Investigation of the adoption of telemedicine technology in the Kuwaiti health system: Strategy and policy of implementation for overseas referral patients

A Thesis submitted for the degree of Doctor of Philosophy

By Ali Buabbas

Supervisor: Dr. Malcolm Clarke

School of Information Systems and Computing

Brunel University, West London, UK

February 2013

Abstract

The cost of health care services is rising and the number of patients requesting overseas treatment from the Kuwait Government continues to increase; this is becoming an unsustainable financial burden. A telemedicine system has the potential to support the Kuwaiti health system to provide medical consultations from global medical centres, and thereby reduce the number of Kuwaiti patients being sent abroad for treatment, and so reduce costs.

This research investigates the readiness of the key stakeholders in regard to adoption of telemedicine systems in the Kuwaiti healthcare system. This is achieved by assessing the readiness of individuals (physicians and patients), the organisation (policy makers) and the technical infrastructure (IT managers). Moreover, the lack of research on this topic, particularly in the Arabian Gulf Region, was the reason behind carrying out this study.

An in-depth study was conducted by using a quantitative and qualitative approach. A questionnaire was used to explore the attitudes of specialised physicians and patients by obtaining their opinions based on specific criteria. Next, semi-structured interviews were conducted: (1) with IT managers to assess the technical infrastructure of the health system; and (2) with policy makers to assess the organisation in regard to its readiness towards telemedicine adoption.

The study shows that the overseas referral patients are ready to use telemedicine systems, as a consequence of their need to receive medical consultations from global experts. However, they expressed some concerns, such as privacy and confidentiality of their data. The specialised physicians also showed readiness towards adoption of telemedicine in the Kuwaiti health system, and their responses indicated that they are willing to use such systems. However, the findings of the interviews reveal that the current technical infrastructure for ICT in the Kuwaiti healthcare system is not ready for telemedicine adoption and there are needs to be change in the way management is organized in order to improve and enhance trust among departments.

The qualitative approach identified factors that would inhibit and hinder the adoption of telemedicine in Kuwait, as well as the supportive factors in the organisation. Using the results, a strategy was developed to demonstrate how the Kuwaiti health system could be made ready to

receive a telemedicine system, together with policies for the use of telemedicine systems by overseas referral patients. A comparison with Jordan and Syria shows that the Kuwaiti healthcare system is more ready to adopt a telemedicine system with respect to the individuals, technical infrastructure and governmental support. Finally, an economic analysis was performed in order to investigate the cost effectiveness of the proposed system.

Table of Contents

Chapter One: Introduction.....1

1. Introduction.....1
1.1 Information and communications technology in medical care.....1
1.2 Overseas referral patients.....1
1.2.1 History.....1
1.3 Statement of the problem.....3
1.4 The proposed solution.....3
1.4.1 Telemedicine systems.....3
1.4.2 Readiness to adopt a telemedicine system.....4
1.5 Research aims and objectives.....5
1.6 Organisation of the thesis.....6

Chapter Two: Research Background.....9

2.1 General information.....9
2.2 History of the State of Kuwait.....10
2.3 Economy in Kuwait.....10
2.4 Culture in Kuwait.....11
2.5 Health in Kuwait.....11
2.5.1 General Information on the Ministry of Health in Kuwait 12
2.5.2 Healthcare services.....12

Chapter Three: Literature Review.....17

3.1 The context of telemedicine……17
3.1.1 Telemedicine's definitions……17
3.1.2 The history of telemedicine……...18
3.1.3 Clinical applications of telemedicine……20
3.2 Current experiences of telemedicine……21
3.2.1 Feasibility of telemedicine implementation……..21
3.2.1.1 Telereferral system…… 22
3.2.1.1.1 Real-time video conferencing……..22
3.2.1.1.2 Store and forward system…….23
3.2.2 Summary……..24
3.3 Benefits of using telemedicine systems……24
3.4 Limitations of telemedicine……...26
3.5 Success factors for telemedicine implementation……26
3.6 The concept of readiness……...27
3.6.1 The concept of readiness in terms of ICT…… 27
3.7 Theories and models and innovation adoption……28
3.7.1 The diffusion of innovation theory……... 29
3.7.2 Lewin's model for change……..….30
3.7.3 The technology acceptance model ……...31
3.7.4 The Arab policy and information technology model (APIT)…….…..…..32

3.8 The readiness factor and ICT adoption and change in healthcare organizations……33
3.8.1 Individual focus……34
3.8.1.1 Factors affecting individuals' attitudes……36
3.8.2 Organisational focus…… 38
3.8.3 Technical infrastructure and readiness……40
3.8.4 Policies and strategies……42
3.9 IT adoption in Gulf Cooperation Council (GCC) countries……44
3.9.1 Culture and IT adoption……44

Chapter Four: Conceptual framework for the current study……..50

4.1 Introduction 50
4.2 Determinants of the study framework.....50

Chapter Five: Research Design and Methodology.....54

5.1 Implications for philosophical paradigms.....54
5.1.1. Positivist.....55
5.1.2. Critical approach.....55
5.1.3. Interpretive.....56
5.1.4 The research predisposition.....57
5.2. Research methods.....57
5.2.1. Quantitative methods.....58
5.2.1.1. Surveys (questionnaires).....58
5.2.2. Qualitative methods.....59
5.2.2.1. Qualitative interviews.....59
5.3. Current research methodology.....60
5.3.1. Combination of quantitative and qualitative methods.....60
5.3.2 Documents.....61
5.4 Design of the study.....63
5.4.1 Designing the survey (themes and questions).....63
5.4.1.1 The physicians' questionnaire.....64
5.4.1.1.1 Readiness assessment of the physicians.....66
5.4.1.2 The patients' questionnaire.....67
5.4.1.2.1 Readiness assessment of the patients.....68
5.4.2 Designing the qualitative method (interview questions).....69
5.4.2.1 The policy makers' interview.....70
5.4.2.2 The IT managers' interview.....71
5.5 Validity and reliability.....71
5.5.1 Content validity.....72
5.6 The awareness session (movie clip).....73
5.7 Ethical considerations.....74
5.8 The pilot study.....74
5.9 Data collection in the research setting.....75
5.9.1 The first stage.....75
5.9.2 The second stage.....76

5.9.3 Difficulties faced during the data collection process.....76
Chapter Six: Data Analysis and Results.....78
6.1 Data analysis of the questionnaires.....78
6.1.1 Results of the patients' questionnaires.....78
6.1.2 Results of the physicians' questionnaires.....90
6.2 Data analysis of the interviews.....101
6.2.1 Results of the policy makers' interviews.....103
6.2.1.1 Allocated size of budget.....104
6.2.1.2 Patients' issues.....104
6.2.1.3 Use of ICT.....105
6.2.1.4 Potential of telemedicine.....105
6.2.1.5 Inhibiting factors.....106
6.2.1.6 Solutions and supportive factors.....107
6.2.1.7 Cultural/social factors.....108
6.2.1.8 Existing and new policies.....109
6.2.1.9 The role of the Ministry of Health.....110
6.2.2 Results of the IT managers' interviews.....111
6.2.2.1 Availability of ICT.....112
6.2.2.2 Capability of the existing ICT.....113
6.2.2.3 Telemedicine technical requirements.....114
6.2.2.4 ICT policy.....114
6.2.2.5 Institutional plans.....115
6.2.2.6 Managerial and cultural factors.....116
Chapter Seven: Discussion.....118
7.1 Readiness of individuals.....118
7.1.1 Overseas referral patients.....118
7.1.1.1 Attitudes of the overseas referral patients towards a telemedicine system.....119
7.1.2 Specialised physicians for referring patients abroad.....121
7.1.2.1 Attitudes of the specialised physicians towards telemedicine.....122
7.2 Readiness of technical infrastructure (existing and future needs).....124
7.3 Readiness of the organisation (the Kuwait Ministry of Health (K-MOH)).....127
7.3.1 Factors affecting the adoption of telemedicine in the Kuwait Ministry of Health.....127
7.3.1.1 Inhibiting factors.....128

7.3.1.2 Supportive factors.....128
7.4 Strategy and policy for telemedicine implementation for overseas referral patients.....129
7.5 Comparison between the readiness of Kuwait and the readiness of other Arab countries, specifically Jordan and Syria.....133
7.6 Economic analysis……...136
7.7 Summery……..143
Chapter Eight: Conclusion.....135
8.1 Conclusion.....144
8.2 Contribution to extant knowledge.....145
8.3 Research limitations.....146
8.4 Future research.....147
References.....148
Appendix.....159

List of Tables

Table 5.1: Health regions and related hospitals in Kuwait……75

Results of the patients' questionnaires

Table 6.1: The response rate for the patients' questionnaires.....78

Table 6.2 Summary of the demographic data of the patients.....79

Table 6.3: Question no. 5…….....80

Table 6.4: Question no. 6…….....80

Satisfaction about the current system

Table 6.5: Crosstab summary for questions no. 7 and no. 1.....81

Table 6.6: Question no. 8.....81

Table 6.7: Crosstab summary for questions no. 9 and no. 4.....82

Table 6.8: Question no. 10.....83

Table 6.9: Question no. 11.....83

Attitude towards telemedicine

Table 6.10: Crosstab summary for questions no. 12 and no. 3.....84

Table 6.11: Crosstab summary for questions no. 13 and no. 1.....85

Table 6.12: Crosstab summary for questions no. 14 and 13.....86

Table 6.13: Crosstab summary for questions no. 15 and 14.....87

Table 6.14: Crosstab summary for questions no. 16 and 2.....88

Table 6.15: Question no. 17.....89

Table 6.16: Questions no. 18.....89

Table 6.17: Summary of patients' comments regarding telemedicine use.....90

Results of the physicians' questionnaires

Table 6.18: The response rate for the physicians…….....90

Table 6.19: Summary of the demographic data of the physicians.....91

Background information

Table 6.20: Summary of the physicians' background information regarding IT usage.....92

Physicians' satisfaction with the current referral abroad system

Table 6.21: Question no. 11.....92

Table 6.22 Question no. 12.....93

Table 6.23: Question no. 13.....94

Physicians' perceptions about telemedicine

Table 6.24: Question no. 14.....94

Table 6.25: Question no. 15.....95

Table 6.26: Question no. 16.....95

Table 6.27: Question no. 17.....96

Table 6.28: Question no. 18.....96

Physicians' comfort with technology

Table 6.29: Table 6.29: Crosstab summary for questions no. 19 and 1.....97

Table 6.30: Question no. 20.....97

Table 6.31: Question no. 21.....98

Table 6.32: Question no. 22.....98

Physicians' willingness about telemedicine

Table 6.33: Question no. 23.....99

Table 6.34: Question no. 24.....99

Table 6.35: Question no. 25.....100

Table 6.36: Question no. 26.....100

Table 6.37: Question no. 27.....100

Table 6.38: Question no. 28.....101

Results of the policy makers' interviews

Table 6.39: Thematic groups and data patterns for the policy makers' interviews and the questions associated.....103

Results of the IT managers' interviews

Table 6.40: Thematic groups and data patterns for the IT managers' interviews and the questions associated.....112

Table 7.1: A comparison summery between Kuwait, Jordan, and Syria in regards to their readiness to adopt telemedicine……135

Table 7.2: Cost for the initial treatment abroad per patient……..139

Table 7.3: Cost for the follow up treatment abroad per patient……139

Table 7.4: Cost for the initial treatment by telemedicine……..140

Table 7.5: Cost for the follow up treatment by telemedicine……140

Table 7.6: Estimated costs for three years using telemedicine with the conventional treatment abroad system……141

List of Figures

Figure 3.1: Geographical location and map of the State of Kuwait.....9

Figure 3.2: The current patient pathway……14

Figure 3.3: The proposed patient pathway…….15

Figure 4.1: The conceptual framework for readiness to adopt telemedicine for overseas referral of patients in the Kuwait Health System…….....52

Figure 5.1: A methodological framework demonstrates the steps that have been followed for data collection.....62

Figure 7.1: Strategy for telemedicine implementation in the Kuwaiti healthcare system…...132

Figure 7.2: Map of the Middle East……133

Figure 7.3: The proposed patient pathway with % routes ……138

Figure 7.4: Estimated cost comparison over 3 years…….142

Figure 7.5: Estimated cost savings using telemedicine over 3 years……....142

Glossary

ACIT	Arab Culture and Information Technology
APIT	Arab Policy and Information Technology
GCC	Gulf Cooperation Council
HIS	Health Information System
IT	Information Technology
IS	Information System
ICT	Information and Communication technology
RFID	Radio Frequency Identification
TAM	Technology Acceptance Model
UK	United Kingdom
US	United States

Declaration

I hereby declare that this thesis entitled “Investigation of the adoption of telemedicine technology in the Kuwaiti health system: Strategy and Policy of implementation for overseas referral patients" is my own work and effort, and has not been previously written by another person, published or submitted for the award of any academic degree.

Ali Buabbas

Acknowledgements

First, I would like to extent my sincere thanks and gratitude to my project supervisor, Dr. Malcolm Clarke for his support and guidance, followed thanks also to the Brunel Research Into Good Health Technology (BRIGHT GROUP) for their continuous support and directions throughout the PhD Program.

My heartfelt thanks also go out to my parents, my brother Yousef, and my beloved wife Nour Al-Attar for their continuous support and patience throughout the study.

Chapter one: Introduction

1. Introduction

1.1 Information and communications technology in medical care

Nowadays, the progress and development of countries is measured by the extent of their use of information technology (IT) and telecommunications systems to provide services to the public. This is due to the fact that IT has the potential to perform the given tasks properly, swiftly, within an appropriate time frame and cost effectively. Hence, it can be seen that the use of information and communications technology (ICT) in healthcare is of paramount importance, in order to promote the quality of healthcare services and to make access to these services equal to all. As a result, telemedicine systems have emerged as a new way of delivering health services for patients, where the only difference is distance and may be defined as the provision of medical services through the use of information technology and communications (ICT) systems (Fong et al., 2011). The use of telemedicine has many advantages for the patient; it saves time and money and promotes compliance with follow-up visits. For the healthcare provider; it allows physicians to exchange experiences, and gain education and training. For the organisation it brings the benefits of telemedicine services including cost effectiveness, and improved quality of care for patients. However, it is not an easy process to introduce a telemedicine system into a healthcare system and many organisations have found it to be a complex and innovative process (Gagnon et al., 2006) as it requires reform in delivering medical care to patients. Such reform requires an input from all of the stakeholders that are involved in the decision-making process regarding telemedicine adoption.

Therefore, adoption of a telemedicine system in a health organisation should be as a result of its need to solve a problem, which could be to improve health services (cost benefit) and/ or to reduce cost (cost effective). The researcher believes that telemedicine would be appropriate for the Kuwaiti healthcare system on both issues. The following section therefore describes the current situation in the Kuwaiti healthcare system.

1.2 Overseas referral patients

1.2.1 History

Following the Iraqi invasion of Kuwait in August 1990, the State of Kuwait was left with many problems: one of which was the total collapse of its medical services (Abd-El-Bary, 1993). The Ministry of Health attempted to re-recruit former staff in order to revive the medical services. However, this attempt has failed for several reasons (Al-Sumait et al., 2001):

(1) Job opportunities in other countries were attractive for many.

(2) Many regarded Kuwait too unstable to return.

(3) There was no financial or other incentives to attract medical experts to work in Kuwait, particularly after the Kuwaiti liberation in 1991.

This resulted in obvious weakness of the medical services and most Kuwaiti citizens were dissatisfied with the healthcare provision at that time. Consequently, the Kuwaiti government realised that the situation required prompt action, and a budget was allocated to refer patients with acute cases to specialised clinics in Europe or the United States. Subsequently, a dedicated department was formed to manage the procedures for these patients until the end of their treatment and return home. These facilities are a burden to the government and according to annual statistics: during the fiscal year 1995-1996, the spend was KD 13 million ($ 46 million USD) (Al-Sumait et al., 2001). This number rose by 25 times in allocated budget for 2008 / 2009 to KD 325 million ($ 1.2 Billion USD) (Alaan, 2009).

Overseas referral patients in Kuwait have been the subject of a research conducted by three surgeons who worked at the Department of Surgery in Mubarak Hospital (general level) in Kuwait (Al-Sumait et al., 2001). They reviewed all the overseas referral files from 1994 to 1998, for the Departments of General Surgery, Vascular Surgery and Urology. Five hospitals participated in the data collection process. The purpose of the research was to determine the reasons why so many patients were being sent abroad to seek solutions. Several recommendations were proposed by the researchers to reduce the expenditure including:

(1) Recruit medical specialists and consultants to work in Kuwait;

(2) Recruit medical specialists to train the national medical staff in Kuwait;

(3) Arrange annual visits by specialists to perform operations and to check critical cases;

(4) Refer medical cases to a local consultant prior to sending the patient abroad in order to assess the seriousness of the condition and the availability of the treatment in the designated country.

This study was restricted to a limited set of specialties and ignored cardiology or oncology, which incur the greatest cost for treatment abroad. Therefore, finding alternative approaches that satisfy both government and patients is of paramount importance to solve the current problem.

1.3 Statement of the problem

Two issues are of concern to the Kuwaiti government regarding treatment abroad:

(1) Increasing number of requests for treatment abroad;

(2) Increasing total healthcare costs.

This will eventually result in an unsustainable budget, which is of concern to both Ministry of Health and the Legislature Office.

The Department of Overseas Referral Treatment has been placed under increasing pressure to seek alternative solutions, especially when the number of cases being referred during 2006-2009 exceeded thousand of cases per year (Alyoum, 2011). A number of reasons may be the cause of this problem:

(1) Medical negligence in hospitals or specialised medical centres;

(2) A lack of medical services and, in particular, medical specialists.

The situation continues to worsen and the Ministry of Health is still seeking solutions to overcome even part of the problem. Therefore, a new system or approach is highly desirable and would be welcomed in order to control the increasing budget allocated for this service, as well as improve the quality of healthcare services.

1.4 The proposed solution

1.4.1 Telemedicine systems

The synergy of information and communications technologies can shape and reshape any system or environment; and there are many possibilities in the healthcare field, such as continuing care, chronic disease management, consultations and education. Since 1990, telemedicine, or "the use of information and communications technology to support health care services delivery remotely", has gained "attention and support from specific groups of health care professionals, such as clinicians, administrators, and policy makers" (Lehoux et al., 2002, p.899). The applications of telemedicine are numerous and are often seen as potential solutions to many problems for any department or healthcare institution, most importantly in terms of cost containment and accessibility to specialised clinical experts (FinOHTA, 1997).

1.4.2 Readiness to adopt a telemedicine system

Based on the extant literature, the adoption of telemedicine in an organisation needs an infrastructure that is ready for changes in healthcare delivery. Thus, telemedicine adoption depends on: the individuals that would use the telemedicine system, the staff and equipment that would support the technical requirements, the health organisation being ready to make decisions based on its needs, and a strategy and policy to introduce the information and communications technology in medical care delivery.

The primary aim of telemedicine is to facilitate and support clinical communications and work, so the healthcare provider can perform his/her tasks. Importantly, the only way of achieving the full benefits of telemedicine services is to meet the actual needs of the target population, in addition to the value that will be added to the health arena. However, in order to successfully adopt these electronic medical services, it is crucial to assess the readiness of the stakeholders based on several important factors prior to the implementation of telemedicine (Jennett et al., 2005; Kifle et al., 2006; Khoja et al., 2007). These stakeholders can include several departments, such as medical, technical and management departments, and assessing their readiness can be achieved by using a proper methodology.

The importance of readiness appears many times in the literature due to the impact that the current abilities of an organisation can exert to inhibit or support telemedicine adoption. It also mitigates the failure of the new system and associated wasted effort, time and money. The current failure rate for information technology implementation projects in the health care sector

has reached 40% (Kaplan and Harris–Salamone, 2009). Failures are typically due to issues with the individual (such as resistance to change) or budget and time overruns with limited or no visible outcomes (Yeo, 2002). Therefore, several recommendations regarding e-health implementation in the Middle East region were made by the World Health Organization (WHO) in 2001 in Cairo, Egypt. This plan of action asked the governments to establish an infrastructure to be ready for e-health implementation. This confirmed the need for ICT in delivering healthcare services regionally or nationally to promote healthcare to achieve equity for all.

1.5 Research aims and objectives

The aim of this research is to investigate the readiness of the key stakeholders in regard to telemedicine system adoption in the Kuwaiti healthcare system, and to propose and validate a strategy and policy for telemedicine implementation for overseas referral patients.

The objectives are:

1- To assess the perceptions of the stakeholders (namely physicians, patients, IT managers and policy makers) regarding telemedicine system adoption.

2- To explore and identify the factors that support or hinder the adoption of telemedicine systems from the perspective of the individual, the organisation and the technical infrastructure.

3- To determine the effect of culture on the reaction of the Kuwaiti health community (patients, physicians, IT managers and policy makers) to the prospect of a telereferral system (telemedicine).

4- To identify the main aspects of comparison between the Kuwaiti community and other Arab communities in regard to readiness and the prospect of a telemedicine system being adopted and used.

5- To develop a policy for overseas referral patients to complement the existing policy.

6- To develop a strategy for optimum implementation of a telemedicine system in Kuwait.

7- To validate the strategy and policy with the policy makers of the Kuwait Ministry of Health.

Several methods are used to achieve the objectives of the research study, and include:

- Reviewing the literature related to the topic;
- Reviewing the existing policy for referring patients abroad;
- Eliciting the perspectives and opinions of the stakeholders, including patients, through questionnaires and interviews;
- Analysis of the collected data;
- Based on the results, a strategy and policy for telemedicine implementation in the Kuwaiti healthcare system is developed;
- A strategy and policy is validated with the policy makers at the Ministry of Health.

There is also an apparent lack of research on this topic in the Arabian Gulf Region.

1.6 Organisation of the thesis

This thesis is organised into eight chapters and each chapter is divided into sections and sub-sections. The following is a brief description of the content of each chapter in the thesis:

Chapter one – Introduction:

This chapter introduces the reader to the main topic, initially by demonstrating the advantages of the use of telemedicine in an organisation. A history regarding overseas referral patients is provided, and highlights the need for the Kuwaiti healthcare system to find a solution and change for the better. The importance of assessing readiness prior to adoption is then discussed. The chapter ends with the research aims and objectives and a summary of the methods selected to achieve the research objectives.

Chapter two – Research background:

This chapter presents general information about the State of Kuwait in regard to history, economics, culture and health. In addition, information about the Kuwait Ministry of Health and the types of healthcare services provided to the population is also presented.

Chapter three – Literature review:

This chapter, surveys the literature, starting from a general perspective and proceeding to the detail of the research objectives. Literature relevant to telemedicine systems is reviewed and discussed, including definitions, history, applications, benefits and limitations, IT theories and models. The readiness factor and associated issues, in regard to the individual, the organisation and the technical staff, are presented and discussed. The survey considers the literature on IT adoption in Arab and Gulf countries that explore the cultural factor. Lastly, there is special focus on the approaches for policies at different levels, and strategies for telemedicine adoption and implementation.

Chapter four – Conceptual framework:

In this chapter, the conceptual framework for the study is developed. This is based on the readiness of each of the following: the individual; the organisation; and the technical infrastructure. The main determinants of the framework are discussed.

Chapter five – Research design and methodology:

This chapter states the theoretical paradigms underpinning the research. The separate types of research methodology are presented. The stages for designing the instruments (the questionnaires and interviews) for data collection are discussed in detail, including validity and reliability issues. The literature used to justify and support the research instruments is presented. The chapter concludes with a discussion on the ethical aspects of the research, the pilot study, the awareness session and the difficulties faced during data collection in the research setting.

Chapter six – Data analysis and results:

Chapter six analyses the data from the questionnaires using statistical techniques, and the interviews by thematic analysis. Results are presented, wherein strategy and policy for optimum use of telemedicine are developed and validated.

Chapter seven – Discussion:

This chapter considers the findings of the study regarding the readiness of the patients and physicians (the individual), IT managers (technical aspects) and policy makers (the organisation). The results are linked with the extant literature on theories and models to support

the findings. Furthermore, the objectives of the study are achieved by addressing the factors affecting the adoption of a telemedicine system in the Kuwaiti healthcare system. based on the overall findings, a strategy for the implementation of a telemedicine system in Kuwait is developed, together with the policy required to integrate telemedicine within the existing system (a telereferral system). In conclusion, a comparison is made between the readiness of Kuwait and the readiness of other Arab countries, specifically Jordan and Syria, in regard to telemedicine adoption.

Chapter eight – Conclusion:

The last chapter has four sections: (1) a conclusion of the research study; (2) the contributions to the extant knowledge; (3) the limitations of the study; and (4) directions for future research.

Appendices

Appendix A: Tables of primary data.

Appendix B: The patient questionnaires (Arabic and English versions) and the physician questionnaire.

Appendix C: The guideline interview questions for the IT managers and the policy makers.

Appendix D: The ethical approval letter and the consent form have also been attached.

Chapter Two: Research Background

This chapter provides the background to the research setting; the State of Kuwait. General information is given on Kuwait in regard to history, economy, culture and health. The governmental healthcare system and the health services provided by the Kuwait Ministry of Health to the population are then described.

2.1 General information

The official name for Kuwait is the State of Kuwait. The State of Kuwait lies in the north-west corner of the Arabian Gulf and is considered a small country in Asia: it covers a geographic area of 17,818 km^2. The State of Kuwait shares a border in the north with the republic of Iraq, in the south with the Kingdom of Saudi Arabia, and in the east with the Republic of Iran, as shown in Figure 3.1 (Kuwait Ministry of Information, 2011).

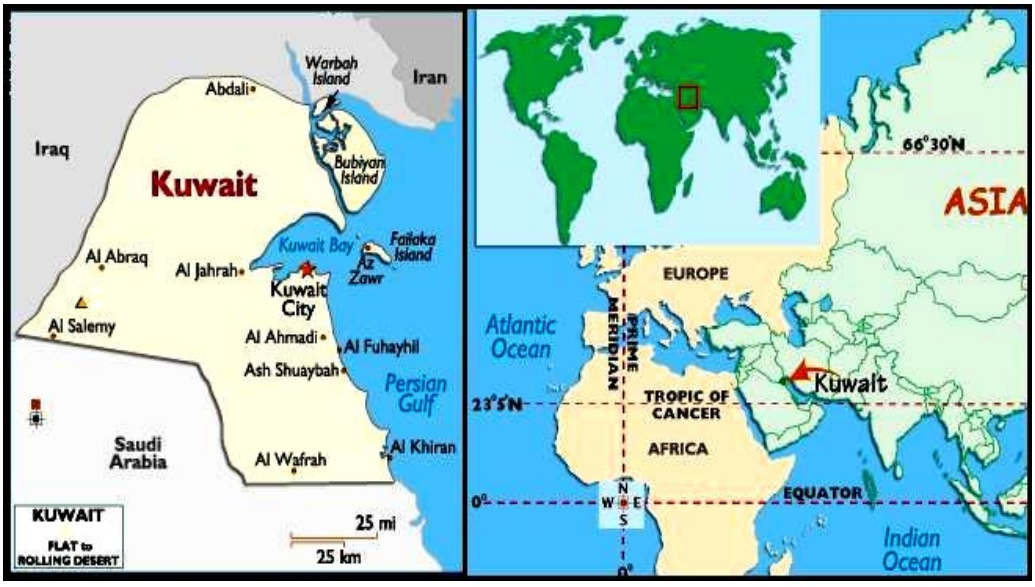


Figure 3.1 Geographical location and map of the State of Kuwait

Source: Google Images

The State of Kuwait has nine islands in the Persian Gulf, which are: Failaka, Bubiyan, Miskan, Warba, Auhha, Umm Al-Maradim, Umm Al-Naml, Kubbar and Qaruh. Bubiyan is the largest, with an area of 863 km^2 (Kuwait Ministry of Information, 2011).

Statistics from 2010 showed Kuwait had about 3,5 million residents with 1,1 million of them Kuwaitis, the others being expatriates and foreigners. The majority of the population 2,4 million reside in Kuwait for business or to work in one of the official governmental sectors (Health Kuwait, 2010).

2.2 History of the State of Kuwait

Kuwait has a long history, and historians consider that Kuwait emerges as an independent political entity in 1613 (Ali and Drive, 2007). For many years Kuwait was a protectorate of Britain (1899-1961). The treaty signed between Sheikh Mubarak the Great, the ruler of Kuwait in 1899, and Britain, provided Kuwait with protection against attack from the Turks, the Ikhwan and the Wahabbi tribesmen. The head of State in Kuwait is hereditary, and has been the Al-Sabah family, for over 200 years (Abd-El-Bary, 1993).

Kuwait became an independent state in 1961 when Sheikh Mubarak terminated the treaty with Britain; and Kuwait became a full member of the United Nations in 1963 (Abd-El-Bary, 1993). During the Iraqi invasion of Kuwait in 1990, a new treaty was signed with the United States of America (USA) to liberate and protect the State of Kuwait from Saddam Hussein, who was the President of Iraq at that time (Abd-El-Bary, 1993). After seven months of occupation, Kuwait was liberated on 26 February; 1991.

2.3 Economy in Kuwait

Oil was discovered in the Gulf Cooperation Council (GCC) countries in the middle of the 20th century. This discovery made a dramatic change to the Gulf region, and demographic, economic and social structures were drastically transformed (Salih, 2010). Kuwait is one of the GCC countries and oil constitutes over 90% of its total exports for the last decade (Ali and Al-Kazemi, 2005). Hence, Kuwait has an excellent economic and financial position, in addition to the strategic importance of its geographical location (Ali and Magalhaes, 2008).

It is noted that the Kuwaiti government provides all its citizens' needs, including health and education, free of charges and imposes no taxes (Abd-El-Bary, 1993). This is also reflected in the high standard of living enjoyed by the citizens owing to the small population and the high revenues from oil export.

2.4 Culture in Kuwait

As in most countries, culture plays an important role in shaping the nature of the living environment in Kuwait, such as the work environment. Islam is the basis of the Arab culture: it governs society's activities and the daily lives of its people (Rouibah, 2008).

The official spoken language of Kuwait is Arabic, with English considered as the second spoken language. The main religion in Kuwait is Islam, (about 85% of the population), while the remaining (15%) are Christian, Hindu and Parsi (Central Intelligence Agency, 2011).

Kuwait has its own culture, just as other GCC countries, that integrates the general Arab culture with the specific Arab Gulf culture. In addition, the strong presence of foreign personnel in the country has given the Kuwaitis a different outlook, particularly in relation to traditions and social activities. Although most Kuwaiti families come from tribal roots (in which the Islamic foundation for social relationships is dominant), the nature of life in Kuwait has been heavily influenced by Western culture, such as competition and equality of sexes (Ali and Drive, 2007).

The people in Kuwait dislike uncertainty and look for structure and certainty (Aladwani, 2002). Therefore, the Kuwaiti people will avoid uncertain things or aspects with an uncertain outcome. According to the extant literature, it is found that culture and local traditions had a negative effect on the work of Kuwaiti citizens (Metle, 2002; Al-Kazemi and Drive, 2007).

2.5 Health in Kuwait

Health is both a pillar of life and the sign of a vibrant community. Health should be a right for every individual. For this reason, the State of Kuwait strives to provide all the necessary medical and health provision for the population in both primary and specialised medical care. In the early 1960s, the government started the construction of hospitals and primary health centres and launched medical services using local and global expertise (Abd-El-Bary, 1993).

Kuwait is divided into five health regions, each with one general hospital. Accordingly, the health plan at Ministry of Health assigns health regions according to the governorates, as follows:

1- The governorate of Kuwait City (the capital)

2- The governorate of Hawalli

3- The governorate of Al-Ahmadi

4- The governorate of Al-Jahra

5- The governorate of Al-Farwaniya

Therefore, each governorate is assigned a health region, which includes one general hospital and a number of primary care centres distributed all over the governorate (Health Kuwait, 2010).

In Kuwait, the public healthcare system is divided into two tiers: the central Ministry of Health and the regional health institutions.

2.5.1 General Information on the Ministry of Health in Kuwait

The Ministry of Health in Kuwait (MOH) is the second largest ministry in the country. It is headed by a minister and an undersecretary, as well as twelve assistant undersecretaries. The Ministry of Health is responsible for the administrative and technical management of the planning, monitoring and evaluation of healthcare services.

Every citizen and expatriate in Kuwait holds an identity card, with a unique number for the holder. This card is used by the Ministry of Health to access the patient's medical record. These medical records are held in the main database centre, which in turn are transferred to the master database within the Department of Information Systems. This system has been running successfully for the last ten years. The medical record contains details of all visits to a health centre, the regional general hospital and referrals to specialty hospitals. In addition, the patient may have been overseas for a specific treatment. All this data and information is kept in the medical record of the patient.

2.5.2 Healthcare services

Healthcare in Kuwait is organised into three service levels: primary healthcare delivered through health centres; secondary healthcare through regional general hospitals; and tertiary healthcare through specialty hospitals. The first tier is the primary healthcare level. Primary healthcare is delivered through 86 health centres, which are distributed throughout the country (Health Kuwait, 2010). Each residential area has one health centre and some of these centres may house

medical specialty clinics. These specialties include diabetes, dermatology, ophthalmology and maternity. The second tier is the secondary healthcare level. This service is delivered through regional general hospitals. Currently, the State of Kuwait is divided into five health regions and each region runs a general hospital. These hospitals accept patients through a referral system. A patient makes a visit to the primary healthcare centre where they are registered. The health centre doctor assesses their condition and refers the patient to the region's general hospital (one of the five hospitals) when required. The third tier is the tertiary healthcare level. This specialty care service is provided to patients through nine specialty hospitals. Most of these specialty clinics are in the Al-Sabah medical region (specialized), including ophthalmology, oncology, neurology, orthopaedics, and surgery. In addition, the government offers further health services solely for Kuwaiti people who suffer from a critical health condition or a rare medical case: referring the patient outside of the country for treatment unavailable in Kuwait, e.g. to a specialised clinic. This service was officially started in 1992 after Kuwait's liberation, when most of the healthcare services were unsatisfactory.

The Kuwaiti government through its Ministry of Health is always striving to improve and develop the healthcare system, and keep up with the latest techniques of developed countries to give the best quality medical care.

This thesis will focus on those governmental hospitals (general or tertiary) that refer patients abroad for treatment, and with which the Department for Treatment Abroad has a direct relationship.

In this context, the conventional pathway of the patient asks for treatment abroad will be changed as a sequence of introducing the new system of telemedicine as shown in figures 3.2 and 3.3. Figure 3.2 depicts the current conventional pathway. Figure 3.3 depicts the proposed patient pathway where teleconsultation is embedded into the conventional patient pathway in order to screen the referral cases, whether to manage the case locally or to expedite refer of the case abroad.

