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How Ready are the Stakeholders in the Palestinian Health Care System in the Gaza Strip to Adopt e-Health?

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How Ready are the Stakeholders in the Palestinian Health Care System in the Gaza Strip to Adopt e-Health?

By

Radwan Mahmoud Baroud

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES
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ABSTRACT

Background

e-Health readiness refers to preparedness of an organization or community to implement any information and communications technology based healthcare program. e-Health has emerged as a powerful tool that has the potential to improve the delivery of information and services, provide distance learning, and develop an interconnected electronic health information infrastructure to support clinical care and system performance. Full benefit of e-health services will be apparent only when they meet the real needs of, and add value to, healthcare services. But for success, it is very important to assess the e-health readiness of stakeholders prior to implementation using sound scientific method.

Objectives

To explore stakeholder readiness in the Palestinian healthcare system in the Gaza Strip to adopt e-health, to understand the facilitators and barriers of this process, and to know the best e-health solutions required to meet their needs.

Methods

Based on the literature review, a conceptual framework was developed that used innovation adoption and change models, and uniquely aligned them with a more recent e-health readiness model, incorporating various determinants at both the organizational and the individual level. A qualitative case study method was used. Four healthcare facilities were selected. From each facility a patient, a practitioner, a management member, and a member of the public were identified for interview. Five focus groups were conducted following the interviews; at least one in each healthcare facility. Data collection was preceded by an awareness session in each healthcare facility. For each case, thematic analysis of interviews
and focus groups transcripts was performed to extract key information related to the four types and four domains of readiness for e-health. A cross case analysis was then performed.

**Results**

Levels and types of readiness varied amongst the facilities. The type of readiness ranged from core readiness (identification of need and dissatisfaction with the current situation) to structural readiness (building of efficient structure and supports). The level of readiness ranged from high (Case 1) to poor (Case 4). Individual, organizational, technological, and external environmental factors were identified that impede or facilitate e-health adoption. E-Health applications that will best meet local needs will be educational, clinical, and administrative in nature, but differ by institution.

**Conclusion**

The data show that stakeholders in the Palestinian healthcare system in the Gaza Strip are ready to adopt e-health. This study provides a valuable resource for those involved in service planning by increasing understanding of the process needed to introduce e-health to the Palestinian healthcare system in the Gaza Strip, and may demonstrate value in other developing countries. Stakeholders in Gaza believe this understanding will assist decision-makers at all levels to structure future e-health programs in a meaningful and effective way.
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<td>ABC</td>
<td>Alliance for Building Capacity</td>
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<td>ACIT</td>
<td>Arab Culture and Information Technology</td>
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<td>APEC</td>
<td>Asia Pacific Economic Cooperation</td>
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CHAPTER ONE: INTRODUCTION

INTRODUCTION TO THE RESEARCH PROBLEM

The rapid evolution in the field of information and communications technology (ICT) is greatly responsible for the prosperity we currently enjoy. Of the many sectors that have been impacted by this revolution, the healthcare system is an important one. The ambitions of early adopters and researchers in the health sector have further supported the use of this technological advance to fulfill the patients' expectations in receiving high quality healthcare services (Richardson et al., 2002).

The present day scenario in the health systems of developed and developing countries have beckoned for innovative approaches which can provide solutions for most of the existing issues. Developed countries face a number of challenges such as increased economic pressure, inequities in health status, quality of care, and a shortage of health professionals (Mitchell, 2000; Moore, 2002; Brady, 2005), while in developing countries the issues are around accessibility, quality of care, provision of services for remote areas, shortage of medical specialties, inadequate continuous medical education, and lack of accurate and timely health information (Sadowsky, 1996; WHO, 2001).

“e-Health” is a broad term that can be considered as the application of information and communications technology to facilitate any aspect of health or healthcare. The World Health Organization (WHO) has defined e-health as “the cost-effective and secure use of ICT in support of health and health related fields, including healthcare services, health surveillance, health literature, and health education, knowledge and research” (WHO, 2005).
e-Health, and its powerful range of functions, serve as channels to achieve good cooperation and communication among the different sectors of the healthcare system. It has been applied to a wide area of image-dependent medical specialties, such as radiology, pathology, cardiology, and dermatology (Brauchli et al., 2004; Wootton, 2003). Other applications have been for medical education, home care, military and prison applications, and urgent distance care.

