied, deciding on the types of ISM to be constructed, selecting a participant group and facilitators, generating the element set, completing the matrix of element interactions, displaying the ISM, and discussing structure and amending if necessary.

7.2 Stage 1: Identifying issues to be studied
Figure 7.1 shows the issues that arise after applying SSM (Chapter 6):

1. Strategic planning system
2. Financial resources system
3. Information policy system
4. Technical system
5. Information Communication Technology (ICT) system
6. Staffing system
7. Staff development and training system
8. Record management system
9. Database system
10. Security system
11. User needs

The conceptual diagram (Figure 7.1) shows these 11 issues within a system boundary that defines the problem situation within CTHMIHR. As indicated, each issue is an individual 'System of interest' that lies within the wider system, which in form is part of the information landscape that defines the system environment.
Figure 7.1: Results of applying SSM
7.3 Stage 2: Deciding on types of ISM to be constructed

The choice of type of ISM is limited to two: intent structure and priority structure. Whereas the former uses the transitive relation “would help to achieve” to structure the elements of the system, the latter uses “is more important than”. An intent structure is generally used to describe system needs, whereas the priority structure is used to organise a functional perspective of the system. In this research, an intent structure was used as the investigation concerned identification of user needs. The intent structure has a number of uses including clarifying thinking, explaining what an organisation is trying to accomplish, and providing a basis for taking action (Warfield, 1973).

7.4 Stage 3: Selecting the participant group and facilitator

The participant group needs to have some underlying knowledge and understanding of the system elements. The facilitator needs to have knowledge and understanding of the application of the process used in generating ISM structures. In this research, the elements were generated by the use of SSM, itself based on the 345 responses to questionnaires, 5 interviews, 3 focus groups, document analysis and observation. Although this is a departure from the norm, it adds a richness that individual members cannot emulate (Janes, 1988). The facilitator (Professor Ron Summers) is an academic who has past experience in using ISM tools in industry and EU-wide projects. In total, six Saudi participants were chosen, two each from the Universities of Loughborough, Nottingham, and Leicester. Each of these participants has a wealth of experience (between seven to twelve years) as managers in Saudi authorities.

7.5 Stage 4: Generating the element set

To provide the background context for generating the element set, each participant received: a one page descriptive overview of the study and its SSM finding; information about the aims and objectives of both the study itself and the part played by ISM; and, a descriptive account of the ISM process to be undertaken.

7.6 Stage 5: Completing the matrix of element interactions

In October 2003, the official meeting was held in the seminar room of the Pilkington Library. The meeting lasted for three hours and the facilitator (Professor Ron Summers)
wrote each numbered element on a flipchart so everyone in the room could see clearly the item under discussion. He also prepared the comparison statement such as “s1 helps to achieve s6” or “s5 must be accomplished before we can go on to s8”. The facilitator also prepared index cards with corresponding numbers to track the participants’ priorities as the process moved along. The researcher prepared a matrix of 11X11 cells to complete the matrix interactions. The following steps then took place:

**Step 1**: The researcher started the meeting by introducing the facilitator (Professor Ron Summers) and participants, and by explaining the aim of the meeting.

**Step 2**: The facilitator started by selecting two elements: s3 (Information Policy) and s9 (Database System). He displayed both cards and asked the participants, “Will s3 help to achieve s9?” and he encouraged each participant to speak on behalf of each element. When the participants voted for a ‘Yes’ a ‘1’ was entered in the appropriate cell of the matrix. A ‘No’ vote resulted in a ‘0’ being entered. The relation was asked as, “Will s3 help to achieve s9?” in the row matrix, whereas “Does s3 depend on s9?” was asked in the column matrix. The facilitator reflected the content of the two items of those index cards that could be seen at that moment [in the above example, s3 and s9].

**Step 3**: The facilitator then selected the next element, s5 (Technical), to be compared to the less preferred element of the first pair, s9. He displayed both cards (s5 and s9) and asked the participants, "Will s5 help to achieve s9?" and again he encouraged one of the participants to speak on behalf of each element. The majority of the participants voted for ‘yes’ and so a ‘1’ was entered in the appropriate cell of the matrix and s5 became the second element. The facilitator then asked the participants to compare s3 with s5. The majority decided that s3 should help to achieve s5 and so a ‘1’ was entered in the appropriate cell of the matrix. The facilitator arranged the index cards in this order: s3, s5, s9.

**Step 4**: The facilitator continued to select items to be compared, always starting the comparisons from the middle of the sequence (s5) and moving up or down, depending on the preference of the group. So, when the facilitator selected s8, he asked the
participants to compare s5 with s8. The majority of participants decided s5 should help to achieve s8 and so then a ‘1’ was entered in the appropriate cell of the matrix. Then the facilitator compared s8 with s9. The majority of participants decided s8 should help to achieve s9 and again, a ‘1’ was entered in the appropriate cell of the matrix, making the order of the index cards: s3, s5, s8, s9.

**Step 5:** Step 4 was repeated until all the items had been compared and put in order. Also, a binary matrix was constructed that represents the complete set of relations of the elements (Table 7.1). This matrix is termed the ‘reachability’ matrix as indicated below.

<table>
<thead>
<tr>
<th>The elements</th>
<th>s1</th>
<th>s2</th>
<th>s3</th>
<th>s4</th>
<th>s5</th>
<th>s6</th>
<th>s7</th>
<th>s8</th>
<th>s9</th>
<th>s10</th>
<th>s11</th>
<th>Help to achieve</th>
</tr>
</thead>
<tbody>
<tr>
<td>s1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>s2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>s3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>s4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>s5</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>s6</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>s7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>s8</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td></td>
<td>3</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>s11</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Dependence on:**

|  | 1 | 2 | 2 | 4 | 5 | 6 | 9 | 10 | 6 | 11 |

**Key**

s1 Strategic planning system
s2 Financial resources system
s3 Information policy system
s4 Technical system
s5 Information Communication Technology (ICT) system
s6 Staffing system
s7 Staff development and training system
s8 Record management system
s9 Database system
s10 Security system
s11 User needs

**Table 7.1 Reachability matrix**
7.7 Stage 6: Displaying the ISM

When all the necessary questions had been answered by the participants, the reachability matrix was constructed. The facilitator arranged the cardboard elements in the same order as he displayed the index cards, giving the participants a visual sense of their priorities. This process was time consuming because it involved discussion. However, discussion is a critical part of reaching consensus and should be encouraged. The participants discussed the elements for one hour and thirty minutes. At the end of the discussion, the ISM was displayed to the group (see Figure 7.2).

7.8 Stage 7: Discussing structure and amending if necessary

The purpose of this stage was to explain to the participants the structure of the ISM model for IMS implementation at CTHMIHR, so that they clearly understood how to interpret it; this stage also allowed them to express their views on it. Figure 7.2 outlines the ISM Intent structure model to implement IMS at CTHMIHR. This model can be interpreted as the structured order of precedence of action to achieve the goal. Thus, the strategic planning system is required initially, as it 'helps to achieve' all others elements of the model. Following the implementation of this system, both financial resources and the information policy can be determined. When these are combined, the technology system can be described that will indicate the ICT required. Following this system's implementation, both the staff development training system, which, in turn, will indicate the make-up of the staffing system, and the security system can be determined. When all of these are combined, the records management system can be described; this will indicate the design of the database management system, and consequently, this will satisfy user needs.

7.9 Summary

This chapter described the process and content of using ISM to generate an intent structure. The hierarchical model obtained is useful, as it takes as its input the issues identified to improve the problem situation via the SSM intervention, and ordered them in a way that provides an indication of action timeline. A contrast can drawn between the unordered conceptual diagram (Figure 7.1) and the output of the ISM process
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(Figure 7.2). The six participants were sceptical about progress initially, but soon were engaged with the ISM process and its consensus decision making methodology. ‘Ownership’ of the content and ‘empowerment’ as a consequence of the decision making process, meant that the output (Figure 7.2) was seen by all participants as being helpful to achieve the aims and objectives of the study.
Figure 7.2: ISM Intent structure model to implement IMS at CTHMIHR
Chapter 8 | Discussion

8.1 Introduction

As indicated throughout this study, there are a number of problems that face information users at the CTHMIHR. These include: (1) the length of time taken for processing information, (2) missing information, (3) network down time, (4) incomplete information, (5) duplication of information held in different departments, (6) too much paper, (7) information not in the right format, (8) irrelevant information, and (9) non-intuitive system design.

The aim of this chapter is to discuss issues related to IMS at CTHMIHR. It begins by considering the information strategy, financial resources and information policy since such management resources need to be in place to achieve the successful implantation of the IMS. The chapter then moves onto ICT/IS and IM, staff/user training and development, and information security. These elements define the human and technical aspects of the IMS. The next section examines records management, the database management system, and the fulfilment of user needs. This brings together multidimensional information about the Hajj process since acting on it to fulfil user needs is a goal of the IMS at CTHMIHR.

The information contained in Figure 7.2 (Stage 7 of ISM in Chapter 7) outlines the ISM Intent structure model required to implement IMS at CTHMIHR. This model can be interpreted as offering a structured order of precedence of actions needed to achieve the goal. Thus, a strategic planning system is required initially as it 'helps to achieve' all others elements of the model. Subsequent to this system implementation, both the necessary financial resources and information policy can then be determined and implemented. After the policy is put into operation, the technology system can be established and implemented, and the ICT that is required can be defined. On the one hand, staff development in ICT leads to the need for a staffing system while, on the other hand, the ICT security infrastructure can be determined. When these human and
technical strands are combined, the records management system that helps to achieve
the creation of a database for the management of Hajj can be described; this can
consequently be mapped to match the needs of the user (both the pilgrim and
researcher).

8.2 Management Resources

8.2.1 Information Strategy

An organisation's mission, objectives and policy should be set up before its strategy
formulation. Strategic planning is the process of making an organisation's strategy
while information strategy is closely linked to organisational strategy, which is one of
its key drivers. The main reason for developing an information strategy is to ensure that
there is a strong and flexible information infrastructure that can support the range of
applications required to satisfy organisational strategy. Information strategy is carried
out by high-level management in an organisation and deals with broad issues
concerning an organisation's development over the long term. Organisational strategy
and information strategy are not frozen but are evaluated and redrafted from time to
time in a predetermined timetable.

There are three key complementary information strategy initiatives which may exist
within an organisation: IT strategy, IS strategy and IM strategy. IT strategy is
concerned primarily with technological issues and what technological system
development is needed in order that the organisation's IS strategy can be realised. IS
strategy is focused on determining what systems must be provided in order that the
objectives of the organisational strategy are realised and IM strategy is the management
framework which is used to guide how the organisation should run IS and IT functions
and activities.

In reality, the result of the document analysis (see Section 2.6) found that CTHMIHR
has three objectives that were developed by senior management (Oversight Committee
of Institution). The analysis also revealed an absence of both organisational and
information strategy. The Dean, Heads of the Departments and members of the focus
groups (see Section 5.2) pointed out a number of problems related to these missing
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elements of CTHMIHR strategy. For example, members of the focus groups indicated that one of the major problems was that information delivery to CTHMIHR takes many forms (e.g. reports, research studies, maps, studies, electronic records, and letters) and comes from both internal and external sources. It is often left to the Heads of Department or Heads of Unit to cope with information as they see fit. They do not always pay appropriate attention to IM, with the result that the information is difficult to access and retrieve. Another problem is that the institution fails to understand the relationship between IM and other aspects of management, such as IT/IS and operational control. For example, Heads of Department complain that IT/IS personnel do not understand departmental needs, while staff complain that the system is difficult to understand and has not been designed to take account of different information handling behaviours. This reflects the fact that CTHMIHR did not have an information strategy to deal with information to achieve the Institute’s strategy. So, this study agrees with Orna (2004) whose study notes that information strategy in the organisation can provide the necessary framework for the management of information.

Furthermore, the responses to the questionnaire (see Table 5.24) indicate that there is a significant difference between IU (internal users) and TE (external users and non users of CTHMIHR information) regarding their understanding of IM. This may be related to IU knowing about IM problems, but not knowing how to deal with them. This might be because of: the lack of CTHMIHR strategy, information strategy and strategic planning; managers focusing only on the short term rather than the long term; an absence of experts and information professionals; a lack of analysis of the internal and external CTHMIHR environments; and a lack of focus on the part of CTHMIHR about where it wants to be in the future. These shortcomings were represented in the rich picture of the SSM.

SSM (Stages 2, 3 and RP: see Sections 6.3 and 6.4) showed that there is a need for developing the following: a CTHMIHR strategy and information strategy; a strategic plan for information policy; a strategic plan for increased funding and the management of such funds; strategic planning for staffing and training; strategic planning for records
management; a strategic plan regarding IT and integrated databases; and a strategic plan for information security.

Figure 6.2 also shows the structure of the 11 problem themes at CTHMIHR. It is clear that the strategic planning problem theme is the basis of all the other problem themes. The research study demonstrates that CTHMIHR has the alignment of information strategy with their objectives is inadequate, so managers may seek short-term rather than long-term objectives. Thus, this study accords with Beynon-Davies (2002) who, when considering strategic analysis, asserts that such analysis should involve analysis of the environment, expectations, objectives, power and culture in the organisation, as well as organisational resources. Strategic analysis involves determining the organisation’s mission and goals and involves answering such questions as “What should we be doing?” and “Where are we going?”

SSM, particularly Stage 6 (see Section 6.7) found that it is vitally important for the Institute, particularly the high level management, to develop a CTHMIHR strategy with a clear mission, objectives and policy before moving further towards developing an information strategy. It is also important for senior management to develop strategic plans regarding the operation of its information strategy to establish an information bank about the Hajj. These strategic plans should help to improve the work and services including: procuring financial resources, formulating information policy, adopting technical systems and ICT, reviewing staffing, reviewing staff development and training, creating a records management system and database system, implementing an information security system, and further understanding and incorporating user needs. These strategic plans should be clear and integrated with each other. Furthermore, it is necessary to set up clear criteria to evaluate these strategic plans, which should be redrafted from time to time. So, this study agrees with Beynon-Davies (2002) when he states that, ideally, organisation strategy formulation should come before the formulation of information strategy. Strategic planning is the process of formulating an organisation’s strategy.

Stage Seven of SSM (taking action) pointed out that increasing the number of meetings between high and middle management should improve the problem situation related to
CTHMIHR strategy and information strategy. It remains to be seen if this action will be implemented by the respective management personnel. Increasing the frequency of meetings between high and middle management will allow the institution to achieve its objectives. This accord with the ideas of Wilson (1997) when he states that senior management must carry out the strategic planning; they must develop overall goals and the methods of achieving them. Middle management, on the other hand, has the job of management control; they must ensure these overall goals are achieved effectively and efficiently.

8.2.2 Financial Resources
Umm Al-Qura University (UQU), like other authorities in the Kingdom of Saudi Arabia, obtains its budget from two main sources. Firstly, financial support is received from the Saudi government. Thus, all UQU faculties, centres and departments are asked to prepare and provide estimates of the funding required to run their programmes. These estimates are then examined by the main funding committee at UQU before being put out to the government committee. The government then decides on the allocation the university will receive. The Saudi government has recently allowed all universities, including UQU, to accept contributions from the private sector in order to encourage it to participate in developing the cycle of education and culture, and to improve services in the universities. CTHMIHR is officially dependent on the UQU budget which, in turn, is managed by the Director of General Budgets and Planning. Other limited resources are received from, for example, local authorities and companies in response to requests to fund certain research studies. These funds are directed by the Financial Affairs Unit in the department of Administrative and Financial Affairs.

Heads of Department and members of the focus groups (see Section 5.2) asserted that one of the major problems facing CTHMIHR is a lack of funding and its management. Around 350 staff (researchers, research assistants) have temporary contracts during the season of Rammadan and Hajj. Their financial support is paid in full by the financial department at UQU and the process of dealing with these financial affairs extends to three to four months after the season finishes. Also, primary staff, particularly non-Saudis, often complain about poor pay for the work they do. This shows that low
salaries, lengthy and complicated procedures involved in order to get paid, and heavy workloads will have a negative effect on work in CTHMIHR. So, Heads of Department and focus groups indicated that the lack of funding and its management are major factors that affect their ability to keep up with the rapidly changing situation. For this reason, the finding of this study agrees with Al-Zahrani (2001) when he said that the government and the private sector should participate in sharing the cost of establishing the IM systems in organisation.

SSM (Stages 2 and 3, and RP - see Sections 6.3 and 6.4) showed that CTHMIHR needs to improve both its financial resources and its management to provide all the institution's operations with sufficient support for their plans. In fact, middle management at CTHMIHR was concerned only with short-term fund management and did not care about searching for alternative sources. Moreover, local authorities, as well as companies, did not know anything about CTHMIHR services and how they could benefit from the institution. Furthermore, the processes involved in getting financial support from other authorities and companies were too complicated and took too long a time to get approval.

These are the main reasons why CTHMIHR has limited support from external financial resources and therefore it is important for middle management and financial staff to evaluate current fund management, make financial processes simple and flexible, look for fund management in the long rather than the short term, use their skills to manage and operate financial resources carefully and efficiently, and manage any mismatching in financial resource allocation effectively. In this way, CTHMIHR will be able to satisfy the demands and expectations of sponsors (local authorities, companies, pilgrims and visitors) by providing the right information services, at the right time, in the right format, and when they are needed (Stages 6 and 7 – see Sections 6.7 and 6.8). Hence, this study agrees with Basager (2001) when he recommends that the private sector should be encouraged to participate, whether by offering donations or by funding research projects.
8.2.3 Information Policy

Orna (1999) asserted that organisation information policy is a dynamic tool which can be used as the basis for developing an organisation’s information strategy; to relate every thing that is done with information to an organisation’s overall objectives; to enable effective decisions to be made about resource allocation; to promote interaction, communication and mutual support between all parts of the organization and between the organisation and its ‘customers’ or ‘public; to provide objective criteria for assessing the results of information-based activities; and give feedback to the process of developing corporate policies.