Figure 3.2: The Current Patient Pathway

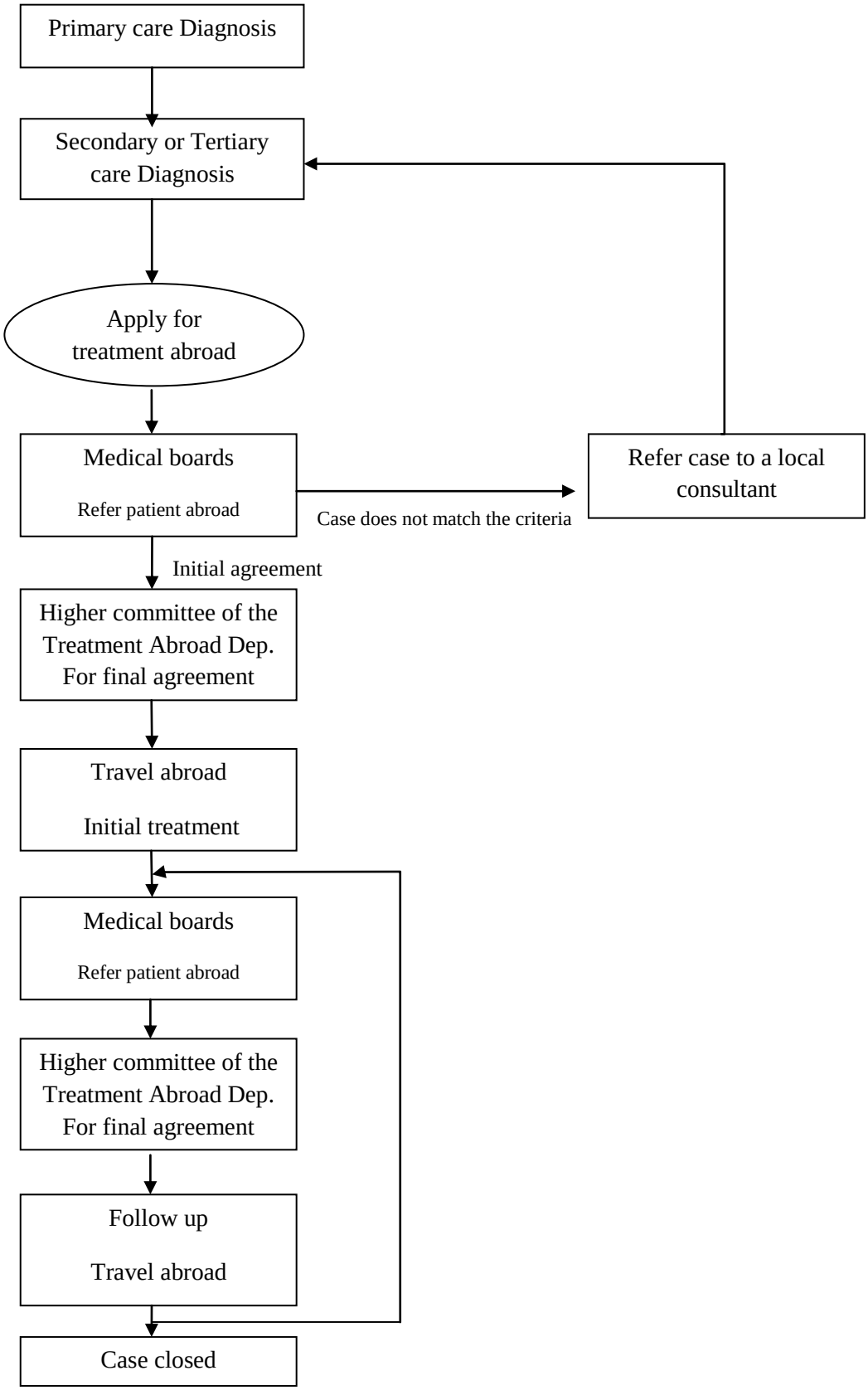
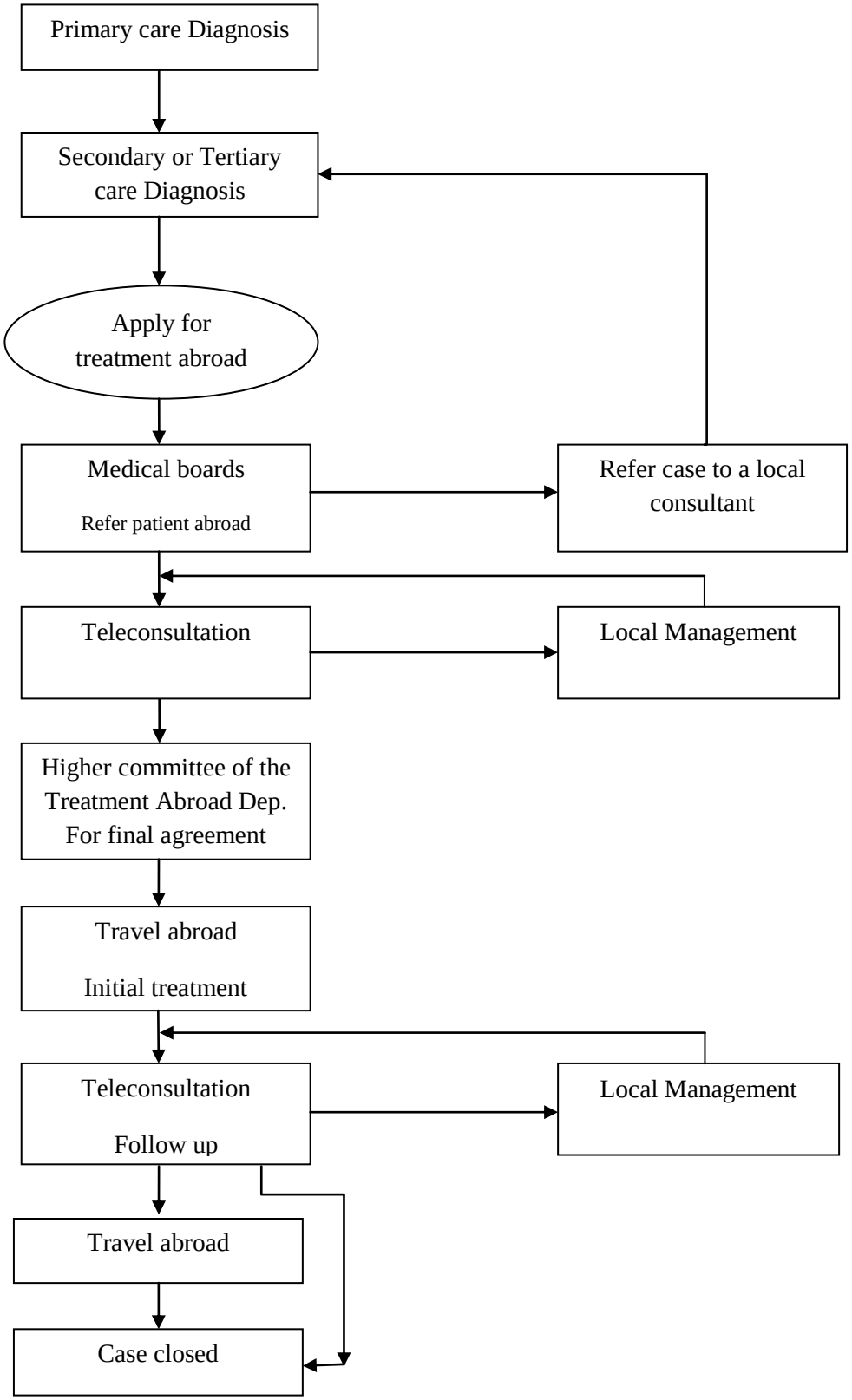


Figure 3.3: The Proposed Patient Pathway



The next chapter will review the literature related to the topic of the research study, discussing the different issues that surround telemedicine adoption in healthcare systems.

Chapter Three: Literature Review

This chapter presents a literature review for the main aspects of telemedicine systems. It starts with a broad definition of telemedicine, and then presents its history, applications, benefits, successful factors and limitations. This chapter also explores theories and models that focus on information technology adoption in organisations. The literature focuses on readiness as a factor through different types of assessment (individual, organisational and technical) and this is discussed. The last part of the chapter concentrates on IT adoption in Arab and Gulf countries, considering the need for further research addressing the policies and strategies required for telemedicine adoption.

3.1 The context of telemedicine

3.1.1 Telemedicine's definitions

The American Telemedicine Association (2009) defines telemedicine as "the use of medical information exchanged from one site to another via electronic communications to improve patients' health statuses". The term 'telemedicine' is derived from the Greek word 'tele', which translates as 'at a distance', while the word 'medicine' derives from the Latin 'mederi', and is associated with the concept of 'healing' (AVD Communications, 2009). In 1996, the Institute of Medicine (IOM) defined telemedicine as "the use of electronic information and communications technologies to provide and support health care when distance separates the participants", and terms such as 'teleradiology', 'telepathology' and 'telecardiology' are all derivatives of 'telemedicine'. Further definitions include: telemedicine is a two-way interactive audio/video telecommunications, computers and telemetry by using a modern information technology, to deliver health services to remote patients and to provide the information needed by primary care physicians and specialists at distance, in order to make a consultation (Bashshur et al., 1997).

In reviewing the literature associated with this study, it became evident that the use of ICT for delivering healthcare services at a distance is related to other terms, including 'telehealth' and 'e-health'. Others have suggested that the word 'telemedicine' should be supplanted by other terms such as 'telehealth' or 'e-health'. However, such perspectives could be associated with the

background of the researchers or because the term appears more contemporary and therefore more fashionable. Unsurprisingly, this issue is still debated (Wootton, 2001).

E-health encompasses all types of electronic healthcare services that are conducted over the internet. It can be led by non-professional individuals for informational, educational or commercial purposes. The term 'telehealth' has been defined as an all-encompassing word that integrates ICT into healthcare practices for the purposes of the protection and promotion of an individuals' health and is considered under the broader term 'telemedicine', which is, to be more specific, concerned with the curative side (Maheu et al., 2001). The concepts and definitions have been created, developed and expanded and reflects the vitality and evolution of telemedicine. This in turn mirrors the healthcare system in general and enables the ICT that supports it (Bashshur et al., 2000). Others have stated that telemedicine is a concept that can be widely used to serve patients clinically, providers educationally and institutions administratively by different means of ICT (Wootton, 2001).

Interestingly, no distinction has been found in order to differentiate the terms 'telemedicine', 'telehealth' and 'e-health': all of them describe the provision of healthcare services between institutions or clinics at a distance by using ICT, with the target of curing patients. It is therefore obvious from the aforementioned telemedicine definitions that all these terms share a similar meaning, which is the use of information technology and telecommunications for the delivery of medical services (curative or preventive) to patients from a distance. However, there are different approaches to explaining the different technologies. It is clear then that telemedicine involves various sciences working collaboratively to achieve what is at the core of telemedicine: the delivery of healthcare services remotely.

3.1.2 The history of telemedicine

The evolution of telemedicine services can be considered to be based on three periods of history, each period being connected to the development of information technology (IT), telecommunications and computers of that time (Bashshur, 2002).

The first period is the late 1950s, when telecommunications media emerged in the form of broadcast and television technology. Wittson et al. (1961) document the first use of telemedicine when a two-way closed-circuit microwave television was used to perform a psychiatric

consultation between the Nebraska Psychiatric Institute and the state's mental health hospital in order to provide those in the state's mental health hospital with expert opinions from the institute. In the 1960s, the National Aeronautic and Space Administration (NASA) in the United States employed telemedicine to monitor the vital signs of its astronauts (such as blood pressure and respiratory rate) during space flight. NASA has also began supporting research for telemedicine projects by providing access to satellite technology. The common characteristic of the systems at that time was the complexity, unreliability and high costs of telecommunications (audio/video) (Bashshur, 1997).

The second era was 1980s, when computers and telecommunications systems advanced rapidly and technology began to merge. Large amounts of data and information would be transmitted successfully, despite the limited bandwidth at that time (Bashshur, 2002). Thereafter, especially after satellite technology became common, large numbers of telemedicine programmes began to emerge. One example was the Space Bridge, a global project developed by NASA to support earthquake victims around the world by providing essential medical consultations. The SatelLife or HealthNet programme began at the time in 1985 and was developed by a non-profit organisation to provide health consultations through email communications and CD-ROM via the HealthSat satellite to developing countries. It worked by connecting urban medical centres with remote clinics within the same country. This was done in specific developing countries, namely: the Philippines, Africa and some countries in the Americas. Different consultations were provided remotely to cover common medical specialties, including infectious diseases, neurology, general surgery and psychiatry. Despite the importance of maintaining the use of telemedicine as a way of providing healthcare services to all populations around the world as an equity-based right for each individual, many telemedicine projects were unsustainable for achieving their goals (Maheu et al., 2001). This was as a result of several factors, the most important of which related to the financial sources to support these projects and they were suspended due to the fear of failure and the uncertain future for telemedicine systems as a cost-effective alternative.

With the advent of the internet in 1990, society became shaped around information and communications technology and this period represents the third period of telemedicine when it become a communicative tool for delivering healthcare services remotely. This era has become

known as the 'digital' era or the internet era, and the power of the internet is used to operate different networks and improve communications around the world. It is characterized by huge strides in the capabilities of equipment, tumbling costs of communication and technology, availability of applications and growing awareness and familiarity with technology. Healthcare already had adopted some information technology developments, such as image digitisation and data compression, and thus enabled health professionals to have interactive video conferences over low-bandwidth lines (Bashshur, 2002). At the same time, telemedicine began to receive attention and support from many groups, such as physicians, health managers and policy makers around the world. Consequently, many countries in Western Europe, North America, Australia and Asia launched telemedicine projects for different medical specialties, such as radiology, pathology, psychiatry and nursing (Lehoux et al., 2002).

It is apparent that there have been numerous attempts to implement telemedicine in the past (irrespective of their success or failure), but the common theme is the challenge to overcome the barriers that are represented by the cultural, social, political and economic aspects.

3.1.3 Clinical applications of telemedicine

Telemedicine technology is normally introduced to healthcare in order to solve a specific problem or to close a gap relating to the delivery of healthcare services. Therefore, telemedicine applications applied in separate medical departments will differ depending on needs.

Telemedicine technology is generally applied in two ways: so called asynchronous, which is based on a 'store and forward' technique; and synchronous or 'real time', which uses video conferencing. One study divides telemedicine applications according to their maturity level and performance in the medical field based on the available literature (Krupinski et al., 2002). Many applications for telemedicine exist but these fall under three main categories: clinical (such as diagnostic and therapeutic tools); educational (such as training courses) and administrative; including financial issues (Wootton, 2001).

From the literature, teleradiology and telepathology are the most used and mature tools of telemedicine. They have been extensively studied and affirmed by many researchers as the most accurate, quickest and cost-effective tools compared to conventional methods (Krupinski et al., 2002; Bashshur, 2002). As these applications rely on the transmission of lab results or digital

images, they are used within many fields including telecardiology, teledermatology, telesurgery and teleophthalmology. These applications of telemedicine are currently operating in many projects around the world, but remain areas of study to prove their effectiveness and efficiency in specific medical fields. Research on telemedicine systems has been undertaken by many researchers, and they tend to focus on either store and forward techniques or video conferencing 'real time' techniques. Recent papers have demonstrated the effectiveness of telemedicine technology used within an ordinary health system by comparing the results before and after the implementation of a telemedicine system. Consequently, ongoing research has examined several issues related to the adoption of telemedicine, including the accuracy and reliability of the diagnosis and case management, in addition to staff and patient acceptance (Mars and Diova, 2008).

3.2 Current experiences of telemedicine

3.2.1 Feasibility of telemedicine implementation

Numerous research has been done on the feasibility of telemedicine applications, and the experiences that have been documented worldwide show the important factors that make telemedicine adoption possible. There are numerous pilot studies on telemedicine adoption in the extant literature based on the two techniques for telemedicine: real time (video conferencing) and store and forward.

To date, almost no telemedicine projects have been successfully implemented on a large scale (MacFarlane et al, 2006; Zanaboni and Wootton, 2012). There are several reasons behind these failures; hence, policy makers should learn from the experiences worldwide in different environments to avoid such problems, in order to ensure the best implementation and sustainability. An Australian study identified a number of reasons that make telemedicine services vulnerable and not sustainable using a qualitative approach (Wade et al., 2006). The reasons for failure include: (1) lack of support from the parties involved; (2) lack of interest on the part of some personnel and relying on one person; (3) insufficient funding for sustainability; and (4) difficulties in approaching the intended goals. Furthermore, the study concluded with two supportive factors, which are important: (1) appropriate cooperation and coordination among the telemedicine staff; and (2) a good IT infrastructure that matches the needs of the organisation.

The next subsection focuses on the feasibility of telereferral systems in bringing medical consultations to local institutions. This system has been proposed in this thesis in order for it to benefit the Kuwaiti healthcare system.

3.2.1.1 Telereferral system

A telereferral system refers to an electronic application derived from telemedicine that is used to refer patients and offer communication between specialist physicians and medical experts through a network, using different types of medical documents to provide diagnosis and treatment for the cases being referred (Network Technology Laboratory, 2006). The implementation of a telereferral system in an organisation must be effective in terms of cost, access to healthcare and saving time (Zanaboni and Wootton, 2012).

3.2.1.1.1 Real-time video conferencing

Disseminating previous experiences of telemedicine implementation is crucial, as it teaches the new adopters about the issues and factors that need to be considered to ensure better outcomes. A systematic review of studies was conducted between 1966 and 2010 to investigate evidence on the reliability of video conferencing for the purpose of making a diagnosis between medical specialists (Martin-Khan et al., 2011). Twenty studies that matched the inclusion criteria were yielded for this review. The studies compared video conferencing diagnosis with conventional healthcare methods by reporting on the observer's agreement with the diagnosis. It was concluded that diagnosis via video conferencing is reliable and this was confirmed in all studies across several fields, including dermatology, neurology, rheumatology, minor injuries, geriatrics and psychiatry. However, it was noted that more care should be taken to ensure safety during diagnostic processes where physical examination is important, such as by providing suitable equipment, advanced cameras and onsite support. Further research was recommended with a large sample size and reliable research design to collect robust evidence. Although the teleconsultation sessions were generally successful, they encountered and resolved a number of minor obstacles, such as delays in accessing and transferring images and audibility (Waite et al., 2006; Wang et al., 2004). A salient aspect was that the success was due to the collaboration efforts of all the stakeholders involved.

On the other hand, some telemedicine programmes in different settings have turned out poorly. Despite the available capabilities, telemedicine systems might fail due to several reasons, including: (1) the low level of collaboration efforts between the specialised clinic and the local clinic; and (2) the lack of a needs assessment prior to implementation in order to ensure the work commitment from all the stakeholders involved, including technological readiness. These unforeseen circumstances might occur in different telemedicine applications; they have been seen in telemedicine programmes, such as telecardiology in Kansas (Doolittle, 2001), and teleconsultation in Uganda (Elder and Clarke, 2007).

It is clear that a collaborative telemedicine team and good ICT capabilities are essential to achieve the optimum clinical outcomes.

3.2.1.1.2 Store and forward system

Ensuring the potential of telemedicine in managing health cases for patients is crucial and demanding. Thus, a systematic review of telemedicine studies was conducted between 2000 and 2004 to ensure the effectiveness and efficiency of three services of telemedicine: video conferencing, store and forward system, and home-based services (Hersh et al., 2006). The results show that video conferencing is more effective than store and forward techniques, although the store and forward technique is a useful tool for patients who are far away from medical institutions as it avoids the burden and expense of travel. The study suggests that telemedicine services should be used but with caution for better healthcare delivery.

A study was conducted (Wootton et al., 2005) to research the referral patterns in a global store and forward telemedicine system that has been operated by the Swinfen Charitable Trust since 1999. A large number of countries were registered to engage and benefit from teleconsultation services at the beginning of the implementation. The study observed that the number of referral cases in some countries had decreased over a period of two years. It was concluded that there had been transfer of knowledge between clinicians to allow local management of cases; a significant goal of telemedicine had achieved.

Different kinds of consultations can take place via telemedicine covering a wide range of specialties, including orthopaedic, dermatology and paediatric, and these applications have a positive impact on the medical practice, particularly on its referral pattern and time management.

Many researchers have confirmed this by investigating acceptance and the effectiveness of such a system (Vassallo et al., 2001; Wootton et al., 2004; Sable et al., 2010).

3.2.2 Summary

It is not sufficient to make telemedicine implementation feasible; it must also be sustainable and achieve the intended objectives. Therefore, the most important factors from the previous studies should be considered, including:

(1) The healthcare providers should be involved in, and responsible for, carrying out the services of telemedicine in order to ensure the diagnosis and the treatment are appropriate.

(2) The presence of cooperation and coordination between the stakeholders (physicians, nurses, patients and technical support teams) to provide the crucial and necessary feedback required in order to achieve the success for the health organisation.

(3) Assessing the organisational needs and exploiting the strengthens and weakness of it are essential to ensure telemedicine services deliver improved healthcare and case management and achieve the benefits.

(4) Funding that matches the need and size of the service within the organization.

Certainly, seeing a doctor in person is preferable, but alternative solutions must be found in the absence of a specialist to manage the condition in a timely manner. Thus, the use of telemedicine as a supportive and alternative tool to provide healthcare services is essential.

3.3 Benefits of using telemedicine systems

Several benefits can be expected from using telemedicine, and these can affect not only the health provider and the patients, but also the entire healthcare organisation. For example, a study of physicians and health managers in the Quebec health region, Canada (Pathni et al., 2009) determined the benefits and usefulness of the telemedicine system that were seen on three levels: 1) clinical/patient; 2) professional/educational; and 3) organisational.

On the clinical level, the telemedicine system could solve many problems (Mishra et al., 2009; Pathni et al., 2009), including:

- Deliver medical services to remote areas, saving time for the patient or doctor.
- Allow earlier intervention, as information about the patient can be transmitted electronically to provide initial diagnosis and management.
- Telemedicine can be used in place of 'on call duty'. For example, a radiologist can report on an image from home or manage more than one clinic remotely at the same time to cover any shortages of specialists.
- Make patients more compliant in follow-up visits.
- A solution for patients who find their restricted movement to be an obstacle to travel, such as rheumatoid patients.

On the educational level, the healthcare professionals would benefit from the:

- Increased ability for communication between medical staff via this system, whereby they can interact with other physicians or peers to gain advice. This has the added benefit that the clinician is educated and trained to handle future cases with the same diagnosis.
- Increased participation in international conferences or meetings by using video conferencing, as the physicians can attend these events at a distance and save time and money.

On the organisational level, telemedicine can affect the budgets of organisations, as the travel expenses for patient transfers or physician education would be reduced (Gagnon et al., 2006; Hailey et al., 2004).

The benefits can be gained in both a small or large setting, in one department or many, and within a small budget or large. However, certain factors are required to ensure the advantages of telemedicine adoption are gained (Hjelm, 2005). This would include good planning, the necessary resources and support from all stakeholders including managers, physicians and patients.

3.4 Limitations of telemedicine

A number of studies have perceived that telemedicine has limitations (Gagnon et al., 2006). Where telemedicine has replaced visits to other health regions or institutions, then reduction in personal contact has had detrimental effects. Similarly tele-education; which replaces in-person attendance at meetings or conferences, prevents peer or specialist meeting in person. Furthermore, lack of commitment between the organisations in maintaining the rights of the personnel involved in telemedicine that require specific and formal protocols to be set up (Gagnon et al., 2006).

Privacy and security are often cited as issues for telemedicine (Jennett et al. 2004). The majority of research on telemedicine has confirmed these findings (Mishra et al., 2009; Pathni et al., 2009; Kokesh et al., 2008).

Telemedicine systems have been demonstrated to be feasible despite the limitations and can be effective in delivering the same quality of healthcare as conventional methods. Benefits have been shown and specific approaches and methodologies allow the required targets to be reached.

3.5 Success factors for telemedicine implementation

The success factors for implementing a telehealth project have been identified in many studies. It is clear that there are certain common factors that should be considered in order to build up an environment prepared for telehealth adoption (Jennett et al., 2004; Hogenbirk et al., 2006; Whitten and Adams, 2003; Gagnon et al., 2006; Waite et al., 2006; Broens et al., 2007). These include:

- Telehealth systems should be introduced into standard medical practice and embedded into routine work.
- The telehealth system should be easy to use, user-friendly and compatible with the organisation's health system.
- Involving key stakeholders including physicians, policy makers, patients and technical experts in the process of telehealth implementation.
- Strong leadership and support from management; financially and motivationally.
- Training staff before and after implementation.

- The concept of readiness, which shows the degree of the preparedness of the professionals, organizations, and communities to participate and succeed before and after telehealth implementation (Gagnon et al., 2006).
- Guidelines and policies for the introduction of telemedicine.
- Strategic plans based on the readiness issues related to the organisational structure, technical infrastructure, communication, change management and human resources.

Out of all the factors readiness is frequently cited and should consider all organisational aspects prior to the adoption of telemedicine. Although this thesis concentrates on readiness, other factors are not neglected.

3.6 The concept of readiness

Readiness as a linguistic concept is the state of 'being prepared' prior to taking any action. It is believed that assessing the readiness of the individual is considered to be an integral and preliminary step in the successful adoption of an innovation and to initiate the change in the implementation process (Alliance for Building Capacity Report, 2002).

3.6.1 The concept of readiness in terms of ICT

E-health readiness has been defined as "the preparedness of the health care institutions or communities for the anticipated change by the programs related to the Information and Communications Technology" (Khoja et al., 2007). It has also been defined as "the degree to which the users, health care institutions, and the health care system itself, are prepared to participate and succeed with e-health implementation" (Khoja et al., 2007, p. 425).

From these definitions for e-health readiness, it is clear that individual, technological and organisational readiness are involved in the assessment preceding the ICT adoption, and the lack of understanding of readiness is an essential factor that has been the reason for the failure of most telemedicine programmes. This specific factor has been identified in all studies in recent years and is highlighted by some as the first consideration to be taken by the organisation prior to the adoption of any new system (Jennett et al., 2003; Chattopadhyay et al., 2008; Khoja et al., 2007).

The concept of readiness should be applied to all resources required prior to implementing telemedicine and might pertain to human, organisational and technical issues. This will ensure that the barriers to implementation within the organisation are explored and assessed in the same way, including individual's resistance to change, risk anticipation, insufficient time and funds, and technology incompetency (Jennett et al., 2005).

As telemedicine technology has the potential to deliver healthcare services across geographic, time, cultural, social and economic barriers (Jennett et al., 2005), a better understanding of all types of resource preparedness in a specific environment might be a solution to prevent most of the failures of information technology projects. Rates as high as 30%, are cited representing a substantial loss of money, time and resources (Jennett et al., 2003).

It is of paramount importance to consider the readiness factor before the adoption of telemedicine programmes through the use of appropriate assessment tools. The design of these tools should be accurate and comprehensive enough to include all the important dimensions regarding the resources that are required to be evaluated. One definition of telemedicine gives, "the use of advanced telecommunications technologies to exchange health information and provide health care services across geographic, time, social, and cultural barriers" (Reid, 1996; Jennett et al., 2003, p. 259), and indicates that readiness must be assessed in all parties within the community to identify and overcome the barriers.

3.7 Theories and models of innovation adoption

Telemedicine systems are a new innovation and a possible solution for several health service problems. It is believed by many researchers that every community or organisation has to prepare their individuals to receive this kind of technology into their routine practice. This preparation might be from various angles that might focus on the organisation, the individuals involved or on the technology itself. It is also highly recommended to consider multiple factors that concern the introduction of telemedicine. Such factors include social, political, organisational and infrastructure aspects (Jennett et al., 2003). Therefore, different types of theories and models have been created and developed as a means of introducing information technology into communities, each of which has different aims.

It is crucial for any organisation to understand the factors that influence the internal and external environment for it to succeed in adopting technology as a new innovation to the individuals or the organisation. Adoption is defined as the decision that refers to any individual or group accepting something (Rogers, 2003). There has been much research on adoption of innovation resulting in many theories and models that explore the processes of change, acceptance and diffusion of technology, and provide understanding of these issues (Kamal and Themistocleous, 2006).

This section reviews the relevant theories and models pertinent to the goals of the study. This includes, the diffusion of innovation theory of Rogers (2003); Lewin's model for change (1952); the technology acceptance model of Davis (1989); and a model for Arab policy and information technology (APIT) and Arab culture and information technology (ACIT) (Checchi et al., 2002).

3.7.1 The diffusion of innovation theory

Innovation is defined by Rogers (2003, p. 11) as "an idea, practice, or object that is perceived to be new by an individual or other unit of adoption", while the word 'diffusion' means the process of spreading these innovations within any social system or environment (Rogers, 2003), such as a health organisation. Three main components emerge from Rogers' theory and they are as follows: 1) the innovation decision process (adoption); 2) the innovation's characteristics; and 3) the characteristics of the adopter. According to Rogers (2003, p. 163), the innovation decision process is defined as "the process through which an individual passes from first knowledge of an innovation, to the formation of an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and then to the confirmation of this process". The decision process of innovation adoption can be described in five steps, namely: "(1) awareness (knowledge), (2) persuasion, (3) decision, (4) implementation, and (5) confirmation" (Rogers, 2003, p. 164). It is clear that the more knowledgeable is the individual about the technology, the more he is accepting of the innovation.

Several studies have confirmed the characteristics of innovation that are important for adoption decisions. These characteristics are: relative advantage; complexity; compatibility; trialability; and observability (Alqahtan, 2004; Bradford and Florin, 2003). Moreover, the theory of Rogers has been applied to determine the barriers to implementing telemedicine technology, and has

found that the needs of the end users are most critical within the environment of the organisation (Helitzer, et al., 2003).

Rogers summarises the characteristics of the adopter in the adoption process as: (1) socioeconomic status (age, gender and level of education); (2) personality values (attitude towards change, dogmatism, intelligence and empathy); and (3) communication behaviour (social participation, interpersonal networks and contact with change agents). This theory combines the personal and technical aspects within the organisation as an innovation adopter. Other researchers argue that adoption of innovation is considered a complex process, which requires a multidimensional assessment of the entire environment, such as management implications, which exceeds Roger's theory (MacVaugh and Schiavone, 2010)

3.7.2 Lewin's model for change

The world is changing rapidly and it can be described as turbulent. The fast industrial and technological advances make it necessary for any organisation to keep abreast of developments and be ready to transform and change to remain competitive with other organisations and survive. However, introducing a technology requires preparation by the organisation and it must expect numerous changes to the organisation, and the individuals.

The state of changes has been described through a three-stage model, consisting of: unfreezing; transition (change); and refreezing.

Unfreezing is defined as the first stage in the change process. It describes the preparedness status of the organisation prior to the change taking place (Lewin, 1952). This involves breaking down the current ways of working by showing the stakeholders the drawbacks of the existing system and the benefits of changing to another system. The change process might encompass the beliefs, values, behaviours and attitudes of individuals. This stage is considered the difficult stage, in which strong reactions from individuals are faced and where motivation can play an important part in the success of this stage (Lewin, 1952).

The second state of change is called 'transition', in which the people have made their decisions and start working in the new way with the expectation that it will improve their work and

provide the promised benefits. Time and communication are two key factors that should be considered in this stage to properly manage the process.

The third and final stage of Lewin's model is 'refreezing', where the change has taken place and people are familiar with their new job descriptions. This stage aims to stabilise the new idea in an individual's beliefs in order to make him or her confident and motivated.

The readiness concept of Lewin's model has been applied to the telehealth field to determine the changes in an organisation, through which the attitudes of the individuals are gradually modified and motivated (Jennett et al., 2005). More clearly, in the last two decades, staff resistance to change and interference has been identified as the cause of most information system failures, such as those highlighted in investigations of United States hospitals (Halpern, 2001; Kaplan, 2000). It has been argued that the reason for prolonged resistance or outright failure is due to not providing an effective unfreezing process before attempting to induce a change (Schein, 1993; Jennett et al., 2005).

It has been argued that human feelings and experience are not considered in Lewin's model, hence, the three sequential stages have been extended to identify factors that inhibit change and, in conjunction with other models, to develop a strategy for the adoption and implementation of information technology use in organisations (Zolla, 1999).

3.7.3 The technology acceptance model

The technology acceptance model (TAM) is "an information systems theory that models the determinants of computer acceptance across a broad range of end-users computing technologies" (McCoy et al., 2005, p. 28). This model has been used by many information systems researchers in the last 20 years to assess the perceptions and behavioural usage of IT prior to adoption; placing acceptance and use of IT as the focal point. The model considers how the attitude of an individual towards an information system is determined by the perceived usefulness and ease of use of the actual system (Davis, 1989; Venkatesh et al., 2003). Davis (Davis et al., 1989, p. 985) defined the variables as: "the prospective user's subjective probability that using the specific application system will increase his or her job performance within the organization context", is the perceived usefulness, and "the degree to which the prospective user expects that target

system to be free from the effort" is the perceived ease of use. There are also behavioural intentions, which relate to how the users regard the usefulness and ease of use of the system.

This model has been used in a study in Kuwait to investigate the factors that might influence the acceptance of adults to use instant messaging outside the workplace for social and entertainment purposes (Roubah, 2008) and the study explored the motivational factors for ICT adoption, focusing on the acceptance of users. A study in Saudi Arabia used the concepts of the technology acceptance model to examine computer usage and user satisfaction of 1190 users in 56 private and public organisations with respect to individual, technical and organisational characteristics. The results of this study revealed that the critical issues that need to be considered regards implementing computer systems also include the social and cultural influences that affect the users (Al-Qahtani et al., 2004).

Numerous research has been done on TAM, which has reached saturation level, and some researchers argue that new models need to be developed, based on the strength of TAM constructs (Chutter, 2009).

3.7.4 The Arab policy and information technology model (APIT)

This model focuses on Arab policy and information technology (APIT), as well as Arab culture and information technology (ACIT). The model considers that there is a relationship between ICT dissemination and government policies, and in which culture and belief play an important role in advocating the adoption of ICT and improving acceptance by decision makers in Arab countries. This model has contributed significantly to this study by exploring factors that enhance or obstruct the introduction of ICT in the specific setting. Others (Checchi et al., 2002; Straub et al., 2001) also have identified the importance of designing a model to identify system outcomes through considering different factors. The factors most influencing outcomes of implementation are: national ICT policies and technological infrastructure; culture-specific beliefs and values; and technological acculturation. Table 3.1 briefly describes the constructs (appendix A).

These models and theories have provided the foundation for research into the factors that facilitate or impede the adoption or diffusion of IT, through which, decision makers and

managers of organisations can set up strategies and appropriate policies for ICT project implementation.

3.8 The readiness factor and ICT adoption and change in healthcare organisations

Readiness, and the importance for organisation managers to consider this factor as a requirement for the successful adoption of innovation, have been identified. Most literature has focused on the technological aspects of telemedicine and its related difficulties, while only a limited number of studies have considered non-technological aspects such as organisational, human, political and socioeconomic factors (Kifle, 2008; Brady, 2005; Tulu, 2005; Wootton et al., 2004).

A framework for Canadian telehealth has developed guidelines for healthcare professionals (Hogenbirk et al., 2006). In this, the organisational environment includes an assessment of; its clinical policies and standards, the organisation, its human resources and, equally, the equipment and related technical issues. It is important to consider factors of readiness that are related to both the organisation, as well as to the individuals. Most of the respondents that were interviewed (n=48) or surveyed (n=84) said that telehealth services would require new policies and procedures different from the conventional ones. Others stated that a strategy should be prepared to cover clinical, administrative and funding issues. It is concluded that changes are expected and required at the same time upon introducing a new system into an organisation, for the purpose of organising the adoption process for the individuals involved.

In another study (Jennett et al., 2003) that highlighted the need to conduct a readiness assessment prior to the adoption of technology, the authors conducted a qualitative study to explore the readiness of different stakeholders: patients, practitioners, the public and the organisation. Four types of readiness were identified: "core, engagement, structure, and non-readiness" (p.260). In a further study on readiness (Khoja et al., 2007), the need for the organisation and the individuals to manage the change properly was identified. This can be achieved through the assessment of readiness, and is considered an important element of change management.

It is observed that any change in an organisation will affect the individuals, as an organisation is a collection of individuals that experience the changes within that organisation. However,

researchers tend to focus either on the organisational or on the individual level for the purpose of assessment and improvement, but not on both at the same time.

3.8.1 Individual focus

It is equally important to consider issues related to IT adoption on the individual level (Hu et al., 2000). The adoption of telemedicine technology in healthcare organisations can be undertaken through cooperation between top management and physicians without any motivation or consideration of any issues (Liu et al., 1998). However, it is important for any healthcare organisation, in order to ensure the optimum outcome, to consider all the essential factors that can be used to explore the current status of readiness for telemedicine adoption. Consequently, a number of studies have investigated the relationship between the attitude of healthcare providers and telemedicine adoption and use (King et al., 2007; Lehoux et al., 2002).

In a study of the attitudes of doctors and nurses towards e-health adoption in rural general practices (GPs) in Scotland (Richards et al., 2005), five important aspects of readiness for e-health were investigated: 1) experience in using computers; 2) perceived experience in accessing e-health services; 3) the quality of the experience; 4) the potential usefulness of e-health by the health care provider; and finally 5) the requirements needed for and the barriers to the implementation of e-health. In the study, 193 respondents completed questionnaires, comprising 134 general practitioners and 59 nurses. The study showed that 69% of the general practitioners had used e-health functions, such as the transmission of X-rays or still images and using the internet to obtain laboratory results and make appointments for outpatient clinics. Nurses were less likely to have experience with computers, e-health functions or the communication of data. A total of 34% of the GPs considered patient privacy to be detrimental while using e-health applications. The study also revealed that e-health applications were very useful for obtaining laboratory results, transmitting electrocardiograms (ECGs) and having video conferences for educational purposes. In contrast, the main barriers identified were the lack of suitable training (55%) and the high cost of e-health equipment (54%).

In a qualitative study to explore the factors that facilitate or prevent the adoption of telemedicine from the perspective of doctors and nurses, 29 face-to-face interviews were carried out (King et al., 2007). Nineteen GPs were interviewed (5 of whom were from isolated clinics), an ten nurses

(3 of whom were from remote clinics). The focal point of the interviews was the communication between primary and secondary care staff. The authors identified topics under the following themes: "1) the effect of telemedicine on the clinical consultations, 2) the relationship between the patient and the professionals, 3) the impact of telemedicine on professional isolation, and 4) the potential for telemedicine to improve education and training" (King et al., 2007, p. 383). Doctors and nurses expressed concern about their inability to examine patients physically, citing the need for touch and smell in cases such as ankle oedema or infected wounds. Patients were also more comfortable with face-to-face meetings. However, there was a general positive perspective among the interviewees regarding the potential for telemedicine to reduce professional isolation by facilitating communication between remote and rural clinics in different ways. Concerns remained about the disadvantages, such as the displacement of the normal way of diagnosis and consultation and the infrastructure needed to adopt using the new telemedicine systems into the existing organisational systems.

Telemedicine was acknowledged to be a useful tool for providing education and training that would save time and money, especially for clinicians working in rural clinics, although such clinicians preferred to be able to meet their peers in person at conferences (Meher et al., 2009; King et al., 2007). The doctors and nurses did express some concerns. The most significant of these related to organisational and technical readiness, as well as the importance of financial support.