Recent studies have demonstrated the socio-economic impact of e-health, and its potential in the areas of improving accessibility, containing cost, and providing quality care (Kuntalp and Akar, 2004; Johnston et al., 2004; Brady, 2005; Craig and Patterson, 2005). For example, e-health has advantages where there is relatively inadequate or non-existent access to healthcare resources (Craig, 1999), uneven geographical distribution of expertise (Wright, 1998), and continuing increases in the cost of healthcare services (Whitten et al., 2000). By improving communication between peripheral health centers and secondary or tertiary hospitals, it has been shown to speed up the referral process, reduce unnecessary referrals, and improve quality of care (Harris, 2002; Kifle et al., 2005a). In some cases, e-health may be cheaper than conventional practice (Edworthy, 2001).

The apparently successful experiences of developed countries in using e-health applications (such as telehealth and e-learning) have encouraged many developing countries to consider this innovation to overcome their healthcare problems. In a regional workshop conducted in Cairo 2001 under the umbrella of WHO, participants strongly recommended that e-health be considered as a strategic component in national healthcare systems of developing countries as it facilitates the delivery of equitable healthcare and
educational services irrespective of distance and availability of specialists. WHO (2005) has also advised these governments to implement policies to facilitate the use of e-health.

Despite high hopes, however, use of ICT (e-health) in developing countries that lack clear readiness potentially carries a number of risks, including huge losses in time, money, and effort. More generally, numerous studies have documented infrastructure barriers and other non-technological factors as barriers to e-health technology adoption, including organizational aspects (Aas, 2001), human elements (Croteau and Vieru, 2002; Kifle et al., 2005b), policy (Anderson, 2000; Varghese and Scott, 2004), socio-economic factors (Jennett et al., 2003; Madon, 2000; Scott et al., 2005) and cultural issues (Checchi et al., 2002; Bagchi et al., 2003; Leidner and Kayworth, 2006).

As in many developing countries, the Palestinian Ministry of Health (MOH) is faced with problems of growing demand for healthcare services under conditions of limited resources. The physical separation of the Palestinian land (West Bank and Gaza Strip) and the unstable political situation further add to the existing woes. In their search for alternatives to overcome the health system’s problems, key government officials in the Palestinian MOH, healthcare organizations, health professionals, patients, and the public, have all realized the potential of e-health applications and services to improve healthcare services delivery. But the logical questions are: What e-health solutions are needed, how ready are the stakeholders to adopt and use them, and how is the adoption of e-health in the Gaza Strip culturally similar to or different from its adoption compared to other cultures? To this point these questions have not been investigated.

In order to decrease the effect of the barriers to e-health and the risk of failure, it is important to apply sound scientific methods to assess the real e-health ‘needs’ and e-
health ‘readiness’ (also referred to as e-readiness) of stakeholders to determine their preparedness for ICT related change.

The concept of “e-readiness” is relatively new in the healthcare sector, and has been defined as “the degree to which users, healthcare organizations, and the health system itself are prepared to participate and succeed in e-health implementation” (Alliance for Building Capacity Report, 2002).

Although it is critical that health policy planners and decision makers have supported information to guide successful planning and implementation of e-health services, no known study has examined e-health readiness within Palestine or other Arab countries in the region. Hence, the motivation for this study is to investigate the stakeholders' readiness for e-health adoption in the healthcare system in the Gaza Strip and to identify some of the key factors that pose challenges for introducing the technology into the Palestinian healthcare system. To achieve this, the investigator surveys the literature, including relevant theories, develops a conceptual framework, and examines various pertinent issues (from the perspective of infrastructure, socio-economic, political and cultural factors), and their interrelationships. A qualitative case study research approach was selected (Yin, 2003; Stake, 1995) as a methodology to guide this research.
SIGNIFICANCE OF STUDY

Several studies in the area of e-health and readiness refer to situations where the potential of e-health is undermined by concerns like policies and regulations, infrastructure, standards, lack of interest, resistance to change, organizational environment, reimbursement, culture, and privacy and security (Courtright, 2004; Stanberry, 2006; Loane and Wootton 2002; Mbarika et al., 2005; Doolittle et al., 2004; Leidner and Kayworth, 2006). Many studies report that e-health faces other uncertainties such as limited acceptance by healthcare professionals, lack of long-term sustainability, untrained staff, and lack of clear planned programs (Bashshur, 2002; Kifle et al., 2006b).

Jennett et al. (2003) have stressed the importance of conducting readiness assessments prior to implementing e-health technology to identify existing infrastructure, needs to be met, and to understand the needs from the perspective of key stakeholders. Similarly Khoja (2006) recognized that before costly investments are made it is essential to determine whether an organization or community is “ready” for e-health implementation. Thus introducing e-health to the Gaza Strip must be preceded by sound research that both assesses the need for e-health and the readiness of stakeholders, and also highlights the barriers and facilitators which, when addressed by policy-makers, can guide successful planning and implementation of e-health services.