In 1983, the senior management (the Oversight Committee of Institution) of the Hajj Research Centre (HRC), or CTHMIHR as it is now called, developed a policy for document management. This policy includes five general sections: (1) financial policy, (2) HRC general director responsibility, (3) policy related to the work group, (4) policy for staff, and (5) policy for research support. However, this document does not contain any policy related to information, neither has it been evaluated since it was developed.

Indeed, CTHMIHR has a problem relating to information policy. The interview analysis (see Section 5.2) indicates that CTHMIHR does not have an appropriate information policy to provide regulations for middle management (Dean, Deputy Dean, and Heads of Department) and information users (internal and external). So, middle management find difficulty in processing critical information for users, particularly external users such as companies and researchers, and may need approval from senior management.

Other problems also exist because there is no clear information policy. These include: staff wasting work time searching Internet services; the IT/IS infrastructure fails to give maximum support to information users; the management of information resources is inadequate; a mismatch exists between CTHMIHR services and systems concerning the use of IT; and there is a lack of handling information between departments and users. This reflects CTHMIHR’s failure to meet the needs of users: a lengthy process and much paperwork is needed to process information; the number of external users,
Discussion

particularly females, has decreased; there is a duplication of the same records in different departments; and there exists an incompatibility between CTHMIHR resources. Therefore, the findings of this study agree with Henczel (2001) when she stated that information policy provides guidelines for both the information manager and the information user. It provides the information manager with a framework within which to work since it details the organisational principles in relation to information, its use and its management. As well as this, it guarantees the necessary allocation of resources for the continuing management of information. She added that, from the information user's perspective, an information policy is a guarantee that the organisation has a commitment to supply the information that s/he requires to do his/her job.

Table 5.15 shows majority of respondents used informal channels (telephone, word of mouth, or friends at CTHMIHR) to access information. The main reasons for this are to speed up the process of accessing information, and because staff at CTHMIHR did not feel they had any responsibility to pass on information in this way. Moreover, Table 5.16 shows that, not only were EUs (external users) required to follow up their own information needs, but also IU s (internal users) needed to use informal channels to speed up the processing of information. It is evident, therefore, that CTHMIHR did not have a clear information policy concerning the processing and handling of information, depending only on the personal relationships between staff and users. Some staff, particularly those staff with extensive experience, may even set up their own policy for handling or processing information, saying to the information user that "the information you need is not for public viewing". This may be because staff do not have the information request by the users or find difficulty in managing the department's information.

It was clear from the observational analysis (see Section 5.4) that the internal information process has been divided into four basic processes: the downward process; the upward process; the horizontal process; and the diagonal processes. Heads of Department complain about the diagonal process because they feel they do not know anything about staff and the way that they work. This may be due to the lack of an
information policy, which can negatively affect the relationship between Heads of Department, staff, and the Dean or deputy Dean of CTHMIHR. This is also one reason why staff complained about the excessive workload for the number of staff currently employed.

SSM (Stages 2 and 3, and RP - see Sections 6.3 and 6.4) indicates that most CTHMIHR information operations and services need a clear information policy, particularly concerning operations related to creating and managing information resources; using the Internet; relating to data which have been created by CTHMIHR and which must be compatible with Data Protection law; accessing information; exchanging information; bought-in technologies; using hardware and software; accessing communication networks; and creating files and records.

SSM (Stages 6 and 7 – see Sections 6.7 and 6.8) indicates that top and middle management should set up a clear strategic planning policy to provide guidelines for information managers and information users. Middle and lower management also should determine all CTHMIHR operations and services that require an information policy. The information policy should include:

1. Using the Internet, Intranet and Extranet; accessing the Records Centre and the Call Centre; using hardware and software; and accessing communication rooms;

2. Changes in the current staffing policy according to the needs of CTHMIHR departments (in terms of skills, knowledge, education and experience). Also an information policy relating to staff development and training should be established. This should include: training programmes, motivation, appropriate staff development, and training materials;

3. A records management policy should be established to include creating, reviewing, retention, scheduling, using the Records Centre, storing, listing records, and destroying unnecessary information;

4. Changes in database policy, explaining clearly the responsibility for developing, data entering, accessing, maintaining, data protection, copyright, security, storage, and destroying unwanted information;
(5) Establishing a security policy that includes: internal and external user access to information through the Internet or Intranet, and prevention and recovery from the impact of security problems.

Thus, CTHMIHR policy should be up-date and reviewed regularly, and should take advantage of the advice of international professional organizations in the field of acceptable adequate policy and standards formulation. So, this study agrees with Orna (1999) and Henczel (2001) when they wrote that the basis of an information strategy is an organisational information policy, which is described in Section 4.2.9.

8.3 Human and Technical Aspects

8.3.1 IT, IS and IM

Most organisations use IT to support information processing tasks, as an enabler of innovation, and as a tool to collapse time and space. It is essential to understand the relation between information systems (IS) and IT. IS use and integrate IT to meet the information needs of different users and organisations. So, an organisation needs appropriate IT to build an IS that can meet its needs. The components of IS are IT, people, environmental factors, data, and organisational processes and rules. Also, the information professional must have both technical and organisational knowledge to guide decisions about how technology can solve the organisation's problems. Therefore, IT must support the goal of IS and IM can be used as guide to direct how the organisation must run its IT and IS functions and activities.

The Dean pointed out that (see Section 5.2.1) the present operating system had been in use since 2000 and the institutions present IS could fulfil the requirements of the CTHMIHR because of the low number of users. He added that information from CTHMIHR had very high significance as the institution provides the resource base for all research, local authorities and companies. In additional, he indicated that the Heads of the Departments were formally responsible for the management of information and engineers in the departments were responsible for the design, development, implementation and maintenance of the information. Heads of Department and members of the focus groups (see Section 5.2.1) complained about the lack of
information strategy, particularly concerning hardware and software, shortages related to the local area network (LAN) and wide area network (WAN), the lack of using Internet technology and creating standard databases, and the fact that two different computer platforms are used (IBM and Mac) and there is no connection between them.

Also, it is clear to an observer of current information systems (see Section 5.2.4) that there is a lot of unnecessary output in the form of papers, tapes and disks; there is a lack of electronic back-up and a filing system is completely absent; there is a lack of awareness on security issues; there are incompatible systems within CTHMIHR; some databases are stored on departmental PCs but not in the Local Area Network (LAN); there is only one member of IT staff who deals with all IT and IS issues.

These problems are reflected in the fact that CTHMIHR does not have an organisational strategy and clear strategic planning related to IT. The major problems were seen as the lack of information professionals; the lack of funding and its management, and the lack of policy related to the buying and use of IT. Therefore, the findings of this study agree with Buchanan and Gibb (1998), and Beynon-Davies (2002), since they stated that it is vital for an organisation to consider IT, IS and IM at a strategic level. They assert that there are three key complementary information strategy initiatives which may exist within an organisation: IT strategy, IS strategy, and IM strategy. IT strategy is concerned with *How* IT systems are essential to support the IS. IS strategy is concerned with *What* information systems are essential to deliver information, while IM strategy is concerned with *Who* in the organisation should run its IS and IT functions and activities.

The observation analysis (see Section 5.4) showed that information at CTHMIHR was scattered in various departments and every department collected information in its own way. Table 5.25 shows all departments have between 8 to 11 types of media storage. This may be because the Head of Department posts rotate on a two-year cycle (UQU rule), so the Head of Department comes with new ideas and from a different background and often feels he could do better than the previous one. This was reflected
in duplication of information (up to seven or more times), the lack of integration of information, and some loss of necessary information.

Table 5.14 (Chapter 5) shows that a small percentage (5%) of internal users (IU) received the information from CTHMIHR they needed daily, weekly or monthly. This indicates that IU had all the information they needed in their departments or that they did not know about the information held in other departments. Furthermore, the next highest percentage among external user respondents was during Ramadan and Hajj. This may be because accessing information at CTHMIHR is easier during Ramadan and Hajj, due to greater openness and the reduction of formal channels. Table 5.16 also indicates that the majority of IU did not use e-mail (93.2%), compared with 76.3% of EU. This may be relate to the fact that accessing the Internet only started in 1998 and CTHMIHR has a limited number of computers that can access the Internet. Also, most of the staff had limited knowledge of Internet services, particularly e-mail, and the staff did not have proper training in using Internet services.

Furthermore, Table 5.16 shows that the majority of EU and IU needed follow-up information. This related to the long procedure which was needed to process the information. The EU also may have found difficulties in accessing records without obtaining permission from the Dean of CTHMIHR or Heads of Department. After a lengthy and complicated application procedure the EU may find that the information is not available for public use.

When respondents to the research questionnaire were asked, in Section 5.4, which method they used to gain follow-up information (Table 5.17), more than 60% of internal users (IU) and 50% of external users said that they gained it by informal communication (word of mouth (unknown contact), telephone, and by word of mouth (known contact). This is because IU and EU found that informal communication could speed up the process of obtaining information and, in any case, staff at CTHMHR do not have any responsibility to pass information to users. Furthermore, IU and EU indicated that to gain information from CTHMIHR took at least a day or more, while only 5.1% of EU
and 11% of IU got their information in less than an hour (Figure 5.7). These low percentages show that staff at CTHMIHR have difficulty in retrieving information.

Table 5.18 shows that the majority of respondents indicated that they get the information they require via paper sources. This may be because most of the information held at CTHMIHR was stored as a paper source; this took time to retrieve and used up space for storage. The same table also indicates that internal users (IU) had limited experience of handling electronic information (less than 27%). The reasons for CTHMIHR not using electronic information very effectively was because the databases were not integrated or that they were programmed in different languages such as Basic, Dbase IV, or Access. Moreover, the staff at CTHMIHR had very limited IT skills or did not have proper training to enable them to deal with such information. Also, the majority (91.5%) of external users (EU) indicated that they also obtained the information they required from paper sources, while the lowest percentages retrieved their information from tape recordings, slides and videotapes. These low percentages may indicate that CTHMIHR does not have an adequate information system to search these types of multimedia resource. All of the shortcomings mentioned above were represented in the rich picture of the SSM.

SSM (Stages 2 and 3, and RP - see Sections 6.3 and 6.4) indicates there is a clear lack in the current information system. This includes: the LAN and WAN are not working properly, difficulty in accessing information held in other departments, a lack of hardware and software, a lack of communication between CTHMIHR and users, incompatibility between information sources, an absence of information professionals, and ISs were too difficult to use and not up-to-date. Moreover, CTHMIHR does not have a female section, so women believe that they will face problems in accessing information.

Stage 6 of the SSM study (see Section 6.7) indicates that it is vital to analyse the current ICT/IS in order to know its strengths and weaknesses, and to assess the needs of IT/IS. The analysis of the current IT/IS can help to review all existing IT/IS functions, including applications, hardware, software, operations’ systems, WAN, LAN, and
maintenance procedures. Moreover, lower management, information professionals should implement and operate the information infrastructure carefully, making sure that hardware and software do their jobs effectively and efficiently. This can be done by correcting current technical problems, delivering up-to-date applications (particularly in Arabic versions), and increasing the number of information professionals, particularly those with postgraduate education in IT, IS and IM.

In addition, Stage 7 of SSM (take action) indicates that developing a Help Desk at CTHMIHR will improve the operation of the system. The main aim of the Help Desk is to enable the ongoing development and maintenance of the IT/IS. The benefits will include: ensuring better control over IT/IS services and CTHMIHR infrastructure; giving technical support to users of IT/IS and enabling them to solve their problems within the shortest time; decreasing service maintenance costs considerably; enabling users to adapt to the fast technological changes within information systems and software; preventing problems before they appear; and permanently maintaining quality services to users of IT/IS. This study agrees with The Central Computer and Telecommunication Agency (CCTA) (1989), Brooke (2002), and Brown and Maxwell (2002) when they argued that the Help Desk is a vital part of the interface between the IT Division and its user community (see Section 4.2.19).

Stage 7 of SSM (take action) demonstrates that using Internet, Intranet and Extranet services increase the number of users, particularly females, as well as increasing the exchange of information between users and CTHMIHR. Using the Internet, Intranet and Extranet to access CTHMIHR information can satisfy user needs including: improving communication and information sharing between users and CTHMIHR; allowing single interfacing with CTHMIHR information resources, the downloading information and software, and the sending and retrieving of e-mails; providing cost-effective and remote access to CTHMIHR information; and offering 24-hour availability, particularly for researchers.

Furthermore, middle and lower management, and information professionals at CTHMIHR need to set up a clear information policy for using the IT system,
particularly the Internet and Intranet; the IT system should also be evaluated from time to time by internal and external users. Therefore, the finding of this study agrees with Darwin (2004) when he pointed out that the main purpose of an Intranet is to share organisational information and computing resources among employees as, when part of an Intranet is made accessible to customers, partners, suppliers or others outside the organisation (by using password-protected access), that part becomes part of an Extranet.

8.3.2 Staff/user training development

The people involved in developing an information system have a vital role to play in ensuring the success of the system. A successful IS project should provide staff and users with a comprehensive training and development programme covering all key areas of information. The benefits of training staff include: increasing productivity, providing the management with accurate information, improving the skills of staff, and improving the existing methods of information collection. Added to that, it can be said that training can contribute to employees' satisfaction and may, consequently, help to minimise employee turnover.

The Dean (see Section 5.2.1) complained about the limited number of CTHMIHR users, particularly female users. However, providing good quality information on the part of the organisation will increase the number of users. If the information provided by CTHMIHR is used by only a small proportion of potential users, it means that CTHMIHR does not provide an adequate service to all users and thus it would be a worthwhile investment to increase this usage by the provision of suitable training. Also, the Heads of Department (see Section 5.2.2) complained about the lack of staff in general and qualified staff in particular; this was regarded as a major problem. So, they indicated that CTHMIHR needs to increase the number of systems analysts, computer programmers, and operation systems in order to improve their information systems.

Members of the focus groups (see Section 5.2.3) also pointed out that CTHMIHR has a clear shortage of operational staff, particularly staff with IT skills; furthermore, these staff complain about workload. This may be related to poor salaries, especially because
new staff with IT skills expect an attractive salary which they are able to command in the private sector. Also, the respondents indicated that CTHMIHR provides a limited number of training courses for staff and these were difficult to attend; moreover, there were no personal benefits from attending these courses. These problems may be related to the absence of strategic planning in relation to staffing and staff training since CTHMIHR does not have a clear policy relate to staffing and staff training, and also to the lack of funds.

Table 5.20 (see Section 5.3.4) presents the types of skill required by internal and external users. Around 30% of internal users (IU) and 50% of external and non-users (TE) have difficulty in using word processing. This may be because most of the IU (full time and part time staff) learned to use a PC on their own, while a few (20% of full time and 11% of part-time staff) learned from CTHMIHR (see Table 5.11). This shows that CTHMIHR has few staff training courses related to ICT.

In the field of Internet services, around 35% of internal users have difficulty using e-mail and also around 38% of IU have difficulty in web searching. This indicates that IU would not have difficulty in learning to use such software if they were offered effective training programmes organised at a suitable time, because using e-mail and searching the Internet are easy to learn, particularly if CTHMIHR had Arabic software applications.

In addition, Table 5.11 (see Section 5.3.4) shows that a low percentage of internal users (IU) used a network to interrogate CTHMIHR databases. This may be because the Local Area Network (LAN) was not working properly or the databases on the LAN are very complicated to search. These results also confirm that CTHMIHR has few training courses related to the use of databases. Also, Table 5.12 shows that more than half of IU used the computer to access Internet services. This demonstrates that the lack of training related to using Internet services drives IU to spend more time learn on his/her own or with friends in the institution.
Additionally, Table 5.12 indicates that IU were limited in attending training programmes, particularly in record management and information management, and that training on Internet services, software packages, Windows features, and English language packages also had very limited attendance. This may relate to the fact that IU (particularly full-time) were not motivated to take part in any training programmes particularly if the training programmes were in their leisure time. For them, more training programmes meant more work. However, Table 5.23 explains that the majority of IU were in favour of increasing incentives to undertake training so, they would be willing to undertake training if, and only if, CTHMIHR provided very good training courses as well as personal benefits for attending such courses.

Stage 1 and RP of the SSM (see Section 6.2) show that the IT staff complained about the limited number of IT operations and programmers, the lack of interest in training courses, and that they felt that Heads of Department had limited knowledge about different types of media. They also complained that there is no understanding of the importance of users in designing IS. Non-IT staff complained that they do know how to store and retrieve information; that information is stored in an unsuitable environment; there is a duplication of information in different departments; and that they find it difficult to update databases. They also added that staff do not know what information is held in other departments and they cannot access it without permission. There are further problems with information needs: some respondents lack English language skills, there is a lack of training courses, and some respondents have limited knowledge of IT and the Internet. The current system is very complex and focuses on IT rather than its users; little support is offered in the use of hardware or software.

SSM (Stages 2 and 3, and RP - see Sections 6.3 and 6.4) showed that there is a need for: more staff, particularly operational IT/IS staff; more primary staff; more training courses; motivation for staff to learn more; CTHMIHR to provide professional staff and consultants to deal with IT and information management as a whole; improving staff salaries; improving English language skills; increasing rotation of the Heads of Department posts; and increasing the motivation of CTHMIHR staff, particularly during Hajj and Ramadan.
Discussion

SSM Stage 6 (see Section 6.7) pointed out that it is vital, not only to define future staff requirements and determine the specifications necessary to recruit quality people, but also to identify the training needs of departments as well as CTHMIHR staff in order to determine the difference between actual and required performance. To this end, senior and middle management should develop a clear strategic plan for the short and long term, not only for staffing but also for staff development and training, taking into account what the CTHMIHR expects to achieve in the future, and the ways in which these achievements can be realized.