In a study that examined the attitudes of doctors and patients regarding telemedicine knowledge and usage at 14 different hospitals in India (Meher et al., 2009), it was found that the doctors were interested in telemedicine, but with the condition for the need for more training sessions. In contrast, the patients needed awareness sessions, as 80% of them were not aware of telemedicine. In Ghana, doctors and administrators have been surveyed to examine their awareness and usage of telemedicine (Darkwa, 2000). The findings of this study are consistent with the previous literature; however, it highlights the need for policy and strategy for telemedicine implementation.

It is clear that telemedicine applications require an appropriate clinical, technical and administrative culture that is ready to receive this kind of approach. Furthermore any lack of

experience or shortage of staff must be addressed prior to the implementation of e-health and any barriers that are identified should be remedied.

One weakness of most of the studies on telemedicine is that they focus on only one or two of the stakeholders involved in the process of implementation; rather, all stakeholders, including physicians, policy makers and technical support teams, need to be assessed for readiness. This would provide a robust foundation from which proper strategic plans can be developed.

In contrast, IS research focuses on the formal study of the entire relationship between individuals and information technology (Yi et al., 2006; Hu et al., 2000), with the intent to understand the factors that influence the motivation of the individual to accept and adopt information technology in a given environment.

This body of research has identified various factors that are addressed in this study and applied to the Arab world, in particular to the State of Kuwait, which is the location for this study.

3.8.1.1 Factors affecting individuals' attitudes

Generally, there is a significant amount of literature that documents the experience of US companies and organisations relating to technology, but there are comparatively few that concentrate on issues related to the surrounding environments, including culture, beliefs and values. Thus, some researchers have paid particular attention to the issues related to the organisation (such as policies), individuals (such as culture) and who are the key players who are going to adopt the technology. For example, there can be disparity between the knowledge of workers in Japan and the US regarding the perception and use of IT, such as mail usage (Straub et al., 1994). This indicates that transferring technology does not merely involve moving hardware and software programmes to another location; rather, there are crucial issues that should be considered prior to the adoption of IT, such as people's perceptions, culture, and social norms, which influence IT diffusion.

It is observed that some new technologies have been refused or have failed once introduced to the marketplace due to limited assumptions and considerations taken before and after implementation (Straub et al., 2001). Hence, a model has been proposed by Straub et al. (2001, p. 9) with three domains believed to affect the outcomes of IT adoption. These are: "1) national

IT policies and technological infrastructure; 2) technological culturation; 3) culture-specific beliefs and values" (see Appendix A, Table 1). These results are further supported by the literature (Feghali, 1997; Hill et al., 1994; Hill et al., 1998; Rogers, 1995), concluding that Arab cultures can influence their own success to impede or facilitate IT adoption in their countries, especially when the technology has been created in Western countries, which have different cultures and norms that influence the design of the systems. Thus, influential factors such as these must be considered for their high level of association with individuals and their decisions.

The weaknesses of the Straub model (2001) have been addressed by a study on a new construct called 'social norms' (Loch et al., 2003). This was an investigation into the diffusion of the internet in the Arab world, in which the culture and social norms were considered from the organisational perspective, and measured the influence of social norms and technology acculturation on the attitudes of the individual towards the use of IT. It is suggested that technological acculturation can be prepared through education and training which are arranged and offered to individuals prior to using new systems.

The diffusion of innovation model (Venkatesh and Davis, 2000) has been used by many after adaptation and augmentation to suit the specific needs of the field of research. This includes the subjective norms to extend the original model to consider behavioural control and culture (McCoy et al. 2005). Many factors influence the individual, including culture and social norms, in the way they make IT adoption decisions. In view of that, it has been found that the Arab people's perceptions of things is of paramount importance and needs to be taken into account in order to facilitate the impediments that prevent the diffusion of IT in Arab countries, as well as to reduce the digital divide (Straub et al., 2001). Furthermore, the technology acceptance model (TAM) has been tested in several countries (the United States, Switzerland and Japan) to ensure the suitability of this model to assess the perceptions of practitioners towards IT usage (Straub et al., 1997). Based on the results of the study, TAM has demonstrated the acceptance of using email of US and Swiss workers but not Japanese workers. This is because of the cultural disparity: Japanese workers avoid uncertainty and other aspects related to Hofstede's cultural dimensions (1984, 2001) (see Appendix A, Table 2).

Uncertainty avoidance is defined as "the degree to which members of a society feel uncomfortable with uncertainty and ambiguity" (Hofstede, 1984); this phenomenon considers the

sensitivities of different cultures (Straub et al., 1997). For example, Indian people do not accept change easily; rather, they are aggressive towards any innovation in comparison to their Western counterparts (Wickramasinghe et al., 2005). It has been argued that there is a strong connection between the culture of people and the use of the technology and information systems (Straub et al., 2002; Straub et al., 1997). On the other hand, McCoy et al. (2005) have extended the work of Straub (1997), adding both the cultural effects of the TAM variables and two further variables: subjective norms and behavioural control. The findings demonstrated the possibility of applying the TAM outside of North America to investigate intentions of people towards using email technology, using the USA and Uruguay as a study sample. Hence, paying attention to the cultural aspect of the organisation has a significant role in enhancing the confidence of the individual towards accepting and using new systems based on IT.

There are numerous definitions for organisational culture that are based on traditions, values, beliefs and behaviour (Twati and Gammack, 2006). It is commonly known that culture is created by the people within a society or work environment. Hofstede (2001) defines organisational culture as "the set of shared values, beliefs, assumptions, and practices that shape and guide member's attitudes and behaviors in the organization", and studying the culture within organisations has recently emerged as a research area. Several studies have correlated the failures of planned organisational changes with the neglect of the cultural factor within the organisation (Twati and Gammack, 2006). Therefore, considering and understanding the cultural factors for the organisation would be a crucial step towards making successful strategic developments and improvements to avoid the failure of telemedicine projects.

3.8.2 Organisational focus

New and significant changes are expected in healthcare organisations upon the adoption of telemedicine technology. As organisations vary in their resources (human, technical and fiscal), they also differ in receiving the innovation of telemedicine. Reviews of organisational resources have proven their ability to demonstrate the success of telemedicine (Loane and Wootton, 2001). Thus, the importance of the readiness of the organisation connects with concepts such as planning and the workplace environment, in order to ensure the sustainability of a telemedicine project (Jennett et al., 2003). Accordingly, the following concepts focus on the strategic planning and policies that are crucial to this study.

The implementation of information and communications technology such as telemedicine requires the proper setup of organisational policies and strategic plans; the systems that are not successful in organisations are those that do not consider these issues (Mars and Escott, 2010; Kifle et al., 2006; Jennett et al., 2003). Therefore, the need to direct attention to preparing a reasonable and robust strategic plan with a review of the existing plan is important to understand the required changes.

Certain points regarding organisational readiness towards telemedicine project implementation can be determined by interviewing the key stakeholders (Jennett et al., 2003). These points can be summarised into one important document: the telemedicine strategic plan. This plan should cover several issues: 1) the assessment and analysis of needs, which concerns problems related to the community and the provider and how those problems can be solved by using telemedicine; 2) a business plan, which focuses on all the issues related to the telemedicine programme such as costs (benefits or effectiveness), the funding body and comprehensive details of the programme including technical support; and 3) the availability of champions (leaders) for the purpose of wisely leading the project and achieving the goals, whether a clinical leader or an administrative one. After the creation of the strategic plan, appropriate policies and procedures can be developed to suit the goals of the organization.

However, preparing a strategic plan alone is not sufficient: the human resources needed to execute this plan is also part of the readiness plan (Hogenbirk et al., 2006; Hwa Hu et al., 2002). These issues should be carefully considered in order to obtain proper findings that support the development of such framework guidelines. Furthermore, it has been found that the work environment and staff readiness to accept new changes are two issues that affect the performance of human resources. In view of this, several studies point out the importance of offering learning or training courses to the staff, in addition to maintain the relationship between management and the telemedicine team in terms of good communication and cooperation (Jennett et al., 2005; Jennett et al., 2003; Hwa Hu et al., 2002). Furthermore, the organisation needs to be ready with all the required facilities and, in particular the technical infrastructure must be carefully prepared for the ease of use of telemedicine.

3.8.3 Technical infrastructure and readiness

The World Health Organization (WHO, 2003) has valued the abilities of ICT (specifically telemedicine) to connect different parties together, including healthcare providers and patients from different locations, regardless of the distance, for the purposes of education and disease case management. Thus, the adoption of ICT, particularly in healthcare, has made governments push towards improving the existing systems of healthcare organisations.

The infrastructure of ICT depends on crucial issues that determine its capability and strengths. Therefore, assessing the readiness of the existing ICT in the organization is of paramount importance to ensure eventual effectiveness (Snyder-Halpern, 2001). The implementation process for one application of telemedicine system such as telecardiology needs to be divided into three phases: pre-implementation, implementation and post-implementation (evaluation phase) (Chattopadhyay et al., 2008). The phase prior to implementation, is concerned with collecting information about the current status of healthcare practices. Many studies have considered assessing the needs of the organization is an important part of the strategic plan, and leads to make the decision about telemedicine adoption (Liu Sheng et al., 1999; Hwa Hu et al., 2002; Chattopadhyay et al., 2008). Thus the preparedness study should go through several phases, starting with examining the availability of ICT, such as the presence of computers, hardware, software, internet connection, and applications or services (such as electronic health records). It should conclude with appropriate policies, protocols and strategies based on the organisational or governmental level (Chattopadhyay et al., 2008; Snyder-Halpern, 2001).

These elements of assessment are recommended to be undertaken when assessing the ICT infrastructure available in the organisation and how able it is to support the telemedicine systems (Chattopadhyay et al., 2008). Naturally, the higher the quality of the computers and the bandwidth used to connect the computers with internet service providers (ISPs), then the better the services. It is therefore very important to build a system with excellent infrastructure characteristics to support reliability, accessibility and speediness in order to operate the system effectively and efficiently within the global network. For example, Libya is currently unable to adopt information technology due to the weak telecommunications infrastructure, which is required to have successful ICT projects throughout Libya (Twati and Gammack, 2006).

On the other hand, technology readiness can be defined as "people's propensity to embrace and use new technologies for accomplishing goals in home and at work" (Parasuraman, 2000, p. 308). This means, therefore, that an individual who is going to use new telemedicine technology has to be ready to provide distant healthcare services. Four components are used to demonstrate the concept of technology readiness in regard to the individual: people are more in control, flexible and competent when they have a positive view and belief about the technology (optimism); the availability of innovativeness (a person who tends to be a technology pioneer or thought-leader); feelings of discomfort or a lack of control over the offered technology; and, finally, the inability to work properly when distrusting the offered technology (Parasuraman, 2000). Of course, taking these points into account would allow for a clear assessment of the technical readiness of healthcare staff, at least prior to technology adoption. It is known that the adoption of telemedicine technology will change the work environment for healthcare professionals.

A UK study in 2004 investigated the readiness of students compared to health professions to use web-based education. The results of this study concluded that the students were not ready to use web technology for distance education, as their technical readiness was not sufficient for the purpose of continuing their learning (Stokes et al., 2004). A study in Canada (Caison et al., 2008) into the readiness of medical and nursing students at the Memorial University of Newfoundland showed that the urban nursing students were found to be more confident towards technology adoption than the rural nursing students. Moreover, the junior medical students were found to be more innovative than the senior medical students aged 25 and above. Also it has been noticed that gender differences play a role in the adoption decision: the results showed that the female medical students were less technologically ready compared to the male medical students. In the US, similar findings were found in a study into the technological readiness of rural Missouri physicians, in which most of the physicians had a negative image regarding the use of telemedicine, correlating with their readiness (Campbell et al., 2001). It is apparent that they considered telemedicine as a threat to their private community and questioned the introduction of telemedicine technology in their routine practice, whilst the specialists working in tertiary clinics who had experience of computer usage welcomed the adoption of telemedicine.

Therefore, it is important for any organisation or government to take readiness assessment into account prior to implementing any project, particularly vital ones such as telemedicine systems, in which ICT efficiency needs considerable attention regarding planning. For this reason, studying readiness will enable an organisation to get an overview of the existing resources (technical or human) and to identify the required needs for the successful implementation of the project.

3.8.4 Strategies and policies

A critical aspect prior to the adoption process is to establish appropriate policies and strategies for the implementation. These should be compatible with the organisation in order to connect the healthcare sector and the technology (Wickramasinghe et al., 2005; Jennett et al., 2005).

Establishing strategies including the policies is the responsibility of decision makers. Strategy can be defined as “the future direction that provides theme and focus; to support the synergistic action at every level of the organization towards survival and success" (LeRouge et al., 2010). This stage is considered an important and sensitive one, in which different issues should be amalgamated together to offer optimum telemedicine services. These include financial, technical and human resource issues, and should be compatible with the goals of the organisation.

With respect to e-health, policy is defined as "a set of statements, directives, regulations, laws, and judicial interpretations that direct and manage the life cycle of e-health" (Jennett et al., 2004, p. 78). It is essential to have appropriate policies that facilitate the adoption of telemedicine into the workplace (Jennett et al., 2005). For example, policy readiness assessment has been included as an important tool for e-health readiness to support legal and regulatory framework issues and political will (Khoja et al., 2007). Policy making depends on the desired goals and can be prepared according to different levels, such as national, regional or organisational policy.

Most telemedicine programmes strongly acknowledge the importance of setting up appropriate policies for successful implementation, but few document the implications of such policies. For example, Al-Gahtani (2004) points out that focusing on management and policy research is of significance as a future research recommendation, specifically in the Middle East region. In China, a study has been conducted primarily to describe the current activities for telemedicine regarding the healthcare services offered to the Chinese population in different areas (Zhelong

and Hong Gu, 2009). Two important aspects were explored by the authors that are expected to overcome the current difficulties or problems faced, such as the high cost of IT investment and the limited growth of telemedicine services. These aspects are: 1) establishing specific policies and standards based on national regulations; and 2) building an infrastructure strategy for the best practice of telemedicine. Therefore, successful implementation of telemedicine technology in any health organisation requires a protocol to organise the delivery of healthcare services to the patient. Additionally, the readiness assessment of the stakeholders (including physicians, IT vendors and patients) towards the adoption of telemedicine services would be a very useful tool to reduce the high cost of information technology infrastructure, which is considered to be the main concern for the Chinese government regarding the implementation of telemedicine.

Each country has its own position, cultures, traditions and expectations that are held by the people. Therefore, it is important for each country to assess its capabilities in every field in order to be aware of its strengths and weaknesses, thereby developing proper health policies and strategies at the national level to address issues to support the development of the new information systems (Wickramasinghe et al., 2005).

There is a global demand to reduce the expenditure currently allocated to provide healthcare services. It is believed that introducing ICT will be beneficial, as it could act as a catalyst to change the healthcare industry worldwide, particularly in regard to cost (Kifle et al., 2006; Straub et al., 2002).

Healthcare is highly sensitive, and it is the duty of each government not only to facilitate the transfer of healthcare information between healthcare institutions but also to ensure the privacy and confidentiality of that information. The government has a crucial role in supporting and facilitating the adoption of a telemedicine project and this includes the deployment of strategic plans. Some suggest that health policies should be written by the government, whereas others believe that the health organisation is the right authority for policy issues (Jennet et al., 2005). Furthermore, it has also been ascertained that policies should not be developed in isolation, that is without the involvement of important stakeholders such as health managers and healthcare providers (Scott et al., 2002). Moreover, understanding the current constraints of the work environment prior to telemedicine adoption is crucial, especially when developing new health policies to avoid any contradictions in such jurisdictions.

In this regard, and from the organisational aspect, setting up policies (including standards and healthcare procedures) prior to the adoption of telemedicine systems will play a significant role in organising and shaping the organisational protocol. This requires proper collaboration and coordination between the stakeholders in order to make sure that the goals of telemedicine are reached and that the structural impediments are reduced.

One approach to a strategy for telemedicine implementation is to allocate the plans based on the readiness of the environment that will adopt the technology (Campbell et al., 2001). These are: 1) fertile soil; 2) somewhat fertile soil; and 3) barren soil. Each one of these readiness stages will have a specific strategy plan that facilitates the introduction of telemedicine into the community. Learning from other telemedicine trials and forming partnerships with other similar health societies has been successful for the implementation of telemedicine (Campbell et al., 2001). Clearly, this is important for establishing a proper strategy. Moreover, consideration of the crucial factors (some of which pertain to social pressure, economic issues, effectiveness, efficiency and people's perceptions) needs to be included in the formation of the strategic plan. Consequently, numerous factors have been considered in frameworks or models in order to support a specific study. Moreover, it is apparent that these factors have been identified and analysed to fit specific research assumptions.

Therefore, a number of studies concerning IT adoption or acceptance at the individual level are reviewed and have been chosen to highlight that introducing and using telemedicine as a new innovation involves issues such as social and cultural that might influence the decision-making process itself (Kamal and Theistocleous, 2006).

3.9 IT adoption in Gulf Cooperation Council (GCC) countries

3.9.1 Culture and IT adoption

In general, there is a noticeable shortage of research on IT adoption in the Middle East. Furthermore, in-depth research into the adoption and implementation of ICT studies in the workplace is also scarce in the same region. This is due to the different dimensions that might affect the adoption process that encompass the multiple stakeholders involved. Kuwait is one of the six Gulf Cooperation Council (GCC) countries (the others being Saudi Arabia, Bahrain, Qatar, Oman and the United Arab emirates), which are distinguished from the other 22 Arab

countries by their wealth, size, geographical location, language and history. Therefore, the current research is the first of its type in the region.

The history of a country plays a crucial role in making the development and advancement of the country possible. In regards to Kuwait, this goes back to the long history of European colonisation. The State of Kuwait, for example, was once colonised by the United Kingdom and this is a factor that must be considered (Aladwani, 2003).

Arab culture is characterised by strong relationships among families within the society of Islam through the customs and norms that are shaped accordingly. Based on this, illegitimate interactions between unrelated men and women are discouraged religiously, including conversation. Some studies have revealed that culture and beliefs have an influence on IT adoption, particularly in Arab countries (Straub et al., 2001; Loch, 2003). Despite the similarities of most of the Arab cultures, there are observable differences. For example, in Saudi Arabia, one of the social norms is gender segregation, which is strictly implemented (Roubah, 2008), while gender inequality is common in Ethiopia, Africa (Kifle et al., 2006). Moreover, an attribute that characterises Arab culture is the propensity for-face-to-face interaction (Roubah, 2008). Therefore, introducing ICT in the Arab community must be studied carefully in regard to the culture and other related issues upon which the decision of the individual regarding ICT adoption would rely.

A study in Kuwait investigated the influence of social norms on one type of ICT usage (instant messaging) (Roubah (2008). The study shows that there was a strong relationship between social norms (like the curiosity of people) and ICT usage in Kuwait. This supports previous studies (such as Al-gahtani and King, 1999; Al-gahtani et al., 2007; Straub et al., 2001; Loch et al., 2003) in Arab countries that obtained the same findings, reinforcing that cultural issues should not be ignored because of their strong effect on IT acceptance. Furthermore, this means that certain types of people within the organisation or community reflect the cultural factors that encourage the acceptability of change, while other cultures could not accept the change.

Insufficient wealth and resources have an influence on the strategy and investment of the country, whereby the growth and development of the country would be slow and limited. The size of the country also has an impact, e.g. Yemen has a large area and fewer funds to make the

investments needed to build an infrastructure for health services and other related concerns (Roubah, 2008). It is important to mention that, in 2007, Kuwait was rated as third in the Middle East for IT usage, after Saudi Arabia and the United Arab Emirates (Roubah, 2008). Accordingly, Kuwait is considered to be one of the Arab countries that are highly appreciative of the use of IT in numerous fields for the purpose of improvement and development. This also indicates that the State of Kuwait has the readiness to improve the existing infrastructure, which would influence the overall IT adoption in the country.

A study was conducted in the Kingdom of Saudi Arabia, covering significant issues regarding information technology usage and user satisfaction (Al-gahtani, 2004). A quantitative approach was used on 1190 computer users in 56 organisations (governmental and private). Sixteen different variables were used in the survey questionnaires, which were refined from previous recognised studies. The results of the study show the importance of innovation characteristics for Rogers (2003) (relative advantage, compatibility, complexity, trailability and observability) in the acceptance decision of the user. Furthermore, the study concluded that culture has an influence on IT adoption and usage specifically in the Arabian Gulf region. The findings further revealed that culture has an effect on education level regarding computer usage of Saudi females. Saudi girls are not exposed to any computer courses until reaching the college educational level. Accordingly, the education level of a person plays a significant role in their acceptance of computer information technology. Another study into the Middle East Region concurs with the relationship between the education level of the individual and acceptance of ICT in their place of work (Twati and Gammack, 2006).

It is obvious that organisations in Arab countries and specifically GCC countries are striving towards using information technology for the purpose of improving their productivity and competitiveness among other organisations. Involving different stakeholders in the acceptance process for computer usage has revealed its credibility in enhancing organisational productivity. The adoption of a new system in any organisation affects the overall work environment, especially if the new system is dependent on technology usage. A lack of readiness of the organisation, individuals and the funds for the required technology are the main reasons for suspending the advancement and development in a country.

A study has been conducted on Omani banks to investigate the reason for not using the internet for their banking transactions, which is called e-commerce (Khalfan and Alshawaf, 2004). A questionnaire survey (no=28) and semi-structured interviews (no=8) were conducted to explore the factors that hinder the development from the perspectives of the managers. The study concluded that two types of factors inhibit IT adoption in the banks of the Sultanate of Oman; managerial and cultural-environmental. A lack of management support, limited IT knowledge, low perception of the current demand for IT and preferring to continue using the conventional ways of doing business are considered to be barriers related to management. By contrast, the cultural/environmental barriers were concerned with privacy and security issues, the absence of policy and regulations on the national level, a lack of consumer knowledge of e-commerce, preferring the traditional ways and the lack of governmental support. This indicates that the adoption process of IT involves many issues that need to be addressed in order to achieve the required objectives of the implementation, which includes the support of the government, the readiness of the stakeholders and funding.

Furthermore, another study affirmed that adopting ICT in governmental schools in Kuwait requires a strategy for implementation in which governmental support is the top priority to cover different issues, such as funding, the building of an infrastructure for e-learning, and educating teachers and parents about the new proposed system (Aldhafeeri et al. 2004). This study supports the findings of the Oman study (Khalfan and Alshawaf, 2004), as the managers in both the countries had the same perspectives, with only minor differences. Another study has been conducted to explore the factors that discourage the implementation of an e-learning system in Kuwait (Ali and Magalhaes, 2008). Several implications emerged from the study that enabled the authors to make a comparison with experiences of Western companies in terms of the barriers to implementation of e-learning. The study results are consistent with the findings of the abovementioned studies, as they discovered the same inhibiting factors, for example a lack of management support, a lack of skilled manpower regarding IT usage and a lack of staff awareness regarding electronic learning, which in turn affects the educational and knowledge levels of the stakeholders. On the other hand, the results have also shown that the State of Kuwait did not have any problems regarding funding issues, whereas the companies in Western countries considered cost as the first barrier to adopting e-learning.

Only one article was found in the open literature that has brought together the term 'telehealth' and Kuwait; however, the authors use the term to demonstrate a specific paradigm called grounded theory based on the concept of 'pay per use' (Akber and Gough, 2003). The study addressed the definitions of telemedicine and telehealth as concepts and as solutions for keeping medical information available all the time for whenever it is needed. Accordingly, the study ignored several issues regarding telemedicine/telehealth adoption due to focusing on the grounded theory concept and related objectives.

Studies are emerging that focus on ICT adoption in general in Arab countries, but not specifically in healthcare. This concept remains novel in the region. It is highly recommended (Roubah, 2008; Aladwani, 2003; Al-gahtani et al., 2007) to study ICT in the Arab region by considering the contributing factors to successful adoption.

Generally, in the world of telemedicine research, shedding light on the strategy and policy of telemedicine implementation has been strongly recommended (Jennett et al., 2005; Kifle et al., 2008). Accepting new innovation in any organisation consists of the decisions that need to be made by the organisation and consideration of the individual who is going to use the innovation. Including all stakeholders (physicians and patients) in the adoption decision process is crucial to demonstrate the level of their perceptions and readiness towards the new innovation.

Furthermore, there are determinants of organisational adoption that facilitate the identification of the factors that influence the acceptance of decision makers regarding technology (Rogers, 2003), and these are: 1) the characteristics of the technology; 2) the characteristics of the organisation (the adopter); 3) the characteristics of the individuals; and 4) external environmental factors. All of these issues can influence the readiness of an organisation towards telemedicine adoption, so the negative points should be identified and reduced while the positive points should be used to support it and improve it. Therefore, assessing these issues for the health system at the Kuwait Ministry of Health is important to identify the gaps and inconsistencies, and thereby fill the gaps. Accordingly, strategies should be prepared, including appropriate policies that facilitate and organise the introduction of telemedicine into the work environment. From that, the determinants of the organisation will become apparent through the readiness of its capabilities, and the conviction of the community will be elevated accordingly.

Ultimately, the conceptual framework of the current study has been developed to encompass the innovation adoption models, the changes model and the recent tools for assessing the readiness factor for technology adoption. Accordingly, this framework is believed to be useful to investigate the adoption of telemedicine technology into the Kuwaiti health system. This will allow the objectives of the study to be achieved, and the strategy and policy required for telemedicine implementation for overseas referral patients can be established (see Figure 4.1).

The following chapter will be the conceptual framework that describes the process of assessing the main determinants for this research study.

Chapter Four: Conceptual framework for the current study

In this research, a conceptual framework is developed to underpin the study to reach the aims and objectives. The following section introduces the topic and then describes the conceptual framework.

4.1 Introduction

The use of ICT in the health field has gained attention in Western countries for two reasons: to improve the quality of healthcare and to reduce costs. Many studies have investigated the optimum environment for telemedicine. However, the rate of failure for ICT projects deters managers and policy makers from accepting the change easily. Therefore, it is essential to achieve a thorough understanding of the environment and to explore all the factors believed to be the most influential for telemedicine system adoption. Furthermore, bringing the technology of telemedicine to the Middle East introduces new complexities due to the need to consider its cultural and social issues.

The literature review has shown how the adoption of telemedicine depends on acceptance by three of the users: the policy makers of the organisation that make the decision to adopt telemedicine; the physicians that must use the system; and the patient. Moreover, the capability of the ICT infrastructure will determine the quality of telemedicine services that can be provided. The theories and models of ICT adoption of the previous chapter are used to develop a framework that encompasses the important determinants and factors that need to be addressed and assessed prior to the adoption of telemedicine (see Figure 4.1).

4.2 Determinants of the study framework

There are three main aspects for readiness prior to the adoption of telemedicine systems in healthcare organisations. Firstly, telemedicine readiness assessment is not only based on the readiness of technology, but includes the organisation and the individual. Secondly, assessment of the preparedness for telemedicine adoption confers two advantages: the factors that are determined to be positive can be strengthened and enhanced, whereas negative factors that would delay or hinder the introduction of telemedicine can be reduced and diminished. Thirdly, the

degree of change needed to adopt a telemedicine system technically, practically or administratively can be assessed.

Specifically determinants of the conceptual framework developed within this study focus on the Kuwaiti healthcare system, and the patients referred overseas for treatment. Hence, assessment will include: individual, organisational and technical (the infrastructure for ICT).

The conceptual framework for this study is shown in figure 4.1. The diffusion of innovation indicates that the adoption process must pass through several stages in order to achieve the intended decision, starting from awareness and knowledge to ending with adoption and implementation (Rogers, 1983; 2003). Therefore, the framework identifies the important factors for each of the stakeholders: individual, organisation and ICT infrastructure. Assessment of readiness for the individuals and their acceptance on telemedicine is explored through their perceptions and concerns. The readiness of the organisation is assessed by exploring the future plans for ICT usage, approaches to reducing the cost of sending patients abroad, education and training programmes, and the "fertility of the ground" (encouraging and inhibiting factors). Assessment of the ICT infrastructure, technological readiness, will determine the availability and capability of ICT use and the ability of the department to receive the ICT (telemedicine).

These determinants are further and collectively affected by the external environment of culture, social norms and beliefs (Straub, 2002; Doktor, et al., 2005). These can be particularly strong in Arabic society and so investigation is paramount in the study.

The position of the policy makers of organisations with respect to readiness and usage of ICT at the Kuwait Ministry of Health is explored through consideration of existing polices. Crucially, appropriate policies for telemedicine practice for overseas referral patients in the Kuwaiti healthcare system must be established and a strategy for use of ICT to deliver healthcare services developed. Ultimately, the users will decide to accept or reject.

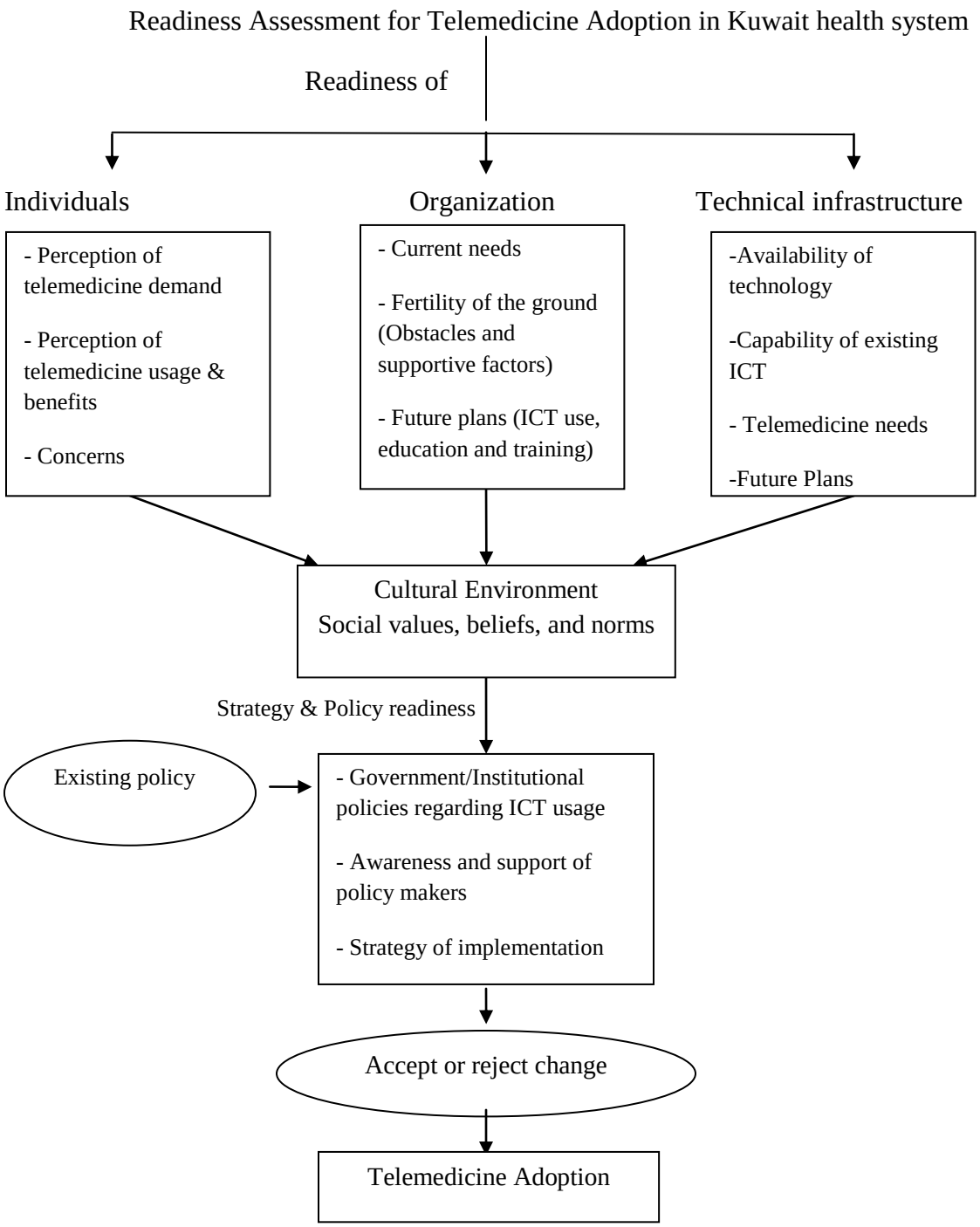


Figure 4.1: The conceptual framework for readiness to adopt telemedicine for overseas referral of patients in the Kuwait Health System.

In addition to developing the framework to investigate the readiness of an organisation in regard to telemedicine adoption; it is equally important to choose and develop suitable instruments to collect and analyse the data.

In the next chapter, the instruments used for data collection are determined and descriptions given of the development stages for designing validated instruments suitable for achieving the research objectives.

Chapter Five: Research Design and Methodology

This chapter describes how the study was conducted, and the method, design, techniques and approach are discussed. Importantly, the implications of the philosophical paradigms are presented and discussed. The rationale for the combined use of the qualitative and quantitative methods is given. A methodological framework that encompasses the steps that have been followed for the process of data collection proceeds as follows: design the quantitative and qualitative instruments, and awareness session; ethical approval; data collection; and data analysis.

5.1 Implications for philosophical paradigms

There has been much research in the IS (information systems) field on the various philosophical paradigms that underpin a research method strategy. Such a research method strategy is required to move from the underlying philosophical assumptions to research design and data collection (Mayers, 1997). Views are used to describe the nature of the world (ontology) and approaches are used to gain the evidence that is required to contribute to the knowledge (epistemology); the choice of reason for these was the difference between the philosophical paradigms in research (Proctor, 1998; Crossan, 2004).

Selection of approval strategies may be guided by: "(1) the philosophical paradigm and goal of research; (2) the nature of phenomena of interest; (3) the level and nature of research questions; (4) and practical considerations related to the research environment and the efficient use of resources" (Orlikowski and Baroudi, 1991; Shih, 1998; Crossan, 2004). This means that there should be strong relationships between the aim of the research, the philosophical method being used and the experience of the researcher, thereby, the researcher can make an appropriate decision on the research strategy properly.

Social science research, such as information systems and information technology studies should provide an overview of the three underlying philosophical perspectives of research methodologies, namely positivist, interpretive and critical theory (Klein and Mayers, 1999). The philosophical paradigms each have distinct characteristics, and it is important to match use of the paradigm with the research of interests. The following section describes the paradigms.

5.1.1 Positivist

Positivist research can be defined and characterised (Uddin and Hamiduzzaman, 2009; Oates, 2006; Orlikowski and Baroudi, 1991) by the following points:

1. It is an established scientific method that examines the natural sciences, such as mechanics and physics, and it is concerned with 'truth' and refutable hypotheses.
2. Models and measurements are the foundation of this type of paradigm: the researcher uses theory to prove or disprove a particular aspect of the world.
3. No bias is expected in this type of research because the truth emerges independently of the personal beliefs and values of the researcher.
4. Testing a hypothesis is the main basis in this empirical research, which either leads to the confirmation or refutation of a specific hypothesis.
5. There are specific instruments for analysing the quantitative data, such as mathematical modelling and statistical analysis.
6. Positivist studies are characterised by generalisations; this means that irrefutable facts can be generalised to other situations in the physical world.

The philosophy of positivist research, according to Orlikowski and Baroudi (1991), is primarily concerned with the variables of quantifiable measures, testing a hypothesis and drawing inferences about a specific phenomenon that occurs naturally. Moreover, positivist research is not recommended for studying social settings where people interact within a specific environment or a community. However, it is an appropriate approach for studying natural phenomena in any aspect around the world (Oates, 2006).

5.1.2 Critical approach

Critical research can be used as an approach to "identify power relations, conflicts and contradictions, and empowering people to eliminate them as sources of alienation and domination" (Oates, 2006, P.296). Research following this type of philosophical paradigm aims

to focus on treating a specific problem within an organisation, particularly where the problem needs to be analysed for patterns of power relations and other related issues in the real world.

In this type of paradigm, the researcher can use their experience or interpretation to determine the appropriate tools to carry out the required investigation in order to solve the problem and improve the productivity of the organisation being studied (Guo and Sheffield, 2008). Moreover, the critical paradigm aims to enhance the power and control of managers in an organisation, and where theory and practice are connected (Mingers, 2003). Thus, empowering the people in the organisation is a pivotal aspect of the critical approach, wherein societal and organisational issues and history are the main concerns. The approach is criticised as critical research outcomes can be uncertain, as some of the theories used are weak and incompatible with the objectives of the research being conducted (Orlikowski and Baroudi, 1991).

5.1.3 Interpretive

The approach chosen for this study can be classified under the interpretive paradigm. Interpretive research in IS and computing can be defined as "concerned with understanding the social context of an information system: the social processes by which it is developed and constructed by people and through which it influences, and is influenced by, its social setting" (Oates, 2006, P.292). From this definition, it is evident that interpretive research can be used to explore and identify all the factors that influence a specific environment, including culture and the experiences of people, and other related issues. It is also of note that the demand for interpretive research in IS research is on the increase, as it provides an important approach to the field (Walsham, 2006; Klein and Mayers, 1999).