The significance of this study lies in its systematic approach to assessing the readiness of stakeholders of the Palestinian healthcare system in the Gaza Strip to adopt e-health. Findings of this study could be used by policy makers and stakeholders inside and outside Gaza, national healthcare services specialists, NGOs, private sector, ICT specialists, universities, etc. Also, international agencies in Gaza and other Middle East
countries could benefit by using this study as a first step in the area of ICT and e-health readiness assessment.

The literature review revealed no existing studies investigating e-health readiness related to Palestine or similar Arab countries in the region. Hence, this study will contribute new information to the body of knowledge in this field, specifically in the Palestinian and Arab dimension. It will also serve as a benchmark study to guide future actions, as well as to put the Gaza Strip on the map of e-health and ICT users, attracting the attention of international funding bodies to support the process of e-health adoption.

STUDY OBJECTIVES

The objective of this study is to understand the processes of e-health technology adoption and e-health readiness within the Arab world in the Middle East region using the Gaza Strip as an exemplar to understand this issue. The following are the practical study objectives:

- To assess the e-health readiness of stakeholders (patients, practitioners, healthcare organizations, and the public).
- To understand the factors that might facilitate or impede e-health implementation.
- To assess current ICT infrastructure, existing and future needs.
- To determine which e-health solutions best meet the system and people needs.
RESEARCH QUESTIONS

The study focuses on seeking answers to the following research questions:

The main question:

How ready are stakeholders in the Palestinian healthcare system in the Gaza Strip to adopt e-health?

Subquestions:

1) How ready are stakeholders to accept and implement e-health?
2) What health and ICT infrastructure needs exist?
3) What e-health solutions would best serve the needs of the population?
4) What are the perceived barriers and facilitators for adoption?

By addressing these research questions, this study aims to provide a valuable resource for those involved in planning and implementation of e-health in developing countries of Palestinian and Arab culture, before huge investments are made.

DISSERTATION ORGANIZATION

The dissertation proceeds as follows:

Chapter 1 states the research problem, justifies the need for this study, and presents objectives, research questions, importance, and the researcher's position.

Chapter 2 provides background to the study (Gaza Strip context).
Chapter 3 focuses on the literature review and on prior work.

Chapter 4 discusses the conceptual framework.

Chapter 5 explains the research methods.

Chapter 6 presents the detailed analysis of the cases.

Chapter 7 presents the cross cases analysis.

Chapter 8 discusses the results.

Finally chapter 9 presents the overall conclusion and recommendations of the study.

THE RESEARCHER

Being a study with a strong qualitative component, it is vital to situate the researcher in relation to the data.

The researcher comes to the study with a fair amount of experience working and living in the Gaza Strip. He has worked in the Palestinian healthcare system, in international projects, and in a non governmental organization as a medical doctor, Projects Director, and Executive. Together with these experiences, the researcher’s belief that ICT has the potential to immeasurably improve the quality of healthcare services and wellness of the Palestinian people, strongly informed the desire to conduct research in the Gaza Strip.
OPERATIONAL DEFINITIONS

The following definitions have been applied throughout the thesis to ensure consistency:

**e-Health**: This term refers to the use of ICT in healthcare for individuals or communities in the provision of care (telehealth), distance education (e-learning), or to manage information for better decision making (health informatics). e-Health is unique in having the capability to cross geographical, temporal, political, social and cultural barriers within the health sector.

**Health informatics**: Health informatics (HI) refers to the use of ICT to manage health data and information for better health-related decision making for individuals and communities.

**Telehealth**: Reid (1996) defined telehealth as the use of advanced telecommunications technologies to exchange health information and provide health care services across geographic, time, social, and cultural barriers. Reid’s definition is adopted as it was the first to acknowledge “crossing” of barriers; noting however that telehealth uses traditional, not just advanced, ICT’s.

**Videoconferencing**: Videoconferencing is the transmission of video images, audio, and often data, over communication networks.

**Telemedicine**: Refers to the use of ICT for the provision of medical care at a distance. It is often used interchangeably with telehealth; however, the term telemedicine generally implies a physician mediated interaction with patients.

**e-Health Readiness**: This term refers to the preparedness of an individual, community, or organization to adopt an e-health program. The aim of assessing e-health readiness is to
identify the type of stakeholder need that must be met, to explore opportunities and threats, and to determine the degree to which potential users, healthcare organizations, and the health system itself are prepared to participate and succeed in implementation of an e-health solution.

**Stakeholders**: In this study the term stakeholders refers to healthcare professionals, patients, the public, and health related organizations (represented by management level decision makers).

**Healthcare Facilities**: A term used to describe any physical entity that employs well-trained staff to provide healthcare services to the general population at the primary, secondary, or tertiary levels, and in the public or private sectors.