In addition, SSM Stage 7 (take action - see Section 6.8) pointed out that the staff recruitment system should be evaluated carefully according to clear criteria to measure performance against job descriptions. As a result, establishing a staffing system which aims to provide CTHMIHR with better qualified staff is vital. Furthermore, staff development and training programmes are crucial to the future prosperity of CTHMIHR. Such programmes should aim to provide users with the necessary skills and competencies to achieve a more highly skilled workforce. It is also important to consider, not only when the training should start and finish, but also what is the best time to take time away from the workplace. Moreover, it is vital to make sure that any equipment that might be needed is available in order to make the staff exchange feel comfortable. Thus, the training programmes should endeavour to help and improve staff skills, as well as meet all the needs of the CTHMIHR systems. To succeed, all systems depend on comprehensive training programmes that show staff how to operate these systems. So, this study agrees with Al-Zahrani (2001) when he noted that training programmes should be designed to provide staff with the knowledge and skills necessary to use the computer system in way that is appropriate to their occupation and the service’s needs.

The content of the training courses should include: IT skills, record management, information security, financial management, information policy, customer services, in languages such as English, French, and non-Arab Muslim languages such as Urdu and Farsi. To improve the quality of training, CTHMIHR should use effective methods to prove that this has been done, as well as determining what learning has taken place. It is
vital to evaluate training outcomes by setting up clear criteria in order to achieve a better skilled workforce. Evaluating outcomes must be built on methods of measurement, determining the types of change taking place in skills, knowledge and the attitudes of users (internal and external) as a result of training and how far this training will help to achieve CTHMIHR's system objectives. In this aspect, the findings of this study agree with Al-Shehri (2003) who points out that the use of Internet-based technology in delivering distance learning courses or programmes presents higher education organisations with incredible opportunities to expand access to education while at the same time enhancing its quality and decreasing its cost.

8.3.3 Information Security

The main objectives of security within the organization are: information systems are available and working when required (availability); data and information are disclosed only to those who have a right to know it (confidentiality); and data and information are protected against unauthorised modification (integrity). Threats to the security of information systems may come from unintentional or intentional acts and may come from external or internal sources. Such threats may derive from the technical environment (program viruses, disk crashes); natural disasters (fires, floods); environmental conditions (electrical surges); human factors (lack of training, errors and omissions); illegal access (hacking); or viruses. In addition, other threats, such as business dependencies (reliance on third party communications carriers, outsourced operations, etc.) can potentially result in a loss of management control and oversight and are increasing in significance.

The Dean and Heads of Department (see Section 5.2.1 and 5.2.2) specified that statistics and information at CTHMIHR have a very high significance as the institution provides the resource base for all researchers, consultants and senior management at local authorities and companies. The Dean pointed out that Heads of Department were officially in charge of the management of information from its creation to its storage and retrieval. He also noted that information engineers in the departments are responsible for the design, development, implementation and maintenance of the information. A member of the focus groups and observation analysis (see Sections 5.2.3
and 5.4) outlined the amount of effort that is made concerning information security. Information was spread around the departments with different types of media storage. This may be because of the lack of information management; in particular, middle management continually hands out information to departments and units and this was reflected in increased duplication of information; some types of media information were stored up to seven times (see Section 5.4.6).

A further problem was Saudi Arabia does not have a Data Protection law (see Section 4.2.11). This appears to be a lack of understanding regarding Data Protection law, as CTHMIHR holds personal information about academic staff without their knowledge (Nojoum 1999). CTHMIHR also does not have a clear plan for disaster prevention and data recovery. This may possibly be due to a lack of expertise relating to information management or that senior management have failed to grasp the importance of information security. Fourthly, there is a clear lack of information professionals. Thus, CTHMIHR does not have backup systems to deal with paper and electronic files, neither does it have a master plan for creating and managing paper files since every department is responsible for taking care of its own files. This problem is reflected in the rapid increase in the number of records as well as files in every department. There is also duplication of the same records in every department under different file names; this duplication reaching up to seven times or more.

All the problems listed above occur because of the non-existence of an information strategy, the lack of an information policy, the absence of information professionals, the lack of information management, the absence of training courses related to information security, and poor records management. All of the above and more weaknesses were represented in the rich picture of the SSM.

The questionnaire analysis (see Section 5.3), particularly Table 5.13, pointed out that IU respondents' problems in the CTHMIHR departments were: information came in different formats; there was no up-to-date information; the processing, storage, indexing, retrieval and duplication of information were all unsatisfactory. However, Table 5.46 shows that around 44% of internal users (IU) agreed that the duplication of
the same records in different departments improved information management. This opinion might be true in the short term for IU but is futile in the long term; it may also suggest that IU do not understand the concept of information management, particularly information security. The table also demonstrated that more than 65% of IU agreed about the setting up of a plan for disaster prevention at CTHMIHR. This may suggest that IU understand the importance of setting up a disaster prevention and recovery plan, particularly in an organisation like CTHMIHR.

Stages 2 and 3, and RP of the SSM (Chapter 6) pointed out CTHMIHR’s need to: destroy unnecessary output, provide a good and secure environment for information, use regular time for backup, develop a clear virus protection plan, develop an automatic security alarm, control static electricity, and develop a security system to access the LAN. Therefore, the institution needs to concern itself with physical security problems such as computer failure, theft, LAN failure, power failure, lightning, flood and fire. Moreover, software security problems could include virus attack, user error, software error, and operating error while data security problems could include software copyright, staff misuse, internal access, data protection, and external access.

Stage 7 of SSM (take action) pointed out that CTHMIHR should establish a security policy to include internal and external user access to information through the Internet or Intranet, the Call Centre, and physical access to the Records Centre; and the prevention and recovery from the impact of security problems. Also, it should establish a security team who should have a master plan to prevent and recover data from the impact of security problems. In addition, the security team should be concerned, not only with physical security, but also with software and data security.

8.4 Information Management

8.4.1 Records Management

Information management (IM) and records management are clearly linked closely together and records management can play a vital part of IM, particularly because it deals with local information pertaining to a particular organisation.
The aim of CTHMIHR is to establish an information bank concerning the Hajj. This information bank should function as a comprehensive scientific reference source that provides a range of statistics, details and facts to assist in planning the utilities and services for the Pilgrimage. The Dean (see Section 5.2.1) indicated that the information at CTHMIHR has very high significance as it provides the resource base for all research. The existing information could be defined as: statistical information, for example, the number of pilgrims, vehicles, the temperature and humidity; surveys and cumulative research in different subjects such as Zam-Zam, pilgrims’ reception, and population movement; and video tapes and photography.

The Heads of Department (Section 5.2.2) stated that the information used in the departments can be defined as: initial and final reports prepared by individual departments; output of computers connected with devices used to analyse materials; electronic sources from the Internet; letters and application forms stored in files; video tapes and pictures; staff files; and research proposals and studies. They also indicated that this information can play a vital part in creating databases about CTHMIHR, particularly concerning research and studies, climatic factors, drinking water, liquid and solid waste, air quality and pollution, noise and water analyses, pictures and video tapes. These databases could help users and the senior management by providing the information they need to achieve CTHMIHR’s objectives. The Heads of Department were personally and formally responsible for the management of the information as well as the design, development, implementation and maintenance of this information. They had been using their operating system since the establishment of the Departments (2000) and every year, there has been an improvement in the information system depending on the development of IT and the requirements of the departments. There are number of factors that may contribute to the failure of IT to deliver the expected performance improvement. These include investment in IT rather than users’ needs, inadequate alignment between information strategy and CTHMIHR strategy, a lack of appropriate measures of success for IT, and the complexity of IT.

Heads of Department and members of the discussion groups (see Sections 5.2.2 and 5.2.3) outlined several problems related to records management. These included: a large
number of cabins and shelves were used to store information; there was an absence of filing systems; many files were left open with poor record management; the same records were duplicated in different departments; there was a lack of electronic records; and it was very difficult to find up-to-date information. All of these problems may be connected to the lack of strategic planning related to records management, the lack of a policy related to managing information resources, a lack of information professionals and expertise, and a lack of training courses related to records managements.

Table 5.13 (Chapter 5) shows that the major problems experienced by internal users (IU) relating to current records management included: information came in a different format; information was not up-to-date; the processing, storage and indexing of information was unsatisfactory; and both the retrieval and duplication of information was not satisfactory. These problems may be a result of: a lack of understanding of the significance of records; the Head of Department being concerned only with short term record problems; or the absence of information professionals at CTHMIHR. Other causes may include the fact that more than 14 photocopy machines are scattered among different departments; this leads to an increase in the number of records and also the duplication of papers. Furthermore, information comes to CTHMIHR in many types of media such as paper, e-resources, videotapes, tape records, album collections, slides, and microfiches. Currently, there is no master plan for records management that would include the retention, disposal and disaster prevention of records. None of these issues are addressed in the present system.

Furthermore, when the respondents were asked about their impression of CTHMIHR information (see Table 5.21 and Figure 5.8 in Chapter 5), particularly information relating to quality, quantity, display, accuracy, timeliness, and the up-to-date nature of information, they signified that around a quarter of respondents believed that the timeliness and up-to-date nature of the information was not satisfactory. This is because of a clear lack of records management or a shortage of information professionals. Nonetheless, these problems give users a very bad impression of information, as well as accounting for the decreased numbers of CTHMIHR users.
The observation analysis (see Section 5.4) shows that CTHMIHR has a major problem related to records management. These problems are: there are more than eight types of media in every department (see Table 5.25); there is a mixture files in drawers, shelves or cabinets; original and copy papers are mixed together in the files; a large number of duplicated papers are distributed around CTHMIHR; the majority of the paper files have been used for historical files and some have never been used; and every department has created its own electronic source. In reality, CTHMIHR does not have a strategic plan related to records management, it lacks funds, has no information policy, lacks skilled ICT support, there is an absence of information professionals to deal with records management, and there is a lack of staff training related to the management of all types of record. All of above shortcomings in records management were represented in the rich picture of the SSM.

Stages 1 and 2 and RP of SSM (Chapter 6) show that there are a number of difficulties related to records management. These include, for example: the lack of a robust filing system; duplication of records; a mix between original and copied papers in the files; difficulty in indexing, classifying, storing and retrieving information; an increase in the number of files created but never used; reports and research studies stored in drawers, shelves or cabinets in boxes, manuals and magazines; and an increase in the number of drawers, shelves and cabinets.

Stages 6 and 7 of SSM (take action) mention that it is vital for CTHMIHR to establish a records management system which aims to create, manage and preserve CTHMIHR records in order to achieve a full data set that can be retrieved at any time in the future. The reasons for establishing a records management system are: centralizing the records used by all departments in the Institute, integrating records, faster retrieval of information, reducing lost or misplaced information, minimizing space for storage, managing the creation of new records, defending vital records and reducing the chances of lost or misplaced information, in addition to improving the overall control of the life-cycle of records.
Also, the research study showed that establishing a Records Centre is essential, particularly in an organisation like CTHMIHR that interfaces with many users and it is vital to establish a Records Centre with a clear mission, objectives and master plan. This will help to improve IM, integrate information, provide low-cost and high density storage, control the growth of information, avoid the duplication of information, ensure that information is kept securely and in an ideal environment that is quickly and easily accessible, and reduce paper work.

8.4.2 Databases

Databases and a database management system (DBMS) can provide many advantages to the organisation. For example, it can improve the strategic use of business data, reduce the complexity of the organisation's information system environment, reduce data redundancy, enhance data integrity, achieve application-data independence, improve security, reduce application development and maintenance costs, improve flexibility of information systems, and increase the access and availability of data and information (Turban, Rainer and Potter, 2001). The rapid increase in the number of users of the Internet and the increasing number of World Wide Web (WWW) servers are rapidly advancing Web data management so that users can access the various information sources across the Internet. Security and privacy are becoming major concerns for Web data management, as are other issues such as copyright protection and ownership of the data. Policies and procedures have to be set up to address these issues. However, the main idea behind the Semantic Web is to add meaning to data available on the web and to facilitate the storing and managing of data as well as information. So, the Semantic Web can be considered to be a collection of information sources that are interconnected and have to be managed by web services interaction.

It appears from the observational analysis (see Section 5.4) that CTHMIHR has a number of Arabic and English resources. Most of these resources have been stored as databases at department PCs with different types of DBMS such Basic, Dbase, Access and Oracle. The Head of the Information and Technical Services Department (see Section 5.2.2) stated that all of these database programs were set up by a computer programmer (a person who makes computer programs and operation systems in the
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These databases could help users and the senior management to find and use the information they need to achieve CTHMIHR’s objectives. However, a number of problems are associated with these databases. These include: a lack of integration between the databases; internal users find difficulty in accessing department databases without permission from the Head of the Department or from the Dean; almost all of the databases have been created without any documentation that helps programmers to maintain them or keep them up-to-date; there is no local area network (LAN) or wide area network (WAN); two different computer platforms (IBM and Mac) exist and there is no connection between them; and users not only find it difficult to use databases, there is a lack of support when staff try to use them. All the above problems may be connected to the lack of the following: strategic planning related to information management; funding to improve hardware and software; information policy to access information; information professionals to help staff when they need help; staff training to access the LAN and WAN; records management to maintain and update information; and information security to keep ward off threats. All of the problems mentioned above have been presented in the Rich Picture of the SSM.

Table 5.11 shows that a very limited percentage of internal users used department PCs to contact CTHMIHR databases. This reveals clearly that CTHMIHR has a definite shortage of both LAN and WAN equipment or databases which satisfy the needs of users and that what exists is too complex to use. This may be related to the lack of hardware and software; the nonexistence of information professionals and computer programmers, as well as operation systems; or it may be that IU may find it difficult to obtain support when it is needed. Additionally, Table 5.20 illustrates that a limited number of IU have IT skills in databases. This returns to the problem that CTHMIHR does not run many training courses related to the use of databases or has a limited number of operation systems to support IU.

Stages 2 and 3, and RP of SSM (see Sections 6.3 and 6.4) showed that CTHMIHR needs to: integrate its databases, centralize its databases, use a LAN for stored databases, increase its electronic resources, and improve its database managing system. Stages 6 and 7 of SSM (take action) shows that it is vital for senior and middle
management to develop an information strategy to manage all CTHMIHR information. It is also essential for the Institute to provide highly qualified information professionals to help senior and middle management to establish a strategic plan for information management. In addition, it is fundamental to understand and analyze the current database system in line with what users (both internal and external) require. The information policy should be established to cover all operational information management.

Using the Semantic Web could help users (particularly females) to access CTHMIHR information without difficulty. Because of Semantic Web can be define as a system where the machine reads and understand the Web pages (see chapter 4). In more detail, a Semantic Web can be defines as a collection of Extensible Markup Language (XML) documents, semi-structured databases, and millions of objects on the Web with semantics needing to be describe (Thuraisinggham, 2002). However, Semantic Web can help female's users in different ways for example: access the CTHMIHR information remotely and search the information Web 24 hours; and easy and fast interface with CTHMIHR information such as videos, digital images, and text.

8.4.3 User Needs
Burton (1997) states that the design of information systems must focus on the information user and his or her requirements, rather than be data or technology driven. He also suggests that a number of information systems developed at a great cost may fail to satisfy users or may have to be revised before they become acceptable to users. Users may be staff in the organization pertinent to the information services offered. In many cases the user may also be a customer or a company paying for an information service. Middleton (2002) points out that there are two ways for information management to deal with the process of understanding the information requirements of users. These are through the study of information needs, which focuses upon the user; and the study of information use, which concentrates on the product or system that services the user's needs.
It seems clear from the observation analysis (see Section 5.4) that the main users of CTHMIHR information are: staff, researchers and academic staff; local governments and companies; and pilgrims and visitors to the Holy places in Makkah and Madinah. Further, from the interviews (see Section 5.2) with Dean and Heads of Department, it appears that the CTHMIHR has a limited number of users. The Head of Information and Technical Services at CTHMIHR pointed out that until 2001 fewer than 1000 users requested information about Hajj. Figure 5.5 (see Section 5.3) goes further by showing that the majority of these were from UQU, while the respondents were staff of local authorities and companies. The small number of users of CTHMIHR’s information services offer an indication that there is a gap in information service provision. This may be related to the fact that the current information system is unwieldy. It is difficult to access the information without permission from middle or senior management; it takes a long time to process the paper work; and CTHMIHR Web pages have limited information content. So, the findings from this study agree with Basager (2001) when he pointed out that excellent information services with high quality information in a suitable media format and able to be accessed at the right time, lead to an increased number of users.

The results from Table 5.6 show that the majority of female respondents find it difficult to access CTHMIHR information. CTHMIHR does not have a female section to deal to with their requests, so females find it particularly difficult to obtain information about services provided by the Institute. Females lack the ICT skills to access CTHMIHR through the Internet and the CTHMIHR Web pages have limited information so these findings agree with those of Al-Biqami (1997) when he suggests that the majority of respondents from his study would consider using the Internet in the future, further demonstrating that the Internet could be very useful as a source for this information since most travel agents dealing with Hajj have access to the Internet. In addition, not only will information provided to internal and external users through the Internet and Intranet services help to increase rapidly the number of users, it will also improve the communication between CTHMIHR and its users, particularly females.
In addition, the research indicates that it is vital to increase the number of users by investigating the reasons for non-use (Stage 6 of SSM). The main reasons for investigating non-use of the CTHMIHR information system are: to increase the number of users, to extend the system and service coverage, to compete effectively with other resources, and to improve the current CTHMIHR information system and services. CTHMIHR should approach non-users of its information services (using suitable techniques such as questionnaires, interviews and focus discussion group) to establish their reasons for non-use. The study again agrees with the findings of Basager (2001) when he indicated that the reason behind a small user-base is a clear shortage in information service provision.