The characteristics of the interpretive paradigm may be further (Bernsten, et al., 2004; Orlikowski and Baroudi, 1991) summarised into six points (Oates, 2006):

1. The interpretive approach can explore more than one truth or knowledge, which can be constructed by human beings either individually or in a group. Thus, the world will be perceived in a different way according to the surrounding culture of the group or the individual. It can be interpreted that the perspectives of individuals reflect the core of the society being examined, so they can be investigated to understand phenomena properly.

2. Language, shared meanings and understanding are social constructs that are transmitted to others by the individual or the group and reflect reality, which is the focal point of interpretivism.
3. The interpretive research process is influenced by the assumptions, beliefs, values and actions of the researcher, which will affect the situation under investigation. Therefore, the researcher is the only person who is acknowledged to be 'self-reflective' for the study ground being investigated.
4. Experiments or tests in an artificial environment are not undertaken; rather, interpretive research is the study of people in their natural world or setting. The perspectives of the participants are crucial and their responses reflect the beliefs of society about a particular subject or situation.
5. In interpretive research, different techniques can be used to generate and analyse the qualitative data: there is no one specific instrument.
6. Multiple explanations can be expected as an outcome of this type of paradigm. The researcher will perceive different interpretations but the strongest will provide the greatest evidence.

5.1.4 The research predisposition

The characteristics of this study must closely align with the interpretive paradigm. Indeed, the interpretive paradigm is an approach that has been used specifically to study the relationships between people, information technology and organisations (Oates, 2006; Bernsten et al., 2004; Orlikowski and Baroudi, 1991).

Therefore, the interpretive approach has been selected in this study to determine the perspectives of the individuals regarding the adoption of telemedicine technology in healthcare organisations.

5.2. Research methods

Information systems are the foundation of telemedicine applications. They combine computer science and management to form a new discipline in healthcare. Interpretive research is concerned with clarifying the ontological and epistemological assumptions that underlie the

research (Bernsten, et al., 2004). Empirical data or evidence is produced by the data generation methods (Oates, 2006). Using of two or more of data generation methods in a single research study is referred to a term called ‘methodological triangulation’ (Hussein, 2009). Researchers and scholars are referring triangulation to mainly a combination of quantitative and qualitative methods for the same study. The advantage of triangulation is to increase the credibility and validity of the research data (Thurmond, 2001). There are several methods of data generations, such as conducting interviews, questionnaires, observations, in addition to the text/statistical documents. Research in the IS field typically utilises two types of research method: quantitative and qualitative in addition to the documents, which consider a source of qualitative data.

5.2.1. Quantitative methods

Quantitative research is defined as "the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect" (Casebeer and Verhoef, 1997, Page 1; Babbie, 1992). The quantitative method is widely used in natural sciences research and it is highly recommended for use in social science research for the following characteristics (Weinreich, 1996): (1) data can be generalised because it is quantifiable and reliable; and (2) it is considered the most appropriate method for evaluating and assessing comparative outcomes with baseline data, as it is designed to ensure objectivity. However, the quantitative approach has the disadvantage that it is unable to translate and explain human behaviour in the real world. A further weakness of quantitative research is its dependence on the quality of the experiment and statistical control, which should factor out all other non-experimental variables (Kaplan and Duchon, 1988). The survey questionnaire is a popular instrument of quantitative methodologies. In a study that reviewed 1893 articles published between 1991 and 2001 in eight major IS publications, it was found that 60% of the methods used were performed quantitatively, and 41% of the techniques used were surveys (Chen and Hirschheim, 2004). This study will use survey questionnaires.

5.2.1.1. Surveys (questionnaires)

Generally, the aim of the survey questionnaire is to obtain data from a sample of the whole target population being studied in a standardised and systematic way (Oates, 2006). Many studies have used surveys to collect data, as the results of the survey can be generalised if based on the

sampling frame. Furthermore, surveying is considered to be a highly structured technique, so it is easy to apply to any research ground (Smith, 2002; Newsted, et al., 1998). Moreover, the survey is often conducted to describe the behaviour and attitudes of the sample under test. The questionnaire has proven its usefulness in IS research for collecting data from the intended perspectives (Oates, 2006; Newsted, et al., 1998). The strength of this technique lies in having a design that matches the study objectives.

5.2.2. Qualitative methods

The qualitative method is defined as "the non-numerical examination and interpretation of observations, for the purpose of discovering underlying meanings and patterns of relationships" (Casebeer and Verhoef, 1997). Furthermore, the primary aim of the qualitative approach is to reflect a situation or a specific environment in the real world through the interaction of the research with the audience members of that world (Weinreich, 1996).

5.2.2.1. Qualitative interviews

The most commonly used qualitative method in health services research is the interview (Smith, 2002), and is particularly prevalent in the IS field (Oates, 2006). Although most health services research is performed using quantitative methods, recently published studies have shown an increasing usage of qualitative methods (Smith, 2002). A study that reviewed nine interdisciplinary journals regarding managed research from 1998 to 2008 found that the average use of qualitative methods in research was 330 articles per year; almost half (47%) of the qualitative methods used were interviews (Weiner, et al., 2010).

In one study that used a qualitative method to study the organisational consequences of telemedicine (Aas, 2001), the author chose this approach due to its ability to interpret the perspectives of the participants. Another study used semi-structured interviews to assess the perceptions of the participants involved in introducing telemedicine technology to their clinical practice (Campbell, et al., 2001). The use of the qualitative method has increased the knowledge base of health research, as this method has the ability to collect plenty of information from the participants (Cunningham, et al., 2010). Moreover, the qualitative method is able to identify unforeseen problems and benefits and to determine the outcomes of the programmes from

different perspectives (Smith, 2002). Therefore, this study will use this method to collect the appropriate data required, based on the research objectives.

5.3. Current research methodology

The two types of research methods (quantitative and qualitative) have individual characteristics and aims of use. However, it is common to combine quantitative and qualitative techniques in the same study. This has been shown to have a robust foundation (Andrew and Halcomb, 2009; Driscoll, et al., 2007). By combining the techniques, two kinds of inferences can be made: (1) quantifiable numerical estimations and statistical models may be applied to the collected data, from which inferences on the population can be made; and (2) deeper understanding of a specific phenomenon or situation within the community of people may be acquired.

This research study also incorporates triangulation of data sources. This can be defined as combining multiple data sources together within the same research study (Hussein, 2009; Smith, 2002; Oates, 2006). Data sources vary, such as questionnaires, interviews, observations or documents and in health service and social science research, triangulation is considered a common practice.

The benefits of combining more than one method together (Hussein, 2009; Creswell, 1994) are:

- To validate the results of each approach within the research study.
- To determine overlapping or different facets of a phenomenon.
- To determine contradictions and different perspectives.
- To provide the study with a profound investigation and rigorous findings.

Therefore research of documentary evidence is included in this study.

5.3.1. Combination of quantitative and qualitative methods

Quantitative and qualitative methods have been used in order to achieve best research design for this study.

The use of both quantitative and qualitative techniques has gained attention in the health research field, as some research issues cannot be addressed by one research method alone (Andrew and Halcomb, 2009; Casebeer and Verhoef, 1997). Some social scientists state that the combination of research methods has some negative aspects, such as a lack of understanding of the influences of the methodological context, which is important to the data interpretation (Smith, 2002). This negative aspect has been criticised by many researchers who agree on the advantages of using the combination.

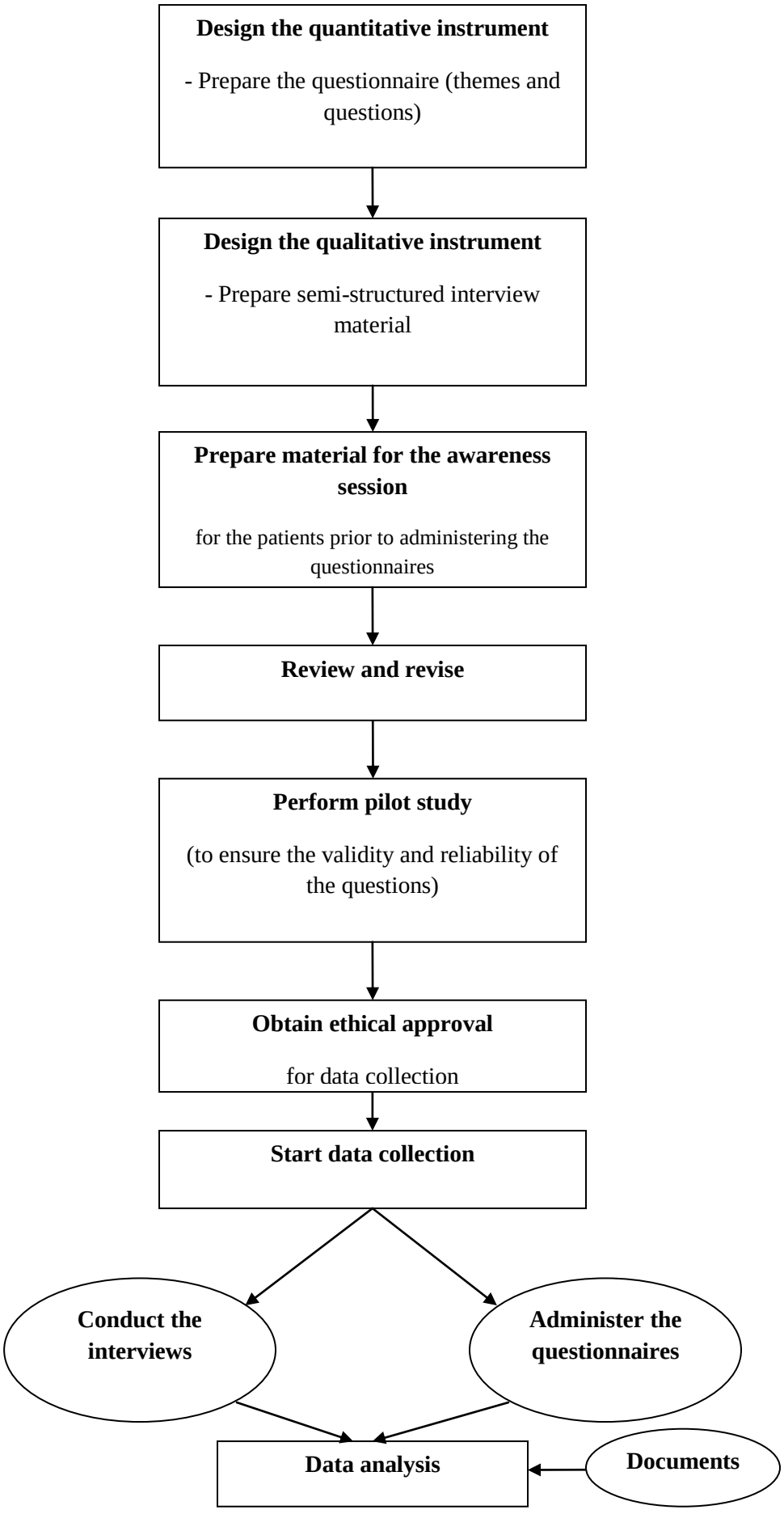
Integrating quantitative and qualitative methods has the further advantage that it allows any discrepancies or weaknesses during data analysis to be discovered. Moreover, new ideas and insight can be created through the combination of these two approaches together (Andrew and Halcomb, 2009; Weinreich, 1996; Kaplan and Duchon, 1988). Some researchers argue the importance of using a combination of methods for obtaining robust research outcomes, highlighting the importance of understanding not only 'what works' (quantitative) but also 'how it works' (qualitative) (Condelli and Wrigley 2004). Complementary findings can be achieved through the use of more than one method in the same study. This study will use both techniques to obtain optimum results.

5.3.2 Documents

In addition to questionnaires, observations and interviews, documents are a further source of data (Oates, 2006). Documents can be written policies or statistics or take other forms (Oates, 2006). It is widely confirmed that the use of a triangulation method reduces bias in gathering and considering data (Creswell, 1994; Oates, 2006; Kaplan and Duchon, 1988).

The policy of the Department for Overseas Treatment of the Kuwait Ministry of Health and the annual statistics for referring patients abroad are important documents for this study.

The figure overleaf is a methodological framework demonstrating the steps that have been followed for the process of data collection (Figure 5.1).


Design the quantitative instrument
- Prepare the questionnaire (themes and questions)
Design the qualitative instrument
- Prepare semi-structured interview material
Prepare material for the awareness session
for the patients prior to administering the questionnaires
Review and revise
Perform pilot study
(to ensure the validity and reliability of the questions)
Obtain ethical approval
for data collection
Start data collection
Conduct the interviews
Administer the questionnaires
Data analysis
Documents

5.4 Design of the study

"A research design is a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research" (Pottas, 2005, p. 85). Developing a strategy for research is like creating a plan to tackle or solve a specific problem, through which different variables are selected surrounding the main topic of the research (Oates, 2006; Stroebal, 2006). Thus, according to the research methodology strategy (see Figure 5.1), the quantitative and qualitative approaches will be combined together due to their appropriateness to the research questions and objectives. Therefore, the instruments that have been chosen for the current research are: the questionnaire and interview. This approach will allow both an overall picture to be gained and new aspects of the factors to be explored.

5.4.1 Designing the survey (themes and questions)

The design of the questionnaire instrument is a very important aspect of the research, as it is intended to achieve the objectives of the study. Therefore, the questionnaire has been designed to address different criteria based on the type of each participant; it has been designed to be distributed to medical specialists (physicians) and patients directly involved in telemedicine system implementation. Preceding the design of the questionnaire, two aspects are crucial to consider (Andrew and Halcomb, 2009; Smith, 2002): the type of information that needs to be collected from the respondents; and how to extract that information and which approaches are useful and appropriate.

Prior to designing the survey questionnaires, important points have been considered in order to formulate a suitable instrument for data collection (Smith, 2002):

- The research objectives are defined to be clearly aligned with the research questions in order to select the appropriate instrument.
- The sample size, sampling techniques and response rates are considered in order to determine the most suitable instrument for each group.
- The data analysis techniques for extracting the evidence need to be determined.

- The literature should be reviewed to link the previous research with the techniques used for the same topic.
- A clear picture of the research criteria (for example, ordering the themes in prioritised order) needs to be provided.

Review of previous relevant research was used to develop the initial draft of the questionnaire for the two types of participant (patients and physicians) (see Appendix B). The questions have been used and validated by other researchers (Khoja, 2007; King, et al., 2007; Werner, 2004; Mairinger, et al., 1996; Wilson and Lankton, 2004); some questions have been modified and pretested for the Kuwaiti setting.

When designing the questionnaire, two types of questions should be considered, which are: Positive and negative worded questions. Mixing together positive and negative worded questions would make the respondent aware more about the meaning of the questions and avoid ticking the same response for every item in the questionnaire (Colosi, 2005). However, in this study, most of the questions in both questionnaires were positives worded, as the serious illness of patient and the busy routine work of the physician are two sensitive issues that were considered and appreciated in order to achieve the intended objectives.

The following sections will focus on the format of the questionnaires.

5.4.1.1 The physicians' questionnaire

Physicians are very important stakeholders in the process of telemedicine adoption (Vitacca, et al., 2009; Gagnon, et al., 2006; Meher et al, 2009). Therefore, their perspectives regarding technology adoption will be highly considered and appreciated, and could determine the outcome of the implementation, as they are the end users of the telemedicine system.

The survey questionnaire is designed to assess the readiness of physicians by exploring their perceptions towards the adoption of telemedicine technology within the Kuwaiti Ministry of Health, and specifically for patients with critical conditions that are looking for experts' consultations. The questionnaire is designed to be concise, easy to understand and in a logical order. It is very important when designing questionnaires to avoid complex, ambiguous and irritating questions (Bowling, 2002; Dane, 1990; Oates, 2006; Smith, 2002).

The questionnaire covers the following areas: (1) demographic data; (2) background information; (3) satisfaction with the current referral abroad system; (4) perceptions about telemedicine; (5) comfort with technology; and (6) willingness regarding telemedicine.

The questionnaire consists of four pages: including the face sheet, which has the title, the objective of the study, and the confidentiality statement. Each page has the logo of the Kuwaiti Ministry of Health and Brunel University, who share responsibility for the study, to reveal that the study is certified and credible. The name of the researcher is at the bottom of face sheet.

A definition of telemedicine precedes the questions to give an overview for participants who have never heard about telemedicine. The questionnaire includes different types of questions, which have been chosen to help the physicians respond easily. Therefore, the questions used are closed-ended, providing the participants with a list of answers from which they can choose the most appropriate response. Closed-ended questions are more appropriate than open-ended questions in this study to be chosen to physicians with their busy routines. It is very important to understand the type of participant being studied when designing questionnaires; and it is not recommended to use open-ended questions in healthcare research due to the time and effort required to provide responses to such questions (Smith, 2002; Oates, 2006). Closed-ended questions can be used when there are a limited number of responses that are of specific interest to the study. Despite having disadvantages, some open-ended parts have been included as optional aspects to some of the questions; for example: "if other, please indicate your answer below" or the use of the comment box at the end of the questionnaire.

Demographic data questions are in the first section of the questionnaire and completed as 'tick the appropriate response' to identify the information needed; this includes age, gender, nationality, specialty and years of experience. This should support assumptions about their basic knowledge and attitude, and allow analysis of relationship between various data.

Background information on the respondent regarding their computer/internet and telemedicine usage was gathered through five closed-ended questions. These questions utilised a 5-point Likert scale (5 = Always, 4 = Often, 3 = Sometimes, 2 = Rarely and 1=Never) to identify the experience of physicians regarding computer and telemedicine use.

Three questions were designed to gauge the current level of satisfaction of respondents regarding the procedure of referring patients abroad and determine their concerns. In this section, two items (Numbers 11 and 13) used a 4-point Likert scale (4 = Strongly agree to 1 = Strongly disagree). One item (Number 12) under this section offered a 'Tick all that apply' answer, including a list of reasonable answers and with a space for additional comments or suggestions. This item aimed to discover the concerns and reasons behind referring patients abroad from the perspectives of the physicians (see Appendix B). This will be discussed in further detail in the following section.

5.4.1.1.1 Readiness assessment of the physicians

The readiness assessment criteria of the physicians regarding ICT adoption (specifically telemedicine) was based on the work of several previous studies (Khoja, et al., 2007; Jannett, et al., 2004; Mairinger, et al., 1996; King, et al., 2007). These identify the need for a focus on the perceptions, comfort and willingness of physicians regarding telemedicine adoption.

The questionnaire contains 28 items in total, which are divided into purposive and sequential sections according to their meaning.

'Perception about telemedicine' is the starting point for assessing the awareness levels of the physicians about state-of-the-art technology, such as telemedicine. Initially, it is very important to consider the perceptions of the physicians prior to technology adoption as they are expected to be involved in training courses and the use of the system (Sheng, et al., 1998; Caison, et al., 2008). Importantly, the perception factor should be assessed, as the participants come from different backgrounds and educational settings (Khoja, et al., 2008; Campbell et al., 2001). Thus, five questions with a 4-point Likert scale (4 = Strongly agree to 1 = Strongly disagree) were used to examine the knowledge level of the physicians regarding the capabilities of telemedicine (ICT) in delivering healthcare services and solving problems.

After that, the 'comfort with technology' section examines the attitudes of the physicians regarding the use and benefits of telemedicine as a communication tool for practicing medicine. This includes the ease of use of software programs and explores how the benefits of telemedicine affect the willingness and comfort of physicians to accept and use such a system (Gagnon, et al., 2006). Moreover, the tendency of healthcare providers to work with technology depends on the

readiness of their technological ability (Chau and Hu, 2000). Accordingly, in this section, four questions with a 4-point Likert scale are used.

The willingness of physicians towards telemedicine technology adoption and usage can demonstrate their attitude as potential users to accept or reject the system (Werner, 2004). Therefore, assessing the willingness of physicians regarding the use of telemedicine systems is essential because it reveals the intentions of users, which reflects the readiness levels of the individuals (Shoaib, et al., 2008; Meher, et al., 2009). The 'willingness regarding telemedicine' is the last section and consists of six questions. Five of these questions use a 4-point Likert scale and the last question offers a 'Tick all that apply' answer selection to explore the barriers to telemedicine adoption, with a space for additional comments.

5.4.1.2 The patients' questionnaire

The main purpose of telemedicine implementation is benefit to the patient (Vitacca, et al., 2009). Therefore, the patient perspectives should be included. Indeed, assessing the readiness of the patients regarding their willingness to utilise the services of telemedicine would contribute positively in the project implementation (Meher, et al., 2009). Telemedicine must be designed to be effective and efficient to offer a high quality of healthcare services to patients. Despite the various benefits of telemedicine to patients, however, several concerns regarding telemedicine usage could negatively affect the attitudes of the patients, such as safety, privacy and confidentiality of information (Vitacca, et al., 2009; Demiris, et al., 2000).

Therefore, the questionnaire was developed to assess the perception level of the patients towards the use of telemedicine and their satisfaction with the current referral system. Thus, the focus of the patients' questionnaire was on the following topics: (1) demographic data; (2) diagnostic profile; (3) satisfaction with the current referral system; and (4) attitude towards telemedicine, which consists of two subsections: patient/physician relationship and technology anxiety.

The questionnaire was designed for patients who need to travel abroad for treatment, and so takes into account the vulnerable nature and anxiety of the patients regarding their conditions. The questionnaire is therefore concise, consisting of only three pages, including the face sheet, and contains only 18 items. The content of the face sheet is similar to the physicians' questionnaire but with text different for the objective. All the questions are closed-ended ('tick

the appropriate response') and are designed to be simple, easy to understand and sensitive to any private issues.

Demographic data includes: age, gender, educational level and marital status. This information can be used to make different relationships in regard to the attitude and knowledge level of the respondent, in order to discover social and cultural issues.

In the second section, the diagnostic profile of the patient is determined using two questions: their health problem and the whether it is their initial visit or a follow-up consultation, as the health condition of the patient could affect their decision regarding telemedicine service usage (see Appendix B).

5.4.1.2.1 Readiness assessment of the patients

Satisfaction with the current health system can involve many aspects, such as delivery of care, cost, quality of care and access to care. Furthermore, there is a correlation between the level of satisfaction of a patient with their current medical care and their compliance with the treatment or the current system (Wilson and Nancy, 2004). Therefore, it is very important to evaluate the level of satisfaction of the patient and their attitude towards the current system (Werner, 2004). This could also provide an indication as to whether a patient would wish a change in the current system.

As a result, three questions using a 4-point Likert scale and two 'tick all that apply' questions are used in the third section of the questionnaire ('satisfaction with the current referral system'), in order to examine the level of satisfaction of the patient regarding the current process of referring patients abroad for treatment.

The last section in the questionnaire is called 'attitude towards telemedicine' and it asks the patients about their familiarity with telemedicine in general. Two questions are used: one offers a Yes/No answer and the other can be answered using a 4-point Likert scale.

The last section of the questionnaire is divided into two subsections:

1) Patient/physician relationship

The nature of the relationship between patient and physician changes using a telemedicine system, therefore it is important to investigate the opinions of patients regarding the new approach to delivering medical consultations (Meher, et al., 2009; Werner, 2004; Demiris, et al., 2000; Agha, et al., 2009). There is also significance in determining the acceptance of patients towards the way that such a system in place of in-person consultations. This section uses three questions with a 4-point Likert scale to examine the attitudes of patients regarding the new approach to delivering consultations (telemedicine). The questions also address social and cultural issues that reflect the attitude of the society towards using new technology.

2) Technology anxiety

The use of technology in healthcare has raised some concerns (particularly for patients), such as: safety, trust, privacy and confidentiality of patient information (Vitacca, et al., 2009; Mair, et al., 2007; Werner, 2004). This anxiety regarding the use of technology should be considered and assessed. Accordingly, two questions with a 4-point Likert scale are used to examine the perspectives of the patient about their trust towards the use of telemedicine services regarding privacy and confidentiality, and whether doctors are able to work with such services or not. These issues could affect the decision of telemedicine implementation.

5.4.2 Designing the qualitative method (interview questions)

The interview is a very useful tool for providing a deep understanding and explanation of a specific phenomenon (Andrew and Halcomb, 2009). Therefore, data from interviews can be a great addition to a survey questionnaire to support the findings and complete the deficiencies. Interviews can be divided into structured (closed-ended questions), semi-structured and unstructured (open-ended questions) interview types (Oates, 2006; Berg, 2009; Andrew and Halcomb, 2009).

According to the objectives of this research study, the interviews were designed to be semi-structured in order to obtain the required data. "Semi-structured are located between the other types of interviews, which involves predetermined questions and special topics" (Berg, 2009, p.107), but allows flexibility in asking further questions within the study area. As the interviewees are busy people, this does not allow an unstructured interview, hence, the questions

of the interview are designed to be succinct, unambiguous and purposive to achieve the intended objectives.

Certain issues should be considered when designing and conducting the interview questions (Bowling, 2002; Andrew and Halcomb, 2009):

1. The questions must be pronounced in a neutral and unbiased way.
2. The questions should not be embarrassing to the interviewee and must be purposive.
3. The title and the study objectives must be clearly stated to the participant, in addition to the confidentiality statement. The identity of the participants should be kept anonymous and their information used only for the research purpose.
4. The consent form must be written and handed to the participant for agreement, with description of the way the interview will be recorded.

The above guidelines have been followed in this study.

Two types of interviews have been designed in this study to gain information from the two types of participant: policy makers and IT managers.

5.4.2.1 The policy makers' interview

This semi-structured interview was designed to explore the opinions of the policy makers within the healthcare organisation regarding the needs and the readiness of healthcare facilities towards telemedicine adoption. Examining the preparedness of the healthcare organisation would give an overall picture of what is available in terms of supportive factors such as human resources, funding, training and policies, and what needs to be developed to adopt telemedicine technology successfully (Jennett, et al., 2005; Gagnon, et al., 2005). Therefore, the questions of the interview were designed to extract information from the policy makers of the Kuwaiti Ministry of Health about several crucial issues:

1. The current problems associated with referring patients abroad in regard to the allocated budget and the critical cases of patients.

2. The future plans to overcome identified problems and whether telemedicine technology is considered in these plans.

3. The potential of telemedicine in healthcare delivery.

4. The supportive factors that would facilitate telemedicine adoption at the Ministry of Health, as well as inhibiting factors to the adoption.

5. The solutions that can be proposed to overcome the barriers to adoption, in addition to the government's role.

6. What polices can be proposed to facilitate adoption of telemedicine.

7. What roles do culture and social norms play.

The outcomes of these interviews will assess the readiness of the Kuwaiti Ministry of Heath as an organisation in regard to telemedicine adoption (see Appendix C).

5.4.2.2 The IT managers' interview

The interview questions were designed to explore the opinions of IT managers regarding the needs and readiness of healthcare facilities for the purpose of assessment prior to telemedicine adoption. Technological readiness in each healthcare facility should be positive prior to telemedicine adoption; this readiness has to include environmental and organisational issues (Legare, et al, 2010, Hu, et al, 2000).

In this study, the questions of the interview were developed to cover the following issues:

1. The current ICT infrastructures available in each health region in Kuwait and their capabilities.

2. The current role of the internet/ICT in each health region in Kuwait.

3. The technical requirements needed to implement telemedicine technology in each health region.

4. The institutional plans for accessing telemedicine (ICT/internet) in the work place (e.g. training courses), as well as the policies required to implement a telemedicine system in Kuwait.

These questions were designed to assess the technical readiness of each health organization which is affiliated to the Kuwaiti Ministry of Health (see Appendix C).

5.5 Validity and reliability

The validity and reliability of the research instruments should be considered in order to demonstrate the robustness of the research being conducted (Oates, 2006; Smith, 2002). The validity of an instrument refers to "the extent to which the questions collect accurate data relevant to the study objectives" (Smith, 2002, p. 45), while the reliability refers to "whether the questionnaire would yield the same results if given repeatedly to the same respondents" (Oates, 2006, p. 227). This means that the findings should be reproducible or internally consistent. It is important to mention that an instrument can be valid but not reliable, or reliable but not valid, or neither valid nor reliable (Oates, 2006; Smith, 2002). The reliability of the data gathered in this study will be considered later in section 5.8.

The aim behind these procedures is to measure the errors that the designed instruments might have included and how these errors can be reduced to obtain an instrument with a high level of accuracy and consistency.

The items used in the questionnaires were validated and amended using feedback from an expert panel and a pilot study. In order to ensure that the instruments were validated to measure the intended objectives, the following procedure has been undertaken.

5.5.1 Content validity

The purpose of 'content validity' is to ensure that the instrument questions are a well-balanced sample of the domain or the issues being covered (Oates, 2006; Smith, 2002; Saarinen, 1996). In this study, the aim is to find an effective assessment method for the readiness of the stakeholders involved in telemedicine adoption and implementation in the Kuwaiti healthcare system. This is intended to prove that the research instruments are achieving the projected objectives.

Accordingly, the questionnaire has to be designed to provide the respondent with the important issues and responses that are believed to be relevant to the main topic. Thus, the content validity procedure was used to validate the designed instruments. This was done by a panel of experts from the research domains from different backgrounds: (1) The Allied Health Sciences School, Kuwait University; (2) The Social Sciences School, Kuwait University; and (3) the Deputy Director of Al-Adan Hospital from the Kuwaiti Ministry of Health.

Based on their extensive experience in carrying out several surveys in their respective domains, they were qualified to detect any incompatibilities or weaknesses in the items being used in the questionnaire according to the study objectives. Therefore, amendments pertaining to some wording of the questionnaire items were made and the interview questions were reordered for a more logical flow. In addition, corrections were made to the Arabic version of the patient questionnaire.

In this study, other approaches were applied to reduce potential errors:

- Triangulation of data sources: it has been proven that the use of more than one data generation method enhances data validity through supporting the findings (Creswell, 1994; Oates, 2006; Kaplan and Duchon, 1988). A triangulation method can be employed to validate the data; the argument is that the use of more than one data generation method can accommodate for any potential errors or shortcomings (Smith, 2002).
- Performing a pilot study (Smith, 2002; Oates, 2006; Dane, 1990): this procedure will be discussed in detail later in this chapter.
- Being present with the respondent while they completed the questionnaire in order to respond to any question raised by the respondent requiring further explanation.
- Attempting to obtain a large enough sample to reduce potential errors.

5.6 The awareness session (movie clip)

Telemedicine is an evolving concept and approach to delivering medical services in the health field in the Middle East and most people are unfamiliar with this kind of technology, particularly the public. Therefore, it was necessary to provide a way to introduce this topic to the study

sample, particularly the patients, who were in the process of being considered to be referred abroad for treatment.

In this research study, the seriousness of the medical condition of the patient and the time required were taken into account in the design of the awareness session. Each respondent was shown a short video clip of around thirty seconds, to demonstrate how telemedicine is used for tele-diagnosis and tele-consultation. This video clip was chosen for its simplicity, lucidity and ability to portray the idea in a very short time. The aim of the video clip is to show the patient how telemedicine works and to make them aware of telemedicine as a practical concept. The video clip was shown before the questionnaire was administrated to the patient. The video was selected from‘youtube.com’ (http://www.youtube.com/watch?v=mDoZx0VAWGw).

5.7 Ethical considerations

Ethical approval was obtained from the university ethics committee. This included full description of the study objectives, study protocol, participants, full disclosure of questionnaires and interviews questions, and analysis methods.

There are certain rights for participants that researchers must maintain (Oates, 2006; Stroebal, 2006). These rights have been followed during this research, although this can have an effect on response rate (Dane, 1990; Smith, 2002). All participants were assured that their identity would be kept anonymous and that their participation was optional and could be withdrawn at any time without any consequences. This was assured by a consent form that was handed out prior to participation and included information on the purpose of the research, its nature, the researcher and the supporting organisations (see Appendix C).

In addition, support letters were sought from each participating site and were submitted as part of the ethics application to the Research Ethics Committee of Brunel University to confirm agreement to participate (see Appendix B).

Finally, information was provided to the staff of each participating site on the surveys and their objectives to start conducting the study.

5.8 The pilot study

The questionnaire was tested in a small scale pilot prior to the main study. This included testing each item for several reasons (Smith, 2002): (1) to ensure the questionnaire is appropriate for its intended setting; (2) to ensure that the questionnaire is acceptable to the participants, in terms of readability and understandability of items; and (3) to ensure that the data is reliable.

The pilot study distributed the questionnaires to five participants from each sample group (patients and physicians).

As a result of the pilot study: Two changes were made to the patient questionnaire: one further box for item number 3 was added for an additional educational level, which is ‘less than K-12’; the instruction to question number 11 was changed from 'tick the appropriate response' to 'tick all that apply' as some patients could select more than one response.

Change was made to the physician questionnaire: the nationality item 'Kuwaiti or Non-Kuwaiti' was added to represent citizens and non-citizens.

5.9 Data collection in the research setting

The research was divided into two stages: the first to distribute the questionnaires to the physicians and patients; the second to conduct the interviews with the policy makers and IT managers.

5.9.1 The first stage

In this stage, a meeting was first held with the director of each hospital to facilitate the research work (as shown in Table 5.1). The questionnaires were distributed by attending the committees that are held weekly for referring patients abroad. Each specialty, such as internal medicine, general surgery, neurology, orthopaedics and oncology generally holds its own medical board, which is attended by members of the board, namely: the head of the board, the head of the department and the consultant who is responsible for the case of the patient (as per treatment abroad policy). The questionnaires were distributed to the consultant physicians at the medical boards in different local hospitals, as detailed in table 5.1.

No.	Health Region	Hospital name

1	Capital	Al-Ameri (General)
2	Hawalli	Mubarak (General)
3	Al-Ahmadi	Al-Adan (General)
4	Al-Jahra	Al-Jahra (General)
5	Al-Farwaniya	Al-Farwaniya (General)
In addition to the specialised Sabah Medical Region		This region encompasses with nine tertiary hospitals, plus one general hospital (Al-Sabah)

Table 5.1 Health regions and related hospitals in Kuwait (Health Kuwait, 2010)

When the medical boards are held, the patients wait outside the office of the medical boards or in the hospital wards, and this afforded an opportunity to approach them and distribute the questionnaires. All patients attending the board were approached whilst waiting for their outcomes. This had the advantage of providing access to the patients, however it is recognised this was a stressful time and could affect results. Patients with critical cases or patients under 18 years old were excluded from the research study.

5.9.2 The second stage

The second stage of the research data collection was the interviews with the policy makers and IT managers. Semi-structured interviews were used in order to lead the interviews in an organised way. The policy makers were approached in their offices at Kuwait Ministry of Health, whilst the IT managers were approached in their offices distributed across each health region (although administrated by one main department, which is located at the Ministry of Health).

Permission was obtained from the interviewees to record the interviews and they were assured of confidentiality and anonymity. Each interview started with the introduction and aims of the research. The average time taken to conduct the interviews for both types of participants was 30 minutes, except the interview conducted with the Health Minister, which was 15 minutes.

5.9.3 Difficulties faced during the data collection process

Several difficulties were faced while conducting this research, such as:

- Dealing with patients requires caution, especially as many had serious illness. Thus, consideration was given to enable the respondents to complete the questionnaires successfully, such as confidence, patience, leniency and optimism.
- Some physicians and policy makers refused to participate because they found the topic uninteresting.
- Physicians are busy, and finding time for interview was not easy, even with an appointment.
- Some of the interviewees were not aware of telemedicine and its potential applications in healthcare, so the researcher gave a small introduction about the topic preceding the interview questions.
- Obtaining some important statistical reports proved impossible; several requests for statistical reports from the department responsible for the treatment abroad were refused each time.

This chapter has described the research strategy including method, technique and approach to address the research questions and to achieve the optimum outcomes of this study.

In the next chapter, the data from the four data gathering instruments will be analysed and the results will be presented.

Chapter Six: Data Analysis and Results

In this chapter, the data analysis consists of two sections: the analysis of the questionnaires, both patient and physician; and the analysis of the interviews.

6.1 Data analysis of the questionnaires

Data presentation will in general be through frequency tables and percentages, as these were deemed sufficient to convey statistically relevant results.

Chi-squared statistics were used to investigate the responses of the patients in terms of the relationships between the different items of the questionnaire. Cross correlation was used to determine significant relationships between two items in the questionnaire.

6.1.1 Results of the patients' questionnaires

The questionnaires were conducted with overseas patients at Kuwaiti governmental hospitals from January 2011 to July 2011. During this period of time, the questionnaires were administrated to 112 patients suffering from a number of diseases. The number of completed questionnaires was 111: one patient stopped completing the questionnaire due to parental refusal, although the case of the patient matches the inclusion criteria. Therefore, the response rate for the patients is 99%, as Table 6.1 shows:

Number of participants contacted	Number of completed questionnaires	Percentage %
112	111	99%

Table 6.1: The response rate for the patients' questionnaires

It was not possible to obtain the total number of patients referred abroad for treatment during the period of the study in order to determine the proportion of patients interviewed as this information was withheld by the Minister of Health. It is known that 420 patients were referred for treatment abroad during the year 2011. It is therefore estimated that the sample size of this study represents 50% of the total population.