**Healthcare professionals / providers / practitioners**: These terms, used interchangeably, define the people who are directly involved in patient care and associated with any type of healthcare facility. They may be physicians, dentists, pharmacists, nurses, health educators, physiotherapists, or technicians (laboratory, x-ray).

**Information and Communications Technology (ICT)**: The application of electronic and computing capabilities (technology) to the creation and storage of meaningful and useful facts or data (knowledge), and to its transmission to users by various electronic means (communication). The ultimate goal is for ICT to transform data into information, information into knowledge, and knowledge into practice.
CHAPTER TWO: CONTEXT

INTRODUCTION

Palestine is one of the 22 countries that constitute the Arab world known as MENA (Middle East and North Africa), that straddles the Asian and African continents (Figure 2.1). These countries have similar cultural make-up and share the characteristics of Islam as a religion and Arabic as a language. The Arab states also share a similar trend in economic development, with the use of technology rapidly growing and invading many professions and daily life sectors.

Figure 2.1: Arab world countries (source: www.arabbay.com/arabmap.htm)

In order to provide context for the study, this chapter will shed light on the Gaza Strip by briefly describing its location, people, culture, political situation and socio-economic status. It will then review Gaza’s ICT profile. Finally, it will examine the
Palestinian system of healthcare and provide reasons why the system might benefit from e-health.

GAZA STRIP PROFILE

The Gaza Strip is located in the Middle East, or south-western Asia. It is a narrow finger shaped strip of land lying on the coast of the Mediterranean Sea, with an area of 360 square kilometres. It is bordered to the south by Egypt, on the west by the Mediterranean Sea, and on the north and east by Israel (Figure 2.2).

Figure 2.2: Map of the Gaza Strip and bordering countries
(Source: UNRWA-Gaza field)
The Gaza Strip has a population of nearly 1.4 million which is expected to increase to 1.9 million by 2015 (Palestinian Central Bureau of Statistics, 2004a). It has one of the highest overall growth rates and population densities in the world: 9,712 persons per square mile. More than half of Gazans live in the region’s urban centres, the largest of which is the city of Gaza. Other cities and towns in the Gaza Strip include Khan Younis, Rafah, Beit Lahia, Beit Hanoun, and Jabalia. Only one third of the area’s residents are indigenous Gazans. The other two thirds are refugees who live in eight refugee camps after they were driven from their land in historical Palestine as a result of the 1948 war. The primary language of Palestinians is Arabic. Hebrew is spoken by many Palestinians, and English is widely understood.

According to the 2004 Palestinian MOH Annual Report, 48% of the population in Gaza is under 15 years of age, 49.4% from 15-64 years, and the rest (2.6%) over 65 years. The infant mortality rate is 24 per 1,000 live births. The total fertility rate is 5.78 children born per woman, resulting in a population growth rate of 3.83 %. The crude birth rate is 39.45 births per 1,000 populations, and the crude death rate is 3.8 deaths per 1,000 population. The adult literacy rate is 92.4%. Life expectancy is 72.7 years (71.2 years for males and 74.1 years for females), and combined primary, secondary, and tertiary gross enrolment for education is 81.2% (United Nations Human Development Report, 2006).

Despite the Gaza Strip’s limited land and water resources, agriculture and raising of livestock dominate the economy of the Gaza Strip. Principal crops grown in the region include olives, vegetables, other field crops, plus citrus fruits, some of which are exported
to European countries. The region also contains some light industry, most of it centered on the city of Gaza, which maintains a small port for the region's fishing fleets.

High population density, limited land access, and strict internal and external Israeli controls have kept economic conditions in the Gaza Strip degraded. The Israeli closure policies, imposed in response to security concerns in Israel, have disrupted labour and commodity relationships with the Gaza Strip. Military measures in the region have resulted in the destruction of capital plant facilities, disruption of administrative structures, and widespread business closures, resulting in extreme unemployment and economic hardship. The gross domestic product (GDP) per capita is US $2,331. Palestine lies 100th of 177 countries on the United Nations Human Development Index (HDI) for the year 2006 (United Nations Human Development Report, 2006).

Table 2.1 compares socio-economic indicators for Palestine and neighbouring countries (Israel, Egypt and Jordan). This comparison shows that Palestine has a better rank than Egypt and Jordan in life expectancy, adult literacy rate, and education but a lower GDP per capita reflecting an inconsistent economic performance as a result of a lack of natural resources and political instability.