The results analysis (Chapter 5) and Stage 2 and RP of SSM (Chapter 6) showed the following: that users need to be informed about CTHMIHR’s information; the process for accessing information should be simplified; females’ IT skills need to be improved; the CTHMIHR website should be evaluated and updated; the exchange of ideas and information needs to be simpler; the number of users needs to increase; there should be a search for non-users of CTHMIHR’s information; information should be provided in other languages, such as French, German and English. Furthermore, the Dean of CTHMIHR suggested that the IMS could be improved by allowing access to the Internet for all users, from both inside and outside Saudi Arabia. He also recommended establishing a Records Centre and Call Centre since CTHMIHR interfaces with many users (Interview analysis: Chapter 5). This researcher agrees with Oak (2004) when he mentioned that a Call Centre can carry out a number of tasks using multiple delivery channels such as the telephone, fax, e-mail or the Internet to provide and receive information from users.

Finally, Figure 7.2 (Stage 7 of ISM in Chapter 7) outlines that all system elements should be implemented in a specific order to best achieve an effective CTHMIHR information system by satisfying all user needs. Other factors include having the strategic policies and finances in place to design the information system. There will be a need for staff development and computer security. These elements would help to achieve the adoption of a records management system and a database management
system. Once these elements are in place, all users (internal and external) of CTHMIHR will have unimpeded access to all publicly available information.

8.5 SSM and ISM

CTHMIHR, like any government organisation in Saudi Arabia, has complex problems related to information management. SSM (Mode 1) has been used successfully in various studies with different issues regarding the Saudi culture. For example, Al-Zaharni (2001) applied SSM (Mode 1) in healthcare, and Al-Shehri (2003) used it in education. The main reason for applying SSM (Mode 1) in this research is that CTHMIHR has a number of complex issues related to information management: security, human activities, policies, money and cultural issues. In addition, the Dean, together with Heads of Department, is conscious of these problems but cannot recognize their source or the people responsible for them. Furthermore, SSM (Mode 1) is concerned with ill-structured or messy problem situations that all levels of management have to deal with (See Chapter 3).

Based on the researcher's understanding, and after applying SSM (Mode 1), the researcher has found that SSM (Mode 1) works successfully in the Saudi culture because it involves all the actors and the views of the Dean, Heads of Department, operational staff, and both internal and external users have been presented and taken into account.

This research emphasizes that SSM (Mode 1) considers the views of people both inside and outside the organisation, and puts forward the opinion that the most effective way to change an organisation is to change how people think within it. This research echoes the opinion of Jackson (1999) when he mentioned that: “SSM seeks to work with different perceptions of the situation, setting in motion a systemic process of learning in which different viewpoints are discussed and examined in a manner that should lead to purposed action in pursuit of improvement”.

In this research (See Chapter 3), five different techniques were used to express the problem situation. These techniques were: document analysis, interviews, focus groups,
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questionnaires and observations. The major strength of using these different techniques is that every technique can express the problem situation from a different angle. For example, document analysis was used to view formal information (document policies, CTHMIHR's structure); interviews were used to address managerial problems; focus groups were used to uncover problems with regard to practices related to information management; questionnaires were used to express the needs and problems of users related to the information they requested; and observation was used to explore the problem situation relating to information processes, that is, the collection, processing, storing and retrieval of data. The researcher used his experience and background working at CTHMIHR, as well as supervisory guidelines, to integrate these five techniques in order to express the real world of the organisation. This research partially agrees with Al-Zaharni (2001) and Al-Shehri (2003) when they depended primarily on only interviews and questionnaires as data collection techniques. However, using other techniques, such as document analysis, observations and focus groups give a multi-dimensional view of problem situations.

The RP (See Section 6.3 in Chapter 6) was used to cover many issues and express many contrasting points of view. Many people, both inside and outside CTHMIHR, as well as researchers at Loughborough University, appeared to enjoy the process of drawing the RP, with lively discussions and good humour, resulting in the production of an encouraging number of creative graphic representations of issues.

To study the validity of the SSM (Mode 1) applied in this research, the researcher used two types of validity: internal and broader validity. Checkland and Scholes (1999) said that validity could be tested through making comparisons between the activities of the conceptual models and real world situations (See Section 6.6). This researcher believes that the aim of such a comparison is to identify differences between the conceptual model's activities and present reality in order to generate discussion about internal validity. On the other hand, broader validity is to discuss whether taking action improved the problem situation or not. Taking action will change the problem situation so it is very difficult to prove SSM solutions without implementing such solutions in the real world to compare the situations before and after using SSM. So, this research
agrees with Jackson (2000) when he said that “problem resolving in a social system is a never-ending process of learning, in which participants’ attitudes and perceptions are continually tested and changed, and they come to entertain new conceptions of desirability and feasibility”.

There are eleven systems related to information management that should be implemented at CTHMIHR to improve the problem situation. The major problem facing the researcher is which of these eleven systems comes first and how one can be implemented before moving on to the next. Therefore, the researcher applied ISM in order to develop a structured order of precedence of action to implement IMS at the CTHMIHR (Chapter 7) and so, on the basis of the researcher’s knowledge, this is the first time ISM has been used in the culture and government of Saudi Arabian organisations. Moreover, SSM (Mode 1) and ISM have been combined to develop a new multi-methodology that has been applied practically for the first time in this research. The main reasons for combining methodologies (SSM and ISM) in this research is because the real world problem situation at CTHMIHR is highly complex and multi-dimensional and so the researcher applied SSM (Mode 1) to discover and express the problem situation (Stages 1 and 2) to develop conceptual models (11 systems) and make comparisons with the real world (stages 3, 4, and 5), and to study subsequent change (that is systemically desirable and culturally feasible) and then to take action to improve the problem situation (Stages 6 and 7). ISM was used to discover the relationships between these 11 systems in order to find a smooth method of implementing them through interpretations with participants.

This is accord with Mingers and Gill (1997), who pointed out that: “methodologies tend to be more useful in relation to some phases than others, so the purpose of combining them has immediate appeal. Even where methodologies do perform similar functions, combining a range of approaches may well yield better results.”
Chapter 9 | Conclusions and Recommendations

9.1 Introduction

The principal aim of this research study was to develop and offer guidelines for implementing an IMS at CTHMIHR to help staff and users access information about the Hajj easily and more effectively when it is needed. This final chapter presents the main conclusions which are concerned with the objectives which were outlined in Chapter 1. These were:

1) To examine the current status of IMS at CTHMIHR.

To fulfil this first objective, Chapter 2 indicated the general background about CTHMIHR and Chapter 5 presented the results analysis of the primary sources (interviews, questionnaires, observation and document analysis). It was found that information management at CTHMIHR has a number of problems, particularly the rapid increase in records, duplication of records, information distribution in different departments, and a lack of information control. The Dean and Heads of Department are aware of the problems, but they cannot identify the source of those problems or the people responsible for them.

2) To determine the current problem situation related to IT, IS and IM.

This was achieved by using primary data sources (Chapter 5) and includes:

a) Documents analysis to analyse the structure of CTHMIHR and its lines of communication.

b) Interviews with the Dean, Heads of Department, and members of discussion groups to collect information about CTHMIHR and its departments’ needs, functions, activities; the relationships between the departments inside and outside the CTHMIHR; existing IMS and practices; and suggestions towards improving IMS at CTHMIHR as well.
c) A questionnaire to collect quantitative data. The questionnaire included questions about information that the user gets from CTHMIHR; current information technology (IT) skills for the users of information; personal information; current IT skills of staff at CTHMIHR; and respondents' opinions.

d) Unobtrusive observation to view the information flow between the Dean and Deputy Dean of CTHMIHR through the Heads of Department to the files or electronic records. A rich picture was then used to represent the processing of information.

3) To understand user needs of a comprehensive, integrated IMS at CTHMIHR.

This was achieved by using Soft System Methodology (SSM) and the Interpretive Structure Model (ISM) which is described in Chapter 2. SSM (Mode 1) was applied (Chapter 6) to define the problem situation and ways in which it could be improved. The major finding of SSM was that CTHMIHR needs to develop and implement the following systems: information policy, information security, staffing system, database management, staff training, records management, user needs, information strategy, and fund management. ISM was applied (Chapter 7) to develop a structured order of precedence of action to implement IMS at the CTHMIHR.

4) Suggestions and recommendations for implementing a comprehensive, integrated IMS at CTHMIHR.

This chapter offers the principal conclusions to be drawn from this research, together with necessary recommendations for further studies.

9.2 Limitations of the Research Study

There are some limitations in this research. These limitations can be summarised in the following major points:

1. Survey method for determining system requirements
2. Soft System Methodology (SSM)
3. Interpretive Structural Modelling (ISM)
4. Testing the model

9.2.1 Survey method for determining system requirements

The research study used 'soft' methods, including document analysis, interviews, focus group discussions, questionnaires and observations as methods to collect information as primary sources to determine the requirements of the CTHMIHR system. All of these methods are used effectively by analysts to collect important information. In contrast, there are computer-aided modern methods for gathering information, including Joint Application Design (JAD), group support systems, CASE tools, and prototyping. These methods can support effective information collection and structuring while reducing the amount of time required for analysis. JAD involves bringing together in one session users, sponsors, analysts and others to discuss and review system requirements. Group support systems are used to facilitate the sharing of ideas and the voicing of opinions about system requirements. CASE tools analyse current systems to discover requirements to meet changing organisational conditions while prototypes are an iteratively developing system that refines the understanding of system requirements in concrete by showing working versions of system features (Hoffer et al., 1998). These modern methods are 'hard' method routes through problem situations. The researcher in this study decided to use 'soft' methods to capture the human activity element in the development of IMS at CTHMIHR.

9.2.2 Soft System Methodology

SSM was developed as a methodology which allows the users of information systems to express their views about the nature of the problem, their attitudes to work, and their suggestions for improving the situation. It has been classified by Jayaratna (1990) as a subjective rather than objective method. The researcher has significant experience in working at CTHMIHR, having worked there as a computer programmer for more than 10 years. The researcher also has a detailed knowledge of the requirements of the system. For the above reasons, the research study applies SSM to assess and improve the problem situation at the CTHMIHR. However, SSM has a number of weaknesses. These include: it is too flexible and too general, it is impossible to manage all people's views, and it does not provide advice about the success or failure of a problem scenario.
9.2.3 Interpretive Structural Modelling (ISM)
ISM has been described as a methodology for dealing with complex issues that include the interrelations between the issue, group and methodology, and between content, context, process and product (Chapter 2). There are a number of features of ISM one of which is that ISM is a qualitative not a quantitative technique (Porter et al., 1980). It breaks a complex subject into manageable pieces and significantly speeds up the process of decision making. It is a technique that allows groups to create structured models of qualitatively defined elements and relations among these elements. It also forces participants to relate the issues to the larger problem, explicitly defining their interrelations. ISM builds directed graphs of these issues, based on a previously agreed on relation. It is easy to understand and cultural aspects of brainstorming within an Islamic environment can be accommodated. For these reasons, the researcher applied ISM to implement IMS at the CTHMIHR.

On the other hand, ISM has a number of weaknesses, including the fact that it depends on the quality of the teams, the role of the facilitator is very important in guiding the teams through the steps of the methodology, and it can be time-consuming if the team produces a controversial set of elements and relationships. Furthermore, ISM identifies static (i.e. structural) rather than dynamic relationships.

9.2.4 Testing the model
The models developed were not evaluated in situ at CTHMIHR due to resource constraints (time, opportunity and budget). However, the following process is recommended for its implementation:

1. Internal criteria: enable conditions within the model itself to be judged, without reference to the model’s purpose, theories or data. There are two internal criteria (Carsan et al., 1983):
   a) Consistency: the model should not contain logical, mathematical or conceptual contradictions.
   b) Algorithmic: the algorithm used for solution or simulation should be appropriate and lead to accurate solutions.
2. External Criteria: model validation with reference to the model's purpose, theories and data. There are four external criteria:

a) Empirical: the model should correspond to the available data.

b) Theoretical: the model should be consistent with accepted theories or practice.

c) Pragmatic: the extent to which the model satisfies the objectives of its use is usually related to the measures of effectiveness, efficiency and efficacy.

d) Heuristic: the assessment of the potential of the model for scientific explanation and discovery.

9.3 Conclusions and Recommendations

9.3.1 Information Strategy

It appears from this research study that CTHMIHR needs to develop an information strategy (IT, IS and IM) in order to establish master plans related to developing information security, creating and managing paper files, maintaining databases, collecting and storing information, educating staff and users in using technologies (training), and improving fund management. Therefore, it is recommended that CTHMIHR needs to develop clear information strategies, particularly strategies related to IM, IS and IT. These information strategies should work together within a generic strategic framework to achieve all strategic objectives. It is also of vital importance that IT, IS and IM strategy remain closely integrated within the strategy adopted. Furthermore, it is vitally important for CTHMIHR to develop a system for strategic planning and operate information strategies to establish an information bank about Hajj. The strategic planning system will help to improve the work and services. These include: procuring financial resources, forming an information policy, adopting technical systems and IT, reviewing staffing, reviewing staff development and training, creating a record management system and database system, implementing a computer security system, and further understanding and servicing user needs.

9.3.2 Financial Resources

This research study found that CTHMIHR needs more financial resources and improvements in fund management. It is recommended that the Institute develop a
financial resource system that aims to provide for all CTHMIHR operations in order to achieve sufficient support for their plans. This is a vital recommendation as it can ‘make or break’ future work on Hajj research and its management. So this study recommends that CTHMIHR needs to search for funds, not only from Umm Al-Qura University, but also from alternative sources such as local authorities and the private sector. Senior and middle management should provide the Institute with a clear strategic plan related to increased funding and its management. Furthermore, the financial staff should use their skills in financial management to make the financial process simple and flexible to satisfy the demands and expectations of sponsors (local authorities and companies).

9.3.3 Information Policy
The Institute needs a clear information policy, particularly relating to using the Internet, accessing information, exchanging information, bought-in technologies, using hardware and software, accessing communication networks, and creating files and records. Thus, it is recommended that it is important to provide policy resources to all CTHMIHR operations by allocating flexible operating systems in order to achieve sufficient support for all plans. Middle and lower management should also have the opportunity to make suggestions and write reports about information policy to be enacted by senior management. The information policy should give a framework and offer guidelines to both managers and users. Furthermore, this information policy must not only be concerned with the short term but also with the long term. Lower levels of management and operational staff should evaluate the information policy by setting up clear criteria to evaluate information policy to make sure that the information policy conforms to all CTHMIHR plans.

9.3.4 Information Security
CTHMIHR requires a system for information security. This system should cover: physical security issues encompassing computer failure, theft, LAN failure, power failure, lightning, flood and fire; software security issues such as virus attack, user error, software error and operating error; and data security issues such as software copyright, staff misuse, internal access, data protection and external access. CTHMIHR should consider the development of a master plan for the prevention of, and recovery from, any
Conclusions and Recommendations

Chapter 9

security problems. The aim of such an information security system is to keep track of electronic records by means of authentication and firewalls in order to provide a secure environment for CTHMIHR’s information. So, senior and middle management should provide CTHMIHR with a strategic plan related to information security and which is concerned with both the short and the long term. The lower levels of management and operational control staff should carefully analyse what is really important and what can provide better security while reducing the cost of security. The information security system should be evaluated regularly to make sure that CTHMIHR information has been kept in a secure environment and that it contains a clear plan for prevention of and recovery from any disasters.

9.3.5 Information Management and Records Management

Information comes to CTHMIHR in many forms and from both internal and external sources and it is often left to Heads of Department or Heads of Unit to cope with it as they see fit. They do not always pay appropriate attention to IM, which makes the information difficult to access. Thus, information at CTHMIHR was scattered across various departments and every department collected information in its own way. Moreover, there are a number of problems related to record management. Such problems include, for example, the lack of a robust filing system; duplication of records; version control; difficulty in indexing, classifying, storing and retrieving information; an increase in the number of files created but never used; reports and research studies stored in drawers, shelves or cabinets with boxes, manuals and magazines; and an increase in the numbers of drawers, shelves and cabinets. Therefore it is recommended that:

- CTHMIHR should identify, design, implement and manage the key processes that will be used to achieve these objectives.
- A clear information policy is developed for processing information to decrease processing time, the amount of paperwork and its duplication, and to improve services to all users (internal and external).
- A complete information management system should be developed which could help staff and users to access information smoothly and without problems.
Updated software and hardware, coupled with a proper training programme, and using the Internet and Intranet will improve information access.

- Heads of Department need to establish master plans for collecting, indexing, saving and retrieving information, not only focusing on the short term but also on the long term (five years).

- Records management should be developed and implemented at CTHMIHR. The reasons for the establishment of records management are: centralizing the records used by all Departments in the Institute, making records more controlled, easily managed and maintained, and integrating the records at CTHMIHR.

- A Hajj Records Centre should be established in CTHMIHR.

9.3.6 Staffing and Training

CTHMIHR needs to increase the number of IM, IS and IT operational staff in order to deal with the complexity of incoming information. The staff at CTHMIHR need to be computer literate and to learn the English language to understand better the available training on offer. Therefore, it is recommended that a staff recruitment system be developed which aims to recruit better-qualified staff who have increased scope for professional development. To achieve these goals, it is recommended that:

- Senior and middle management should develop a clear strategic plan for short-term and long-term staffing, taking into account what the CTHMIHR expects to achieve in the future, and the ways in which these achievements can be realized.