In the following section, each item of the questionnaire will be analysed and comments made on the results.

The questionnaire was divided into four sections, with the last section having two sub-sections. Each section of the questionnaire included closed-ended questions, in addition to the comments box at the end for expressing additional opinions.

The first section in the questionnaire was the demographic data. This included age, gender, marital status and educational level (Table 6.2). These demographic characteristics show the diversity of the patients; they also allow any relationship between the characteristics and responses to be investigated.

- **Section A- Demographic data**

Variables		No.	%
Age	18-30 years	28	25
	31-40 years	36	32
	41-60 years	38	34
	61-70 years	9	8
Gender			
	Male	56	51
	Female	55	49
Marital status			
	Single	27	24
	Married	74	67
	Divorced	3	3
	Widowed	7	6
Educational level	Less than K-12	22	20
	K-12	13	12
	Diploma	31	28
	College	39	35
	Post-graduate	6	5

Table 6.2: Summary of the demographic data of the patients

Most patients (67%) were married. Most patients (35%) were well educated and had graduated from college. There was almost equal distribution for gender (51% male, 49% female).

- **Section B- Diagnostic profile**

Question no. 5: Patient's health problem.

This question was asked to determine the health problems of the overseas referral patients. The results show (Table 6.3) most were orthopaedic patients (21%) followed by neurological (15%), cancer (13%), and heart surgery (13%), general surgery 17%, and other diseases 22%.

Patient's health problem	Percent %
Cancer	13%
Heart surgery	13%
General Surgery	17%
Neurological diseases	15%
Orthopaedics	21%
Other diseases	22%

Table 6.3: Question no. 5

Question no. 6: Type of the patient's case.

This question asked about the state of the health case, whether it was first-time or follow-up. Table 6.4, shows that most of the cases (65%) were first-time patients with 35% follow-up.

Patients' case type	Percent %
First time	65%
Follow up	35%

Table 6.4: Question no. 6

- **Section- C: Satisfaction with the current referral system**

Question no. 7: I am happy to travel abroad for treatment.

This question asked about the willingness of the patient to travel abroad to obtain the required treatment. 70% of the patients were willing or very willing to travel abroad to obtain their treatment, whereas 30% of the patients disagreed or strongly disagreed with travelling abroad for treatment (Table 6.5).

The chi-squared test suggests that there is no statistically significant relationship between the patients willing to travel abroad for treatment and their age. Pearson's chi-squared (x^2) = .805 (5.331^a, p >0.05) (Table 6.5a).

Happy to travel for treatment * Respondent's age Cross tabulation

Crosstab		Respondent's age				Total %	Category Total %
Questions no. 7		**18-30**	**31-40**	**41-60**	**61-70**		
Happy to travel for treatment	**Strongly agree**	10%	9%	12%	5%	35%	70%
	Agree	8%	11%	14%	2%	35%	
	Disagree	5%	11%	6%	2%	24%	30%
	Strongly disagree	2%	2%	2%	0%	6%	

Table 6.5: Crosstab summary for Questions no. 7 and no. 1

Table 6.5 a	**Chi-Square Tests**		
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.331^a	9	.805
N of Valid Cases	111		

a. 7 cells (43.8%) have expected count less than 5. The minimum expected count is .49.

Question no. 8: It took too long to get permission to travel abroad.

This question asked about the perception of the patient regards the time it took to obtain permission to travel abroad for their treatment or consultation. 86% of patients agree or strongly agree that the current procedure to get permission to travel abroad took too long, whilst 14% of patients disagreed or strongly disagreed with this statement.

Question no. 8		**Percent %**	**Total%**
Valid	Strongly agree	50%	86%
	Agree	36%	
	Disagree	10%	14%
	Strongly disagree	4%	

Table 6.6: Question no. 8

Question no. 9: I am worried about travelling abroad.

This question was asked to investigate if the patient worries about travelling abroad in general. The results show that 57% of the patients were worried (40%) or very worried (17%) about travelling abroad, whereas 43% of the patients had no worries about travelling abroad, (31% disagreed, 12% strongly disagreed) (Table 6.7).

There was no statistical significance between being worried about travel abroad except for almost all widowed patients expressing being worried see Table 6.7.

Worried about travelling abroad * Marital Status Cross-tabulation

Crosstab		Marital Status				Total %	Category Total %
Q no. 9		Single	Married	Divorced	Widowed		
Worried about travelling	Strongly agree	4%	11%	2%	0%	17%	57%
	Agree	8%	26%	1%	5%	40%	
	Disagree	10%	20%	0%	1%	31%	43%
	Strongly disagree	2%	10%	0%	0%	12%	

Table 6.7: Crosstab summary for questions no. 9 and no. 4

Table 6.7 a Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.185[a]	9	.116
N of Valid Cases	111		
a. 10 cells (62.5%) have expected count less than 5. The minimum expected count is .35.			

Question no. 10: Before I travelled abroad, I was worried about…

Question 10 determines factors about which patients most worry before they travel abroad. Table 6.8 shows that the greatest worry of the patients was separation from their family (38%). The

next greatest worry was the foreign country (18%). Moreover, 8% of the patients had a fear of travelling.

Question no. 10	Percent %
1- Fear of travel	8%
2- It is expensive	9%
3- Language	14%
4- Will be separated from my family	38%
5- It is hard for me to travel	13%
6- Foreign country	18%

Table 6.8: Question no. 10

Question no. 11: Have you considered another way of treatment other than travelling abroad to get a medical consultation?

The aim of this question was to understand the willingness of patients to seek a medical consultation in ways other than travelling abroad.

The study results show that 44 % of the patients were looking for a visiting consultant to obtain treatment, and 46% of the patients were looking to obtain a medical consultation at a local private hospital (see Table 6.9).

Question no. 11		Percent %
Valid	Visiting consultant	44 %
	Local private hospital	46 %

Table 6.9: Question no. 11

- **Section D- Attitude towards telemedicine**

Question no. 12: Have you ever heard of telemedicine before?

This question determines the awareness that patients may have about telemedicine. 40% of the patients had heard about telemedicine use.

Of the 35% of patients who were college graduates, 20% had heard about telemedicine. Whereas, of the 20% of patients with an educational level of less than K-12; 17% had not heard about telemedicine, (Table 6.10).

The chi-squared test suggests that there is a statistically significant relationship between the awareness of patients about telemedicine and their educational level, where Pearson's chi-squared (x^2) = 28.544[a], p <0.05 (Table 6.10a).

Heard of Telemedicine * Educational level Cross tabulation

Crosstab		Educational level					Total %
Q no. 12		Less than K-12	K-12	Diploma	College	Post-graduate	
Heard of telemedicine	Yes	3%	0%	12%	20%	5%	40%
	No	17%	12%	16%	15%	0%	60%

Table 6.10: Crosstab summary for questions no. 12 and no. 3

Table 6.10a Chi-squared tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.544[a]	4	.000
N of Valid Cases	111		

a. 2 cells (20.0%) have expected counts less than 5. The minimum expected count is 2.38.

Question no. 13: I would be happy to use telemedicine.

This question was used to determine the attitudes of the patients towards using telemedicine as a way of receiving medical consultations and treatment at a distance.

69% of the patients agree (46%) or strongly agree (23%) that would be happy to use telemedicine: 26% of the patients were in the age group 31-40. In contrast, 31% of the patients

disagree (27%) or strongly disagree (4%) with the statement: 16% of the patients were between the ages of 41 and 60 (see Table 6.11).

The chi-squared test suggests that there is no statistically significant relationship between the attitude of patients towards using telemedicine and their age. However, Pearson's chi-squared (x^2) = 0.056 (16.590[a], p >0.05) (Table 6.11a).

Happy to use telemedicine * Respondent's age cross tabulation

Crosstab		Respondent's age				Total %	Category Total %
Q no. 13		**18-30**	**31-40**	**41-60**	**61-70**		
Happy to use telemedicine	**Strongly agree**	5%	9%	9%	0%	23%	69%
	Agree	14%	17%	10%	5%	46%	
	Disagree	6%	6%	12%	3%	27%	31%
	Strongly disagree	0%	0%	4%	0%	4%	

Table 6.11: Crosstab summary for questions no. 13 and no. 1

Table 6.11a	**Chi-squared tests**		
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	16.590[a]	9	.056
N of Valid Cases	111		

a. 7 cells (43.8%) have expected counts less than 5. The minimum expected count is .32.

1. Patient-physician relationship

Question no. 14: I would find it difficult to talk to a doctor using (a screen and camera) telemedicine.

This question was designed to explore the patient-physician relationship when using telemedicine.

The chi-squared test suggests that there is a statistically significant relationship between the difficulty of talking with a physician through telemedicine and the patient's happiness with using telemedicine, whereby Pearson's chi-squared (x^2) = 45.794[a], p <0.05 (Table 6.12a).

48% of the patients agree (36%) or strongly agree (12%) that it would be difficult to talk to a physician using telemedicine, 24% (3+1+4+16) are happy to use telemedicine. In contrast, 52% of the patients disagree (45%) or strongly disagree (7%) and stated that it would not be difficult to talk with a physician using telemedicine (see Table 6.12).

Difficult to talk by telemedicine * Happy to use telemedicine cross tabulation

Crosstab		Happy to use telemedicine				Total %	Category Total %
Q no. 14		Strongly agree	Agree	Disagree	Strongly disagree		
Difficult to talk using telemedicine	Strongly agree	3%	1%	6%	2%	12%	48%
	Agree	4%	16%	14%	2%	36%	
	Disagree	10%	29%	6%	0%	45%	52%
	Strongly disagree	6%	1%	0%	0%	7%	

Table 6.12: Crosstab summary for questions no. 14 and 13

Table 6.12a Chi-squared tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.794[a]	9	.000
N of Valid Cases	111		
a. 9 cells (56.3%) have expected counts less than 5. The minimum expected count is .29.			

Question no. 15: I would be willing to discuss my problems with a doctor over a telemedicine link.

This question was asked to understand the willingness of patients to discuss their problems with a doctor over a telemedicine network, and determines the nature of the relationship between patient and physician.

The chi-squared test suggests that there is a statistically significant relationship between the patients willingness to discuss their problems with a doctor over a telemedicine link and their

perceived difficulty of talking with a physician through telemedicine, whereby Pearson's chi-squared (x^2) = 41.577[a], p <0.05 (Table 6.13a).

With regards to the results, 74% of the patients were willing (46%) or very willing (28%) to discuss their problems with a doctor over a telemedicine link, 46% (11+28+7) % of patients also stated they would not have difficulty talking to a physician via telemedicine link. In contrast, 26% of the patients disagree (23%) or strongly disagree (3%) and were not willing to discuss their problems with a doctor using this technique, 20% (3+14+2+1) % of patients also stated they would have difficulty talking with a physician using telemedicine (see Table 6.13).

Willing to discuss the problems… * Difficult to talk… using telemedicine Cross tabulation

Crosstab		Difficult to talk using telemedicine				Total %	Category Total %
Q no. 15		Strongly agree	Agree	Disagree	Strongly disagree		
Willing to discuss problems over a telemedicine link	Strongly agree	4%	6%	11%	7%	28%	74%
	Agree	3%	15%	28%	0%	46%	
	Disagree	3%	14%	6%	0%	23%	26%
	Strongly disagree	2%	1%	0%	0%	3%	

Table 6.13: Crosstab summary for questions no. 15 and 14

Table 6.13a Chi-squared tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.577[a]	9	.000
N of Valid Cases	111		
a. 9 cells (56.3%) have expected counts less than 5. The minimum expected count is .22.			

Question no. 16: I would be willing to be examined by a doctor over a telemedicine link.

This last question was asked to explore the willingness of patients to be examined by a doctor using a telemedicine network.

It was hypothesised that women may be less willing to be examined than men due to cultural effects. However the results suggest that there is no statistical difference between the willingness of patients to be examined by a doctor using a telemedicine link and their gender, whereby Pearson's chi-squared (x^2) = 3.368[a], p >0.05 (Table 6.14a).

With regards to the results, 76% of the patients were willing to be examined by a doctor over a telemedicine link with approximately equal ratio male to female (50% and 50%), whereas, 24% of the patients were not willing to be examined by a doctor over a telemedicine link.

Willing to be examined by a doctor using telemedicine * Gender Cross tabulation

Crosstab		Gender		Total	Category Total %
Q no. 16		Male	Female		
Willing to be examined	Strongly agree	13%	11%	24%	76%
	Agree	26%	26%	52%	
	Disagree	11%	10%	21%	24%
	Strongly disagree	0%	3%	3%	

Table 6.14: Crosstab summary for questions no. 16 and 2

Table 6.14a Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.368[a]	3	.338
N of Valid Cases	111		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.49.

2. Technology anxiety

Question no. 17: I am worried that telemedicine is not private and confidential.

This question was asked to determine the concerns of patients regarding the privacy and confidentiality of their information when using a telemedicine system (technology anxiety). With regards to the results, 55% of the patients were worried (36%) or very worried (19%) about the

privacy and the confidentiality of their data, while 45% of the patients had no concerns over the privacy and confidentiality of the telemedicine system (see Tables 6.15).

Question no. 17		Percent %	Total %
Valid	Strongly agree	19%	55%
	Agree	36%	
	Disagree	40%	45%
	Strongly disagree	5%	

Table 6.15: Question no. 17

Question no. 18: The physician will not be able to examine me by telemedicine as well as if I were with the doctor in person.

This question was asked to discover whether patients were anxious about the ability of the doctor to examine them through telemedicine technology. As a result, 73% of the total patients agree (50%) or strongly agree (23%) that a physician would not be able to examine them by telemedicine as well as if they were with the doctor in person. In contrast, 27% of the patients disagree (24%) or strongly disagree (3%) with this statement (see Table 6.16).

Question no.18		Percent %	Total %
Valid	Strongly agree	23%	73%
	Agree	50%	
	Disagree	24%	27%
	Strongly disagree	3%	

Table 6.16: Questions no. 18

Several patients provided further comments. Table 6.17 shows a summary of the comments of the patients based on thematic content analysis.

Patients comments	Percent %
1-The current referral system is better than telemedicine	9 %
2- Telemedicine has ambiguous benefits	6 %
3-Telemedicine needs good infrastructure from technical and managerial issues	6 %
4- Telemedicine is good to save time and money	17 %
5- We need to gain trust of it through pilot systems	4 %

Table 6.17: Summary of patients' comments regarding telemedicine use

17% of the patients said that telemedicine is a good technique to save time and money, however 6% of the patients considered that telemedicine has ambiguous benefits. 9% of the patients said that the current referral system is better than telemedicine. 6% said that telemedicine needs a good infrastructure in terms of technical and managerial issues and 4% said a pilot system would be needed in order to gain trust of telemedicine technology.

6.1.2 Results of the physicians' questionnaires

The questionnaires were conducted with physicians at Kuwaiti governmental hospitals from January 2011 to July 2011. During this period, the questionnaires were handed to 68 physicians across many specialties and from different hospitals in Kuwait. The number of completed questionnaires was 63: a total of 5 physicians refused to participate due to their lack of interest in the research and the subject. Therefore, the response rate for the physicians is 93%, as Table 6.18 shows:

Number of participants contacted	Number of completed questionnaires	Percentage %
68	63	93 %

Table 6.18: The response rate for the physicians

- **Section A- Demographic data**

Variables		No.	%
Age	Less than 35	3	5
	35-50	36	57
	51-60	16	25
	above 60	8	13
Gender	Male	59	94
	Female	4	6
Nationality	Kuwaiti	31	49
	Non-Kuwaiti	32	51
Specialty	Oncology	3	5
	Orthopaedics	4	6
	Cardiology	6	10
	Neurology	7	11
	Surgery	19	30
	Others	24	38
Years of experience	5 -10	7	11
	11- 20	24	38
	21 and above	32	51

Table 6.19: Summary of the demographic data of the physicians

Table 6.19 shows demographic details of those physicians who responded to the survey questionnaire. The majority of the physicians (57%) were between the ages of 35 and 50. Male respondents represent 94% of the sample, whereas females represent 6%. The responding physicians were 51% Kuwaiti and 49% non-Kuwaiti. Most (30%) were surgeons, and the smallest number of respondents per speciality was oncologists (5%). Fifty-one per cent of the physicians had experience of 21 years and above (see Table 6.19).

- **Section B- Background information**

This section investigates the skills of the physicians regarding their use of computer and information technology in the hospital, such as using the internet, e-mail and telemedicine applications.

Results show that use of computers by physicians is now relatively common with 89% reporting they use computers sometimes, often or always. Only 5% reported they never use a computer.

Internet and e-mail use were relatively high (71% and 67% respectively), although a significant number (19%) reported never using e-mail (see Table 6.20).

Questions	Always	Often	Sometimes	Rarely	Never
6-Use of a computer	40%	32%	17%	6%	5%
	40%	**72%**	**89%**	**95%**	
7-Use of internet	30%	24%	17%	13%	16%
	30%	**54%**	**71%**	**84%**	
8-Use of e-mail	30%	21%	16%	14%	19%
	30%	**51%**	**67%**	**81%**	
9-Use of telemedicine application	0%	0%	0%	0%	100%
10-Use of telemedicine system	0%	0%	0%	0%	100%

Table 6.20 Summary of the physicians' background information regarding IT usage

- **<u>Section C- Physicians' satisfaction with the current referral abroad system</u>**

Question no. 11: I am satisfied with the current procedures for referring patients abroad.

This question was asked to determine the level of satisfaction of the physicians regarding the current procedures for referring patients abroad.

With regards to the results, 60% of the physicians were dissatisfied with the current procedures for referring patients abroad; with 20% of the physicians very dissatisfied. However, 40% of the physicians were satisfied with the current referral abroad system with 3% very satisfied (see Table 6.21).

Question no. 11		Percent %	Total %
Valid	Strongly agree	3 %	40 %
	Agree	37 %	
	Disagree	40 %	60 %

	Strongly disagree	20 %	

Table 6.21: Question no. 11

Question no. 12: I have concerns about the current referral abroad system. (Tick all that apply)

This question was designed to determine the concerns of the physicians with the current referral abroad system. Additional space was provided for the physicians to add their own concerns.

The greatest concern, 92% of the physicians, was that too many patients ask for unnecessary treatment abroad. 32% of the physicians were concerned about unavailable treatment for some health cases, 30% said the procedure for referring abroad takes too long to get permission, and 13% were concerned about medical mistakes (see Table 6.22).

Question no. 12	Percentage %
1- It takes too long	30%
2- Treatment unavailable	32%
3- Medical mistakes	13%
4- Too many patients ask for unnecessary treatment abroad	92%

Table 6.22: Question no. 12

The additional concerns were analysed using thematic content, which revealed:

- Eleven percent (11%) of the physicians said they are pressurised by colleagues and family to accept such cases and to refer them abroad.
- Eleven percent (11%) of the physicians said that there is a need is to optimise current health services, such as nursing and informatics.
- Eight percent (8%) of the physicians were concerned about patient-doctor trust.

Question no. 13: A telemedicine system could be a solution for handling these issues.

This question was asked to determine if a telemedicine system could be a solution for the previous issues or concerns. As a result, 73% of the total physicians agreed that a telemedicine

system could be a solution for handling the issues or concerns (see Table 6.22); with 19% of the physicians strongly agreeing with this statement. In contrast, 27% of the physicians disagreed that telemedicine could be a solution for handling the concerns (see Table 6.23).

Question no. 13		Percent %	Total %
Valid	Strongly agree	19 %	73 %
	Agree	54 %	
	Disagree	25 %	27 %
	Strongly disagree	2 %	

Table 6.23: Question no. 13

- **Section D- Physicians' perceptions about telemedicine**

Questions no. 14, 15, 16 and 17 were designed to examine the perceptions of the physicians about the use of ICT, such as telemedicine.

Question no. 14: Telemedicine is a viable approach for providing medical care services to patients.

With regards to the results, 89% of the physicians agree (68%) or strongly agree (21%) that telemedicine is a viable approach for providing medical care services to patients. On the other hand, 11% of the total physicians disagreed with this statement and none strongly disagree (see Table 6.24).

Question no. 14		Percent %	Total %
Valid	Strongly agree	21 %	89 %
	Agree	68 %	
	Disagree	11 %	11 %
	Strongly disagree	0%	

Table 6.24: Question no. 14

Question no. 15: There is a potential role for ICT/the internet in health care.

With regards to the results, 97% of the physicians agree (65%) or strongly agree (32%) that there is a potential role for ICT/the internet in health care. Only 3% of the total physicians disagree with this statement and none strongly disagree (see Table 6.25).

Question no. 15		Percent %	Total %
Valid	Strongly agree	32 %	97 %
	Agree	65 %	
	Disagree	3 %	3 %
	Strongly disagree	0%	

Table 6.25: Question no. 15

Question no. 16: Using a telemedicine system can save time and money.

With regards to the results, 90% of the physicians agree (58%) or strongly agree (32%) that using a telemedicine system can save time and money. Only 10% of the physicians strongly agree and none strongly disagree with this statement (see Table 6.26).

Question no. 16		Percent %	Total %
Valid	Strongly agree	32 %	90 %
	Agree	58 %	
	Disagree	10 %	10 %
	Strongly disagree	0%	

Table 6.26: Question no. 16

Question no. 17: A telemedicine system can save effort.

With regards to the results, 83% of the physicians agree (59%) or strongly agree (24%) that using a telemedicine system can save effort. In contrast, 17% of the physicians disagree and none strongly disagree that a telemedicine system can save effort (see Table 6.27).

Question no. 17		Percent %	Total %
Valid	Strongly agree	24 %	83 %
	Agree	59 %	
	Disagree	17 %	17 %

	Strongly disagree	0%	

Table 6.27: Question no. 17

Question no. 18: The applications of ICT in health care are already available

With regards to the results, 35% of the physicians agree (32%) or strongly agree (3%) that the applications of ICT in health care are already available in Kuwaiti hospitals. 65% of the physicians disagree (40%) or strongly disagree (25%) and said that the applications of ICT are not available in health care in Kuwait (see Table 6.28).

Question no. 18		**Percent %**	**Total %**
Valid	**Strongly agree**	3 %	35 %
	Agree	32 %	
	Disagree	40 %	65 %
	Strongly disagree	25 %	

Table 6.28: Question no. 18

- **Section D- Physicians' comfort with technology**

Questions no. 19, 20 and 21 were designed to examine the attitudes of the physicians regarding the usage and benefits of telemedicine as a communication tool for practicing medicine, with the last question of this section (no. 22) designed to examine their comfort with using telemedicine with regards to the culture of Kuwait.

Question no. 19: I can trust the technology to work.

95% of the physicians trust (76%) or strongly trust (19%) the technology to work. In contrast, only 5% of the total physicians disagree and none strongly disagree and said they cannot trust the technology to work (see Table 6.29).

The chi-squared test suggests that there is no statistically significant relationship between the physicians trust of the technology to work and their age, with Pearson's chi-squared (x^2) = 11.211^a, $p > 0.05$ (Table 6.29a).

Crosstab		Respondent's age				Total %	Category Total %
Q no. 19		Less than 35	35-50	51-60	Above 60		
Trust technology to work	Strongly agree	0%	14%	3%	2%	19%	95%
	Agree	3%	43%	19%	11%	76%	
	Disagree	2%	0%	3%	0%	5%	5%
	Strongly disagree	0%	0%	0%	0%	0%	

Table 6.29: Crosstab summary for question no. 19 and 1

Table 6.29a Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.211[a]	6	.082
N of Valid Cases	63		
a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .14.			

Question no. 20: I am happy using ICT/the internet for the purposes of patient care and education.

With regards to the results, 95% of the physicians agree (63%) or strongly agree (32%) that they would be happy to use ICT/the internet for the purposes of patient care and education. On the other hand, only 5% of the total physicians disagree and none strongly disagree with using ICT/the internet for patient care and education (see Table 6.30).

Question no. 20		Percent %	Total %
Valid	Strongly agree	32 %	95 %
	Agree	63 %	
	Disagree	5 %	5 %
	Strongly disagree	0%	

Table 6.30: Question no. 20

Question no. 21: There is a general comfort in using ICT/the internet to store, retrieve and communicate patient information with other health institutions.

With regards to the results, (91%) of the physicians agree (64%) or strongly agree (27%) that there is a general comfort in using ICT/the internet to store, retrieve and communicate patient information with other health institutions. In contrast, 9% of the total physicians disagree (8%) or strongly disagree (1%) with this statement (see Table 6.31).

Question no. 21		Percent %	Total %
Valid	Strongly agree	27 %	91 %
	Agree	64 %	
	Disagree	8 %	9 %
	Strongly disagree	1 %	

Table 6.31: Question no. 21

Question no. 22: Our culture and social norms do not refuse the use of telemedicine.

89% of the physicians agree (71%) or strongly agree (18%) that culture and social norms in Kuwait do not refuse the use of telemedicine. In contrast, 11% of physicians disagree (10%) or strongly disagree (1%) and said that culture and social norms in Kuwait refuse the use of telemedicine (see Table 6.32).

Question no. 22		Percent %	Total %
Valid	**Strongly agree**	18 %	89 %
	Agree	71 %	
	Disagree	10 %	11 %
	Strongly disagree	1 %	

Table 6.32: Question no. 22

- **Section F- Physicians' willingness about telemedicine**

Questions no. 23, 24, 25, 26 and 27 were designed to examine the willingness of the physicians towards the adoption and use of telemedicine technology, and specifically how their attitudes as potential users can affect their acceptance or rejection of the system. The last question was designed to explore the barriers to telemedicine adoption and allowed for additional comments.

Question no. 23: I would like to consult with large centres in my specialty whilst I am in my own hospital.

Almost all of the physicians (99%) would like to undertake consultations with large centres in their own specialties at a distance while they are in the hospital; 51% of the physicians strongly agree and 48% agree. Only one physician (1%) disagreed and none strongly disagree (see Table 6.33).

Question no. 23		Percent %	Total %
Valid	Strongly agree	51 %	99 %
	Agree	48 %	
	Disagree	1 %	1 %
	Strongly Disagree	0%	

Table 6.33: Question no. 23

Question no. 24: I would like to be able to watch an operation as it is taking place.

92% of physicians agree (43%) or strongly agree (49%) that they would like to be able to watch an operation as it is taking place in a health institution. 8% of physicians disagree (5%) and strongly disagree (3%) with the above statement (See Table 6.34).

Question no. 24		Percent %	Total %
Valid	Strongly agree	49 %	92 %
	Agree	43 %	
	Disagree	5 %	8 %
	Strongly disagree	3 %	

Table 6.34: Question no. 24

Question no. 25: The proposed technology of telemedicine is appropriate due to the current conditions in the hospital.

75% of the physicians agree (59%) or strongly agree (16%) that telemedicine is appropriate to the current conditions in hospitals in Kuwait, such as shortages of sub-specialists. On the other hand, 25% of the physicians disagree (22%) or strongly disagree (3%) with this statement (see Table 6.35).

Question no. 25		Percent %	Total %
Valid	Strongly agree	16 %	75 %
	Agree	59 %	
	Disagree	22 %	25 %
	Strongly disagree	3 %	

Table 6.35: Question no. 25

Question no. 26: I think that my colleagues would be willing to implement the technology of telemedicine for its intended purpose.

90% of physicians agree (74%) or strongly agree (16%) that their colleagues would be willing to implement the technology of telemedicine for its intended purpose. Whereas only 10% of the physicians disagree and none strongly disagree (See Table 6.36).

Question no. 26		Percent %	Total %
Valid	Strongly agree	16 %	90%
	Agree	74 %	
	Disagree	10 %	10%
	Strongly disagree	0%	

Table 6.36: Question no. 26

Question no. 27: A telemedicine system can be integrated within the existing system.

75% of the physicians agree (65%), strongly agree (10%) that a telemedicine system can be integrated within the existing system in Kuwait. 25% of the physicians disagree (19%) or strongly disagree (6%) (See Table 6.37).

Question no. 27		Percent %	Total %
Valid	Strongly agree	10 %	75 %
	Agree	65 %	
	Disagree	19 %	25 %
	Strongly disagree	6 %	

Table 6.37: Question no. 27

Question no. 28: Which of the following issues might be a reason for *not* adopting telemedicine? (Tick all that apply)

This question was designed to determine the issues that might be reasons for ***not*** adopting telemedicine in the Kuwaiti healthcare system.

Table 6.38 shows that most of the physicians (73%) said that lack of suitable training in the use of equipment was a reason for not adopting telemedicine. Moreover, 44% of the physicians chose 'negative attitudes of staff involved in telemedicine use' as a barrier to adopting telemedicine. Furthermore, concerns about patient privacy/confidentiality and lack of perceived clinical usefulness were only chosen by 27% of the total physicians (see Table 6.38 for further details).

Issues might be the cause of not adopting telemedicine	Percentage %
1. High cost of equipment	37 %
2 Lack of suitable training in the use of equipment	73 %
3. Concerns about patient privacy/confidentiality	27 %
4. Lack of perceived clinical usefulness	27 %
5. Negative attitudes of staff involved	44 %
6. Perceived increase in workload	35 %
7. Lack of user-friendly software	38 %
8. Lack of consultation between IT and clinicians	38 %

Table 6.38: Question no. 28

6.2 Data analysis of the interviews

Thematic analysis is "a qualitative technique that examines the different topics covered within a selection of documents" (Oates, 2006, P. 239). In this study, the themes were developed based on the literature on the topic of telemedicine adoption and implementation, and by considering the setting in Kuwait.

Preceding data analysis, the interviews were transcribed from the audio recordings. Most interviews were recorded digitally, but for those interviewees who refused audio recording, extra time was necessary for the researcher to record the responses manually. As all of the interviewees were Kuwaiti, the interviews were conducted in Arabic, except for questions where a preference for English as indicated by the interviewees in order to express their opinions in a comprehensive and easy way.

As the number of interviews was relatively few and responses brief, a manual approach to thematic analysis was used. This technique is widely used in information systems and health services research, and is deemed most appropriate for analysing the data in the current study (Oates, 2006; Smith, 2006; Miles and Huberman, 1994; Bowling, 2009).

Data analysis proceeded using the following method, which was used for the two types of stakeholders of telemedicine adoption, namely the (1) policy makers and (2) the IT managers:

1. Translate each interview from Arabic to English.
2. Review the data repeatedly in order to identify the information of most relevance to the objectives of the study.
3. Organise the data to collect the important themes together; remove duplication of information.
4. Collect similar themes together to identify common topics.
5. Frequency analysis to identify the most important topics for the interviewees.
6. Correlation within interviews to identify and validate topics.

The results of the analysis of the interviews is summarised, in Tables 6.39 and 6.40. The questions of the interviews are in Appendix C. Feedback on the results was sought by having a further interview with the policy makers.

The Undersecretary of the Kuwait Ministry of Health arranged for interviews to be held with a number of policy makers who were responsible and considered to be involved in telemedicine

adoption and implementation. A special interview was arranged with the Kuwait Minister of Health, in order to explore his opinion with regards to telemedicine adoption.

There were interviews with seven policy makers:

- Kuwait Minister of Health
- Undersecretary of the Ministry of Health
- Assistant Undersecretary for Public Health
- Assistant Undersecretary for Planning and Follow-up
- Assistant Undersecretary for Supporting Medical Services
- Assistant Undersecretary for Financial and General Services
- Director of Treatment Abroad Department

6.2.1 Results of the policy makers' interviews

All of the interviewees were physicians, and their age was above 50 years old, with an experience of more than 20 years, except the Minister of Health, who is aged below 50 years old.

From the analysis of the interviews, four main thematic groups emerged: (1) current referral abroad system; (2) ICT and telemedicine context; (3) telemedicine adoption; and (4) decision makers and organisational readiness.

Each thematic group was sub-divided into a number of topics which related to specific questions on the questionnaire (see Table 6.39).

Thematic Groups and Sub-topics		**Questions associated**
Thematic Group 1: Current referral abroad system		
Sub-topic (1)	Allocated size of budget	Q. 4
Sub-topic (2)	Patients issues	Q. 5
Thematic Group 2: ICT and telemedicine context		
Sub-topic (3)	Use of ICT	Q.6,7

Sub-topic (4)	Potential of telemedicine	Q.8,9
Thematic Group 3: Telemedicine adoption		
Sub-topic (5)	Inhibiting factors	Q.10
Sub-topic (6)	Solutions and Supportive factors	Q. 11,12
Sub-topic (7)	Cultural/Social factors	Q. 10,15
Thematic Group 4: Decision makers and organizational readiness		
Sub-topic (8)	Existing and new policies	Q.13,16
Sub-topic (9)	The role of the Ministry of Health	Q.14

Table 6.39: Thematic groups and sub-topics for the policy makers' interviews and the associated questions.

These interviews were analysed in the same way to determine themes and responses that emerge. Results are presented by addressing each of the topics of the table 6.39.

6.2.1.1 Allocated size of budget

The interviews with the policy makers confirmed that the Kuwait Ministry of Health has concerns over the size of the budget that has been allocated annually to refer Kuwaiti patients abroad for treatment. All the interview participants said and agreed that there are too many patients asking for unnecessary treatment abroad and they are currently abusing the service and wasting the budget, as the government is responsible for all the expenses of the patient and one of their kin. Two of the policy makers commented on this as "*therapeutic tourism*". Accordingly, the policy makers at the Ministry of Health were not satisfied with the budget and its inflation: they considered it a problem and are seeking a solution that satisfies all parties. "*We are not satisfied with the size of the budget that inflates year after year, so we consider it a problem, and we are seeking a solution that fits all parties such as government and patients*" (policy maker 1, Kuwait Ministry of Health).

6.2.1.2 Patients' issues

All the policy makers agreed that there are psychological pressures on patients who travel abroad for treatment, such as emotional effects from leaving their home and, in some cases, financial effects, although patients are encouraged to seek treatment and second opinions. "*Patients are not satisfied with the current health services, and always seek second opinions and trusted*

medical services" (policy maker 2, Kuwait Ministry of Health). Two of the participants said that some patients need to travel abroad to receive special treatment but they are unable because none of their families are able to accompany them.

6.2.1.3 Use of ICT

Several plans have been developed to improve the quality of health services and to reduce the budget for patients being treated abroad. One plan was to have visits by medical experts in the different specialties from abroad to diagnose patients and undertake surgery. Three of the policy makers asserted that there had been offers from global medical centres to use telemedicine services such as telecardiology and telepaediatrics. "*We have offered telemedicine services from global medical centres for cardiac and paediatric patients, but the absence of awareness and a leader specialist in using information and communications technology in medicine was behind the lack of consideration of telemedicine adoption*"(policy maker 1, Kuwait Ministry of Health).

In addition, the interviews revealed that there had been local projects in the Ministry of Health based on ICT about twelve years ago. However, these projects had failed due to issues, such as weak management. One commented "*This is because unqualified persons were given sensitive positions that misled the ICT project*s" (policy maker 1, Kuwait Ministry of Health).

One of the policy makers stated that telemedicine technology was successfully being used on an individual basis by some physicians in one hospital in Kuwait for follow-up patients at distance; other staff welcomed this attempt.

All the participants appreciated the use of ICT in practicing medicine, but with the reservation of the need for good management and a strong technical infrastructure to avoid failure.

6.2.1.4 Potential of telemedicine

All of the interviewees were aware of the potential of telemedicine to deliver medical services, but their knowledge was limited. The majority of the policy makers confirmed the need for telemedicine services, especially for patients with difficulties to travel and follow-up patients. Moreover, all of the policy makers stated that telemedicine would have a positive impact on the health status of the patients. "*Use of telemedicine in the Kuwaiti health system will certainly*

provide a positive impact on the patients themselves and their family as well" (policy maker 2, Kuwait Ministry of Health).

All of the interviewees agreed that if telemedicine were implemented properly, the budget spent on sending patients abroad would be reduced, even if only operated for follow-up or chemotherapy patients. Indeed, all of the policy makers stated that medical staff in Kuwait would benefit from sharing knowledge with other global medical experts. "*Telemedicine is useful if implemented properly for follow-up and chemotherapy patients, as it will reduce the budget and will educate our medical staff from sharing experiences with other global experts*" (policy maker 3, Kuwait Ministry of Health).

A further policy maker identified the potential for telemedicine if implemented in the Kuwait health care system "*Telemedicine system will be very effective for follow up cases*" (policy maker 7, Kuwait Ministry of Health)

The responses of the interviewees indicate how all consider that telemedicine usage is important, as it would have a positive impact on the patients, medical staff and budget of the health care organisation.

6.2.1.5 Inhibiting factors

It is common for there to be issues working against the adoption of ICT (telemedicine) in health care organisations. Most of the policy maker interviewees at the Ministry of Health in Kuwait asserted that the absence of strong leadership and management is the biggest inhibiting factor for telemedicine adoption. Hence, bad communication between departments and institutions is obvious at the Kuwait Ministry of Health, in addition to the slowness of routine administrative work.