CULTURAL PROFILE

An increasing numbers of studies in the ICT literature have discussed the effects of culture on technology adoption and use (Baba, 1995; Loch et al., 2000; Hasan and Dist, 1999; Checchi et al., 2002). Hence, highlighting some cultural aspects of the Palestinian population will provide a better understanding of the components that affect the social life of the people, and their process of decision making in daily life.
<table>
<thead>
<tr>
<th>Socio-economic indicators</th>
<th>Palestine</th>
<th>Jordan</th>
<th>Egypt</th>
<th>Israel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life expectancy at birth (years)</td>
<td>72.7</td>
<td>71.6</td>
<td>70.2</td>
<td>80.0</td>
</tr>
<tr>
<td>Rank out of 177</td>
<td>62</td>
<td>76</td>
<td>94</td>
<td>9</td>
</tr>
<tr>
<td>Adult literacy rate (% age 15 and older)</td>
<td>92.4</td>
<td>89.9</td>
<td>71.4</td>
<td>97.1</td>
</tr>
<tr>
<td>Rank out of 177</td>
<td>47</td>
<td>57</td>
<td>93</td>
<td>28</td>
</tr>
<tr>
<td>Combined primary, secondary, and tertiary gross enrolment ratio (%)</td>
<td>81.2</td>
<td>79.0</td>
<td>75.5</td>
<td>89.7</td>
</tr>
<tr>
<td>Rank out of 177</td>
<td>49</td>
<td>58</td>
<td>70</td>
<td>25</td>
</tr>
<tr>
<td>GDP per capita (US$)</td>
<td>2,331</td>
<td>4,688</td>
<td>4,211</td>
<td>24,047</td>
</tr>
<tr>
<td>Rank out of 177</td>
<td>na</td>
<td>99</td>
<td>106</td>
<td>23</td>
</tr>
<tr>
<td>HDI Value</td>
<td>0.736</td>
<td>0.760</td>
<td>0.702</td>
<td>0.927</td>
</tr>
<tr>
<td>HDI Ranking out of 177 countries</td>
<td>100</td>
<td>86</td>
<td>111</td>
<td>23</td>
</tr>
</tbody>
</table>

Table 2.1: Palestine socio-economic indicators compared with the neighbouring countries Israel, Egypt and Jordan (Source: United Nations Human Development Report, 2006)

In Palestinian culture, the family constitutes the dominant social institution through which people inherit their religious, class, and cultural affiliations. Family is considered as the source of security and support in times of individual and societal stress. Many parents prefer to have more children, and an extra child is usually seen as an extension of family power and prestige, and an additional source of labour (Arab Encyclopedia Britannica, 2000)

Traditionally, in the Palestinian family, gender and age play a big role in specifying responsibilities. Cultural influence tends to patriarchal, where the father is the head of the family and the provider, while the mother plays a major role in raising
children and taking care of the house. The most major family decisions are made by the father (National Institute for Technology and Liberal Education, 2002). Parents are usually overprotective and restrictive, and children grow up to feel secure only on familiar ground. The children avoid taking risks and challenges, for independence of mind, critical dissent, and adventure beyond the recognized limits are constantly and systematically discouraged by parents and older family members.

Nonetheless, the situation is changing in response to new political, technological, and societal realities, the increasing employment of women, and the migration of children to culturally different countries (seeking education and work). In recent years, both parents provide for family needs, with decisions made jointly. Sons and daughters are given responsibilities that correspond with their age and gender.

Islam is the religion of the majority of Palestinians, and is followed in all areas of life, influencing governmental, political, and social issues (UN Human Development Report, 2006).

POLITICAL BACKGROUND

The Israel-Palestinian Liberation Organization Declaration of Principles on Interim Self-Government Arrangements, signed in Washington on 13 September 1993, provided for a transitional period not exceeding five years of Palestinian interim self-government in the Gaza Strip and West Bank. Under this declaration, Israel agreed to transfer certain powers and responsibilities to the Palestinian National Authority (PNA); this transfer for the Gaza Strip and Jericho took place in 1994 and additional areas of the West Bank in 1995 and 1997. The Declaration of Principles provides that Israel will
retain responsibility during the transitional period for external and internal security and for public order of settlements and Israeli citizens. Negotiations to determine the permanent status of Gaza and West Bank began in September 1999, but their failure led to a second Intifadah (violent uprising) that broke out in September 2000.

In April 2003 the United States of America, European Union, United Nations, and Russia presented a roadmap towards a final settlement of the conflict by 2005 leading to two states, Israel and a democratic Palestine. The proposed date for a permanent status agreement has been postponed indefinitely due to violence and accusations that both sides have not followed through on their commitments. In September 2005, Israel withdrew all its settlers and soldiers and dismantled its military facilities in the Gaza Strip and four northern West Bank settlements. Nonetheless, Israel controls maritime, airspace, and other access routes to the Gaza Strip (The CIA World Fact Book, 2005).