- Lower management and operational control staff should write a clear staffing policy document which aims to locate and attract good quality applicants and to make valid, reliable, and cost effective decisions about whom to select. It is important for lower management and operational control staff to obtain consensus among middle management and to get support from them as needed.

- The aim of a staffing system is to allocate the right person with appropriate knowledge and skills for the job in order to achieve CTHMIHR objectives.

In addition, it will provide existing internal users with the required skills and competencies to achieve a better skilled workforce. Therefore, it is recommended that:
• Lower management and operational control staff need to assess the present skills problems and the future challenges that can be met through training.

• Senior and middle management should develop a strategic plan for staff development and training, not only in the short term, but also for future opportunities in staff development.

• Lower management and operational control staff should set up clear training objectives that include providing CTHMIHR users (internal and external) with proper training courses with suitable information technology, within a convenient time-frame for users, in order to achieve better skills and competencies.

• Middle and lower management should evaluate training outcomes by setting up clear criteria in order to achieve a better skilled workforce.

9.3.7 Information and Communication Technologies

The Institute needs to improve current IT and IS, to increase the number of Arabic software applications, to be interoperable for the full integration of systems, to focus on IM rather than the use of IT, to design a system which takes account of information handling behaviours and the knowledge of experts in IT, and to simplify the use of IS. Also CTHMIHR needs to improve its current LAN in order to allow information to be accessed more easily and smoothly, to simplify information processes, and to encourage users to use formal communication channels. Therefore it is recommended that:

• An IT presence is developed that aims to provide hardware and software (IT) to all CTHMIHR operations in order to achieve an integrated information system.

• A Help Desk is established at CTHMIHR to improve the operation of the system. The main aim of the Help Desk is ongoing development and maintenance of IT and IS.

• An IT system is procured as a priority in order to exchange information among users and to achieve easy communication between users of information and CTHMIHR. The use of Internet, Intranet and Extranet services will increase the number of users as well as allowing the exchange of information between users and CTHMIHR.
9.3.8 Databases

This study found that there were a number of problems related to e-resources including: each department has its own database, some of which are stored only on departmental PCs; users find difficulty in accessing databases without permission from upper management; there is a lack of database integration; and CTHMIHR uses more than four database systems (Basic, Databases VI, Access, and Oracle). There are a number of software packages that are used in the above databases which accept Arabic words; these include Al-Msaed Al-Arabic, Al-Nafitha, and Arabic for Windows. Because it is difficult to keep databases up-to-date, it is therefore recommended that developing a database system is very important so that CTHMIHR database records can be manipulated and stored. Using the Semantic Web as a feature in a future Database Management System would link corporate information such as videos, forms, digital images, texts and spreadsheets to the Web, and this will enable users to contact CTHMIHR from anywhere in the world. The emphasis here returns to content management rather than interfacing disparate systems.

9.3.9 User Needs

The research study found that the Institute needs to simplify the process for accessing information, increase IT skills in the female population, evaluate and update the CTHMIHR website, simplify the exchange of ideas and information, increase the number of users, search for non-users of CTHMIHR information, and provide information in other languages such as French, German and English. It is recommended that the Institute investigates the workflow requirements of its users (using suitable techniques, such as questionnaires, interviews, and focus groups). This will allow the provision of the right information to be delivered at the right time in the right place and in the right format. The research study also believes that developing a Call Centre at CTHMIHR will greatly help to satisfy immediate users' needs.

9.4 Change Management

The research study also suggests five kinds of change are needed: structural, procedural, policy, attitudes and culture.
9.4.1 Structural Changes

- Establish a Help Desk and Records Centre as part of the Department of Information and Technical Services.
- Establish a Call Centre to improve communication between users of information and CTHMIHR, and to provide users with the requested information in a short time.
- Establish a master team to review all systems. The mission of the master team is to make sure that all system teams achieve their aims and objectives. The master team may have members from outside CTHMIHR or from outside Saudi Arabia.

9.4.2 Procedural Changes

- The number of meetings between senior and middle management should be increased (at least twice every year) to ensure that CTHMIHR is achieving its goals.
- Heads of Unit should report to lower management every month and introduce a reporting system.
- Heads of Department should report to middle management every three months instead of reporting only after Ramadan and Hajj.
- Middle management should report to senior management every four months instead of reporting once a year.

9.4.3 Policy Changes

- Establish a clear strategic plan related to Saudi national information policy.
- Establish an information policy team with a clear mission and objectives.
- Effect changes in current staffing policy according to departmental need (in terms of skills, knowledge and education as well as experience).
- Establish an information policy related to staff development and training, a records management policy, and a security policy.

9.4.4 Attitudinal changes

- Senior management should encourage the private sector, local authorities and companies to provide funds for CTHMIHR.
Conclusions and Recommendations

- More training programmes are required, particularly in IT skills, the English language, records management, information security, and customer services.
- Use appropriate training materials with appropriate staff development in appropriate IT, will achieve a better skilled workforce.
- Use on-line courses to train internal and external users (male and female). This will both improve their IT skills and their attitudes.

9.4.5 Cultural Changes at the Organisational Level

- Senior and middle management should develop a strategic plan for national and international services.
- CTHMIHR should establish project management teams with a clear mission and objectives, with proper skills, knowledge, experience and education, with the right technologies and sufficient funds. These teams should include: the strategic planning team, the financial team, the information policy team, the technical team, the staffing and training team, the security team, and the user needs team.
- The information process will encourage users to use formal instead of informal communication.
- The security team should be concerned, not only with physical security, but also with software and data security.
- CTHMIHR needs to translate its information into different languages to satisfy non-Arabic users.
- CTHMIHR should provide staff with proper language training to deal with non-Arabic users.
- Using Internet services at CTHMIHR will help females to access information at any time. On-line courses also will help users, particularly females, to improve their IT skills.
- CTHMIHR should provide Call Centre staff with proper training to deal with multi-language problems.

Furthermore, the research study applied ISM to offer guidelines for implementing IMS at the CTHMIHR. Figure 7.2 (ISM Intent Structure Model to implement IMS at CTHMIHR - Stage 7 of ISM in Chapter 7) shows that all system elements should be
implemented in a specific order to best achieve an effective CTHMIHR information system by satisfying all the user needs identified.

9.6 Suggestions for Further Studies

A number of specific research areas could be investigated in more detail at CTHMIHR, including:

- Developing, implementing, and evaluating the CTHMIHR strategy, its information strategy, from which an information policy can be derived;
- Developing, implementing, and evaluating Information Communication Technology systems within the Institute;
- Developing, implementing, and evaluating the human resources system and the needs for staff training;
- Developing, implementing, and evaluating the security system including computer security;
- Establishing, implementing, and evaluating a technical support ‘Help Desk’;
- Establishing and implementing a records management system, and then evaluating it; and
- Establishing, implementing, and evaluating a Call Centre.

At a more general level, this study poses further questions related to the provision at national information strategy and policy. The operational ‘fall out’ from such studies could be investigated further by the multi-methodology adopted in this study or each of its components: Soft System Methodology; or Interpretive Structural Modelling.
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Appendix 1

Interview Questions

Name:

Department:

Time: □ AM □ PM

Date: / /

CTHMIHR needs

1. What are the functions of the CTHMIHR?
2. Have these functions been written down? If not could you please tell me the reasons?
3. What are the activities you undertake towards achieving these functions?
4. How are these activities achieved? (Why? Where? By whom?)
5. Is CTHMIHR related to other authorities in Saudi Arabia? (What are these? Why are they related? What is the nature of this relationship?)

Existing information and practices

6. Can you define the information that you use in the CTHMIHR?
7. What is the significance of the information in the CTHMIHR?
8. To what extent do these information contribute to the success of the CTHMIHR and why?
9. Who is formally responsible for the management of this information, which are created, received and used in the CTHMIHR?
10. Who is responsible for the design, development, implementation, and maintenance of this information?
11. How long have you been using your present operating system?
12. Do you think that the Information Management System (IMS) you use can fulfill the requirement of the CTHMIHR and why?

Requirement to improve IMS

13. What are your suggestions towards improving the current IMS in your department? (IM, People, IT)
14. What is your opinion about establishing a Record Centre in CTHMIHR?
15. What is your opinion about establishing a Call Centre in CTHMIHR?
16. What are the steps that you have undertaken to improve information management at the CTHMIHR?
17. Do you have any suggestions you want to add?
Interview Questions

Name:

Department:

Time: □ AM □ PM

Date: / /

Departments needs

1. What are the functions of your department?
2. Have these functions been written down? *If No could you please tell me the reasons?*
3. What are the activities you undertake towards achieving these functions?
4. How are these activities achieved? (Why? Where? By whom?)
5. Is your department related to other departments in the CTHMIHR? (What are these? Why are they related? What is the nature of this relationship?)

Existing information and practices

6. Can you define the information that you use in your department?
7. What is the significance of the information in your department?
8. To what extent do these information contribute to the success of your department and why?
9. Who is formally responsible for the management of this information, which are created, received and used in your department?
10. Who is responsible for the design, development, implementation, and maintenance of this information?
11. How long have you been using your present operating system?
12. Do you think that the Information Management System (IMS) you use can fulfill the requirement of your department and why?

Requirement to improve IMS

13. What are your suggestions towards improving the current IMS in your department? (IM, People, IT)
14. What is your opinion about establishing a Record Centre in CTHMIHR?
15. What is your opinion about establishing a Call Centre in CTHMIHR?
16. What are the steps that you have undertaken to improve information management at the department?
17. Do you have any suggestions you want to add?
Appendix 3

Discussion Group Questions

Name:  
Department:  
Time:  □ AM  □ PM  
Date:  / /  

Current problems

1. What are the current problems that related to information problems at CTHMIHR?

Requirement to improve IMS

2. What are your suggestions towards improving the current IMS at CTHMIHR?
The present survey aims development of an Information Management System (IMS) at the Custodian of the Two Holy Mosques Institute of Hajj Research (CTHMIHR), Saudi Arabia. This IMS would help staff and users to access information about Hajj easily and more effectively, when it is needed.

**Instructions:**
Please read the question carefully, look at the given options then answers by putting a "☐" or number in the appropriate boxes.

### Part I: Questions about Information that Users get it from CTHMIHR

<table>
<thead>
<tr>
<th>When did you start using information from CTHMIHR?</th>
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<tbody>
<tr>
<td>☐ Less than two years</td>
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<table>
<thead>
<tr>
<th>2. How many times did you get information from CTHMIHR? <em>(Tick one please)</em></th>
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<tbody>
<tr>
<td>☐ Any time</td>
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<table>
<thead>
<tr>
<th>3. In what way was the information required? <em>(Tick more than one)</em></th>
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<tbody>
<tr>
<td>☐ Telephone</td>
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<tr>
<th>4. Did you need to follow up the information required?</th>
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<tr>
<td>☐ Yes</td>
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</table>

- *If No go to question 6*

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<thead>
<tr>
<th>5. In what way did you use to flow up your require? <em>(Tick more than one)</em></th>
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<td>☐ Post</td>
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<tr>
<th>6. How much time did you take to get information from CTHMIHR? (e.g. 25 Mins)</th>
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<tr>
<td>☐ Mins</td>
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<th>7. In what type of multimedia did you get information? <em>(Tick more than one)</em></th>
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<tr>
<td>☐ Paper</td>
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<th>8. In what way was the information delivered? <em>(Tick more than one)</em></th>
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<td>☐ Post</td>
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### What is your impression about:

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<thead>
<tr>
<th>Quality of information</th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not Good</th>
<th>Don't Know</th>
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<tbody>
<tr>
<td>Quantity of information</td>
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<td>Display of information</td>
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<td>Timeliness of information</td>
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<tr>
<td>Accuracy of information</td>
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<tr>
<td>Up-date nature of information</td>
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* IT = Information Technology
* IM = Information Management System
* IS = Information System
### Part II: Current Information Technology (IT) Skill for the Users of Information

**How well do you understand the following?**

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<tbody>
<tr>
<td>15. Word Processing (e.g., Word for Windows)</td>
<td>[ ]</td>
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<tr>
<td>16. Spreadsheet (e.g., Excel)</td>
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<tr>
<td>17. Presentation (Power Point)</td>
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<tr>
<td>18. Database (e.g., Access)</td>
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<tr>
<td>19. Network management</td>
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</table>

**Windows Features:**

| 20. Task bar | [ ] | [ ] | [ ] | [ ] | [ ] |
| 21. Work with dialog boxes | [ ] | [ ] | [ ] | [ ] | [ ] |
| 22. Create a folder | [ ] | [ ] | [ ] | [ ] | [ ] |
| 23. The control panel | [ ] | [ ] | [ ] | [ ] | [ ] |
| 24. Save and save as | [ ] | [ ] | [ ] | [ ] | [ ] |

**Internet Services:**

| 25. E-mail | [ ] | [ ] | [ ] | [ ] | [ ] |
| 26. Web search | [ ] | [ ] | [ ] | [ ] | [ ] |
| 27. Discussion Group | [ ] | [ ] | [ ] | [ ] | [ ] |
| 28. Create web page | [ ] | [ ] | [ ] | [ ] | [ ] |

29. Comment and Observation to Improve (IT) skills for the users of information

---

### Part III: Personal Information

30. How old are you?

- [ ] Less than 20
- [ ] 20- Less than 30
- [ ] 30- Less than 35
- [ ] 35- Less than 40
- [ ] 40 - Less than 45
- [ ] 45- Less than 50
- [ ] 50- Less than 55
- [ ] More than 55

31. Are you?

- [ ] Married
- [ ] Single

32. What is your highest academic qualification?

- [ ] Less or Intermediate
- [ ] Secondary
- [ ] Diploma
- [ ] Ph.D.
- [ ] Professor
- [ ] Bachelor
- [ ] Master

33. Gender

- [ ] Male
- [ ] Female

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Part IV: Current IT Skill for Staff at CTHMIHR

34. What type of user are you?
1. Staff at CTHMIHR
2. Researcher inside CTHMIHR
3. Researcher outside CTHMIHR
4. Staff at Umm-Al-Qura University
5. Staff at local authority
6. Staff at company

If you tick 3, 5, 6 go to page 4 (Part V - your opinion)

35. Which type of staff Type are you?
1. Full-time
2. Part-time

36. When did you start work at CTHMIHR?

37. In which department you work now? (Tick one please)
1. Dept. of Information and Technical Services.
2. Dept. of Administrative and Human Research
3. Dept. of Environmental and Health Research
5. Dept. of Research and Information Affairs

38. Do you have a PC at home? 1. Yes 2. No

39. Do you use a PC at office? 1. Yes 2. No

If No go to question 43.

40. How did you learn to use a PC? (Tick more than one)
1. On my own
2. As part of my study
3. Friend
4. CTHMIHR

41. How long have you been using PC?
1. Years
2. Months

42. What is the aim of the PC in your office? (Tick more than one)
1. Contact with CTHMIHR databases
2. Contact with Internet
3. Write reports and do research
4. Write letters
5. Create my own database
6. Draw maps

43. Have you attend any training programmes from the following? (Tick more than one)
1. Internet services
2. Software packages
3. Windows Feature
4. English language
5. Records management
6. Information management

44. Did you find any problems in the following? (Tick more than one)
1. Store information
2. Retrieve information
3. Up-date information
4. Process of information
5. Information came in different format
6. Duplication of information
7. Indexing of information
8. Others .................
### Part V: Your Opinion

**A. Indicate the extent to which you agree that each of the following affects the ability of CTHMIHR staff to deal with IT**

<table>
<thead>
<tr>
<th></th>
<th>Strong agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strong disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>45. Staff's knowledge of English language</td>
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<tr>
<td>46. Improve of IT facilities in CTHMIHR</td>
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<tr>
<td>47. Easily to use IT services at CTHMIHR</td>
<td></td>
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<td>48. Increase incentives to undertake training</td>
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<td>49. Bureaucracy and centralised administration at CTHMIHR</td>
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<tr>
<td>50. Bureaucracy and centralised administration in the Departments of CTHMIHR</td>
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<td>51. Increase of co-operation between CTHMIHR staff</td>
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<tr>
<td>52. Instability at work</td>
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</table>

**B. Indicate the extent to which you agree that each of the following affects the Information Management (IM) at CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strong agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strong disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>53. Understanding of Information Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54. Investigated in IT rather than Information Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55. Setting up a plan for disaster prevention and recovery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56. Databases must be compatible with Data Protection mechanism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57. Development Records Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58. Development Call Centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59. Improve electronic records</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60. Controlling the records creation and growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61. Integration of Databases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62. Develop a clear policy of IM, IT and IS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63. Duplication of the same records in different departments.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>64. Information is not held at CTHMIHR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65. Information is not up-date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**66. Comment and Observation to Improve IMS at CTHMIHR**

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**Thank you very much for your Co-operation**
PAGE NUMBERING AS ORIGINAL
Appendix 5

Users’ Skills
1. Software packages

a) Word Processing

The respondents were asked about their skill in using Word Processing. The statistical information in Table A5.1 shows the difference between IU and TE and their use of Word Processing. A \( \chi^2 \)-test was used to test the significance of association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>72</td>
<td>30</td>
<td>2</td>
<td>6</td>
<td>36</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>62</td>
<td>36</td>
<td>10</td>
<td>4</td>
<td>87</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>134</td>
<td>66</td>
<td>12</td>
<td>10</td>
<td>123</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* TR = Total Respondents  
* EU = External users  
* NU = Non-users

\( H_0 \) states that there is no difference between ‘Internal’ and ‘External & Non’ users and their skills in using Word Processing. On the other hand, \( H_1 \) states that there is a difference between ‘Internal’ and ‘External & Non’ users and their skills in using Word Processing.