Moreover, three of the policy makers said "…*three issues were responsible for the suspended ICT projects, which are: staff resistance to change, work overload, and legality issues*". There is always the question of "*Who is responsible for medical mistakes during teleconsultation? The local physician, the distant physician or the technical support team?*" (policy maker 1, Kuwait Ministry of Health).

Some of the policy makers mentioned that some types of patients, especially the elderly patients do not accept change and the use of something strange to them with unknown results. Also, they do not trust technology to work properly and prefer face to face consultation.

Indeed, there are doctors, particularly consultants, who do not accept the idea of teleconsultation as they are confident about themselves and think that they have enough knowledge to treat the health cases of patients with no need for extra consultation: "*....we have doctors in Kuwait who are over-confident and who would consider the use of telemedicine as an inhibiting factor to their capabilities and abilities*" (policy maker 3, Kuwait Ministry of Health).

On the other hand, all of the policy makers commented on the unpreparedness of the technical infrastructure at the Ministry of Health, which is considered an obstacle to telemedicine adoption that needs very serious improvement. One of the participants commented "*We are far away from this kind of technology and services, due to inefficiency of the current technical infrastructure*" (policy maker 7, Kuwait Ministry of Health).

The cost is not an inhibiting factor to telemedicine adoption in Kuwait, as it was not mentioned by any of the interviewees.

6.2.1.6 Solutions and supportive factors

There are many factors that act as obstacles to the successful adoption of telemedicine in the health care in Kuwait which include concerns expressed by patients and medical staff, IT support and management. The policy maker interviewees suggested solutions for these obstacles, and these are summarised as:

1- Good leadership and management would help to improve communication between departments and institutions; this would help the project to be led and managed properly.

2- Building a good technical infrastructure that users could rely on to work efficiently.

3- Increasing the awareness of telemedicine for all stakeholders, including patients.

4- Providing continuous training programmes for all staff involved.

5- Providing a pilot system of telemedicine to prove the potential of the system.

6- Encouraging physicians to use telemedicine by offering incentives.

7- With regards to legal issues, an approval letter should be issued during the agreement process between health institutions, in order to specify who would be responsible in the event of medical mistakes during teleconsultation.

8- The cultural and social concerns of the patients should be carefully considered prior to the use of telemedicine.

The use of technology in Kuwait is already seen in many arenas and numerous types of companies, such as banks, and supermarkets, as well as on the social level. Most of the interviewees agreed that information technology should be integrated into health services: "*The wide use of the internet and computers in Kuwaiti society gives us an optimistic insight into the use of IT in our health services*" (policy maker 4, Kuwait Ministry of Health).

The policy makers also indicated that the Ministry of Health in Kuwait welcomes projects that return benefits. However, the difficulty in making decisions and identifying the actual need are slowing development (So, cost is considered a supportive factor in Kuwait, even though the spending of money to run future projects must be reasonable with no waste).

Indeed, one of the interviewees declared that *"…we have well-trained staff in hospitals in Kuwait who are highly educated and ready to use telemedicine to improve the quality of medical services and to reduce the overload of some clinics*" (policy maker 3, Kuwait Ministry of Health). All of the interviewees confirmed that all medical laboratories, radiography department and nuclear medicine departments are fully computerised, which could facilitate the use of telemedicine.

6.2.1.7 Cultural/social factors

All of the policy makers agreed with the importance of taking the cultural and social norms of people in Kuwait into consideration in order to facilitate the adoption and implementation of telemedicine. Three of the policy makers asserted: "*Cultural and social norms in Kuwait are issues that cannot be ignored, since Kuwait is an Arabic and Islamic country, so we should consider it seriously for the easy adoption of telemedicine*" (policy maker 5, Kuwait Ministry of Health).

Telemedicine is considered a new approach in health care delivery, hence most of the policy maker interviewees said: "*Certainly there will be patients that refuse or avoid any new technique that has unexpected outcomes*" (policy maker 5, Kuwait Ministry of Health). Also, women in Kuwait refuse to expose their bodies to strangers, so they always take this into consideration when they are with a physician in person.

Therefore, the policy makers confirmed the need to increase the awareness of the public in general, and patients in particular, in order to minimise the inhibiting nature of some social norms. In addition, the confidence of physicians could help patients to accept the new way of conducting consultations. All of the interviewees said: "*We have to guarantee the privacy and confidentiality of patient data*" (policy maker 5, Kuwait Ministry of Health).

6.2.1.8 Existing and new policies

The overseas treatment of Kuwaiti patients is organised through a set of policies, which was prepared by the Kuwait Ministry of Health. Therefore, all of the interviewees said: "*In order to introduce any system or technique to support the treatment abroad department, new policies should be developed to organise the process of telemedicine implementation*" (policy maker 6, Kuwait Ministry of Health).

Most of the policy makers also said that data security and user protection must be maintained officially. "*policies for telemedicine use should be developed by involving medical boards for each specialty in the hospital, in addition to the need for a list of legislations in order to maintain rights for both patients and physicians and to avoid the misuse of telemedicine"* (policy maker 4, Kuwait Ministry of Health).

Furthermore, two of the policy makers mentioned that there should be collaboration and coordination between the Ministry of Health and the Ministry of Justice in order to maintain the privacy and confidentiality of patient information: "*….for example, what would happen in the case of leaked information regarding patients with AIDS or a disorder of the reproductive system?*" (policy maker 1, Kuwait Ministry of Health).

Developing a policy for telemedicine will be important, especially to prevent certain behaviour from some patients, such as requesting multiple teleconsultations by the same patient for the

same health problem "… *in regards to the culture of the Kuwaiti people, the number of teleconsulations should be restricted with the number of times in order to avoid misuse of the telemedicine system"* (policy maker 2, Kuwait Ministry of Health).

One of the policy makers declared the importance of involving patients in the use of telemedicine to eliminate some barriers. "*The final decision regarding the type of diagnosis and treatment by telemedicine use should be given to the patient*" (policy maker 4, Kuwait Ministry of Health).

6.2.1.9 The role of the Ministry of Health

The Kuwait government always welcomes improvements and developments in all fields, particularly in health. Therefore, the Kuwait Ministry of Health can play a substantial role in bringing in and encouraging the acceptance of telemedicine services for patients for the intended purposes.

The Ministry of Health in Kuwait welcomes any project that leads to improvements in health care services and gives all the support needed. "*Undoubtedly that the Kuwait government will give all the support needed to the Ministry of Health, starting from encouragement and finance to the community awareness of the people of Kuwait*" (policy maker 6, Kuwait Ministry of Health).

From the responses of the policy makers, the following points summarise the expected role of Kuwait's Ministry of Health in facilitating the adoption of telemedicine:

1. The adoption of telemedicine relies on a political decision. Accordingly, agreements between health institutions (local and global) will determine the needs of technical requirements, charge fees and the expected outcomes of telemedicine services that must be determined and facilitated by the Ministry of Health.

2. Three institutions should be involved altogether (not separate) with the Kuwait Ministry of Health with regards to telemedicine implementation in Kuwait: (1) a tender committee; (2) the Ministry of Planning; and (3) the Central Unit of Information Technology.

3. It is very important to choose the best company (in terms of previous reputation) to work with to provide telemedicine technology.

4. Cooperation and coordination should be initiated between the Ministry of Health and other ministries in Kuwait, such as the Ministry of Telecommunications to support the internet and other telecommunication media and the Ministry of Information to publicise the services of telemedicine locally.

5. Develop the strategy required to implement the telemedicine system in the Kuwait health care system. "*The Ministry of Health will be responsible for organizing the work teams, and putting the strategy required for telemedicine implementation*" (policy maker 7, Kuwait Ministry of Health)

6.2.2 Results of the IT managers' interviews

There are five health regions in the State of Kuwait, in addition to a specialised health region (Al-Sabah health region), and each health region has an IT manager. Therefore, interviews were conducted with all of the six IT managers.

The purpose of these interviews was to explore the opinions of the IT managers regarding the needs and readiness of the health care facilities in Kuwait for the purpose of assessment prior to telemedicine adoption.

All of the interviewees were well educated, some of them hold a Bachelor of Science in information technology, while others were computer engineers, and their age was between 35 and 45 years old, with an experience of more than 10 years.

Three main thematic groups were identified: (1) readiness of ICT infrastructure; (2) ICT and telemedicine context; and (3) telemedicine adoption, with each having sub-topics as seen in Table 6.40.

Thematic Groups and Sub-topics		**Questions associated**
Thematic Group 1: Readiness of ICT infrastructure		
Sub-topic (1)	Availability of ICT	Q. 4

Sub-topic (2)	Capability of the existed ICT/Internet	Q. 5,8
Thematic Group 2: ICT and telemedicine context		
Sub-topic (3)	Telemedicine technical requirements	Q.6
Sub-topic (4)	ICT policy	Q.9
Thematic Group 3: Telemedicine adoption		
Sub-topic (5)	Institutional plans	Q. 8
Sub-topic (6)	Managerial and cultural factors	Q. 9

Table 6.40: Thematic groups and sub-topics for the IT managers' interviews and the associated questions.

Analysis of the data is presented by thematic group and sub-topic as seen in Table 6.40.

6.2.2.1 Availability of ICT

Analysis of the transcripts of the interviews with the IT managers revealed that although the Ministry of Health in Kuwait is able to offer all the requirements for telemedicine implementation, the development process is very slow in Kuwait due to the administration system and its bureaucracy. Furthermore, all hardware and software are available and cost is not an issue "*…actually, it is not what ICT we have, it is what clear vision does the higher management want to achieve. It is the bureaucracy again*" (IT manager 1, Kuwait Ministry of Health).

The IT manager of the Capital Health Region discussed the approximate figures for the availability of technology in his institution: 900 computers, 650 printers, 6 working 1MB modems (each with a network capability of 100 MB/s) and 30 servers, in addition to one internet laboratory for searching e-journals and books.

In the Al-Farwaniya Health Region, there are about 700 computers, 400 printers, 1 working 1MB modem (with a network capability of 100 MB/s) and 22 servers, in addition to one internet laboratory for searching e-journals and books.

In the Hawalli Health Region, there are about 750 computers, 450 printers, 1 working 1MB modem (with a network capability of 100 MB/s) and 20 servers, in addition to one internet laboratory for searching e-journals and books.

In the Al-Jahra Health Region, there are about 1000 computers, 800 printers, 3 working 512 KB modem (with a network capability of 100 MB/s) and 28 servers, in addition to one internet laboratory for searching e-journals and books.

Other IT managers did not wish to provide details on the available technologies in their regions, e.g. "*we have got approximately similar availability of information technologies to other health regions*" (IT manager 2, Kuwait Ministry of Health).

6.2.2.2 Capability of the existing ICT

Each health region working under the umbrella of the Ministry of Health reports having a health information system (HIS). Two of the health regions (Al-Ahmadi and Capital) are using HISs from Germany, whereas the other four health regions (Al-Farwaniya, Hawalli, Al-Jahraa and Al-Sabah) are using Malaysian HISs. Separate companies are responsible for the maintenance of these systems.

All of the IT managers reported that there is no connection between the hospital and the primary care clinics with regards to patient records. So, each patient has two files: one for primary care and one for secondary care. "*...we are working now to integrate the hospital with the primary care clinics in each health region in order to unify one record for each patient in an electronic format*" (IT manager 3, Kuwait Ministry of Health).

The interviewees report that most of the departments in the hospitals are fully computerised, including medical laboratories, radiography department, nuclear medicine departments and pharmacies. However, these departments are working on stand-alone systems.

Although some of the health regions provide intranet services for medical staff for internal communication, only the Capital Health Region and the Hawalli Health Region provide an internet access for medical staff at the hospital, and even this at a low level, and provided by the organization. In the near future, an official internet connection will be provided to all of the hospitals and primary care clinics in Kuwait: "*It seems from the government's plan that, in the coming future, they will provide each health region in Kuwait with an internet connection by using a fibre optic cable for communication, which is supported by the Ministry of Telecommunications*" (IT manager 1, Kuwait Ministry of Health).

It is very important to provide healthcare with the necessary ICT technologies to make services complete and to raise the quality of services. Therefore, the technical assessment involves different aspects that support telemedicine use, most importantly the use of electronic patient records. Most of the IT managers confirmed the importance of completing electronic patient records: *"...I can say yes for telemedicine adoption after running the complete version of electronic patient records, in addition to the internet connection that can be easily offered"* (IT manager 2, Kuwait Ministry of Health).

6.2.2.3 Telemedicine technical requirements

The concept of telemedicine was new to all the interviewees: *"As a concept, it seems new and I've never heard about it. However, I can help you to answer these questions if the concept is similar to teleconferencing"* (IT manager 4, Kuwait Ministry of Health). Therefore, each interviewee was then given an introduction to the topic.

For the optimum use of a telemedicine system in the Kuwait health system, the IT managers agreed on certain technical requirements that must be available and in good condition. In addition to electronic patient records, these were:

- Audio and video equipment (microphones and cameras), electronic pads for zooming capabilities, screens and monitors.
- Computer systems.
- Fibre optic cable to provide a high quality internet connection.
- High bandwidth capability for high resolution images or live interaction.
- Satellite channels.
- Virtual Provider Networks (VPNs) for security and for working at a high quality.

Most of the IT managers said that the contract between the Ministry of Health and global medical centres will determine everything regarding the technical requirements to ensure the proper interoperability and compatibility of the communication standards.

6.2.2.4 ICT policy

Developing the policies to organise and facilitate the process of telemedicine implementation is also necessary, as there are currently no policies for using information and communication technology in the healthcare system in Kuwait.

All of the interviewees commented that the slowness of ICT adoption in Kuwait is due to the lack of specific policies that provide for the rights of purchasers and users: "*Unfortunately, we do not have any policies that support purchasing and using ICT widely*" (IT manager 5, Kuwait Ministry of Health).

Most of the IT managers added that purchase of ICT systems or equipment for the Ministry of Health should be exempt from tax, as these ICT systems will be utilised by patients. Therefore, there was a consensus among the interviewees regarding the need to set up a policy to support the purchasing of ICT systems.

6.2.2.5 Institutional plans

The interviewees described how all of the health regions in Kuwait share the same plans, which are:

- Integrating the primary care information system with the hospital information system in order to share a unified electronic patient record.
- Providing internet services for all medical staff.
- Building very strong security to keep the system safe and to maintain the privacy and confidentiality of patient information from unauthorised interventions.
- Using radio frequency identification (RFID) to trace patient information.
- Archiving old medical records electronically.
- Working on a smart card technology via ID card.
- Teleconsultation and teleconferencing for local and global communication.
- Offering all kinds of training programmes that suit different levels, such as computer skills, network knowledge and communication skills.

There were also institutional plans to establish a teleconsultation/teleconference room in each hospital. However, there was no clear vision how to implement the plans or for the IT departments in general. Two of the IT managers commented: *"…there is no clear vision for our*

departments that could lead us to the bright future for *ICT use and management*" (IT manager 1, Kuwait Ministry of Health).

6.2.2.6 Managerial and cultural factors

The IT managers articulated further aspects that would contribute to providing an ideal ICT infrastructure for telemedicine adoption. This can be classified under management and cultural issues. For example: "*A good ICT infrastructure is usually associated with excellent management and thorough policies, especially ones that relate to medico-legal issues. For example: what happens in the case of medical mistakes while using a telemedicine system? And how do we make sure that this mistake is medical or technical?*" (IT manager 6, Kuwait Ministry of Health). The medico-legal issue is still an obstacle in Kuwaiti society that suffers from bureaucratic management, which makes everything work slowly and become more centralised.

Also, appropriate policies must be developed for each team in the hospital in order to organise the work and this should not change upon the arrival of a new manager due to a personal trend, especially if the policies are effective. "*...this is how the culture influences the work, whereby some groups within the institution pretend that their ideas are correct and applicable, which in fact they are not and their ideas go against the work welfare"* (IT manager 1, Kuwait Ministry of Health).

Most of the IT managers confirmed that the following points must be addressed prior to telemedicine adoption:

- The workload must be managed prior to introducing any new system.
- A trial telemedicine system should be run for a period to ensure the suitability of the project.
- The different languages of technical support staff and medical staff mean that there is a need for specialists that could work as liaisons between the different teams.
- IT support should be available and ready 24 hours a day before, during and after the implementation of telemedicine services to offer prompt support.

This chapter has described the analysis of the data from the questionnaires and interviews and presented the results of the analysis. The chapter also presents the results of seeking feedback from the policy makers.

In the next chapter, the findings of this chapter will be discussed, and the results will be linked with the literature reviewed in chapter three.

Chapter Seven: Discussion

In this chapter, several issues and factors are explored and identified by assessing the readiness for each of the levels (individual, technical and organisational) in regard to the adoption of telemedicine system in the Kuwaiti healthcare system. Accordingly, a strategy and policy for implementation has been developed for overseas referral patients. Indeed, a comparison will be made at the end of this chapter between the readiness of Kuwait health care system and other health care systems, such as Jordan and Syria in regard to telemedicine adoption.

It is relevant to note that the Kuwaiti government has had to rebuild all the infrastructures for all of the establishments and its associates in the country after liberating the State of Kuwait from the Iraqi invasion in 1991. The Iraqi invasion destroyed everything, not only the oil wells, but also all the health facilities and hospitals in all the health regions in Kuwait. Therefore, readiness at the individual, technical and organisational levels has to be considered as a new phase of assessment for improvement and development in Kuwaiti healthcare since the liberation.

7.1 Readiness of individuals

The adoption of telemedicine systems and their use in hospitals in Kuwait relies on the needs of the individuals (the givers and the receivers) in the organisations and their awareness of the potential of telemedicine to achieve the desired goals. Moreover, involving the individuals and exploring their acceptance level at the stage preceding the adoption of telemedicine is crucial and could help predict the success of the adoption.

7.1.1 Overseas referral patients

The number of patients requesting referral abroad for treatment has risen year on year, especially after 1991, when most specialists were reluctant to take a job in Kuwait due to political issues. Compensating for this shortage of specialties by local staff has taken place slowly. Therefore, the findings of this study revealed that most of the overseas referral patients were happy to travel abroad to receive medical consultations and treatment. However, permission to travel abroad takes too long to approve, as most of the patients (86%) asserted, which in turn might negatively affect the health conditions of the patients. Furthermore, more than half of the overseas referral patients had concerns, mostly due to separation from their family, being in a foreign country and

finding it difficult to travel because of the severity of their illness. Neither the marital status of the patient nor their gender affected anxiety regards referral abroad, except for all divorced and most widowed patients being worried and this could be due to cultural effects as their spousal support is no longer available. As a result, the findings reveal that patients in Kuwait strive to obtain the best medical consultation from several local institutions but almost always consider overseas options eventually. These patients are not satisfied with the tertiary services in Kuwait that require specialists and sub-specialists for the most difficult health cases; thus, they are forced by the shortage of specialists to apply to travel abroad for treatment. This is very expensive for the government. Dissatisfaction with the current health services in Kuwait should initiate a demand to improve them and fill the gap in the availability of specialists. Consequently, this should create a fertile ground for change and the new approach accepted. This is the stage of 'unfreezing' as stated in Lewin's model (Jennett et al., 2005).

7.1.1.1 Attitudes of the overseas referral patients towards a telemedicine system

In Kuwait, the relationship between the citizens and their rulers is good, and the Government attempts always to consider their opinions seriously and react positively. The government therefore considers it important to take into account the attitude of overseas referral patients in regard to telemedicine and this in turn reflects their needs as well as their perceptions.

The findings of this study demonstrate that the educational level of patients has an impact on their awareness level of telemedicine: half of the 40% of patients who had heard about telemedicine were well educated and most of them held a degree. The majority of the overseas referral patients (69%) were willing to use telemedicine. Age did not have a strong influence. The results illustrate that most patients were willing to use telemedicine, as most of them (74%) agreed to discuss their health problem via this new technique; however, about half of them (48%) said that it would be difficult to talk to a physician using telemedicine technology. This concern could be due to the lack of knowledge regarding the potential of ICT to deliver medical consultations, as well as the fact that the relationship between the patient and physician while using this technique is considered new. These results are consistent with the literature, which has revealed the main concerns of patients regarding telemedicine use (Miller, 2011; Lopez et al.,

2011). Surprisingly, a high percentage of the overseas referral patients (76%) were willing to be examined by a doctor over a telemedicine link and the results suggest that gender would not make any difference. The society in Kuwait is conservative and has its own culture and religion; however, desire of the patient to be treated quickly remains dominant. The results reveal that about half of the patients (54%) were worried about the privacy and confidentiality of their data when using telemedicine. By contrast, 46% of the patients agreed that telemedicine would be private and confidential. It seems that the lack of awareness of the patient regarding the safety of technology use has a clear effect on their responses. Also, special attention should be given to the culture of female patients who require privacy, particularly when asked to expose parts of their bodys to male doctors. Therefore, guaranteeing the privacy and confidentiality of the information in regard to the culture of the patients would contribute positively to the better acceptance of telemedicine use. In addition, use of a demonstration to show how the system works effectively could enhance the trust of the patient and the healthcare provider, as other studies have suggested (Love and Whitten, 2005; Guillen, 2002; Hu et al., 2000).

On the other hand, the majority of the overseas referral patients (73%) stated that the ability of a physician to examine them would be affected by use of telemedicine systems, in comparison to an examination in person. Thus, the perception of these patients is that telemedicine use is a new procedure in which the routine work of medical practice will be changed slightly, since the new procedure will lack an important aspect: direct physical examination. This aspect provides physicians with multisensory information, which is considered a fundamental requirement in the diagnostic process. Moreover, the use of ICT as a telemedicine system needs to be user-friendly to make the teleconsultation procedure appear smooth and efficient; otherwise patients will lose their trust in the entire system, as several studies have affirmed (Miller, 2011; Lopez et al., 2011; Pal et al., 2005).

Further comments have been made by the patients: most importantly that telemedicine can save time and money. In addition, they comment that the use of telemedicine in the Kuwaiti health system will save lives. This will be either by expediting the process of referring patients abroad or by getting medical consultations quickly so that the medical staff in Kuwait can react appropriately. In addition, from the comments, there is a need for a pilot telemedicine system in order for patients to trust the whole telereferral system and to understand the benefits. Much of

the extant literature is consistent with these comments (Pathni et al., 2009; Latifi et al., 2007; Dorrian et al., 2009; Wootton, 1997).

The attitude of Kuwaiti patients towards adopting a telemedicine system to support the health services in Kuwait has shown the willingness of the majority, even though the concept of telemedicine is considered new for them. Of course, this could relate to how the individual reacts to new issues. Therefore, this finding is contrary to previous research that has found Kuwaitis tend to avoid uncertainty, which needs to be minimised in order to implement an IT project (Aladwani, 2002). In addition, ambiguity should be avoided, according to Hofstede's (1980) uncertainty dimension. However, unlike people in other Arab countries, Kuwaiti people have acquired outside cultural ideas and norms that have an effect on their attitudes. This has been noted as shaping them (Ali et al., 1997). This is explained by the State of Kuwait being a trading centre in the past and where places such as India and Great Britain practiced business. The relationship formed between Great Britain and the State of Kuwait at that time resulted in the agreement for Kuwait to become a protectorate.

Overall findings show there to be clear readiness in overseas referral patients and a need to find a new approach to provide the best medical consultations from global experts. Hence, telemedicine can provide a solution to their current issues: difficulty in travelling, separation from home and the need to provide prompt intervention and therapy. However, patients did express some apprehensions regarding telemedicine use, such as; the quality of the telemedicine service, the privacy and confidentiality of the data, and the ability for a doctor to use the system easily and effectively.

7.1.2 Specialised physicians for referring patients abroad

The policy of the Department of Treatment Abroad states that a physician who is responsible for the healthcare of patients has to be a specialist or consultant who is able to assess the case efficiently (Policy of the treatment abroad, 2009). It is also important to know the experience of these specialists in using computers, as the introduction of a telemedicine system in any organisation requires medical staff to be trained on how to use the technology; video with computer systems experience. This study confirms that more than half of the specialist physicians in Kuwait (whether Kuwaiti or non-Kuwaiti) do not consider the use of computers,

the internet and e-mail in hospitals as a necessity. It also shows that only 40% of the physicians used computers, the internet (30%) and e-mail (30%) in their hospital as normal practice, whereas none of the specialists had experienced use of telemedicine or its applications. Therefore, it is realized that the computerised system has not been entirely implemented in governmental hospitals in Kuwait, as well as evidence that the present health system does not obligate medical staff to routinely use computer systems in their work.

The increasing number of patients being referred abroad serves as an indication of two issues: that the current health services in Kuwait are not at a satisfactory level and that the specialists who treat patients are not knowledgeable enough to handle the health cases. The findings of this study illustrate that a high percentage of physicians (60%) were not satisfied with the current procedure for referring patients abroad. Some were concerned that there were many patients asking for unnecessary treatment abroad, while others said there is no treatment for some health cases in Kuwait, which requires sending patients abroad. Furthermore, some of the physicians were concerned about the procedure of referring patients abroad as it takes a long time to get permission, which in turn can adversely affect the health condition of patients. The physicians also highlighted their concerns regarding the pressure that they received from their own families and friends to accept cases that do not necessitate referral abroad. This is a common phenomenon in Kuwait called "wasta", which often occurs with members of parliament asking friends to disobey laws and rules in order to gain votes for them in future elections (Saleh, 2010). The results of this study show that the majority of the physicians (73%) see that a telemedicine system could be a solution to handle these issues. This would be achieved by using telemedicine in the pre-referral stage to screen the health cases and determine the appropriate treatment procedure.

7.1.2.1 Attitudes of the specialised physicians towards telemedicine

It is believed that bringing a telemedicine system into a healthcare organisation changes the process of giving healthcare services to patients, as well as the activities of the medical staff that reflect the nature of their work in the hospital. Therefore, the attitudes of physicians as the main users of telemedicine are very important, since they will play a major role in the acceptance and adoption of a telemedicine system in the Kuwaiti health system. The findings of this study reveal that the majority of the specialist physicians believed that telemedicine is a viable approach for

providing medical care services at a distance to patients, in addition to its potential to save time and money as a result of bringing the medical consultation of experts to the physicians while they remain in hospitals in Kuwait and by treating cases as soon as possible. As a consequence, this can save the lives and time of patients and money for the healthcare system. In addition, most of the physicians (83%) affirmed that the use of a telemedicine system could save effort. This would result from reducing the long wait for appointments for referring patients abroad. Thus, benefits of using telemedicine are expected, as several research studies have confirmed, even though there are some studies that suggest further investigation in different arenas and specialties to ensure the utility of telemedicine use on patients, as well as the healthcare provider (Miller, 2011; Buck, 2009).

The willingness of the physicians to accept telemedicine systems can be perceived through their comfort in accepting and using ICT to make the process of healthcare provision more efficient and effective. The study found that the majority of the physicians (95%) trusted the technology to work, and age did not influence their belief regarding the effectiveness of ICT. The majority of the physicians were willing to use ICT and the Internet to store, retrieve and communicate patient information with other health institutions for the purpose of treating patients and educating medical staff. Importantly, a large proportion of the physicians (89%) agreed that the use of telemedicine in the healthcare system in Kuwait would not contradict the culture and social norms of Kuwaiti people. This confirms that telemedicine would not be severely affected by culture in Kuwait and could be used by physicians. Furthermore, any physician who is happy to change would have a positive impact on the people around them (Lorenzi and Riley, 2003), especially as patients desire to receive treatment quickly.

Furthermore, in working with the world's leading centres of medicine, telemedicine systems can help improve the treatment of patients, as well as improve the knowledge and experience of local medical staff. Thus, almost all the specialist physicians (99%) in this study would welcome the use of this service, suggesting that their colleagues would also desire to use this technology.

On the other hand, the two main factors that were chosen by the physicians against the adoption of telemedicine in the Kuwaiti health system were: (1) the lack of suitable training in the use of telemedicine equipment; and (2) the negative attitude of staff involved in the implementation process. These factors concur with literature, which highlights the importance of training when

implementing a new system to avoid failure, and the role of management in changing and avoiding undermining by some individuals when adopting a new system (Lorenzi and Riley, 2003).

The study shows that the specialist physicians in Kuwait were knowledgeable about the potential of ICT in healthcare to improve the quality of health services and to solve associated problems. Hence, the majority of the physicians would welcome the provision of training courses on telemedicine system use (a trial system) and would give support to medical staff so they could be aware of the usefulness of the system.

In summary, the readiness of the specialist physicians regarding telemedicine adoption in the Kuwaiti health system was quite positive; their responses proved that they are willing to receive telemedicine and expect the use of electronic patient records. Consequently, the findings are contrary to previous studies that found that Arab culture being very complex, held attitudes that would be less enthusiastic or negative towards technology, especially when organisation do not consider cultural issues (Straub et al., 2001; Twati and Gammack, 2006; Al-Qahtani, 2004).

7.2 Readiness of technical infrastructure (existing and future needs)

This study shows participants consider that the current technical infrastructure for each health region affiliated to the Ministry of Health was satisfactory with respect to the availability of technology, such as computer systems, servers and networks. However, assessment of the technical infrastructure reveals that all the health regions were deficient regarding internet connections. This deficiency would impede the adoption of a telemedicine system in the Kuwaiti health system. However, the participants confirmed that this deficiency will be solved shortly, following the sign of a contract between the Ministry of Health and the Ministry of Telecommunication to provide all the hospitals within the health regions with an official internet connection. It has been stated: "*It seems from the Government's plan that, in the coming future, they will provide each health region in Kuwait with an internet connection by using a fibre optic cable for communication, which is supported by the Ministry of Telecommunication*" (IT manager 1, Kuwait Ministry of Health).

The interviews with the IT managers showed there are many criticisms on the management of the main IT administration by the Ministry of Health relating to its failure to achieve its

objectives, rather than just the provision of technology. In turn, this could affect the adoption and implementation of a telemedicine system.

The first criticism is the fragmented use of electronic patient records in hospitals, as not all patient information is collected, stored, manipulated and communicated electronically. Only some departments in Kuwaiti hospitals are computerised, and then as stand-alone systems, such as medical laboratories, nuclear-medicine, radiology and pharmacies. Moreover, there is no communication of patient information between the health regions, due to the incompatibility of individual hospital information systems. Therefore, patient files are transferred manually from one health region to another for the purpose of consultations. Thus, these issues should be solved to facilitate telemedicine. As has been declared: *"I can say yes for telemedicine adoption after running the complete version of electronic patient records, in addition to the internet connection that can be easily offered"* (IT manager 2, Kuwait Ministry of Health). Secondly, it was clear from the findings that one of the impediments for ICT use in the health system in Kuwait is the lack of the policies that are required to make the adoption and use of ICT easy and to organise the staff within the work environment more effectively. Lastly, there was criticism over the absence of a practical vision for the main IT administration at the Kuwait Ministry of Health, which has a negative impact on the entire work of each IT department.

Therefore, based on the study findings, it seems that the main administration of IT has a weakness, since there are neither obvious policies to stipulate how IT staff should do their jobs in the hospitals effectively nor a clear vision for all departments in all health regions to achieve certain objectives. Furthermore, the cultural factor has been blamed for its influence on subjective decision making. These decisions stem from different parties, such as hospital management or the main administration of IT, without involving the IT managers in each health region to participate in the improvement process. "*...this is how the culture influences the work, whereby some groups within the institution pretend that their ideas are correct and applicable, which in fact they are not and their ideas go against the work welfare"* (IT manager 1, Kuwait Ministry of Health).

The technical requirements for telemedicine use have been mentioned in the results chapter, even though the participants were not familiar with the concept of telemedicine. However, the findings confirm that the technical requirements to establish a telemedicine system could be

easily provided. Unlike other Arab countries that consider the provision of technology to be difficult, the State of Kuwait does not consider the cost to be an issue (Aladwani, 2002), as a result of wanting to provide the best quality technology and health services to their citizens. The IT administration at the Ministry of Health offers many forms of training programmes to the IT staff to keep them at the optimum level of knowledge and skills in different fields, such as networks and telecommunications. However, the confusion of the administration in Kuwait in choosing suitable training courses for medical staff in a timely manner will inevitably lead to negative outcomes, particularly for end users, (Liu Sheng et al., 2010; Paul et al., 1999). Interestingly, the IT staff need to be assisted by professionals from health and informatics backgrounds in order to work as liaisons when interacting with the medical staff. This is due to the difficulty in establishing understanding between the medical staff and the IT staff (different technical language).

Existing computers and other technology equipment were not mentioned as an obstacle. On the contrary, technology in Kuwait can be easily imported for the health organisations. However, the main IT administration has shown confusion and weakness in leading and implementing IT projects. This can be seen in the following issues, with the participants identifying for criticism:

- The health information system, including electronic patient records, has been suspended in some hospitals and is only partially working in others.
- Lack of policies in regard to the use of ICT in healthcare, as this is required to organise the work within the hospital and within the health regions.
- The centralisation in making decisions without involving the IT departments in all of the health regions and a bureaucracy that makes the work flow very slowly.
- Lack of communication between IT departments and other medical departments within hospitals, which is very important for cooperative and coordinated work in order to facilitate the process of healthcare services.

It is sufficient to say that the absence of the abovementioned points in the organisation would contribute to the failure of a telemedicine system. These findings are consistent with a previous study that found that good planning is a necessity for IT project success in Kuwait. There is also a need for highly qualified staff with different skills and provisional of training courses to reduce

the uncertainty of the project (Aladwani, 2002; Lorenzi and Riley, 2003; Paul et al., 1999). Similar results have been found in other projects such as implementing a teleradiology system in a Hong Kong healthcare organisation, where obstacles such as bad management of the telemedicine project, lack of interdepartmental communication and the absence of internal champions were reported as contributing to failure (Lui Sheng et al., 2010).

Ultimately, the technical readiness of the healthcare system in Kuwait relies on its ability for management to change the way it has been practicing its work, and so improve and develop at all levels.

7.3 Readiness of the organisation (the Kuwait Ministry of Health (K-MOH))

The policy makers identified that Kuwaiti patients are not satisfied with the current tertiary services due to the shortage of specialists, as well the long wait for appointments. Furthermore, budget spent on sending patients abroad for treatment has become a burden on the government and does not satisfy the policy makers due to the high cost. This dissatisfaction will require the policy makers to look for different methods and solutions to reduce the number of overseas referral patients, or for follow-up patients at least. In this way, the budget that has been allocated annually for this purpose could be reduced significantly.

As one of the policy makers stated "*We are not satisfied about the huge budget that inflated year after year, so we considered it a problem, and we are seeking a solution that fits all parties such as government and patients*" (policy maker 1, Kuwait Ministry of Health). Apparently, the situation at the Ministry of Health and in the healthcare system in Kuwait requires change to achieve the intended goals. This is a good indicator that the organisation could be receptive to solution and change; Lewin's model calls this the 'unfreezing' stage (Lewin, 1952; Jennett et al., 2005).

7.3.1 Factors affecting the adoption of telemedicine in the Kuwait Ministry of Health

This study found that telemedicine could be adopted in the near future for use in the Kuwaiti healthcare system. The study also found that the Kuwaiti healthcare system could be ready to receive the technology of telemedicine, but with certain conditions that must be provided prior to

the implementation process. Briefly, the factors that inhibit the adoption of telemedicine in the Kuwaiti healthcare system must be minimised or diminished and the factors that are considered supportive must be strengthened and enhanced.

7.3.1.1 Inhibiting factors

The study shows that there are some issues hindering the adoption of telemedicine that need to be tackled: These inhibiting issues are:

- The low level of awareness of telemedicine system, particularly among medical staff. This would produce some side issues, such as: resistance to change. As one of the policy maker consider it an overload.
- The absence of a local champion that could lead the campaign for telemedicine implementation in the Kuwaiti healthcare system. As mentioned by one of the policy makers at the Ministry of Health: "*We have offered telemedicine services from global medical centres for cardiac and paediatric patients, but the absence of awareness and a leader specialising in using information and communications technology in medicine was behind the lack of consideration of telemedicine adoption*" (policy maker 1, Kuwait Ministry of Health).
- A bureaucratic organisation, with: (1) centralisation of the work; and (2) slow speed of implementation and improvements in healthcare services.
- Corruption, nepotism, favouritism and political interference are evident and inferred by different departments at the Kuwait Ministry of Health. This could affect the development of the sector and make decision-making and reform difficult.
- Unpreparedness of the technical infrastructure at the Ministry of Health, together with weak management of IT departments. This was evidenced by the failure to complete the implementation of EPRs in the hospitals. As one of the policy makers commented "*We are far away from this kind of technology and services, due to inefficiency of the current technical infrastructure*" (policy maker 7, Kuwait Ministry of Health).