In parliamentary elections, conducted on 25 January 2006, the Islamic Resistance Movement (Hamas) won a large majority in the new Palestinian parliament qualifying it to form the new cabinet. Since that date, Israel, the United States, and the European Union, imposed severe sanctions on PNA. All foreign aid was stopped and the Israeli government froze a $55 million monthly tax and customs transfer to the PNA which covers about half of the authority's monthly payroll and unemployment benefit costs. The PNA's bank accounts in Israel were frozen also and, in the absence of an independent Palestinian bank, it was impossible to transfer money to the PNA.

The PNA budget is approximately $1.9 billion a year, of which $1.3 billion comes from the US, EU, and taxes collected on behalf of the PNA by the Israeli authorities (World Bank Annual Report 2005). The economic sanctions, military pressure, and
border closures have created a real humanitarian catastrophe. At the time of writing, the PNA’s 130,000 workers, who according to World Bank estimates support 1.5 million Palestinians, have not been paid for seven months. As a consequence, Palestinian hospitals are on the verge of collapse, and 70% of the schools are going to be closed down due to the lack of financial support for day-to-day operation and maintenance.

This unstable political situation directly affects all the developmental and technical assistance projects supported by international aid organizations including projects aimed at upgrading the Palestinian healthcare system. This further implies the indirect threat of reducing visibility of this study in the short term or perhaps longer, if no positive change occurs in the near future.

INFORMATION AND COMMUNICATIONS TECHNOLOGY PROFILE

The UNCTAD report (UNCTAD, 2002) identifies the national ICT infrastructure and the government’s attitudes and policies towards ICTs. The PNA created the Ministry of Telecommunications and Information Technology (MTIT) in 1996 to shoulder the responsibility of developing and strengthening the ICT sector. Measures were taken by the Ministry to encourage domestic and foreign investment in this sector, including policies and regulations to protect customers and companies. More details about the MTIT can be found on its website: www.mtit.gov.ps/mtit/default.asp.

In parallel, the Ministry of Health, led by its first minister of health, Dr. Riyad Al-Zanoon, recognized the importance of ICT for quality improvement in healthcare provision and also as a solution to overcome many of the Ministry’s problems, particularly those related to the management of health information. Dr. Al-Zanoon was
the first official to speak about Telehealth and Telemedicine and express his willingness to study this topic. Being a champion in this area, he supported many international projects to upgrade the systems in the Ministry of Health and introduce computers and networks. Nowadays, the European Gaza Hospital enjoys the results of his achievements by having the best ICT platform in Palestine.

Support also comes from other sectors, for example many ICT programs were launched by universities (e-Learning, e-Library), and by the private sector, to promote ICT use in different settings and to increase the availability of computers, access to the Internet, and other equipment.

Technology availability and affordability are major issues in adopting e-health applications. According to the Palestinian Central Bureau of Statistics (2004b), the percentage of households with computers in Gaza amounted to only 22.5%, with 35.7% of those aged 10 years and over using computers. Table's 2.2 and 2.3 shows more about ICT use in households.

Other data show that of the 78% of households without a computer, no one in the family has the skills to use one. The reason behind this becomes clear when considering the average household income in the Gaza Strip is about $2,331 US per annum (United Nations Human Development Report, 2006), and a personal computer costs between $400-700 US.

Of interest is that while only 9.2% of Palestinian households have access to the Internet, 60.8% of them found the monthly cost of using the Internet at home suitable and affordable, with just 25.8% considering the cost too much. Among the group aged 10 years and over, 27.5% use the Internet for knowledge purposes, and 65.5% have an e-
mail account. Recent survey results announced by the Palestinian Central Bureau of Statistics (2004b) showed that 40.8% of Palestinian households have a fixed phone line. In addition, 72.8% of Palestinian households have at least one member who possesses a mobile phone.

<table>
<thead>
<tr>
<th>Entertainment Tools</th>
<th>Percentage (% of households)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>22.5</td>
</tr>
<tr>
<td>Telephone line (fixed)</td>
<td>36.5</td>
</tr>
<tr>
<td>Internet at home</td>
<td>9.2</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>64.1</td>
</tr>
<tr>
<td>Radio/cassette</td>
<td>83.4</td>
</tr>
<tr>
<td>TV set</td>
<td>91.2</td>
</tr>
<tr>
<td>Video</td>
<td>14.0</td>
</tr>
<tr>
<td>Satellite Dish</td>
<td>70.5</td>
</tr>
<tr>
<td>Home library</td>
<td>28.0</td>
</tr>
</tbody>
</table>

Table 2.2: Percentage of households with entertainment tools at home (Palestinian Central Bureau of Statistics Report, 2004)