The result of the \( \chi^2 \)-test shows that there is a significant difference between ‘Internal’ and ‘External & Non’ users and their skills in using Word Processing. The calculated test value (\( \chi^2 = 20.51, \text{df}=4, P<0.005 \)) is more than the table value. Therefore the researcher ACCEPTS \( H_1 \) and REJECTS \( H_0 \).
b) Spreadsheets (Excel)

The respondents were asked about their skill in using Spreadsheets (Excel). The statistical information in Table A5.2 shows the difference between IU and TE and their use of Spreadsheets. A $\chi^2$-test was used to assist the significance of association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>52</td>
<td>28</td>
<td>8</td>
<td>4</td>
<td>54</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>32</td>
<td>40</td>
<td>20</td>
<td>16</td>
<td>91</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>84</td>
<td>68</td>
<td>28</td>
<td>20</td>
<td>145</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* TR = Total Respondents
* NU = Non-users

$H_0$ states that there is no difference between IU and TE and their skills in using Spreadsheets. On the other hand, $H_1$ states that there is a difference between IU and TE and their skills in using Spreadsheets.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their skills in using Spreadsheets. The calculated test value ($\chi^2 = 21.02$, df=4, P<0.005) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
c) Presentation (PowerPoint)

The respondents were asked about their skill in using Presentation (PowerPoint). The statistical information in Table A5.3 shows the difference between IU and TE and their use of Presentation (PowerPoint). A $\chi^2$-test was used to test the significance of association between these relationships.

Table A5.3: User types and skills in the use of Presentation (PowerPoint)

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>46</td>
<td>16</td>
<td>24</td>
<td>6</td>
<td>54</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>26</td>
<td>48</td>
<td>18</td>
<td>16</td>
<td>91</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>72</td>
<td>64</td>
<td>42</td>
<td>22</td>
<td>145</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their skills in using Presentation. On the other hand, $H_1$ states that there is a difference between IU and TE and their skills in using Presentation.

The result of the $\chi^2$-test shows that there is significant association between IU and TE and their skills of using Presentation. The calculated test value ($\chi^2 = 19.47$, df=4, P<0.005) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
d) Database (Access)

The respondents were asked about their skill in using Database (Access). The statistical information in Table A5.4 shows that there was a relationship between IU and TE and their skills in using Database (Access). The $\chi^2$-test was used to test the significant association of these relationships.

**Table A5.4: User types and skills in the use of Database (Access)**

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>36</td>
<td>24</td>
<td>24</td>
<td>12</td>
<td>50</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>20</td>
<td>32</td>
<td>22</td>
<td>20</td>
<td>105</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>56</td>
<td>56</td>
<td>46</td>
<td>32</td>
<td>155</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TR = Total Respondents  
* NU = Non-users

$H_0$ states that there is no difference between IU and TE and their skills in using Database (Access). On the other hand, $H_1$ states that there is a difference between IU and TE and their skills in using Database (Access).

The result of the $\chi^2$-test shows that there is significant association between IU and TE and their skills of using Database (Access). The calculated test value ($\chi^2 = 19.64$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
2. Internet services

a) E-mail

The respondents were asked about their skill in using E-mail. The statistical information in Table A5.5 shows the difference between IU and TE and their skills in using E-mail. A \( \chi^2 \)-test was used to test the significance of the association between these relationships.

Table A5.5: User types and skills in the use of E-mail

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>74</td>
<td>22</td>
<td>6</td>
<td>2</td>
<td>42</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>70</td>
<td>28</td>
<td>12</td>
<td>2</td>
<td>87</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>144</td>
<td>50</td>
<td>18</td>
<td>4</td>
<td>129</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* TR = Total Respondents
* NU = Non-users

\( H_0 \) states that there is no difference between IU and TE and their skills in using E-mail. On the other hand, \( H_1 \) states that there is a difference between IU and TE and their skills in using E-mail.

The result of the \( \chi^2 \)-test shows that there is significant difference between IU and TE and their skills of using E-mail. The calculated test value (\( \chi^2 = 10.64, \text{df} = 4, P<0.005 \)) is more than the table value. Therefore the researcher ACCEPTS \( H_1 \) and REJECTS \( H_0 \).
b) Web search

The respondents were asked about their skill in using Web search. The statistical information in Table A5.6 shows the difference between IU and TE and their skills of using Web search. A $\chi^2$-test was used to test the significance of association between these relationships.

Table A5.6: User types and skills in using Web search

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>66</td>
<td>24</td>
<td>8</td>
<td>4</td>
<td>44</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>64</td>
<td>30</td>
<td>14</td>
<td>4</td>
<td>87</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>130</td>
<td>54</td>
<td>22</td>
<td>8</td>
<td>131</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their skills of using Web search. On the other hand, $H_1$ states that there is a difference between IU and TE and their skills of using Web search.

The result of $\chi^2$-test shows that there is no significant difference between IU and TE and their skills of using Web search. The calculated test value ($\chi^2 = 8.51$, df $=4$, $P<0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$. 

310
c) Discussion Group

The respondents were asked about their skills in the use of Discussion Group. The statistical information in Table A5.7 shows the difference between IU and TE and their skills in using Discussion Group. A $\chi^2$-test was used to test the significance of the association between these relationships.

Table A5.7: User types and skills in use of Discussion Group

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>26</td>
<td>28</td>
<td>20</td>
<td>14</td>
<td>58</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>30</td>
<td>34</td>
<td>20</td>
<td>16</td>
<td>99</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>56</td>
<td>62</td>
<td>40</td>
<td>30</td>
<td>157</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their skills in using Discussion Group. On the other hand, $H_1$ states that there is a difference between IU and TE and their skills in using Discussion Group.

The result of the $\chi^2$-test shows that there is no significant difference between IU and TE and their skills in using Discussion Group. The calculated test value ($\chi^2=3.65$, df=4, $P<0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$. 

311
d) Creating a web page

The respondents were asked about their skills in creating a web page. The statistical information in Table A5.8 shows the difference between IU and TE and their skills in creating a web page. A $\chi^2$-test was used to test the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Reasonably well</th>
<th>Have used</th>
<th>Difficult to use</th>
<th>Heard of it</th>
<th>Not at all</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>20</td>
<td>28</td>
<td>26</td>
<td>14</td>
<td>58</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>20</td>
<td>34</td>
<td>26</td>
<td>22</td>
<td>97</td>
<td>199</td>
</tr>
<tr>
<td>TR</td>
<td>40</td>
<td>62</td>
<td>52</td>
<td>36</td>
<td>155</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their skills in creating a web page. On the other hand, $H_1$ states that there is a difference between IU and TE and their skills in creating a web page.

The result of the $\chi^2$-test shows that there is no significant difference between IU and TE and their skills in creating a web page. The calculated test value ($\chi^2=4.13$, df=4, $P<0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$. 
Appendix 6

Users’ Impression of CTHMIHR Information
a) Quality of Information

The respondents were asked their views of the quality of information. Table A6.1 shows the difference between IU and EU respondents who expressed an opinion (N=258) and their perception of the quality of the information. A $\chi^2$-test was used to test the significance of the association between these relationships.

<table>
<thead>
<tr>
<th>User type</th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>44</td>
<td>66</td>
<td>26</td>
<td>8</td>
<td>144</td>
</tr>
<tr>
<td>EU</td>
<td>38</td>
<td>42</td>
<td>34</td>
<td>0</td>
<td>114</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>108</td>
<td>60</td>
<td>8</td>
<td>258</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* TE = EU and NU  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and EU and their impression of the quality of information. On the other hand, $H_1$ states that there is a difference between IU and EU and their impression of the quality of information.

The result of the $\chi^2$-test shows that there is a significant association between IU and EU and their impression of the quality of information. The calculated test value ($\chi^2=11.51$, df=3, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.
b) Quantity of Information

The respondents were asked their views of the quantity of information. Table A6.2 shows the difference between IU and EU respondents who expressed an opinion (N=254) and their perception of the quantity of the information. The $\chi^2$-test was used to assess the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>18</td>
<td>60</td>
<td>52</td>
<td>14</td>
<td>144</td>
</tr>
<tr>
<td>EU</td>
<td>24</td>
<td>56</td>
<td>28</td>
<td>2</td>
<td>110</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>116</td>
<td>80</td>
<td>16</td>
<td>254</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* TU = IU and EU
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and EU and their impression of the quantity of the information, whereas $H_1$ states that there is a difference between IU and EU and their impression of the quantity of information.

The result of the $\chi^2$-test shows that there is a significant relationship between IU and EU and their impression of the quantity of information. The calculated test value ($\chi^2=12.78$, df=3, P<0.005) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
c) Display of Information

The respondents were asked their views of the display of information. Table A6.3 shows the difference between IU and EU respondents who expressed an opinion (N=254) and their perception of the display of information. The $\chi^2$-test was used to reveal the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>32</td>
<td>54</td>
<td>36</td>
<td>20</td>
<td>142</td>
</tr>
<tr>
<td>EU</td>
<td>14</td>
<td>58</td>
<td>20</td>
<td>20</td>
<td>112</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>112</td>
<td>56</td>
<td>40</td>
<td>254</td>
</tr>
</tbody>
</table>

$*$ IU = Internal users  
$*$ EU = External users  
$*$ TU = IU and EU  
$*$ TE = EU and NU  
$*$ NU = Non-users  
$*=TR = Total Respondents$

$H_0$ states that there is no difference between IU and EU and their impression of the display of the information, whereas $H_1$ states that there is a difference between IU and EU and their impression of the display of information.

The result of the $\chi^2$-test shows that there is a significant relationship between IU and EU and their impression of the display of information. The calculated test value ($\chi^2=8.33$, df=3, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
d) Timeliness of Information

The respondents were asked their views of the timeliness of information. Table 6.4 shows the difference between IU and EU respondents who expressed an opinion (N=258) and their perception of the timeliness of information. The χ²-test was used to assess the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>22</td>
<td>50</td>
<td>40</td>
<td>32</td>
<td>144</td>
</tr>
<tr>
<td>EU</td>
<td>10</td>
<td>34</td>
<td>44</td>
<td>26</td>
<td>114</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>84</td>
<td>84</td>
<td>58</td>
<td>258</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents

H₀ states that there is no difference between IU and Tu and their impression of the timeliness of the information, whereas H₁ states that there is a difference between IU and EU and their impression of the timeliness of information.

The result of the χ²-test shows that there is a significant relationship between IU and TE and their impression of the timeliness of information. The calculated test value (χ²=4.94, df=3, P<0.005) is less than the table value. Therefore the researcher ACCEPTS H₀ and REJECTS H₁.
e) Accuracy of Information

The respondents were asked their views of the accuracy of information. Table A6.5 shows the difference between IU and EU respondents who expressed an opinion (N=246) and their perception of the accuracy of the information. The $\chi^2$-test was used to see the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>40</td>
<td>52</td>
<td>20</td>
<td>30</td>
<td>142</td>
</tr>
<tr>
<td>EU</td>
<td>8</td>
<td>58</td>
<td>24</td>
<td>14</td>
<td>104</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>110</td>
<td>44</td>
<td>44</td>
<td>246</td>
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</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and EU and their impression of the accuracy of the information. On the other hand, $H_1$ states that there is a difference between IU and EU and their impression of the accuracy of the information. The result of the $\chi^2$-test shows that there is a significant relationship between IU and TE and their impression of the accuracy of the information. The calculated test value ($\chi^2=22.51$, df=3, P<0.005) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 

318
f) The up-to-date nature of Information

The respondents were asked their views of the up to-date nature of the information. Table A6.6 shows the difference between IU and EU respondents who expressed an opinion (N=246) and their perception of the up to-date nature of the information. The $\chi^2$-test was used to examine the significance of the association between these relationships.

Table A6.6: User type and up-to-date nature of information

<table>
<thead>
<tr>
<th></th>
<th>Excellent</th>
<th>Good</th>
<th>Acceptable</th>
<th>Not good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>14</td>
<td>46</td>
<td>36</td>
<td>34</td>
<td>130</td>
</tr>
<tr>
<td>EU</td>
<td>12</td>
<td>34</td>
<td>36</td>
<td>24</td>
<td>106</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>80</td>
<td>72</td>
<td>58</td>
<td>236</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* TE = EU and NU
* TU = IU and EU
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and EU and their impression of the up to-date nature of the information, whereas $H_1$ states that there is a difference between IU and TE and their impression of the up to-date nature of the information.

The result of the $\chi^2$-test shows that there is a significant relationship between IU and EU and their impression of the up to-date nature of the information. The calculated test value ($\chi^2=1.25$, df=3, $P<0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$. 

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Appendix 7

Users' Opinions of IT
a) **Staff knowledge of the English language**

The respondents to this research questionnaire were asked their opinion about the staff knowledge of the English language. Table 5.37 indicates that the respondents of TE (86.9%) agreed more about staff knowledge of the English language than IU (67.1%). On the other hand, 4.0% of TE respondents and 23.3% of IU respondents disagreed about staff knowledge of the English language.

Also, Table A7.1 shows the difference between IU and TE and their perception of the staff’s knowledge of the English language. A *χ²*-test was used to test the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IU</strong></td>
<td>52</td>
<td>46</td>
<td>14</td>
<td>24</td>
<td>10</td>
<td>146</td>
</tr>
<tr>
<td><strong>TE</strong></td>
<td>121</td>
<td>52</td>
<td>18</td>
<td>6</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>173</td>
<td>98</td>
<td>32</td>
<td>30</td>
<td>12</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents

*Ho* states that there is no difference between IU and TE and their impression of the staff’s knowledge of the English language. On the other hand, *H₁* states that there is a difference between IU and TE and their impression of the staff’s knowledge of the English language.

The result of the *χ²*-test shows that there is a significant difference between IU and TE and their impression of the staff’s knowledge of the English language. The calculated test value (χ²= 37.26, df=4, P<0.005) is more than the table value. Therefore the researcher ACCEPTS *H₁* and REJECTS *Ho*.

This may be related to IU not finding any benefits in knowledge of the English language because all software programmes can be used in the Arabic language, and all sources and material IU needed are written in Arabic as well, whereas TE feel that CTHMIHR staff
should have knowledge of the English language to communicate with non-Arabic users particularly through Internet services. Also, there is a huge number of e-sources and books published on the Internet written in English that can be delivered through Internet services and IU should know these resources of information. Moreover, most of the IT manuals are in English, so it is very important for staff to have knowledge of the English language particularly to know how to deal with IT hardware and software.

b) Improvement of IT facilities in CTHMIHR

The respondents were asked their opinion about improving IT facilities in CTHMIHR. The information contained in Table 5.37 indicates that the respondents of TE (89.9%) agreed more about improving IT facilities in CTHMIHR than IU (68.4%). Only 2.0% of TE and 12.4% of IU respondents disagreed about improving IT facilities.

Table A7.2 shows the difference between IU and TE and their perception of the improvement of IT facilities in CTHMIHR. A $\chi^2$-test was used to assist the significance of the association between these relationships.

**Table A7.2: User type and perception of the improvement of IT facilities in CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>50</td>
<td>50</td>
<td>28</td>
<td>16</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>123</td>
<td>56</td>
<td>16</td>
<td>4</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>173</td>
<td>106</td>
<td>44</td>
<td>20</td>
<td>2</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* TU = IU and EU
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of improving the IT facilities in CTHMIHR. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of improving the IT facilities in CTHMIHR.
The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of improving the IT facilities in CTHMIHR. The calculated test value ($\chi^2 = 36.33$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may be because ‘Internal’ users did not anticipate any benefits from the improvement in IT facilities without training programme to use this IT; or maybe they felt IT was very difficult to use without knowledge of the English language. TE on the other hand, felt that improvement of IT facilities in CTHMIHR would improve information management.

c) Ease of use of IT services at CTHMIHR

The respondents were asked their opinion about the ease of use of IT services at CTHMIHR. Table 5.37 indicates that more respondents of TE (84.9%) agreed about the ease of use of IT services at CTHMIHR than IU (74.0%), while only 2.0% of TE and 13.7% of IU respondents disagreed about the ease of use of IT services at CTHMIHR.

Table A7.3 shows the difference between IU and TE and their perception of the ease of use of IT services at CTHMIHR. A $\chi^2$-test was used to examine the significance of the association between these relationships.

**Table A7.3: User type and comments on the ease of use of IT services at CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>52</td>
<td>56</td>
<td>18</td>
<td>14</td>
<td>6</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>95</td>
<td>74</td>
<td>26</td>
<td>4</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
<td>130</td>
<td>44</td>
<td>18</td>
<td>6</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the ease of use of IT services at CTHMIHR. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of the ease of use of IT services at CTHMIHR.
The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the ease of use of IT services at CTHMIHR. The calculated test value ($\chi^2 = 20.42$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may be related to the fact that IU (particularly part-time, non-Saudi, or staff with low qualifications) feel that they would lose their season (Ramadan and Hajj) or primary jobs if they made IT services easy to use. Moreover, CTHMIHR has a limited number of IT operations, so IU may find it difficult to get support when they need it. TE on the other hand feel that it would be more effective and cheaper if the IT services at CTHMIHR could be used easily, particularly with remote access (through the Internet).

d) Increasing incentives to undertake training

The respondents were asked their opinion about increasing incentives to undertake training at CTHMIHR. Table 5.37 indicates that more respondents of TE (81.4%) agreed to increasing incentives to undertake training than IU (69.5%), while only 1.7% of TE and 13.7% of IU respondents disagreed with increasing incentives to undertake training.