7.3.1.2 Supportive factors

In Kuwait, there are some factors that would make the adoption and use of a telemedicine system as part of the healthcare system possible. These are:

- The wide spread use of technology in different arenas in Kuwait, such as banks, industries, companies and supermarkets, indicates the importance of using informatics to perform work properly. Additionally, people in Kuwait often use technology for personal use and social communication, such as smart phones.
- The educational level of the medical staff in Kuwaiti hospitals is considered high and they will be ready to use telemedicine. As has been stated: *"…we have well-trained staff in hospitals in Kuwait who are highly educated and ready to use telemedicine to improve the quality of medical services and to reduce the overload of some clinics*" (policy maker 3, Kuwait Ministry of Health).
- Full support of the Kuwait government is expected at all levels, including tangible support (such as financing) and intangible support by disseminating awareness to the public about the use of the telemedicine system through different media. In addition, the government will aid in the elimination of obstacles throughout the implementation of telemedicine.

7.4 Strategy and policy for telemedicine implementation for overseas referral patients

The literature identifies that an organisation that is willing to adopt telemedicine in its healthcare system should initially consider the importance of developing an appropriate policy (Jennett et al., 2005; Kifle et al., 2006) and strategy (Le Rouge et al., 2010; Yun and AE Park, 2007), as these are required to organize the system for best implementation and practice. Hence, this work has developed a set of policies that define the restructuring of the existing procedure prior to referring patients abroad, in order to regulate and organise the clinical practice. The following sections are the strategy that the healthcare system should follow in order to adopt a telemedicine system, in addition to a policy that clarifies how the new system of telemedicine would be integrated within the work flow. The strategy is based on the findings of this study and the existing knowledge of the researcher of the Kuwaiti health system. Figure 7.1 depicts the

required action of plans at all levels to achieve a successful telemedicine implementation, where good management and leadership is required and supported by the government (Figure 7.1).

A strategy for the implementation of a telemedicine system in the Kuwaiti healthcare system

- Complete the implementation of health information systems in the hospitals.
- Complete electronic patient records in the hospitals.
- An awareness campaign for telemedicine use among the medical departments in the hospitals and for the public.
- Designate a champion to lead the telemedicine project. This would be recommended to be a physician with a strong informatics background who is respected by others to help disseminate the knowledge of telemedicine with confidence.
- Initiate cooperation and full partnership between the Ministry of Health and other institutions or agencies that are involved in the use of information and communications technology, including the Ministry of Telecommunication.
- Include the use of telemedicine for the delivery of healthcare in national policies for ICT use, especially relating to issues of its security.
- Provide legislation and regulation to protect the rights of individuals in regard to data security, user protection, patient privacy and confidentiality.
- Develop appropriate internal policies in the hospitals, with respect to administrative, clinical and technical issues.
- Select the best suppliers with a good reputation to provide the technological requirements for telemedicine in order to ensure efficiency and effectiveness.
- Encourage the staff that will use the telemedicine system by giving incentives.
- Provide comprehensive training courses for all the involved stakeholders, with particular attention to the timing of the training.
- Operating the telemedicine system must be done properly with respect to management and technical issues (a pilot system is to be recommended).

- Form an expert team from different backgrounds and interested in informatics to monitor the progress and evaluate the outcomes of the new approaches.
- Consider successful telemedicine projects worldwide and learn from them. Recruit a champion from abroad to lead the project in the State of Kuwait, and who has an understanding of the cultural and social issues.
- Survey the research in informatics to summarise the outcomes and disseminate the knowledge and experiences to other organisations to support improvement and development.
- Include the use of ICT in healthcare as part of the curriculum for medical and allied health students to improve knowledge about the use of informatics in healthcare, and widen and facilitate the use of ICT in the healthcare arena by different specialists.

The Policy that would be required to be in place to integrate telemedicine within the Kuwaiti healthcare system:

- The medical board for each specialty will have the responsibility to refer patients to the telemedicine system for the purpose of remote consultation and screening the health status of the patient.
- The patient will be free to choose whether to use the telemedicine system and the treatment that is recommended during the teleconsultation.
- A consent form explaining the optional steps of teleconsultation will be given to the patient, such as recording the session of teleconsultation.
- Consultation through telemedicine can only be requested by the responsible doctor.
- The patient will be seen by telemedicine within a short time and automatic referral abroad is provided when required.
- The patient will stay and be given treatment in a hospital in Kuwait where possible as recommended by the remote consultant.
- Follow-up will be assessed through the use of the telemedicine system. Accordingly, the follow-up health plan will be given to the patient by the remote consultant.
- Patients referred for treatment using telemedicine will be expedited.

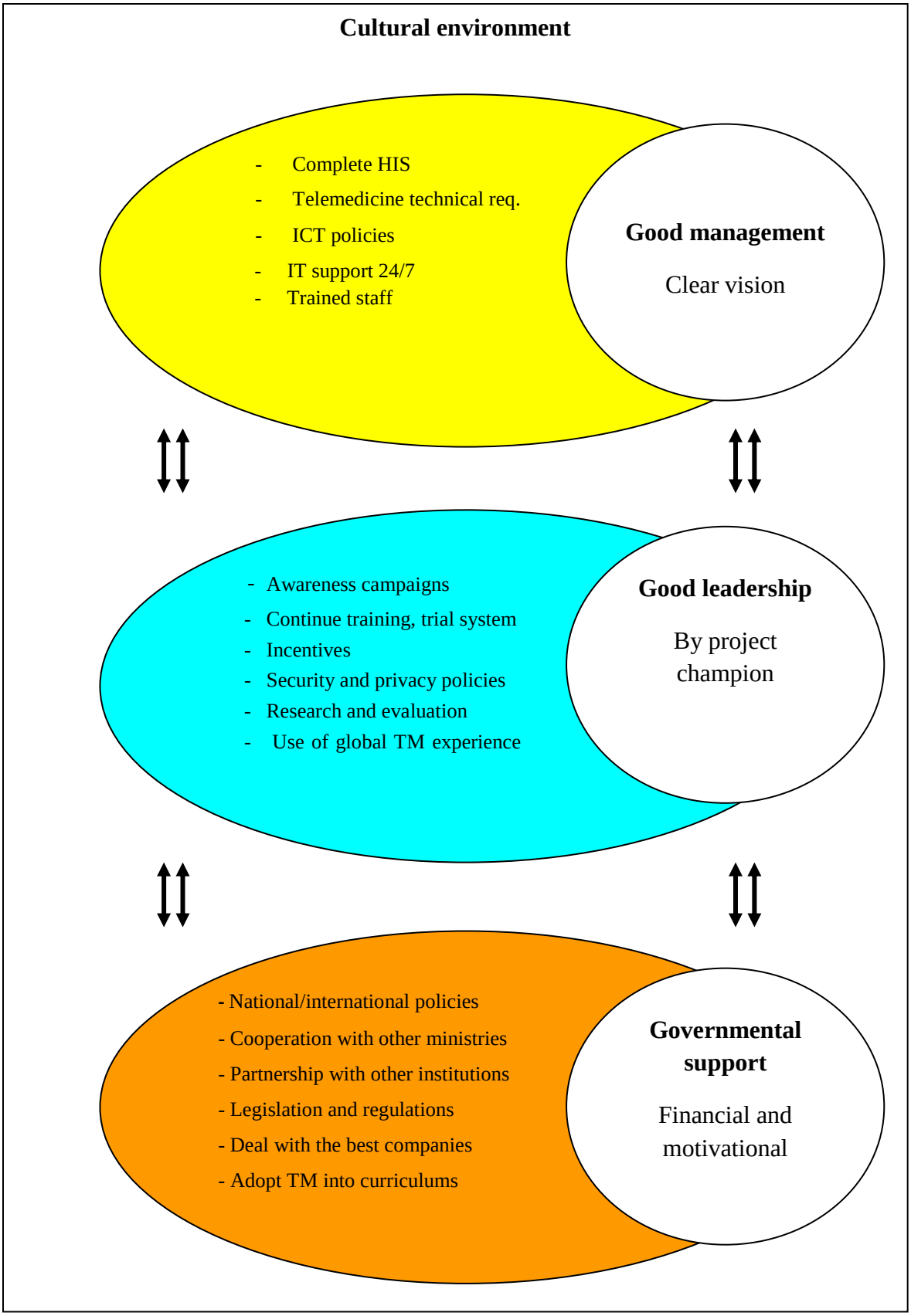


Figure 7.1 Strategy for telemedicine implementation in the Kuwaiti healthcare system

7.5 Comparison between the readiness of Kuwait and the readiness of other Arab countries, specifically Jordan and Syria

Despite the general similarities between the Middle East countries, particularly with respect to religion, language and culture, there are many differences that would be affect the feasibility of adopting ICT (a telemedicine system) in health organisations. The differences can arise from the attitudes of the individual Arab people within their communities towards the use of telemedicine and the level of awareness or the capability of the organisation or the government in regard to the funds and infrastructures.

Therefore, in this study, the researcher compares the State of Kuwait, Jordan and Syria with respect to their readiness towards telemedicine adoption in their healthcare systems. This will demonstrate how countries within the same geographic region show some differences in their readiness to adopt telemedicine systems, which plays a large role in the adoption decision process. The most important criteria used for comparison were: technical infrastructure, awareness about telemedicine, funding, attitude (resistance) and government support (Alajlani, 2010).

Jordan and Syria are countries located in the Middle East. Jordan is bordered by Syria to the north, Iraq to the northwest and Saudi Arabia to the east and south. Syria is bordered by the Mediterranean Sea and Lebanon to the west, Israel/Palestine and Jordan to the southwest and Iraq to the east, as shown in Figure 7.2.

Source: Google map, Middle East

A recent study has compared the readiness of Jordan and Syria for telemedicine system adoption (Alajlani, 2010). It discovered that the technical infrastructure in Jordan was sufficient to support the adoption of telemedicine, particularly in urban areas. Moreover, the awareness of doctors about telemedicine technology was quite positive but they asked for training courses for better understanding. Most of the patients were aware of telemedicine applications. This could be owing to the modern educational programmes given to students by the universities. However, most of the patients were resistant to the use of telemedicine and preferred the conventional way of consulting doctors. Funding was considered the main barrier in initiating the use of telemedicine in Jordan: although the government has not hindered the adoption of telemedicine, it has asked for sponsors to establish projects and to make telemedicine implementation sustainable.

In contrast, in Syria, the technical infrastructure is considered poor and it cannot be relied upon (Alajlani, 2010). The complex procedure of the government for importing medical devices is behind this weakness, especially for the governmental sector. In addition, internet use is limited and insecure. Furthermore, most of the doctors, as well as the Syrian people, had a lack of knowledge and experience; their resistance to the use of telemedicine was evident. Therefore, only a small number of doctors and citizens were aware of the uses of telemedicine. This might be due to the educational programmes in Syrian schools, which differ from those in Jordan (which are considered advanced). It was reported that funding was not a significant issue in Syria for the implementation of a telemedicine system project (Alajlani, 2010). However, it is concluded that the lack of knowledge of telemedicine applications is the most likely reason for not considering funding as an issue.

This research study shows that the technical infrastructure of the Kuwaiti healthcare system is good in regard to the technology equipment and is capable of rapid improvement to support proper use of telemedicine, but will require good management. Internet use can easily be offered for both the public and the hospital employees at their work. Internet use in Kuwait is secure, both for personal use and for any other use. The majority of doctors in Kuwait were very aware about telemedicine systems, as most of the members of the medical boards have come from the United States, Canada or England, where the main source of knowledge is medical literature, professional contacts and international conferences. However, they did ask for proper training

courses in the use of telemedicine adoption in the Kuwaiti healthcare system. More than half of the overseas referral patients were not aware of telemedicine systems, even though most of the patients were willing to use telemedicine for the intended purpose. They did ask for privacy and confidentiality of their information. This study found that funding of a telemedicine project is not considered a problem as Kuwait is a wealthy state, and the government has a policy to provide the best healthcare services for its society. This finding concurs with the results of other studies that found that the more a healthcare organisation is supported by the government, including funding, the more feasible it is that telemedicine would be adopted and succeed (Yun and AE Park, 2007). For more details regarding the readiness of the Kuwaiti healthcare system, see the previous chapters.

The following table (7.1) summarises the comparison points between Kuwait, Jordan, and Syria.

Comparison	Kuwait	Jordan	Syria
Technical abilities, including internet	Available No restriction for internet use	Available Limited internet use (official places)	Poor Internet use is very limited and insecure
Awareness about telemedicine	The majority of doctors were aware of telemedicine. Less than 50 % of the patients were aware of telemedicine	The majority of doctors and people were aware of telemedicine.	The majority of doctors and Syrian people were not aware of telemedicine use
Attitude toward telemedicine	Doctors ask for training courses with no resistance. Most of the patients were willing (not resistant) to the	Doctors ask for training courses with no resistance from the most Patients were resistant to the telemedicine	Doctors and Syrian people were resistant to telemedicine use

	telemedicine use	use	
Funding	Available	Not available	Not available
Governmental support	Available	Available but awaiting for sponsors	It's complicated especially for governmental sector

Table 7.1: A comparison between Kuwait, Jordan, and Syria in regards to their readiness to adopt telemedicine.

It can be seen from this comparison (table 7.1) that the Kuwaiti health system is more ready to adopt a telemedicine system than Jordan and then Syria. This might be due to three main points:

1. Governmental support (financial and incorporeal)
2. The ease of importing and providing for the technical requirements of telemedicine.
3. The culture and society is flexible: they like to use technology, so the majority of citizens do not mind using telemedicine technology to receive treatment, the specialist physicians agreed that the adoption of telemedicine, specifically for overseas referral patients, is a top priority.

7.6. Economic analysis

This section investigates the effectiveness of the new system. Analysis will be performed using estimated values.

Figure 7.3 shows the proposed patient pathway using telemedicine. In this new pathway, the medical board will make new decisions in the way that the case is managed locally and exploiting support from the remote consultant to expedite referral of the case abroad (See Figure 7.3).

According to the available statistics, it has been estimated that Kuwait Government spent $ 1.2 Billion for treating patients abroad for the year 2008/2009 for an estimated 3000 patients.

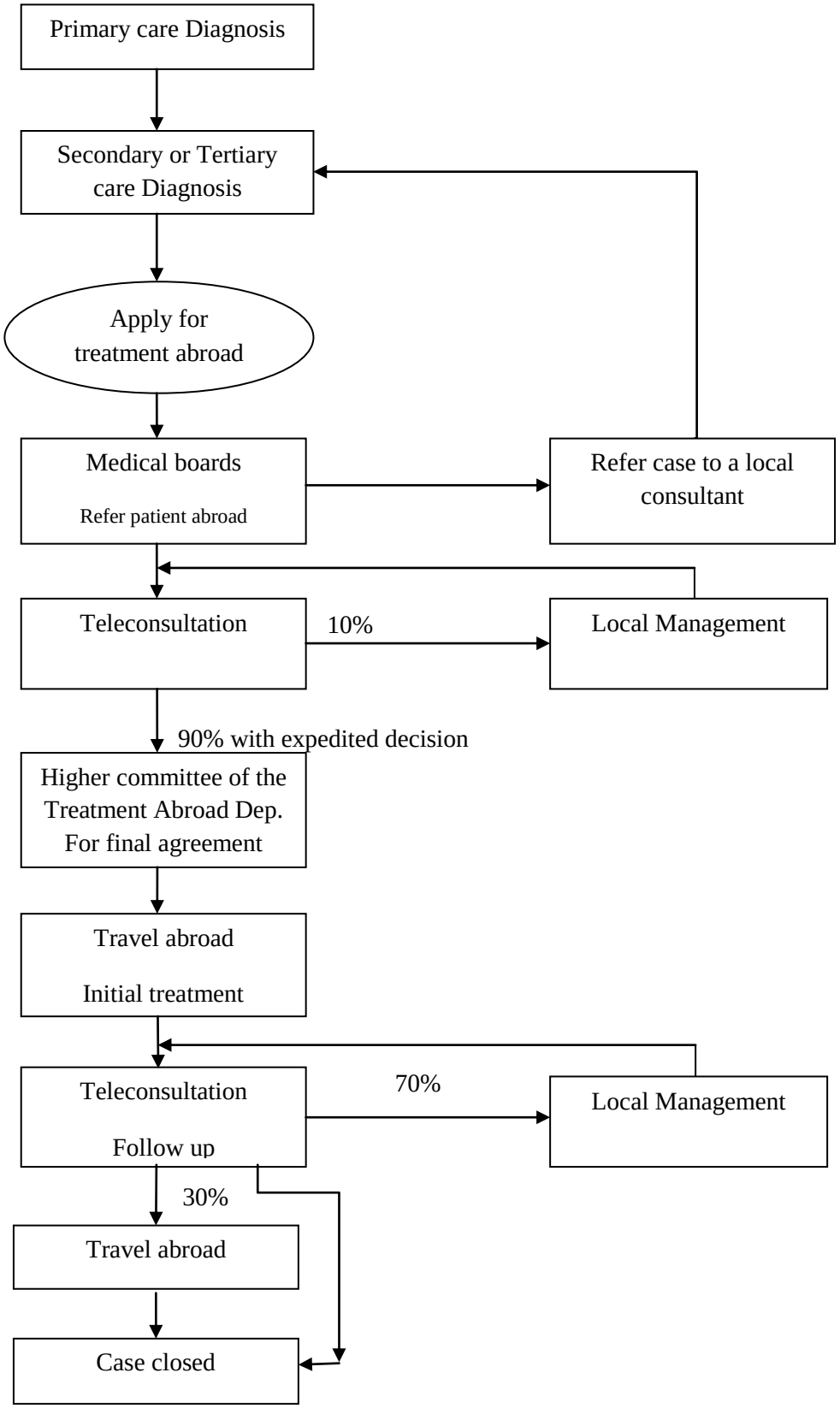
These figures are used as the bases of analysis in Table 7.2, 7.3, 7.4, 7.5, and 7.6.

Table 7.2 provides an estimate of the average cost for the initial treatment of a patient travelling abroad. Table 7.3 provides an estimate of the average cost for subsequent follow up treatment of a referral abroad patient. Table 7.4 provides an estimate of the teleconsultation that precedes referral for initial treatment and associated costs should treatment be managed locally. Table 7.5 provides an estimate of follow up managed by teleconsultation. The estimated costs from Tables 7.2, 7.3, 7.4, 7.5 are used to undertake an economic evaluation into the use of teleconsultation.

Assuming introduction phase in year 1 where all patients continue to be referred abroad for initial treatment and 40% receive follow up by teleconsultations; year 2 where 95% continue to be referred abroad for initial treatment and 60 % receive follow up by teleconsultation; reaching stable numbers in year 3 where 90% of the patients continue to be referred abroad and 70% receive follow up by teleconsultation. We can calculate projected costs using the new pathway, as shown in table 7.6.

The impact may be seen in figures 7.4 and 7.5 where potential savings could be $300 million per annum.

Figure 7.3: Proposed Patient Pathway:



Cost category	Cost of one patient and escort ($ USD)
Travel costs	12000
Hospitalization, including investigations and medications	160000
Consultation	6000
Expenses for travel	40000
Total Cost	**218000**

Table 7.2 Cost for initial treatment abroad per patient

Cost category	Cost of one patient and escort ($ USD)
Travel costs	12000
Hospitalization, including investigations and medications	40000
Consultation	600
Expenses for travel	10000
Total Cost	**62600**

Table 7.3 Cost for follow up treatment abroad per patient

The cost estimation for the initial treatment abroad and follow up is=**218000+ 62600 *(1.5) = $ 312000**, per patient. The value (1.5) has been estimated for the same patient with twice follow up a year.

Cost category	Cost of one patient ($ USD)
Travel costs	0
Hospitalization, including investigations and medications	40000
Teleconsultation	1000
Expenses for travel	0
Total Cost	**41000**

Table 7.4 Cost for initial treatment by telemedicine

Cost category	Cost of one patient ($ USD)
Travel costs	0
Hospitalization, including investigations and medications	10000
Teleconsultation	1000
Expenses for travel	0
Total Cost	**11000**

Table 7.5 Cost for follow up treatment by telemedicine

The cost estimation for the initial treatment abroad and follow up is=**41000+ 11000 *(1.5) = $ 57500**, per patient.

Cost category	Cost for Year (1) ($ USD)	Cost for year (2) ($ USD)	Cost for year (3) ($ USD)
Equipment	500,000	0	0
Telecommunications	100,000	100,000	100,000
Initial treatment abroad	100% (patients rate=3000) 218000*3000= 654,000,000 million	95% (patients rate=2850) 218000*2850= 612,300,000 million	90% (patients rate=2700) 218000*2700= 588,600,000 million
Initial telemedicine	0 %	5% (patients rate=150) 41000*150= 6,150,000 million	10% (patients rate=300) 41000*300= 12,300,000 million
Follow up treatment abroad	60% (patients rate=1800) 93900*1800=169,020,000 million	40% (patients rate=1200) 93900*1200= 112,680,000 million	30% (patients rate=900) 93900*900= 84,510,000 million
Follow up telemedicine	40% (patients rate=1200) 16500*1200=19,800,000 million	60% (patients rate=1800) 16500*1800= 29,700,000 million	70% (patients rate=2100) 16500*2100= 34,650,000 million
Total cost	**$ 843,420,000 USD**	**$ 760,930,000 USD**	**$ 720,160,000 USD**

Table 7.6: Estimated costs for three years using telemedicine with the conventional treatment abroad system

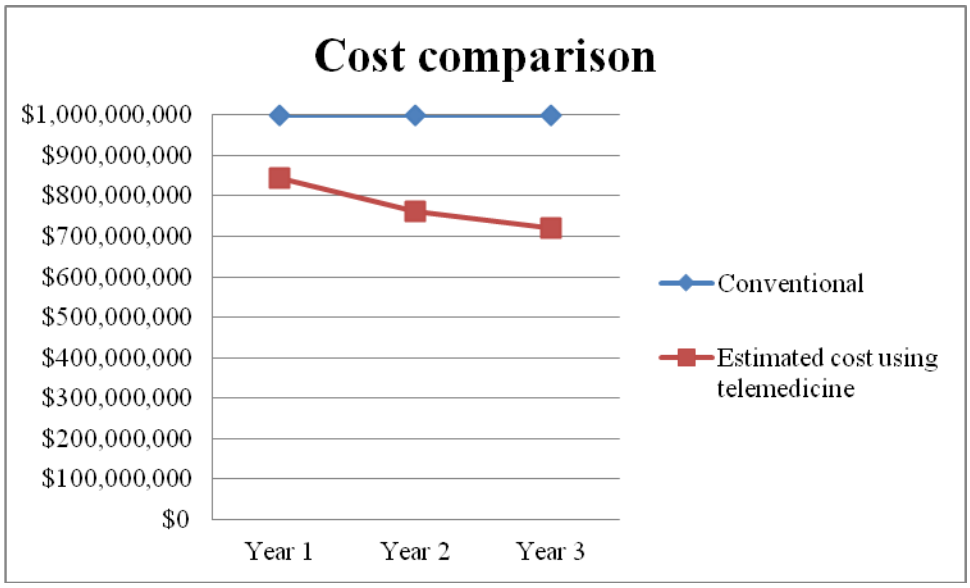


Figure 7.4: Estimated cost comparison over 3 years

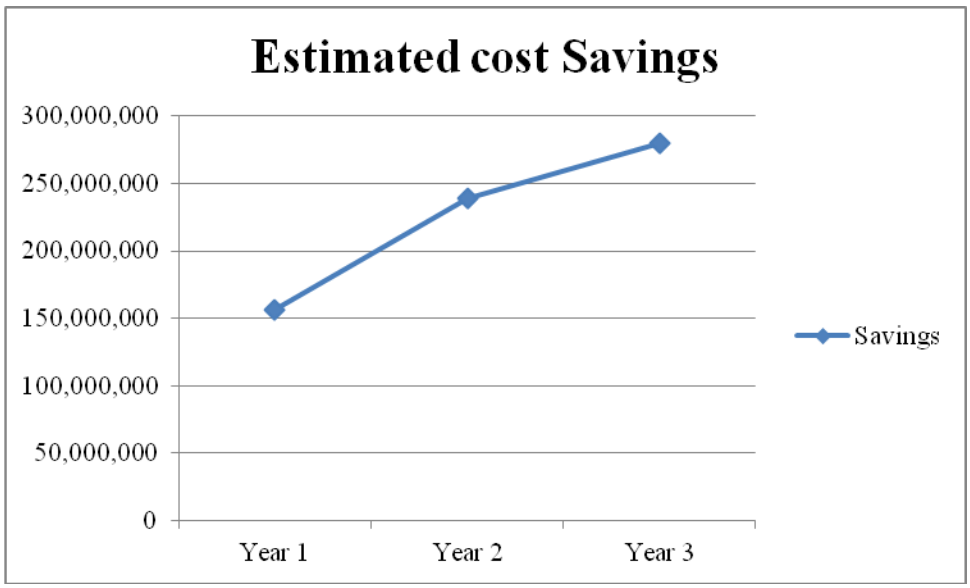


Figure 7.5: Estimated cost savings using telemedicine over 3 years

7.7 Summary

From the overall discussion, the researcher has achieved the aims and objectives of this research study. First of all, the perceptions of the key stakeholders in regard to telemedicine use have been explored and assessed. The factors as identified by the individuals that support or hinder telemedicine adoption in the Kuwaiti healthcare system have been explored. Other factors resulting from issues of the organization or technical infrastructure have been identified and considered. A strategy for telemedicine implementation has been developed and validated. Additionally, a policy for telemedicine use for overseas referral patients has been proposed. Finally, a comparison has been made between the Kuwaiti healthcare system and the systems of Jordan and Syria (as examples of Arab countries) for their respective readiness for telemedicine. In the final section of this chapter, an economic analysis to demonstrate the cost effectiveness of the new system has been performed.

Chapter Eight: Conclusion

This chapter summarises the main findings of this research study and provides a conclusion. The contributions of this research to the extant knowledge, the limitations of the study and possible future research avenues are identified and discussed.

8.1 Conclusion

This research study aimed to investigate the readiness of the Kuwaiti healthcare system to adopt a telemedicine system for referral abroad patients. Telemedicine has been proposed to solve two main issues: (1) the shortage of sub-specialist doctors and the consequent long wait for appointments for patients; and (2) to reduce the huge financial burden on the government. Therefore, this investigation was undertaken in order to assess the readiness of the main stakeholders in the adoption of a telemedicine system, which are: the individuals (physicians and patients), technical staff (IT managers) and organisational stakeholders (policy makers).

An in-depth study was conducted using a quantitative and qualitative approach (This was successful in reaching the research aims and answering the required questions). A questionnaire was used to explore the attitudes of specialised physicians and patients by eliciting their opinions based on specific criteria. A semi-structured interview was conducted: (1) with IT managers to assess the technical infrastructure of the healthcare system; and (2) with policy makers to assess the organisation in regard to its readiness towards telemedicine adoption.

The general findings of this research study show that there is clear readiness to use telemedicine for the overseas referral patients and is explained by the need to find improved ways to obtain expert medical consultations. Moreover, there was clear readiness by the specialised physicians towards telemedicine adoption in the Kuwaiti health system. However, there was apprehension from the patients regarding telemedicine use, including the privacy and confidentiality of their data. The findings of the interviews reveal that the current technical infrastructure for ICT use in the Kuwaiti healthcare system is not ready for telemedicine adoption and furthermore, there needs to be change in the way its management works in order to improve and enhance trust between departments.

The qualitative approach succeeded in assessing the organisational readiness by exploring both the factors that inhibit and hinder the adoption of telemedicine in Kuwait, and the supportive factors within the organisation. From these results, a set of strategies were developed to demonstrate how the Kuwaiti health system could be made ready to receive a telemedicine system, together with supporting policies for use of telemedicine by overseas referral patients. These results were validated by eliciting the feedback from the key policy makers. From the comparison with Syria and Jordan, it seems that the Kuwait health care system is more ready to adopt telemedicine system in regard to the individuals, technical infrastructure, and governmental support.

8.2 Contribution to extant knowledge

This research has made contributions in four principal areas: (1) information and communications technology (ICT); and (2) health and information management; (3) Policy; (4) cultural knowledge. This research contributes to the knowledge regarding the adoption of ICT in healthcare delivery systems with its main analysis of readiness and the adoption decision process, which involves many stakeholder groups from different backgrounds. In this research study, assessing the readiness factor has been done through exploring the many factors (including encouragers or inhibitors) that are relevant to the individual, organisational and technical structures, and the study contributes to existing research through its analysis of these issues based combination and extension of existing theories and models. Moreover, the enhanced framework contributes by addressing important issues and resulted in a strategy and policy for telemedicine implementation that also takes into account external environmental factors such as culture and social norms. This is the first study that addresses all these issues together.

The originality of this research is its focus on the specific and unique problem of the introduction of telemedicine technology to deliver healthcare services for overseas referral patients in the Kuwaiti governmental sector. Kuwait is a member state of the Gulf Cooperation Council (GCC), which are states characterised by their geographic location, wealth, history and oil production. This makes the research of great interest that has compared studies in other Arab countries (Jordan and Syria). Therefore, the study can contribute to ICT research in the Arabian Gulf region, specifically towards telemedicine. The strategy and policy formulated and validated within this research will contribute directly to the future planning of the overseas patient referral

service in Kuwait and be adopted by policy makers and ICT managers. Other countries may also take advantage of this research in order to gain understanding of the nature and culture in countries such as Kuwait and interesting to work or collaborate in the region.

8.3 Research limitations

This research study has limitations:

- Exclude ethnicity from demographic data. Although Kuwait includes several ethnic groups including Bedouins, tribes and clans (Abd-El-Bary, 1993), it was deemed too sensitive politically to include in this study.
- Restriction of statistical reports: The study would have benefited from accurate statistics data on some issues. However, the Department of Statistics and the Department of Treatment Abroad restricted access to these reports.
- Incomplete answers by some of the interviewees:
  - Some answers were given on the basis of a limited knowledge about the topic and would appear to have been given to oppose the interviewer.
  - Conservative answers by some of the interviewees: Some of the interviewees appeared uncomfortable in providing answers to some of the questions and explained they had reservations in providing honest answers for fear of the outcome should their identity become known and preferred to provide a more conservative answers.
- Cultural issues: Although the study included aspects of culture in both questionnaires and interviews, it is clear from the responses that there remain several important aspects to be investigated and understood. Furthermore, adoption of any theory of use or acceptance should include a culture dimension.
- Scope of the research study: The research was limited to the study of overseas referral patients and specialist physicians involved in the referral process and it is therefore not generalisable to the general use of telemedicine within the country.

- Pre-implementation stage: This research study has considered only the stage preceding the adoption and implementation of telemedicine in the Kuwaiti healthcare system. Hence, all the factors investigated in this study were limited to this stage.

8.4 Future research

This research defined work with very narrow scope. The outcomes identify areas requiring further investigation and aspects where work might generalise. Further research could include:

- Different organisations: The framework developed to assess readiness for this study could be applied to other organisations in other countries.
- Cultural issues: Future research should include more on cultural issues, and consider how to integrate within the theories and models.
- The implementation stage: The research should be extended to study the next stage that is implementation and adoption of a telemedicine system in a healthcare organisation in order to validate findings. This might include a pilot telemedicine project.
- Specialisation: This study investigated telemedicine adoption in general in the Kuwaiti healthcare system. Future research might focus on medical specialisations (eg. telecardiology) to determine if there is need for differences in the policies and strategies required for proper implementation.

References

Aas IH. (2001). A qualitative study of the organizational consequences of telemedicine. Journal of Telemedicine and Telacare; 7, 18-26.

Abd-El-Bary P. (1993). Portrait of Kuwait. The Kuwait Bookshops Co LTD. Kuwait.

Abdul Rashid Z., Sambasivan M., Abdul Rahman A. (2004). The influence of organizational culture on attitudes toward organizational change. Leadership & Organization Development Journal; 25(2), 161-179.

Akber A., Gough T. (2003). TeleHealth paradigm for Kuwait's healthcare. Logistics Information Management; 16(3), 229-245.

Agha Z., Schapira R., Laud P., McNutt G., Rotter D. (2009). Patient satisfaction with physician-patient communication during telemedicine. Telemedicine and e-health; 15(9), 830-839.

Aladwani A. (2003). Key internet characteristics and e-commerce issues in Arab countries. Information Technology & People; 16(1), 9-20.

Alajlani M. (2010). Issues facing the application of telemedicine in developing countries: Hashemite Kingdom of Jordan and Syria Arab Republic. PhD Thesis, Department of Information systems and computing, Brunel University, UK.

Aldhafeeri F., Almulla M., Alraqas B. (2006). Teachers' expectations of the impact of E-learning on Kuwait's public education system. Social Behavior and Personality; 34(6), 711-728.

Al-Gahtani S. (2004). Computer technology acceptance success factors in Saudi Arabia: an exploratory study. Journal of Global Information Technology Management; 7(1), 5-29.

Al-Gahtani S., Kin M. (1999) Attitudes, satisfaction and usage: factors contributing to each in the acceptance of information technology. Behaviour & Information Technology; 18(4), 277-297.

Al-Gahtani S., Hubona G., Wang J. (2007). Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. Information & Management; 44 (8), 681-91.

Ali A., Tagi A., Krishnan K. (1997). Individualism, Collectivism, and Decision Styles of Managers in Kuwait. The Journal of social Psychology; 137 (5), 629-637.

Ali GH., Magalhaes R. (2008). Barriers to implementing e-learning: a Kuwait case study. International Journal of Training and Development; 12(1), 36-53.

Al-Khaldi, M., Wallace O. (1999). The influence of attitudes on personal computer utilization among knowledge workers: the case of Saudi Arabia. Inf. Manage; 36(4), 185-204.

Alliance for Building Capacity (2003). Framework for Rural and Remote Readiness in Telehealth. Final report for the office of Health and the Information Highway (OHIH). Available at http://www.hc-sc.gc.ca/hcs-sss/pubs/kdec/ab_alliance/ab_alliance1-eng.php [accessed 2/2/2010]

Al-Mabrouk K., Sour J. (2009). A delphi study on issues for successful information technology transfer in the Arab world. Int. Arab J. Inf. Technol; 6(1), 7-16.

Al-Sumait B., Asfer S., Al-Awadi KH. (2001). Overseas referral of Kuwaiti surgical patients. The Kuwait Medical Journal, 33(1), 71-74.

American Telemedicine Association. http://www.americantelemed.org/i4a/pages/index.cfm?pageid=1/ Accessed 23-3-2010.

Andrew S., Halcomb E. (2009). Mixed methods research for nursing and the health sciences. A John Wiley & Sons Ltd. UK.

Babbie E. (1992). The practice of social research. 6th ed. Belmont (CA): Wadsworth Publishing Company.

Bashshur R. L. (2002). Telemedicine and health care. Telemedicine Journal and e-Health; 8(1), 5-12.

Bashshur R. L., Reardon T. G., Shannon G. W. (2000). Telemedicine: A new health care delivery system. Annu Rev Public Health; 21, 613–637.

Bashshur R. L., Sanders J. H., Shannon G. (1997). Telemedicine: Theory and practice. Charles C. Thomas, United States.

Baqer S. (2007). Department of Information Systems: IT Projects and Vision. User's guide /Ministry of Health.

Berg B. (2009). Qualitative research methods for the social sciences. 7th ed. Pearson. Boston. USA.

Bernsten K., Sampson J., Osterlie T. (2004). Interpretive research methods in computer science. Norwegian University of Science and Technology. Method Assay.

Bradford M., Florin J. (2003) Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. Accounting Information Systems; 4, 205-225.

Brady J. L. (2005). Telemedicine behind bars: A cost-effective and secure trend, Biomedical Instrumentation and Technology; 39(1), 7-8.

Bowling A. (2002). Research methods in Health. 2ed. Open University Press. Buckingham, Philadelphia, USA.

Broens T., Veld R., Hutten M., Hermens H., Halteren A., Nieuwenhuis L. (2007). Determinants of successful telemedicine implementations: a literature study. Journal of telemedicine and telecare; 13(6), 303-309.

Buck S. (2009). Nine human factors contributing to the user acceptance of telemedicine applications: a cognitive-emotional approach. Journal of Telemedicine and Telecare; 15, 55-58.

Campbell, J. D., Harris, K. D., Hodge, R. (2001). Introducing telemedicine technology to rural physicians and settings. The Journal of Family Practice; 50(5), 419 – 424.

Campbell, K. (2000). Gender and educational technologies: Relational frameworks for learning design. Journal of Educational Multimedia and Hypermedia; 9(1), 131 – 149.

Casebeer A., Verhoef M. (1997). Combining qualitative and quantitative research methods: Considering the possibilities for enhancing the study of chronic diseases. Public Health Agency of Canada. 18(3). Available at http://www.phac-aspc.gc.ca/publicat/cdic-mcc/18-3/d_e.html. Accessed on 20/06/2010.

Chattopadhyay S., Li J., Land L., Ray P. (2008). A framework for assessing ICT preparedness for e-health implementation. e-health Networking, Applications and Services, (HealthCom 2008), 10th International Conference on 7-9 July 2008, Singapore. Australian School of Business.

Checchi R. M., Sevcik G. R., Loch K. D., Struab D. D. (2002). An instrumentation process for measuring ICT policies and culture. Proceedings of International Conference on Information Technology, Communications and Development, Kathmandu, Nepal, December 1-3.