<table>
<thead>
<tr>
<th>Reason for having computer</th>
<th>Percentage (% of households)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching children of family</td>
<td>21.8</td>
</tr>
<tr>
<td>Entertainment of children</td>
<td>7.0</td>
</tr>
<tr>
<td>Use for work</td>
<td>10.5</td>
</tr>
<tr>
<td>Use for Internet</td>
<td>3.1</td>
</tr>
<tr>
<td>For learning and study</td>
<td>45.1</td>
</tr>
<tr>
<td>Entertainment of family (not children)</td>
<td>3.3</td>
</tr>
<tr>
<td>Developing computer skills</td>
<td>8.8</td>
</tr>
<tr>
<td>Other</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Table 2.3: Percentage distribution of households by main reason for having a computer (Palestinian Central Bureau of Statistics Report, 2004)
THE PALESTINIAN SYSTEM OF HEALTHCARE

Since its establishment in 1994, the Palestinian MOH has assumed direct responsibility for the provision and development of health services in Palestinian territories. The Ministry has been striving to optimize the utilization of available resources and opportunities in order to meet the health needs of the Palestinian population.

The Palestinian MOH is the main health services provider in the Gaza Strip at all levels of care. A substantial share of tertiary care is provided by neighbouring countries, mostly Egypt, Jordan, and Israel. Other healthcare providers include: the United Nations Relief and Working Agency (UNRWA), national and international NGOs, and private (for profit) health sector providers. The MOH is the authority responsible for supervision, regulation, licensure, and control of the whole health service. A set of rules and regulations, including the patient right and privacy act, were advertised on the Palestinian MOH website, www.moh.gov.ps

The MOH employs about 6,635 personnel (physicians, dentists, nurses, pharmacists, midwives, paramedical and administrative staff) distributed among the different levels of care (Palestinian MOH Annual Report, 2004). The ratio of physicians and nurses per 100,000 population is well below that of neighbouring countries (Table 2.4).
<table>
<thead>
<tr>
<th>Country</th>
<th>Physicians per 100 000 population</th>
<th>Nurses per 100 000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palestine (West Bank and Gaza Strip)</td>
<td>60.21</td>
<td>90.37</td>
</tr>
<tr>
<td>Egypt</td>
<td>202</td>
<td>233</td>
</tr>
<tr>
<td>Jordan</td>
<td>266</td>
<td>296</td>
</tr>
<tr>
<td>Lebanon</td>
<td>210</td>
<td>100</td>
</tr>
<tr>
<td>Syrian Arab Republic</td>
<td>144</td>
<td>189</td>
</tr>
</tbody>
</table>

**Table 2.4: Ratio of healthcare providers to population - a regional comparison**

Note: Figures for Palestine were extracted from the Ministry of Health annual report, 2004. Figures are not inclusive of private sector providers and therefore might be under-representative. Figures for the neighbouring countries were obtained from UN\EMRO Report, 2002.

In 2005, according to the Ministry of Finance, the MOH expenditure amounted to US$155.6 million (West Bank and Gaza Strip), representing 8.75% of the total Palestinian National Authority budget. Salaries represent 48.65%, drug and vaccination 21.14%, treatment abroad 15.55%, medical supplies 5.65%, laboratory 1.4%, and the other utilities 7.5% (WHO, 2006). Figure 2.3 shows the MOH expenditure ($USM) for the year 2005.

Recently the MOH faced an increase in the number of patients referred abroad for hospitalization and consultation due to the shortage of some medical specialties, lack of sophisticated diagnostic aids, and an increase in the number of bad causalities from domestic and Israeli military aggression (Palestinian Ministry of Health Annual Report, 2004). This increased the burden on the Ministry budget worsening its ability to address the increasing demands of the population for services.
Figure 2.3: Palestinian MOH expenditure for the year 2005
(Adopted from WHO, 2006)

Figure 2.4: Annual number of referred cases abroad (2000-2004)

For the year 2004, referral abroad cost the MOH $58,079,245 USD, while the total MOH budget in the same year was $126,474,889 USD. Figure 2.4 shows the annual increase in the number of patients referred abroad for consultation and treatment through the period 2000-2004.
Given the information above the challenges of the Palestinian healthcare system can be summarized as: scarce resources, increased health and medical demands, the pressure of the political situation (instability, isolation), scarce opportunities for medical education and Continuous Professional Development (CPD), lack of timely and accurate health information, and weak communications among healthcare providers and the citizens they serve that leads to duplication of services. e-Health applications could help in addressing these challenges.

HOW MIGHT THE PALESTINIAN HEALTHCARE SYSTEM BENEFIT FROM e-HEALTH

Alvarez (2002) believes in the ability of ICT to reduce the effects of geographic isolation, and provide a mechanism for remote data access, health-information sharing, and medical support. e-Health may also reduce costs to the system for repeat diagnostic testing, redundant record keeping, and high travel costs associated with receiving care in remote or rural locations.