Table A7.4 shows the difference between IU and TE and their perception of increasing incentives to undertake training. A $\chi^2$-test was used to test the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>52</td>
<td>50</td>
<td>24</td>
<td>16</td>
<td>4</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>97</td>
<td>72</td>
<td>28</td>
<td>0</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td>122</td>
<td>52</td>
<td>16</td>
<td>6</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* NU = Non-users
* TE = EU and NU
* TU = IU and EU
* TR = Total Respondents
\( H_0 \) states that there is no difference between IU and TE and their impression of increasing incentives to undertake training. On the other hand, \( H_1 \) states that there is a difference between IU and TE and their impression of increasing incentives to undertake training.

The result of the \( \chi^2 \)-test shows that there is a significant difference between IU and TE and their impression of increasing incentives to undertake training. The calculated test value \( (\chi^2 = 27.03, \text{df}=4, P<0.005) \) is more than the table value. Therefore the researcher ACCEPTS \( H_1 \) and REJECTS \( H_0 \).

This may relate to IU (particularly full-time) staff feeling that they were not motivated to do any training programme particularly if the training programmes were in their leisure-time. Also, they believed that more training programmes meant more jobs to do, whereas TE believed that more training programmes meant fewer errors and excellent information services.

e) Comment on bureaucracy and the centralised administration at CTHMIHR

The respondents were asked their opinion on bureaucracy and the centralised administration at CTHMIHR. The information contained in Table 5.37 indicates that the respondents of TE (48.3%) agreed less on bureaucracy and the centralised administration at CTHMIHR than IU (58.9%), while just 6.5% of TE and 11.0% of IU respondents disagreed about bureaucracy and the centralised administration at CTHMIHR.

Table A7.5 shows the difference between IU and TE and their perception of the bureaucracy and the centralised administration at CTHMIHR. A \( \chi^2 \)-test was used to assist the significance of the association between these relationships.
Table A7.5: User type and opinion on bureaucracy and the centralised administration at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>34</td>
<td>52</td>
<td>44</td>
<td>14</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>36</td>
<td>60</td>
<td>90</td>
<td>6</td>
<td>7</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>112</td>
<td>134</td>
<td>20</td>
<td>9</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* NU = Non-users  
* TU = IU and EU  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the bureaucracy and the centralised administration at CTHMIHR. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of the bureaucracy and the centralised administration at CTHMIHR.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the bureaucracy and the centralised administration at CTHMIHR. The calculated test value ($\chi^2 = 14.90$, df = 4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may be related to the fact that IU staff feel that they are in a safe place if they keep away from the responsibility of handling information or distributing CTHMIHR information without permission from top management. However, TE feel that the bureaucracy and the centralised administration at CTHMIHR will increase paperwork and take a long time to process information as well as cost money, particularly if this information is none electronic.

f) Comment on bureaucracy and centralised administration in the CTHMIHR departments

The respondents were asked their opinion on bureaucracy and the centralised administration of the CTHMIHR departments. The information contained in Table 5.37 indicates that the respondents of TE (44.2%) agreed less about bureaucracy and centralised
administration in the departments than IU (52.1%). In contrast, 9.5% of TE and 19.2% of IU respondents disagreed about the bureaucracy and the centralised administration in the CTHMIHR departments.

Table A7.6 shows the difference between IU and TE and their perception of the bureaucracy and the centralised administration in the CTHMIHR departments. A $\chi^2$-test was used to test the significance of association between these relationships.

**Table A7.6: User type and opinion about bureaucracy and centralised administration in the CTHMIHR departments**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>28</td>
<td>48</td>
<td>42</td>
<td>22</td>
<td>6</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>34</td>
<td>54</td>
<td>92</td>
<td>12</td>
<td>7</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>102</td>
<td>134</td>
<td>34</td>
<td>13</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* TU = IU and EU
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the bureaucracy and the centralised administration in the CTHMIHR departments. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of the bureaucracy and the centralised administration in the departments.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the bureaucracy and the centralised administration in the CTHMIHR departments. The calculated test value ($\chi^2 = 14.82$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may relate to the fact that if IU distribute information without permission from top management, this will put them at high risk. However, TE state that it is true that bureaucracy and centralised administration in the departments may control information,
but it is a long process and time consuming to get the information as well as permission, particularly from top management.

g) Increase of co-operation between CTHMIHR staff

The respondents were asked their opinion of increasing co-operation between CTHMIHR staff. Table 5.37 indicates that the vast majority of respondents (88.0%) supported increasing co-operation between CTHMIHR staff. All TE and 9.6% of IU thought there was no need for increased co-operation between CTHMIHR staff.

Table A7.7 shows the difference between IU and TE and their perception of increasing co-operation between CTHMIHR staff. A $\chi^2$-test was used to examine the significance of the association between these relationships.

<table>
<thead>
<tr>
<th>User type</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>58</td>
<td>50</td>
<td>24</td>
<td>12</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>105</td>
<td>70</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>163</td>
<td>120</td>
<td>48</td>
<td>12</td>
<td>2</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of increasing co-operation between CTHMIHR staff. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of increasing co-operation between CTHMIHR staff.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of increasing co-operation between CTHMIHR staff. The calculated test value ($\chi^2 = 23.29, \text{df} = 4, P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 

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There is a strong tradition of using old sources such as paper filing. This problem is illustrated when staff need to know everything, keep everything in their hands, keep everything secret, and permission must be given by top management. These reasons explain why the users used informal ways of getting the information they needed from CTHMIHR. TE believed that an increase of co-operation between CTHMIHR staff would increase information services and satisfy user needs.

h) Mobility at work

The respondents were asked their opinion about mobility at work to improve the ability of CTHMIHR staff to deal with IT. Table 5.37 indicates that 71.3% of TE and 60.3% of IU agreed about mobility at work, while just 3.0% of TE and 19.2% of IU respondents disagreed about Mobility at work.

Table A7.8 shows the difference between IU and TE and their perception of mobility at work. A $\chi^2$-test was used to test the significance of the association between these relationships.

Table A7.8: User type and their opinion about mobility at work to improve the ability of CTHMIHR staff to deal with IT

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>60</td>
<td>28</td>
<td>30</td>
<td>20</td>
<td>8</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>82</td>
<td>58</td>
<td>53</td>
<td>4</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>142</td>
<td>86</td>
<td>83</td>
<td>24</td>
<td>10</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* NU = Non-users  
* EU = External users  
* TU = IU and EU  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of mobility at work. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of mobility at work.
The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of mobility at work. The calculated test value ($\chi^2 = 27.01, \text{df}=4, P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

It is true that a move between departments can improve the knowledge of staff, and the exchange of ideas and experiences can create strong relationships between staff. Mobility at work, on the other hand, could make the CTHMIHR staff concerned about their jobs and develop their own ways of creating, indexing, storing, and retrieving information without integrating files in the department and CTHMIHR as a whole. In other words, everyone does their job by creating their own database or filing system in a different format without any type of integration. So, most IU and TE showed that mobility at work can help to improve information services and staff skills if there is a clear information management policy and system with a standard format of record filing.
Appendix 8

Users' Opinion of IM
b) Investigation into IT rather than IM

The respondents were asked their opinion of how investigation into IT rather than IM would affect the IM at CTHMIHR. Table 5.46 indicates that more TE respondents (72.9%) than IU (68.4%) favoured investigating IT. Only 19.2% of IU and 9.0% of TE respondents disagreed with this proposal.

Table A8.1 shows the difference between IU and TE and their perception of investigation into IT rather than IM. A $\chi^2$-test was used to assist the significance of the association between these relationships.

Table A8.1: User types and their opinion of how investigation into IT rather than IM would affect the IM at CTHMIHR.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>50</td>
<td>50</td>
<td>18</td>
<td>26</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>71</td>
<td>74</td>
<td>36</td>
<td>16</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>124</td>
<td>54</td>
<td>42</td>
<td>4</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* TE = EU and NU
* TU = IU and EU
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their view of investigation into IT rather than IM. On the other hand, $H_1$ states that there is a difference between IU and TE and their view on this matter.

The result of the $\chi^2$-test shows that there is no significant difference between IU and TE and their opinion about investigating IT rather than IM. The calculated test value ($\chi^2 = 8.73$, df = 4, $P < 0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$.

It is true that IT is a very important part of developing an information system but investigating IT rather than IM could cause a number of problems that include the complexity of information systems and a difficulty in using the system, incompatible
systems, and not being able to find support, particularly if the IT staff are limited. Investigating IT will not guarantee the improvement of the information services.

c) Setting up a plan for disaster prevention and recovery

The respondents were asked their opinion of how setting up a plan for disaster prevention and recovery would affect the IM at CTHMIHR. Table 5.46 indicates that TE (77.9%) agreed more about setting up a plan for disaster prevention and recovery than IU (68.5%). Only 8.2% of IU and no TE respondents disagreed about setting up a plan for disaster prevention and recovery.

Table A8.2 shows the difference between IU and TE and their perception of setting up a plan for disaster prevention and recovery. A $\chi^2$-test was used to examine the significance of association between these relationships.

### Table A8.2: User types and their opinion of how setting up a plan for disaster prevention and recovery would affect the IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>52</td>
<td>48</td>
<td>34</td>
<td>8</td>
<td>4</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>85</td>
<td>70</td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>137</td>
<td>118</td>
<td>78</td>
<td>8</td>
<td>4</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* TE = EU and NU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their view of setting up a plan for disaster prevention and recovery. On the other hand, $H_1$ states that there is a difference between IU and TE on this issue.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE. The calculated test value ($\chi^2=17.61$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 

333
This may mean that TE understands the importance of setting up a plan for disaster prevention and recovery particularly in an organisation like CTHMIHR. Moreover, such a plan would help CTHMIHR to be ready to work again after a disaster at CTHMIHR.

d) **Databases must be compatible with the Data Protection mechanism**

The respondents were asked their opinion of how the compatibility of databases with the Data Protection mechanism would affect the IM at CTHMIHR. Table 5.46 indicates that more TE respondents (81.9%) agreed on this issue than IU (79.5%). Only 5.5% of IU and 2.0% of TE respondents disagreed on this.

Table A8.3 shows the difference between IU and TE and their view on databases being compatible with the Data Protection mechanism. A $\chi^2$-test was used to examine the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>54</td>
<td>62</td>
<td>22</td>
<td>6</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>65</td>
<td>98</td>
<td>32</td>
<td>2</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>119</td>
<td>160</td>
<td>54</td>
<td>8</td>
<td>4</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
  * TE = EU and NU
  * TE = EU and NU
* *EU = External users
  * *TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their view of databases being compatible with the Data Protection mechanism. On the other hand, $H_1$ states that there is a difference between IU and TE on this matter.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE. The calculated test value ($\chi^2 = 35.10$, df=4, $P < 0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 334
This may relate to the fact that IU feel that data created by CTHMIHR are not compatible with the Data Protection mechanism. Staff at CTHMIHR therefore feel unsafe when they pass information to somebody else without permission from high management. This is one of the reasons why handling information at CTHMIHR is a long process. However, TE agree that all data at CTHMIHR must be compatible with the Data Protection mechanism to prevent and protect their data from being used by someone else without permission.

e) Development of the Record Centre

The respondents were asked their opinion of how the development of the Record Centre would affect the IM at CTHMIHR. Table 5.46 indicates that TE (80.9%) agreed more to the development of the Record Centre than IU (69.8%). In contrast, only 8.2% of IU and only 1.0% of TE respondents did not agree to the development of the Record Centre.

Table A8.4 shows the difference between IU and TE and their perception of the development of the Record Centre. A $\chi^2$-test was used to assist in finding the significance of the association between these relationships.

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>70</td>
<td>32</td>
<td>32</td>
<td>12</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>105</td>
<td>56</td>
<td>36</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>88</td>
<td>68</td>
<td>14</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the development of the Record Centre. On the other hand, $H_1$ states that there is a difference between IU and TE on this issue.
The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the development of the Record Centre. The calculated test value ($\chi^2=13.09$, df=3, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

This may relate to the fact that the development of the Record Centre plays a vital part at CTHMIHR which includes controlling the growth of records, avoiding duplications of the same records, integration of records, and ensuring that all records are kept safe and in an ideal environment.

f) Development of the Call Centre

The respondents were asked their opinion of how the development of the Call Centre would affect the IM at CTHMIHR. Table 5.46 indicates that TE (81.9%) agreed more to the development of the Call Centre than IU (74.4%). Only 2.7% of IU and 1.0% of TE respondents did not agree with the development of the Call Centre.

Table A8.5 shows the difference between IU and TE and their perception of the development of the Call Centre. A $\chi^2$-test was used to assist the significance of association between these relationships.

Table A8.5: User types and their opinion of how the development of the Call Centre would affect the IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strong agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>76</td>
<td>32</td>
<td>34</td>
<td>4</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>105</td>
<td>58</td>
<td>34</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>90</td>
<td>68</td>
<td>6</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

336
$H_0$ states that there is no difference between IU and TE and their impression of the development of the Call Centre. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of the development of the Call Centre.

The result of the $\chi^2$-test shows that there is no significant difference between IU and TE and their impression of the development of the Call Centre. The calculated test value ($\chi^2 = 4.8$, df=3, $P<0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$.

This may relate to the fact that the development of the Call Centre can play a vital part at CTHMIHR which includes control of the flow of information and growth of records, helping TE to get information, particularly those who need it by remote access, and improving information services to users.

g) Improving electronic records

The respondents were asked their opinion of how improving electronic records would affect the IM at CTHMIHR. Table 5.46 indicates that 88.9% of TE and 75.3% of IU respondents agreed that electronic records should be improved. On the other hand, only 7.0% of IU and 1.0% of TE respondents thought that the electronic records should not be improved.

Table A8.6 shows the difference between IU and TE and their perception of improvement of electronic records. A $\chi^2$-test was used to test the significance of the association between these relationships.
Table A8.6: User types and their opinion of how improving electronic records would affect the IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>72</td>
<td>38</td>
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<td>8</td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>97</td>
<td>80</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
<td>118</td>
<td>46</td>
<td>10</td>
<td>2</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the improvement of electronic records. On the other hand, $H_1$ states that there is a difference between IU and TE and their view this matter.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their view of the improvement of the electronic records. The calculated test value ($\chi^2=42.24$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

By improving electronic records at CTHMIHR, both IU and TE will have improved access to CTHMIHR information, particularly users with remote access. An improvement of the electronic records would save time, money, and space at work. Furthermore, electronic records can help staff to retrieve and present information for managers at the right time, affording them a good quality and quantity of information.

h) Controlling the record creation and growth

The respondents were asked their opinion of how controlling the creation and growth of records would affect the IM at CTHMIHR. Table 5.46 indicates that TE (86.0%) agreed more on this than IU (79.4%). In contrast, only 5.5% of IU and 2.0% of TE respondents disagreed with controlling record creation and growth.
Table A8.7 shows the difference between IU and TE and their perception of controlling record creation and growth. A $\chi^2$-test was used to assist the significance of the association between these relationships.

**Table A8.7: User types and their opinion of how controlling record creation and growth would affect the IM at CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>64</td>
<td>52</td>
<td>22</td>
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<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>71</td>
<td>100</td>
<td>24</td>
<td>2</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>135</td>
<td>152</td>
<td>46</td>
<td>8</td>
<td>4</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* NU = Non-users  
* TU = IU and EU  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their views on controlling the record creation and growth. On the other hand, $H_1$ states that there is a difference between IU and TE on this matter.

The result of the $\chi^2$-test shows that there is no significant difference between IU and TE and their views on controlling the records’ creation and growth. The calculated test value ($\chi^2 = 6.06$, df = 4, $P < 0.005$) is less than the table value. Therefore the researcher ACCEPTS $H_0$ and REJECTS $H_1$.

This may be because IU and TE feel that information services at CTHMIHR will be improve by better record management. This includes: creating, indexing, filing, storing, retrieving and, where appropriate destroying records. As a result, CTHMIHR will improve the accessibility of records.

i) **Integration of databases**

The respondents were asked their opinion of how the integration of databases would affect the IM at CTHMIHR. Table 5.46 indicates that more TE (81.9%) agreed more about the
integration of databases than IU (79.5%). Only 9.5% of IU and 3.0% of TE respondents disagreed about the integration of databases.

Table A8.8 shows the difference between IU and TE and their perception of the integration of databases. A $\chi^2$-test was used to assist the significance of the association between these relationships.

Table A8.8: User types and their opinion of how the integration of databases would affect the IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>74</td>
<td>42</td>
<td>16</td>
<td>10</td>
<td>4</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>81</td>
<td>82</td>
<td>30</td>
<td>4</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>155</td>
<td>124</td>
<td>46</td>
<td>14</td>
<td>6</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* TE = EU and NU  
* EU = External users  
* TU = IU and EU  
* NU = Non-users  
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the integration of databases. On the other hand, $H_1$ states that there is a difference between IU and TE on this issue.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the integration of databases. The calculated test value ($\chi^2=28.84$, df=4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

j) Developing a clear policy for IM, IT and IS

The respondents were asked their opinion of how developing a clear policy for IM, IS, and IT would affect the IM at CTHMIHR. Table 5.46 indicates that more TE (82.9%) than IU (78.0%) agreed that there was a need to develop a clear policy of IM, IT and IS. In contrast, only 8.2% of IU and 3.0% of TE respondents disagreed that there was a need to develop such a clear policy.
Table A8.9 shows the difference between IU and TE and their perception of the development of a clear policy of IM, IT and IS. A $\chi^2$-test was used to examine the significance of the association between these relationships.