Chen W., Hirschheim R. (2004). A paradigmatic and methodological examination of information systems research from 1991 to 2001. Info Systems J; 14, 197-235.

Colosi R. Negatively worded questions cause respondent confusion. [cited 2013 Feb 22]; Available from: http://www.amstat.org/sections/srms/proceedings/y2005/Files/JSM 2005-000508.pdf

Condelli L., Wrigley H. (2004). Real World Research: Combining Qualitative and Quantitative Research for Adult ESL. American Institutes for Research, Washinton, DC, USA. 1-34.

Crossan F. (2004). Research philosophy: towards an understanding. Nurse Researcher; 11(1), 46-55.

Cunningham P., Felland L., Ginsberg P., Pham H. (2010). Qualitative methods: A crucial tool for understanding changes in health systems and health care delivery. Medical Care Research and Review; 86(1), 34-40.

Dane F. (1990). Research methods. Wadsworth, California.

Darkwa O. (2000). An exploratory survey of the applications of telemedicine in Ghana. Journal of telemedicine and telecare; 6(3), 177-183.

Davis F.D., Bagozzi R.P., and Warshaw P.R. (1989). User Acceptance of Computer Technology: a Comparison of two Theoretical Models, Management Science, Vol. 35, No. 8, pp. 982-1003.

Demiris G., Speedie S., Finkelstein S. (2000). A questionnaire for the assessment of patients' impressions of the risks and benefits of home telecare. Journal of Telemedicine and Telecare; 6(5), 278-284.

Doolittle G. (2001).Telemedicine in Kansas: the successes and the challenges. Journal of Telemedicine and Telacare; 7 (2), 43-46.

Dorrian C., Ferguson J., Ah-See K., Barr C., Lalla K., Der Pol M., Mckenzie L., Wootton R. (2009). Head and neck cancer assessment by flexible endoscopy and telemedicine. Journal of Telemedicine and Telecare; 15, 118-121.

Dovers K. (1999). How will we know "Good" qualitative research when we see it? Beginning the dialogue in health services research. Health services research; 34(5),1153-1188.

Driscoll D., Yeboah A., Salib P., Rupert D. (2007) Merging Qualitative and Quantitative data in mixed methods research. How to and why not. Ecological and Environmental Anthropology; 3(1), 19-28.

Durrheim K. (2002). Research in Practice: Applied methods for the social sciences. Cape Town: University of Cape Town Press.

Easterby-Smith M., Thorpe R., Lowe A. (1997). Management Research: an Introduction. London, Sage.

Eikelboom R., Atlas M. (2005). Attitude to telemedicine, and willingness to use it, in auditory patients. Journal of telemedicine and telecare; 11(2), 5-22.

Elder L., Clarke M. (2007). Past, present and future: experiences and lessens from telehealth projects. Open Med.; 1 (3): 166-170.

Eminovic N., Witkamp L., Ravelli A.C.J., Bos J.D., van den Akker T.W., Bousema M.T.,. Henquet C.J.M, Koopman R.J.J., Zeegelaar J.E., Wyatt J.C. (2003). Potential effect of patient-assisted teledermatology on outpatient referral rates. Journal of Telemedicine and Telacare; 9(6), 321-327.

Feghali E. (1997). Arab Culture Communication Patterns. International journal of Intercultural relations; 21(3), 345-378.

Gagnon M., Duplantie J., Fortin J., Landry R. (2006). Implementing telehealth to support medical practice in rural/remote regions: What are the conditions for success?. Implementation Science; 1(1), 1-8.

Guo Z., Sheffield J. (2008). A paradigmatic and methodological examination of knowledge management research; 2000 to 2004. Decision Support Systems; 44, 673-688.

Hailey D., Ohinmaa A., Roine R. (2004). Study quality and evidence of benefit in recent assessments of telemedicine. Journal of Telemedicine and Telacare; 10(6), 318-324.

Hailey D., Roine R., Ohinmaa A. (2002). Systematic review of evidence for the benefits of telemedicine. J. Telemed. Telecare; 8(1), 1-30.

Helitzer D., Health D., Maltrud K., Sullivan E., Alverson D. (2003). Assessing or predicting adoption of telehealth using the diffusion of innovations theory: A practical example from a rural program in New Mexico. Telemedicine and e-Health; 9(2),179-187.

Hill C., Lock K., Straub D., El-Sheshai K. (1998). A Qualitative assessment of Arab culture and information technology transfer. Journal of Global Information Management; 6(3), 29-38.

Hill C., Straub D., Lock K., Cotterman W., El-Sheshai K. (1994). The Impact of Arab Culture on the Diffusion of Information Technology: A Culture-Centered Model. Paper presented at the impact of Informatics on society: Key Issues for developing Countries, IFIP 94, Havana, Cuba.

Hofstede G. (1984). Culture's Consequences: International Differences in Work-Related Values, abridged ed., Sage Publications, Newbury Park, CA.

Hofstede G. (2001). Culture's Consequences: Comparing Values Behaviors, Institutions, and Organizations across Nations, 2nd ed., Sage Publications, Thousand Oaks, CA.

Hogenbirk J., Brockway P., Finley J., et al. (2006). Framework for Canadian Telehealth guidelines: Summery of the environmental scan. Journal of Telemedicine and Telecare: 12(2) 64-70.

Hu P.J.H., Chau P.Y.K., and Sheng O.R.L. (2000). Investigation of Factors Affecting Healthcare Organization's Adoption of Telemedicine Technology, Proceedings of the 33rd Hawaii International Conference on System Sciences.

Hu P., Wei P., Cheung H. (2002). Investigating telemedicine developments in Taiwan: implications for telemedicine program management. Proceedings of the 35th Annual Hawaii International Conference on System Sciences (HICSS'02); V.6: 160-168.

Hussein A. (2009). The use of triangulation in social sciences research: Can qualitative and quantitative methods be combined?. Journal of comparative Social Work; 1: 1-12.

Jafar M. (2004). Information technology in the Middle East. Journal of Global Information Technology Management; 7(1), 1-4.

Jennett P., Gagnon M., Brandstadt H. (2005). Preparing for success: Readiness models for rural telehealth. J Postgrad Med; 51(4), 279-285.

Jennett P., Yeo M., Pauls M., Graham J. (2003). Organizational readiness for telemedicine: Implications for success and failure. Journal of Telemedicine and Telacare; 9 (suppl. 2), 27-30.

Jennet P., Scott R., Hall A., Hailey D. Ohinmaa A., Anderson C., Thomas R., Young B., Lorenzetti O. (2004). Policy Implications associated with the Socioeconomic and Health system Impact of Telehealth: A Case Study from Canada. Telemedicine and e- Health; 10 (1), 77-83.

Jennett P., Jackson A., Ho K., Healy T., Kazanjian A., Woollard R., Haydt S., Bates J. (2005). The essence of telehealth readiness in rural communities: An organizational perspective. Telemedicine and e-Health; 11(2), 137-145.

Jennett P., Jackson A., Healy T., Ho K., Kazanjian A., Woollard R., Haydt S, Bates J. (2003). A study of a rural community's readiness for telehealth. Journal of Telemedicine and Telacare; 9(3) 259–263.

Kamal M., Themistocleous M. (2006). A conceptual Model for EAI Adoption in an E-government Environment. European Mediterranean Conference on Information Systems, July 6-7, Coasta Blanca, Alicante, Spain.

Kaplan B., Harris-Salamone K. (2009). Health IT success and failure: recommendations from literature and an AMIA workshop. J Am Med Inform Assoc.; 16(3): 291–299.

Khalfan A., Alshawaf A. (2004). Adoption and Implementation Problems of E-banking: A study of the Managerial Perspective of the Banking Industry in Oman. Journal of Global Information Management; 7(1), 47-64.

Khoja S., Scott R., Casebeer A., Mohsin M., Ishaq A., Gilani S. (2007). E-Health readiness assessment tools for healthcare institutions in developing countries. Telemedicine and e-Health; 13(4), 425-432.

Kifle M., Mbarika V., Datta P. (2006). Interplay of Cost and Adoption of Telemedicine in Sub-Saharan Africa: The Case of Telecardiology in Ethiopia, Information Systems Frontiers; 8(3), 211-223.

King G., Richards H., Godden D. (2007). Adoption of telemedicine in Scottish remote and rural general practices: a qualitative study. Journal of Telemedicine and Telacare; 13, 382-386.

Klein H., Myers M. (1999). A set of Principles for Conducting and Evaluating Interpretive Field Studies in Information systems. MIS Quarterly; 23(1), 67-94.

Kokesh J., Ferguson A., Patricoski C., Koller K., Zwack G., Provost E., Holck P. (2008). Digital images for postsurgical follow-up of tympanostomy tubes in remote alaska. Otolaryngology - Head and Neck Surgery; 139(1), 87-93.

Krupinski E., Nypaver M., Poropatish R., Ellis D., Safwat R., Sapci H. (2002). Clinical Applications in Telemedicine/Telehealth. Telemedicine and e-Health; 8(1), 13-34.

Lehoux P., Sicotte C., Denis J., Berg M., Lacroix A. (2002). The theory of use behind telemedicine: How compatible with physicians' clinical routines?. Social Science & Medicine; 54(6), 889-904.

leRouge C., Tulu B., Forducey P. (2010). The business of telemedicine: Strategy primer. Telemedicine and e-health; 16 (8), 898-909.

Lewin K. (1952). Group Decision and Social Change. In Newcombe, E., & Harley, R. (Eds.), Readings in Social Psychology. New York, Henry Holt.

Liu Sheng O., Hwa Hu P., Wei C., Kunihiko H., Grace A. (1998). Adoption and Diffusion of Telemedicine Technology in Health Care Organizations: A Comparative Case Study in Hong Kong. Journal of Organizational Computing and Electronic Commerce; 8 (4), 247-275.

Liu Sheng O., Hwa Hu P., Wei C., Ma P. (1999). Organizational management of telemedicine technology: Conquering time and space boundaries in healthcare services. IEEE Transactions on Engineering Management; 46 (3): 265-278.

Lopez C., Valenzuela J., Calderon J., Velasco A., Fajardo R. (2011). A telephone survey of patient satisfaction with real-time telemedicine in a rural community inn Colombia. Journal of Telemedicine and Telecare; 17, 83-87.

Lorenzi M., Riley T. (2003). Organizational issues=change. International Journal of Medical Informatics; 69 (3), 197-203.

Love B., Whitten P. (2005). Patient and provider satisfaction with the use of telemedicine: Overview and rational for cautious enthusiasm. Symposium; 51 (4), 294- 300.

Maheu M., Whitten P., Allen A. (2001). E-health, telehealth, and telemedicine: A guide to startup and success. Jossey-Bass, United States.

Marilyn J. F. (1996). Telemedicine: A guide to assessing telecommunications in health care. Institute of Medicine, Washington D.C.

May C., Gask L., Atkinson T., Ellis N., Mair F., Esmail A. (2001). Resisting and promoting new technologies in clinical practice: The case of telepsychiatry.Soc. Sci. Med. 52(12) 1889-1901.

Mairinger T., Gabl C., Derwan P., Mikuz G., Ferrer-Roca O.(1996). What do physicians think of telemedicine ? A survey in different European regions. Journal of Telemedicine and Telecare; 2 (1), 50-56.

Mair F., Finch T., May C., Hiscock J., Beaton S., Goldstein P., McQuillan S. (2007). Perceptions of risk as barrier to the use of telemedicine. Journal of telemedicine and telecare; 13(1), 38-39.

McCoy S., Evarard A., Jones B. M. (2005). An examination of the Technology Acceptance Model in Uruguay and the US: A Focus on Culture. Journal of Global Information Technology Management; 8 (2), 27-45.

Meher S., Tyagi R., Chaudhry T. (2009). Awareness and attitudes to telemedicine among doctors and patients in India. Journal of telemedicine and telecare; 15(3), 139-141.

Miller E. (2011). The continuing need to investigate the nature and content of teleconsultation communication using interaction analysis techniques. Journal of Telemedicine and Telecare; 17, 55-64.

Mingers J. (2003). The paucity of multi method research: a review of the information systems literature. Inf. Systems. J; 13, 233-249.

Mishra A., Kapoor L., Mishra S.K. (2009). Post-operative care through tele-follow up visits in patients undergoing thyroidectomy and parathyroidectomy in a resource-constrained environment. Journal of Telemedicine and Telacare; 15(2), 73-76.

Mosar C. A, Kalton G. Survey Methods in Social Investigations. Aldershot: Gower, 1989.

Mostafa M. (2005). Attitudes towards women managers in the United Arab Emirates. Journal of Managerial Psychology; 20 (6), 522-540.

Nerlich M., Schaechinger U. (2003). Integration of health telematics into medical practice. IOS, Amsterdam, Netherland.

Newsted P., Huff S., Munro M. (1998). Survey Instruments in Information Systems. MISQ; 553-554.

Oates B. (2006). Researching Information Systems and Computing. London, SAGE.

O'Cathain A., Murphy E., Nicholl J. (2010). Three techniques for integrating data in mixed methods

studies. BMJ; 341, 1147-1150.

Oppenheim A. N. Questionnaire design, interviewing, and attitude measurement. New York, Casselll publishing, 1999.

Orlikowski W., Baroudi J. (1991). Studying the Information Technology in Organizations: Research Approaches and Assumptions. Information Systems Research; 2 (1), 1-28.

Palvia P., Mao E., Salam A., Soliman K. (2003). Management Information Systems Research:What's There in A Methodology? MIS; (11), 289-309.

Parasuraman. A. (2000). Technology readiness index (TRI): A multiple-item scale to measure readiness to embrace new technologies. Journal of Service Research; 2(4), 307 – 320.

Parasuraman A., Colby C. L. (2001). Techno-ready marketing: How and why your customers adopt technology. NewYork: The Free Press.

Pathni R., Satpathy S., Kailash S. (2009). Need for tele follow-up - a study at a public sector quaternary referral hospital in india. Journal of Telemedicine and Telecare; 15 (5), 255-259.

Pottas L., (2005). Inclusive Education in South Africa: The Challenges Posed to the teacher of the Child with A hearing loss. Methodology Chapter (4): University of Pretoria etd: 83-140. Available at http://upetd.up.ac.za/thesis/available/etd-09072005-105219/unrestricted/04chapter4.pdf. Accessed on 22-12-2010.

Proctor S. (1998). Linking philosophy and method in the research process: the case for realism. Nurse Researcher; 5 (4), 73-90.

Reid J. R. (1996) Telemedicine primer: Understanding the issues. Innovative Medical Communications, United States.

Rogers E.M. (2003). Diffusions of innovations (5th ed.) New York, Free Press.

Rouibah K. (2008). Social usage of instant messaging by individuals outside the workplace in Kuwait: A structural equation model. Information Technology and People; 21 (1), 34-68.

Saarinen T. (1996). An expanded instrument for evaluating information system success: Information and Management; 31, 103-118.

Sable C., Cummings S., Pearson G., Schratz L., Cross R., Quivers E., Rudra H., Martin G. (2002). Impact of telemedicine on the practice of pediatric cardiology in community hospitals. Pediatrics; 109, (1), e3.

Shih FJ. (1998). Triangulation in nursing research: issues of conceptual clarity and purpose. Journal of Advancing Nursing; 28 (3), 631-641.

Shoaib S., Mirza S., Murad F., Malik A. (2009). Current status of e-health awareness among healthcare professionals in teaching hospitals of Rawalpindi. Telemedicine and e-Health; 15(4), 347-352.

Smith F. (2002). Research Methods in Pharmacy Practice. Pharmaceutical Press, London.

Snyder-Halpern R. (2001). Indicators of organizational readiness for clinical information technology/systems innovation: a Delphi study. Int. J. Med. Inf.; 63 (3), 179-204.

Sproull N. (1995). Handbook of research methods: a guide for practitioners and students in the social sciences, (2nd ed.) London.

Straub D. (1994). The effect of culture on IT diffusion: E-mail and FAX in Japan and the U.S. Information System Research; 5 (1), 23-47.

Straub D., Keil M., Brenner W. (1997). Testing the technology acceptance model across cultures: A three country study. Information & Management; 33 (1), 1-11.

Straub D., Loch K., Hill C. (2001). Transfer of information technology to the Arab world: A test of cultural influence modeling. Journal of Global Information Management; 9 (4), 6-28.

Stroebel D., (2006). Research Methodology: Chapter (3). University of Pretoria etd: 68-100. Accessed on 22-12-2010

Stokes C., Cannavina C., Cannavina G. (2004). The state of readiness of student health professionals for web-based learning environments. Health Informatics Journal; 10 (3), 195 – 204.

Thurmond V. (2001). The point of triangulation. Journal of Nursing Scholarship; 33 (3): 253-258.

Twati J., Gammack, J. (2006). The impact of organizational culture innovation on the adoption of IS/IT: the case of Libya. Journal of Enterprise Information Management; 19 (2), 175-191.

Uddin M., Hamiduzzaman M. (2009). The Philosophy of Science in Social Research. Journal of Internationa social Reseach; 2 (6), 654-664.

Vassallo D. J., Swinfen P. , Swinfen R. , Wootton R.(2001). Experience with a low-cost telemedicine system in three developing countries. Journal of Telemedicine and Telecare; 7 (1), 56–58.

Venkatesh V., Morris M.G. Davis G.B., Davis F.D. (2003). User Acceptance of Information Technology: Toward A Unified View. MIS Quarterly; 27 (3); 425-478.

Vitacca,M., M. Mazzu, S. Scalvini. (2009). Socio-technical and organizational challenges to wider e-health implementation. Chronic Respiratory Disease; 6 (2), 91-97.

Vuononvirta T., Timonen M., Kiukaanniemi S., Timonen O., Ylitalo K., Kanste O., Taanila A. (2011). The compatibility of telehealth with health-care delivery. Journal of Telemedicine and Telecare; 17, 190-194.

Waite K., Silver F., Jaigobin Ch., Black S., Lee L., Murray B., Danyliuk P., Brown E. (2006). Telestroke: a multi-site, emergency-based telemedicine service in Ontario. Journal of Telemedicine and Telecare; 12 (3), 141-145.

Wang S., Gross H., Lee S., Pardue C., Waller J., Nichols F., Adams R., Hess D. (2004). Remote Evaluation of Acute Ischemic Stroke in Rural Community Hospitals in Georgia. Stroke; 35, 1763-1768.

Way H. (2010). AVD Communications [internet]. Available at http://www.advcomms.co.uk/telemedicine/definition.htm. [Accessed 25/2/2010].

Weiner B., Amick H., Lund J., Lee SH., Hoff T. (2010). Review: Use of the qualitative methods in published health services and management research: A 10-year review. Medical Care Research and Review; 68 (1), 3-33.

Weinreich N. (1996). Integrating Quantitative and Qualitative methods in Social Marketing Research. Social Marketing Quarterly; 3 (1), 53-58.

Werner P. (2004). Willingness to Use Telemedicine for Psychiatric Care. Telemedicine and e-Health; 10(3), 286-293.

Whitten P., Adams I. (2003). Success and failure: A case study of two rural telemedicine projects Journal of Telemedicine and Telecare; 9, 125-129.

Wickramasinghe N. S., Fadlalla A.M.A, Geisler E, Schaffer J.L. (2005). A framework for assessing e-health preparedness. International Journal of Electronic Healthcare; 1 (3), 316-334.

Wilson E., Lankton N. (2004). Modeling patient's Acceptance of Provider-delivered E-health. Journal of Medical Informatics Association; 11 (4), 241-248.

Wittson C., Affleck D., Johnson V. (1961). Two-way television in group therapy. Ment. Hosp; 12 (11), 22-23.

Wood M., Re R., abdoh A., Bradford D., Kleit A., Chambers R., Altobello C., Ginther B., Gomez N. (2001). Patient and physician satisfaction in a clinical study of telemedicine in a hypertensive patient population. Journal of telemedicine and telecare; 7(4), 206-211.

Wootton R. (2001). Telemedicine and developing countries - successful implementation will require a shared approach. Journal of telemedicine and telecare; 7 (1), 1-6.

Wootton R. (1997). The possible use of telemedicine in developing countries. Journal of Telemedicine and Telecare; 3 (1), 23-26.

Wootton R., Youngberry K., Swinfen R., Swinfen P. (2005). Referral patterns in a global store-and-forward telemedicine system. Journal of Telemedicine and Telecare; 11(Suppl. 2), S100-103.

Wootton R., Youngberry K., Swinfen P., Swinfen R. (2004). Prospective case review of a global e-health system for doctors in developing countries. Journal of Telemedicine and Telecare. 10 (Supp.1) 94-96.

Wootton R. (2001). Recent advances: Telemedicine. BMJ; 323 (7312), 557-560.

Yeo T. (2002). Critical failure factors in information system projects. International Journal of Project Management; 20, 241–246.

Yi M., Jackson J., Park J., Probst J. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. Information & Management; 43 (3), 350-363.

Zolla, G. (1999). Information technology diffusion: a comparative case study of intranet adoption. Management of Engineering and Technology; 2, 19-23.

Appendix A:

Table 2.1: Brief description of the constructs (Checchi et al., 2002)

Construct	Description
National ICT Policies/ technological infrastructure	ICT are either facilitated or impeded by policies. The ICT infrastructure status
Transfer implementation factors	Factors that contribute to the success or failure of the technology implementation
Culture-specific beliefs and values	Individuals and groups are influenced by cultural and social responses; beliefs and values. These issues are influence the motivation towards the ICT adoption.
Technological culturation	Individuals or group cultures are influenced by the external technological advanced culture (e.g. Western industrialized culture)
Information technology transfer (ITT) / ICT outcomes	Prediction of success, actual use, intention to use, diffusion, and success of system development are outcomes measurement

Table 2.2: Measures of Cultural dimensions (Hofstede, 1984; 2001)

Hofstede's dimensions	Definition
Uncertainty avoidance (UA)	Focuses on the level of tolerance for uncertainty and ambiguity within the society.
Power distance (PD)	Focuses on the degree of equality, or inequality, between people in the country's society
Masculinity (MAS)	Muscularity measures the degree to which "masculine" values like assertiveness, performance, success, and competition prevail over "feminine" values like the quality of life, services, caring, and solidarity
Individualism (IDV)	Focuses on the degree the society reinforces individual or collective achievements and interpersonal relationships
Long-term orientation or Confucian dynamism (LTO)	Cultures typified by a long-term orientation oriented towards future rewards, in particular perseverance and thrift, while a short-term orientation is characterized by values relating to both the past and present, in particular, the respect for the tradition preservation of "face" and the fulfillment of social obligations

Appendix B: Includes the following documents:

1. Patient questionnaire (Arabic and English versions)
2. Physicians Questionnaire
3. Ethical approval
4. Information sheet

Investigation of the adoption of telemedicine technology in the Kuwait health system: Strategy and Policy of implementation for overseas referral patients

This questionnaire asks about your experiences of the overseas referral for medical treatment and your opinion on the use of the telemedicine system.

All information will be confidential and will only be used for research purposes. I thank you for your participation in completing this survey.

Prepared by:

PhD student Ali buabbas

United Kingdom

Questionnaire

- **Please tick the box for the appropriate response to each of the following:**

A- Demographic data

1- Age: ☐ 18-30 ☐ 31-40 ☐ 41-60 ☐ 61-70

2- Gender: ☐ M ☐ F

3- Education level: ☐ less K-12 ☐ K-12 ☐ Diploma ☐ College ☐ post-graduate

4- Marital status: ☐ Single ☐ Married divo☐l widow☐l

B- Diagnostic Profile

5- What is your health problem?

☐ Cancer ☐ Heart surgery ☐ Nerves disease ☐ Internal surgery ☐ Orthopedics ☐ Other

6- What type of patient are you?

☐ First time ☐ Follow up

C- Satisfaction about the current referral system

7- I am happy to travel abroad for treatment

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

8- It took too long to get permission to travel abroad

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

9- I am worried about travelling abroad the country

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

10- Before I travelled abroad I was worried about (Tick all that apply)

☐ Fear of travel ☐ I will be separated from my family

☐ It is expensive ☐ It is hard for me to travel

☐ Language ☐ Foreign country

11- Have you ever considered another way of treatment other than traveling abroad, to get the medical consultation? (Tick all that apply)

☐ Visiting consultant ☐ local private hospital ☐ None

D Attitude toward telemedicine

12- Had you ever heard of telemedicine before?

☐ Yes ☐ No

13- I would be happy to use telemedicine

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

- Patient/physician relationship

14- I would find it difficult to talk to a doctor using (a screen and camera) telemedicine

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

15- I would be willing to discuss my problems with a doctor over a telemedicine link

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

16- I would be willing to be examined by a doctor over a telemedicine link

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

- Technology anxiety

17- I am worried that the telemedicine is not private and confidential

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

18- The physician will not be able to examine me by telemedicine as well as if I was in person with the doctor

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

- If you have any comment, please write it down in the box below

Thank you for your participation

تبني تكنولوجيا الطب عن بعد في النظام الصحي في الكويت

يسأل هذا الاستبيان عن خبرتك في متابعه العلاج الطبي بالخارج ،وعن رأيك في استخدام نظام الطب عن بعد.

المعلومات في هذا الاستبيان سوف تعامل بسريه وسوف تستخدم في أغراض البحث العلمي.

شكرا لك سلفا لتعبئتك هذا الاستبيان

الباحث في المجال الصحي: علي جاسم بوعباس

المملكه المتحده

الاستبيان

من فضلك اختر الاجابه المناسبه لكل ما يلي:

أ- بيانات شخصيه

1- العمر: ☐ **30-18** ☐ **40-31** ☐ **60-41** ☐ **70-61**

2- الجنس: **ذكر** ☐ **أنثى** ☐

3- الحاله الاجتماعيه: **أعزب** ☐ **متزوج** ☐ **مطلق** ☐ **أرمل** ☐

4- المستوى التعليمي: **أقل من ثانوي** ☐ **ثانوي** ☐ **دبلوم** ☐ **بكالوريوس** ☐ **دراسات عليا** ☐

ب- جوانب التشخيص

5- ما هي مشكلتك الصحيه؟

أمراض سرطانيه ☐ **جراحه قلب** ☐ **جراحه عامه** ☐ **أمراض عصبيه** ☐ **عظام** ☐ **أخرى** ☐

6- هل أنت مريض علاج بالخارج؟

لأول مره ☐ **أو متابعه** ☐

ت- الرضا عن النظام الحالي المتبع للعلاج بالخارج

7- أنا سعيد للسفر للعلاج بالخارج

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

8- الاجراءات طويله للحصول على موافقه العلاج بالخارج

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

9- أنا قلق بشأن السفر خارج البلاد

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

10- قبيل السفر للخارج، أنا قلقت من **(اختر كل ما هو مناسب)**

☐ **خوف من السفر** ☐ **البعد عن الأهل**

☐ **الغلاء** ☐ **صعوبه السفر**

☐ **اللغه** ☐ **بلاد أجنبيه**

11- هل سعيت للحصول على الاستشاره الطبيه غير السفر للخارج؟ (اختر كل ما هو مناسب)

☐ **مراجعه استشاري زائر** ☐ **مستشفيات الكويت الخاصه** ☐ **لا يوجد**

ث- موقفك نحو نظام الطب عن بعد

12- هل سمعت من قبل نظام الطب عن بعد

نعم ☐ **لا** ☐

13- أنا سأكون سعيدا باستخدام نظام الطب عن بعد

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

- علاقه المريض/ الطبيب

14- سأجد صعوبه في الحديث مع الدكتور عبر شاشه التلفاز والكاميرا (الطب عن بعد)

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

15- سأكون راغب في مناقشه مشكلتي الصحيه مع الدكتور عبر نظام الطب عن بعد

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

16- أنا سأكون راغب بفحصي بواسطه الدكتور عبر نظام الطب عن بعد

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

- قلق باستخدام التكنولوجيا

17- أنا قلق بشأن (الطب عن بعد) بأنه لا يوفر الخصوصية والسرية

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

18- سيكون الدكتور <u>غير قادر</u> على فحصي باستخدام نظام الطب عن بعد كما لو كنت معه شخصيا

أوافق بشده ☐ **أوافق** ☐ **لا أوافق** ☐ **لا أوافق بشده** ☐

أي ملاحظات أخرى، من فضلك اكتبها في الصندوق المخصص تحت

Investigation of the adoption of telemedicine technology in the Kuwaiti health system: Strategy and Policy of implementation for overseas referral patients

The objective of this questionnaire is to explore the perception of the physician towards adoption of telemedicine technology.

All information will be confidential and will only be used for research purposes. I thank you for your participation in completing this survey.

Telemedicine is the use of information and communication technology (ICT) in delivering the medical care services when the distance separates the participants for the purpose of improving the patient care and the education of the health care provider. Video conferencing (live) and store-and-forward (e-mails) are two common techniques for telemedicine

Questionnaire

- **Please tick the box for the appropriate response to each of the following:**

A- Demographic data

1- Age: less 35 ☐ ☐ 35-50 ☐ 51-60 ☐ above 60

2- Gender: ☐ M ☐ F

3- Nationality: ☐ K ☐ Non-K

4- Speciality:

☐ Oncology ☐ Orthopaedics ☐ Cardiology ☐ Neurology ☐ Other……

5- Years of experience: 5-10 ☐ 11-20 ☐ 21 and above ☐

B- Background information: Please **circle** for the appropriate response

6- Do you use a computer at you work? Always Often Sometimes Rarely Never

7- Do you use internet at you work? Always Often Sometimes Rarely Never

8- Do you use e-mail at your work? Always Often Sometimes Rarely Never

9- Do you have telemedicine applications? Always Often Sometimes Rarely Never

10- Do you use telemedicine system? Always Often Sometimes Rarely Never

C- Satisfaction with the current referral abroad system

11- I am satisfied with the current procedures for referring patients abroad

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

12- I have concerns about …..(Tick all that apply)

☐ Takes too long ☐ Treatment unavailable ☐ Medical mistakes

☐ Too many patients ask for unnecessary treatment abroad

☐ Others like……

13- Telemedicine system could be a solution for handling the previous issues

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

D- Perception about telemedicine

14- Telemedicine is a viable approach for providing medical care services to patients

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

15- There is a potential role for ICT/ internet in the health care

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

16- Using of telemedicine system can save time and money

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

17- Telemedicine system can save efforts

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

18- The applications of ICT in health care is already available

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

E- Comfort with technology

19- I can trust the technology to work

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

20- I am happy in using ICT/Internet for the purpose of patient care and education

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

21- There is a general comfort in using ICT/Internet in storing, retrieving, and communicating of patient information with other health institution

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

22- Our culture and social norms do not refuse using telemedicine

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

F- Willingness about telemedicine

23- I would like to consult with the large centers in my specialty, whilst I am in my own hospital

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

24- I would like to be able to watch an operation as it is taking place

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

25-The proposed technology of telemedicine is appropriate due to the current conditions in the hospital

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

26- I think that my colleagues would be willing to implement the technology of telemedicine for its intended purpose

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

27- Telemedicine system can be integrated within the existing system

☐ Strongly agree ☐ Agree ☐ Disagree ☐ Strongly disagree

28- Which of the following issues might be the cause of ***not*** adopting telemedicine? (Tick all that apply)

☐ High cost of equipment
☐ Negative attitudes of staff involved
☐ Lack of suitable training in the use of equipment
☐ Perceived increase in workload
☐ Concerns about patient privacy/confidentiality
☐ Lack of user-friendly software
☐ Lack of perceived clinical usefulness
☐ Lack of consultation between information technology experts and clinicians
☐ Others, please mention it……

- If you have any comment, please write it down in the box below

Thank you for your participation

School of Information Systems, Computing and Mathematics
David Gilbert, Head of School, Professor of Computing
Jasna Kuljis, Head of Information Systems and Computing, Professor of Computing
Tony Rawlins, Head of Mathematical Science, Professor of Mathematics

The use of e-learning to improve numeracy on Schools

Brunel University, Uxbridge,
Middlesex UB8 3PH, UK
Telephone: +44(0) 1895 274000
Fax: +44(0) 1895 251686
Email:
Laurence.Brooks@brunel.ac.uk
Lampros.Stergioulas@brunel.ac.uk
Allan.Tucker@brunel.ac.uk

Date: 22nd November 2010

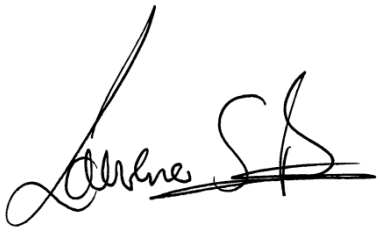
STATEMENT OF ETHICS APPROVAL

Proposer: ALI J. M. N. H. BUABBAS

Title: **Investigation the adoption of telemedicine technology in the Kuwait health system: Policy and strategy of implementation on overseas referral patients**

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,



Dr. Laurence Brooks, Chair of the Research Ethics Committee
SISCM

Important information

The name of the researcher: Ali Buabbas

This research project is a PhD thesis aims to investigate the adoption of telemedicine technology in the Kuwait health system, focuses on the overseas referral patients.

The aim of the questionnaire is to explore your opinion about the use of telemedicine system in order to obtain the medical consultation at distance from specialized clinics.

Completing this questionnaire is optional (not compulsory), and you can withdraw any time without consequences.

All information will be confidential and will only be used for research purposes.

If you have any concerns or complaints regarding this project please contact siscm-srec@brunel.ac.uk or Dr. Annette Payne Tel. No. 01895266295

Appendix C: Includes the following documents:

1- Interview guide for IT managers

2- Interview guide for policy makers

3- Consent form

Investigation of the adoption of telemedicine technology in the Kuwait health system: Strategy and Policy of implementation for overseas referral patients

This interview is aimed to explore the opinions of the health care organization members (policy makers) regarding the needs and the readiness of the health care facility, for the purpose of assessment prior telemedicine adoption.

Date: Place: Time:

Interviewer:

Interviewee (Position):

All information will be confidential and will only be used for research purposes.

I thank you for your participation

1- Date of birth:

2- Educational level:

3- Years of experience:

4- From your perspective, what are the main problems associated with referring patients abroad for treatment? (economic issue /patients issues)

5- From your opinion, what do you think about patients leaving their home for treatment?

   - Several fairs like financial, emotional, and travel
   - Patient accompany - follow up patients (post surgery, chemotherapy)

6- What are the proposed plans for cutting the huge budget spent on the high number of patients treating abroad? Such as use of ICT

7- Why you did not consider using of ICT (telemedicine) as a solution?

   - Different telemedicine applications

8- How does telemedicine system could affect the health status of the patients?

   (case management)

9- How would you describe the potential of telemedicine system in delivering health services? (the benefits of telemedicine on patient, physician, health care organization)

10- What do you think the barriers of telemedicine adoption in the Kuwait Ministry of Health?(resistance to change/technology, cultural and social issues)

11- How to overcome these barriers of implementation?

12- What do you think the supportive factors for telemedicine adoption in Kuwait Ministry of Health? (the available and the non available)

13- What do you think the needs in order to integrate telemedicine system into physician clinical practice? (conditions that could help (existing policies))

14- How do you explain the governmental role in facilitating the adoption of telemedicine in Kuwaiti health system? (community awareness, financial support)

15- What is the role of the Kuwaiti community culture, social norms and beliefs in accepting the new of health care delivery?

16- In case of accepting this technology of telemedicine, what do you think the policies needed to be set up prior adoption?

Any thing else you would like to add? Did I miss something important?

Many thanks for your participation making this interview successful

Investigation of the adoption of telemedicine technology in the Kuwait health system: Strategy and Policy of implementation for overseas referral patients

This interview is aimed to explore the opinions of the ICT managers regarding the needs and the readiness of the health care facility, for the purpose of assessment prior telemedicine adoption.

Date: Place: Time:

Interviewer:

Interviewee (Position):

All information will be confidential and will only be used for research purposes.

I thank you for your participation

1- Date of birth:

2- Educational level:

3- Years of experience:

4- Could you describe the current ICT infrastructure available at your institution?
(Hardware and software)

5- What is the capability/level of the ICT/internet at your institution?
(Speed and quality of connection)

6- What do you know about telemedicine system?
(Set up requirements)

7- From your opinion, do you think the current level of ICT infrastructure is ready for telemedicine adoption?
(Effectiveness and affordability)

8- What are the institutional plans for accessing the ICT/internet at the work place?
(Training programs, manpower)

9- How do you think the ICT infrastructure should be for telemedicine implementation? ICT policy, cultural factor

Any thing else you would like to add? Did I miss something important?

Many thanks for your participation making this interview successful

Appendix D:

School of Information systems, Computing, and Mathematics

Brunel University, West London

Consent Form

Title of the project: Investigation of the adoption of telemedicine technology in the Kuwait health system: Strategy and Policy of implementation for overseas referral patients.

Name of the researcher: Ali Buabbas

Please tick box

1	I confirm that I have read and understand the information sheet for the above study. I am fully aware about the purpose of this research.	
2	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reasons	
3	I agree to the interview being audio-recorded for purpose of transcription	
4	I agree to take part in the above study	

_____ _____ _____

Name of participant Date Signature