**Table A8.9: User types and their opinion of how developing a clear policy for IM, IS, and IT would affect the IM at CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strong agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strong disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>60</td>
<td>54</td>
<td>20</td>
<td>8</td>
<td>4</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>81</td>
<td>84</td>
<td>28</td>
<td>4</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>138</td>
<td>48</td>
<td>12</td>
<td>6</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* TE = EU and NU
* EU = External users
* TU = IU and EU
* NU = Non-users
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of whether to developing a clear policy or not. On the other hand, $H_1$ states that there is a difference between IU and TE and their impression of develop a clear policy for IM, IT and IS.

The result of the $\chi^2$-test shows that there is significant difference between IU and TE and their impression of the development of a clear policy for IM, IT and IS. The calculated test value ($\chi^2=12.99$, df=4, P<0.005) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

**k) Duplication of the same records in different departments**

The respondents were asked their opinion of how the duplication of the same records in different departments would affect the IM at CTHMIHR. Table 5.46 indicates that more TE (46.7%) agreed about the duplication of the same records in different departments than IU (743.8%). 20.5.6% of IU and 8.0% of TE respondents disagreed about the duplication of the same records in different departments.
Table A8.10 shows the difference between IU and TE and their perception of the duplication of the same records in different departments. A $\chi^2$-test was used to examine the significance of the association between these relationships.

**Table A8.10: User types and their opinion of how the duplication of the same records in different department would affect the IM at CTHMIHR**

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>34</td>
<td>30</td>
<td>52</td>
<td>20</td>
<td>10</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>51</td>
<td>42</td>
<td>90</td>
<td>14</td>
<td>2</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>72</td>
<td>142</td>
<td>34</td>
<td>12</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users
* EU = External users
* TE = EU and NU
* NU = Non-users
* TU = IU and EU
* TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression about the duplication of the same records in different departments. On the other hand, $H_1$ states that there is a difference between IU and TE on this issue.

The result of the $\chi^2$-test shows that there is a significant difference between IU and TE and their impression of the duplication of the same records in different departments. The calculated test value ($\chi^2=341.64$, $df=4$, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$.

1) **Information not being held at CTHMIHR**

The respondents were asked their opinion of how the information not being held at CTHMIHR would affect the IM at CTHMIHR. Table 5.46 indicates that TE (46.7%) agree more to the information not being held at CTHMIHR than IU (46.6%). 25.8% of IU and 18.1% of TE respondents disagreed about the information not being held at CTHMIHR.

Table A8.11 shows the difference between IU and TE and their perception of the information not being held at CTHMIHR. A $\chi^2$-test was used to assist in finding the significance of the association between these relationships.
Table A8.11: User types and their opinion of how the information not being held at CTHMIHR would affect the IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strong agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strong disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>36</td>
<td>32</td>
<td>36</td>
<td>28</td>
<td>14</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>57</td>
<td>36</td>
<td>70</td>
<td>26</td>
<td>10</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>68</td>
<td>106</td>
<td>54</td>
<td>24</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* TE = EU and NU  
* NU = Non-users  
* TU = IU and EU  
* TR = Total Respondents

H₀ states that there is no difference between IU and TE and their impression of the information not being held at CTHMIHR. On the other hand, H₁ states that there is a difference between IU and TE on this matter.

The result of the \(\chi^2\)-test shows that there is a significant difference between IU and TE and their impression about information not being held at CTHMIHR. The calculated test value (\(\chi^2=587.43, \text{df}=4, P<0.005\)) is more than the table value. Therefore the researcher ACCEPTS H₁ and REJECTS H₀.

m) Information was not up-to-date

The respondents were asked their opinion about how the information not being up-to-date at CTHMIHR would affect the IM at CTHMIHR. Table 5.46 indicates that more TE (49.2%) agreed that the information was not up-to-date at CTHMIHR than IU (45.2%). 26.0% of IU and 15.1% of TE respondents disagreed on this issue.

Table A8.12 shows the difference between IU and TE and their perception of the information not up-to-date at CTHMIHR. A \(\chi^2\)-test was used to assist in finding the significance of the association between these relationships.
Table A8.12: User types and their opinion of how the information not being up-to-date at CTHMIHR would affect IM at CTHMIHR

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>No opinion</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IU</td>
<td>34</td>
<td>32</td>
<td>42</td>
<td>28</td>
<td>10</td>
<td>146</td>
</tr>
<tr>
<td>TE</td>
<td>52</td>
<td>46</td>
<td>71</td>
<td>22</td>
<td>8</td>
<td>199</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>78</td>
<td>113</td>
<td>50</td>
<td>18</td>
<td>345</td>
</tr>
</tbody>
</table>

* IU = Internal users  
* EU = External users  
* NU = Non-users  
* TE = EU and NU  
* TU = IU and EU  
*TR = Total Respondents

$H_0$ states that there is no difference between IU and TE and their impression of the information not being up-to-date at CTHMIHR. On the other hand, $H_1$ states that there is a difference between IU and TE and their opinions on the issue.

The result of the $\chi^2$-test shows that there is significant difference between IU and TE and their view of the information not being up-to-date at CTHMIHR. The calculated test value ($\chi^2 = 448.50$, df = 4, $P<0.005$) is more than the table value. Therefore the researcher ACCEPTS $H_1$ and REJECTS $H_0$. 
استبيان مستخدمي معلومات معهد خادم الحرمين الشريفين لأبحث الحاجة

يرجى الرد على الأسئلة التالية بحسب الحاجة.

1. ما نوع المعلومات التي تستخدمها؟
   - 2-4 أعوام
   - أقل من 2 عام
   - أكثر من 7 أعوام

2. ما هو الأسلوب الذي تستخدمه؟
   - شهر
   - شهر رمضان
   - شهر الحج

3. ما هو الطرق المفضلة في استخدام المعلومات؟
   - القرآن الكريم
   - الأدب الإلكتروني
   - الكلام المباشر

4. هل تحتاج إلى مزيد من المعلومات؟
   - نعم
   - لا

5. ما هو الوقت المفضل في استلام المعلومات؟
   - الصباح
   - السكينة
   - بعد الظهر

6. ما هو الوسيلة المفضلة في استلام المعلومات؟
   - البريد الإلكتروني
   - الرسائل النصية

7. ما هو الوسيطة المفضلة في استلام المعلومات؟
   - شبكة مهدف
   - مجموعة صور

8. ما هو الوقت المفضل في استلام المعلومات؟
   - الظهيرة
   - المساء

9. ما هو النظام المفضل في استلام المعلومات؟
   - البريد الإلكتروني

10. ما هو النظام الفعال في استلام المعلومات؟
    - البريد الإلكتروني

11. ما هو النظام الفعال في استلام المعلومات؟
    - الرسائل النصية

12. ما هو النظام الفعال في استلام المعلومات؟
    - الشبكات الاجتماعية

13. ما هو النظام الفعال في استلام المعلومات؟
    - الإنترنت

14. استعدادات المعلومات (تحديث)

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الجزء الثاني: مهارات تقنية المعلومات لدى مستخدمي معلومات المهم
ماهي قدرتك على إعداد ما يلي؟

### Software Packages
- Word Processing (e.g. Word for Windows) .15
- Spreadsheet (e.g. Excel) .16
- Presentation (Power Point) .17
- Database (e.g. Access) .18
- Network management .19

### Windows Feature:
- Task bar .20
- Work with dialog boxes .21
- Create a folder .22
- The control panel .23
- Save and save as .24

### Internet services:
- E-mail .25
- Web search .26
- Discussion Group .27
- Create web page .28

أي ملاحظات أو تعليقات حول تطوير مهارات تقنية المعلومات لدى مستخدمي معلومات المهم.

### الجزء الثالث: معلومات شخصية
- عمرك؟
  - أقل من 20 .1
  - 20-30 .2
  - 30-40 .3
  - 40-50 .4
  - 50-55 .5
  - فاكر .6
- الحالة الاجتماعية
  - متزوج .1
  - غير متزوج .2
- أعلى درجة علمية حصلت عليها؟
  - دبلوم .1
  - تأهيل .2
  - ماجستير .3
  - دكتوراه .4
  - دكتور .5
  - الجنس .6

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# الجزء الرابع: مهارات تقنية المعلومات لدى موظفي المهد

34. في أي مجموعة مستخدمي المعلومات يمكنك تصنيف نفسك؟
- موظف من المهد
- موظف جامعي أو القرى
- موظف حكومي
- موظف من خارج المهد
- موظف شركة خاصة

إذا كانت إجابتك 3 أو 5 أو 6 اذهب إلى صفحة 4 (الجزء الخامس: رأيك الشخصي)

35. من أي نوع من الموظفين تعود؟
- موظف دائم في المهد
- موظف مؤقت (موسمي)

36. هل بدأ العمل بالههد؟ عام?

37. في أي قسم عمل الآن؟
- قسم الخدمات والخدمات الاجتماعية و الإدارية
- قسم البحث العلمي والهندسة
- قسم الخدمات الصحية
- قسم الخدمات الإلكترونية
- قسم الخدمات المالية والادارية

38. هل لديك جهاز حاسوب آلي في المنزل؟
- نعم
- لا

39. هل تستخدم جهاز حاسوب آلي في العمل؟
- نعم
- لا

40. كيف تعلمت استخدام الحاسوب الآلي؟ (إذا كانت الإجابة رلاا اذهب إلى السؤال 43)
- يمكنني أن أتعلم من آخرين
- يمكنني أن أتعلم من خلال دراسات الأصدقاء
- يمكنني أن أتعلم من خلال دراسات الأصدقاء
- يمكنني أن أتعلم من خلال دراسات الأصدقاء
- يمكنني أن أتعلم من خلال دراسات الأصدقاء

41. منذ متى تستخدم الحاسوب الآلي؟
- سنة
- شهر

42. ما هو الهدف الرئيسي من استخدام الحاسوب الآلي في العمل؟ (إذا كان اختيارك من واحد)
- الاتصال بقواعد المعلومات في المهد
- كتابة الملاحظات
- كتابة الملاحظات
- كتابة الملاحظات
- كتابة الملاحظات

43. هل تم لك الألقان واحد الدورات التالية؟ (إذا كان اختيارك من واحد)
- خدمات الإنترنت
- اللغة الإنجليزية
- اللغة الإنجليزية
- اللغة الإنجليزية

44. هل تواجه مشاكل مع التالي؟ (إذا كان اختيارك من واحد)
- تحديث المعلومات
- تحديث المعلومات
- تحديث المعلومات
- تحديث المعلومات
- أخرى الذكرها
الجزء الخامس: رأيك الشخصي

ما مدى تأثير الأمور التالية على نجاح موظفي المعهد في التعامل مع تنفيذ العلومات

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شكراً جزيلًا على حسن تعاونكم معنا ... وجزاكم الله خيرًا  

Mohammed Nojoum © 2001
الأمير محمد بن سليمان آل سعود أمير المنطقة الشرقية

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الإمام محمد بن سعود الإسلامية

أهلا وسهلا بك في جامعة الإمام محمد بن سعود الإسلامية

المقدمة

في عام 1433 هـ / 2012 م، احتفل العالم الإسلامي بختام مسابقة بحثية عالمية في مجال العلوم الإسلامية. هذه المسابقة تهدف إلى تعزيز البحث العلمي وتعميق المعرفة في مجالات متعددة من العلوم الإسلامية.

الهدف

اليوم، نود أن نوجه نظرة أعمق إلى ما تم إنجازه خلال هذا الإحتفال. وقد وفق مشاركون من 모든 أنحاء العالم، بما في ذلك SCH (أحد أهم المراكز للبحث المتعلق بالعظم) في مصر، لطرح بحوثهم في هذا الحدث. تتميز هذه البحوث بتنوعها وعمقها في المفاهيم الإسلامية، مما يعكس توجهات الركز العلمي في العلوم الإسلامية.

البحث

يرجى مشاركة الردود على البذور التي تم بثها في هذا الحدث. الهدف من هذه الردود هو تعزيز المعرفة والتجربة بين الباحثين. نأمل أن تكون هذه الردود جزءًا من رحلتنا العلمية المستمرة، حيث نسعى إلى تطوير البحث العلمي في مجال العلوم الإسلامية.

الشكر والتقدير

نود أن نشكر جميع الأطراف المشاركة في هذا الحدث، من المشاركين إلى المدعرين. قد تكون المسابقة نشأت على تفاني وحُبٍّ، لكن النجاح وحده يتطلب جهدًا وصبرًا. بناءً على ذلك، نشكر جميع المشاركين على مشاركتهم ودعمهم في هذا الحدث العلمي.

لقد أثرى هذا الحدث علمنا وتجاربنا، وخلاله قمنا بتقييم آلة جديدة لمفاهيم الاختلاص الإسلامي. نأمل أن تكون هذه الورشة بمثابة نقطة بداية لحوار مستمر بين الباحثين في هذا المجال.

نود أن نشكر جميع الأطراف المشاركة في هذا الحدث، من المشاركين إلى المدعرين. قد تكون المسابقة نشأت على تفاني وحُبٍّ، لكن النجاح وحده يتطلب جهدًا وصبرًا. بناءً على ذلك، نشكر جميع المشاركين على مشاركتهم ودعمهم في هذا الحدث العلمي.

نأمل أن تكون هذه الورشة بمثابة نقطة بداية لحوار مستمر بين الباحثين في هذا المجال.

الشكر والتقدير

مكاكة الامام محمد بن سعود الإسلامية

المملكة العربية السعودية

Makkah Al Mukarramah P.O. Box 6287
Cable Gameat Umm Al - Qura, Makkah
Faxemely Makkah 5573282
Tel - Makkah 5572855

 الإسلامي
سعادة عميد معهد البحوث العلمية وإحياء التراث الإسلامي
سلمه الله

السلام عليكم ورحمة الله وبركاته

ويعود

أفيدكم علماً بأن الباحث محمد بن صديق بن عمر محمد أحد المتعهرين من معهد خادم الحرمين الشريفين لأبحاث الحج للحصول على درجة الدكتوراة في إدارة المعلومات من قسم علم المعلومات في جامعة لفترة بريطانيا، ويهدف المعهد من تخصصه إلى إنشاء نظام لإدارة المعلومات به يساعد طالبي (مستخدمي) المعلومات في الحصول على حاجته منها بسرعة وسهولة وفعالية. ونظراً لحاجته. في إعداد أبحاثه لتقديمها إلى الجامعة البريطانية للحصول على درجه العلمية. إلى استيفاء المعلومات اللازمة لتعبيبة الاستبانات المرفقة من كافة الوحدات الأكاديمية بالجامعة.

فإننا نأمل من سعادتك تركز بالمواقفية وتعميم من يلتزم لاستكمال الاستبانات المرفقة الخاصة بالبحث.

شاكرين ومبدرين لكم كريم توفيك...

مع رافض التحية والتقدير...

عميد معهد خادم الحرمين الشريفين لأبحاث الحج

د. أسامة بن فضيل الباز

Makkah Al Mukarramah P.O. Box 6287
Cable Gamest Umm Al-Qura, Makkah
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Tel - Makkah 5572855
الملكة العربية السعودية
وزارة التعليم العالي
جامعة أم القرى
معهد خادم الحرمين الشريفين لأبحاث الحج

سعادة عميد كلية الشريعة والدراسات الإسلامية

سلامه الله ورحمة الله وبركاته

واعداً:

أفيدهن علماً بأن الباحث محمد بن صديق بن عمر نجوم أحد المبعوثين من معهد خادم الحرمين الشريفين لأبحاث الحج للحصول على درجة الدكتوراة في إدارة المعلومات من قسم علم المعلومات في جامعة لفترة ببريطانيا، ويهدف المعهد من تخصصه إلى إنشاء نظام لإدارة المعلومات بما يستند إلى الذكاء الصناعي. وتساعد في إعداد أبحاثه لتقييمه إلى الجامعة البريطانية للحصول على درجة العلمية، إلى استيفاء المعلومات اللازمة لدعم الاستدامة الموحدة من كافة الوحدات الأكاديمية للجامعة.

فإن أمان من سعادتك التكريم بالموافقة وتعتبرنا من يلزم لاستكتمال الاستدامة الموحدة

الخاصة بالبحث.

شاكرين ومقدرين لكم تعاونكم...
 مع وافر التحية والتقدير...

عميد معهد خادم الحرمين الشريفين لأبحاث الحج

دراسة في مساحة... (الاسم)

8/97

Makkah Al Mukarramah P.O. Box 6287
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جامعة أم القرى / جامعات الفقه / مكة المكرمة / 1486 هـ
المملكة العربية السعودية
وزارة التعليم العالي
جامعة أم القرى
كلية الهندسة والعمارسة الإسلامية
مكتبة المعلمين

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سعادة رئيس قسم العمارسة الإسلامية
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سعادة رئيس قسم الهندسة الميكانيكية
سعادة رئيس قسم هندسة الحاسب الآلي

السلام عليكم ورحمة الله وبركاته، وبعد:

نرفق لسعادةكم صورة خطاب سعادة عمد معهد خادم الحرمين الشريفين لأبحاث الجح رقم 1 بتاريخ 12/29/1421 المطمن على طلب سعادته تعمية الاستعانات الخاصة بالباحث محمد بن صديق بن عمر جواد المبتعث بالمدينة والمهم بالتأهل على درجة الدكتوراه في إدارة المعلومات، من قسم علم المعلومات في جامعة لفره ببريطانيا.

نأمل تكركم بالإطلاع والتوقيع على جلب تكميل الاستعانات وإرسالها لسعادة مدير الإدارة.

عميد كلية الهندسة والعمارسة الإسلامية

/ طارق بن محمد نحاس

Makkah Al Mukarramah P.O.Box: 5555
Tel: (02) 5281155 Fax: (02) 5270027
E-Mail: eng-arch@uqu.edu.sa

المملكة العربية السعودية
وزارة التعليم العالي
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كلية الهندسة والعمارسة الإسلامية
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