Due to the political situation in the Gaza Strip, and the ensuing border closures (which restrict movement of both goods and people internally and externally) the MOH and the Palestinian people in the Gaza Strip strongly depend on neighbouring countries (Egypt, Jordan, and even Israel) to provide the clinical healthcare services needed in many areas of underserved medical specialties. The physical separation of the Palestinian land into the Gaza Strip and West Bank (see Appendix 3.b) also causes duplication of government services, including healthcare services, even though the geographical area is
not that large. Thus, under the prevailing circumstances in Palestine, it can be assumed that e-health will ensure greater stability in provision of services.

e-Health can also enhance sharing of knowledge, resources, and tools between developed and developing countries to improve health, education, and research. It could also improve productivity and facilitate research (Saidi, 2002). These potential benefits are obvious incentives for serious consideration for the introduction and implementation of e-health into the Palestinian healthcare system.
CHAPTER THREE: LITERATURE REVIEW

INTRODUCTION

Adoption of innovation (e.g. e-health) has antecedents and preconditions that impact readiness at the organizational and individual levels. This chapter provides a review of the literature relevant to assessing the readiness of stakeholders in the Palestinian healthcare system to adopt e-health. In addition, the concept of readiness is described in the context of environmental factors, other than technology, that facilitate or impede e-health readiness in developing countries, such as culture, economy, health human resources, socio-political, legal and policy setting, etc.

In the first section, theories related to innovation adoption, diffusion, and change are reviewed, with instances of related works on ICT adoption and acceptance. In the second section, definitions and concepts related to e-health and e-readiness are introduced. Thereafter, the concept of e-readiness in general, and in the health sector in particular, is examined including its importance for successful e-health adoption. Next alignment of these concepts is presented, i.e. the relationship of readiness to innovation adoption and the change process (including individual and organization readiness for change). Finally, e-readiness in developing countries, and the challenges faced in e-technology adoption, is reviewed including previous studies related to Palestine.

INNOVATION ADOPTION AND CHANGE THEORIES AND MODELS

Rogers (2003) defines innovation as “an idea, practice, or object that is perceived to be new by an individual or other unit of adoption”. For any organization to be
successful in bringing innovation into its environment, a better understanding is required of its internal and external customers, processes, and factors each of which will influence the decision to either adopt an innovation or not. In this respect, research on the adoption and diffusion of innovations can offer significant insight to understand and guide examination of this issue. Adoption here refers to the decision of any individual or organization to make use of an innovation, whereas diffusion refers to the accumulated level of users of an innovation in a market (Rogers, 2003).

The process and the factors that affect the spread of innovations are described in several well-known theories such as the Diffusion of Innovation Theory (Rogers, 2003) and Lewin’s model for change (1952) where innovation adoption was discussed in the context of change. In addition, the Theory of Reasoned Action (Fishbein and Ajzen, 1975) explains the individual behavioural factors of change. The literature review starts with the Diffusion of Innovation Theory as it provides a broad perspective of user acceptance of innovations; the scope then narrows down to more specific theoretical models that provide a better fit for the study goal.

A. The Diffusion of Innovation Theory (DIT)

Rogers’ diffusion of innovation theory explains how new ideas or innovations are disseminated and adopted at the community and population levels. The three main components are: 1) the innovation-decision (adoption) process, 2) the characteristics of an innovation, and 3) adopter characteristics.
1- Innovation adoption process:

The adoption process has a sequence of stages that a potential adopter of an innovation passes through before acceptance. Rogers (2003) defines this as:

“the process through which an individual or other decision making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision” (Rogers 2003, p. 20). This definition can be simplified to five sequential steps: Knowledge (awareness), persuasion, decision, implementation, and confirmation.

2- Characteristics of innovation:

Different innovations have different characteristics which result in various probabilities of adoption and adoption rates. These innovation characteristics have also been classified into five criteria: Relative advantage, compatibility, complexity, observability, and trialability.

a. Relative advantage: One of the best predictors for the extent of adoption, it refers to the extent to which the potential adopter perceives an innovation is superior to alternative products, services, or concepts (Rogers 2003, p. 229).

b. Compatibility: The compatibility of an innovation refers to the extent to which an innovation conforms with the potential adopters' existing values, previous experiences, and needs (Rogers, 2003, p. 240). Generally, compatibility has a positive influence on the acceptance of the innovation.

c. Complexity: This refers to the extent to which an innovation is perceived as difficult to understand and use (Rogers, 2003, p. 257). Greater perceived
complexity of innovations negatively affects their speed and probability of adoption.

d. Observability: This is the extent to which the results of an innovation are visible to others (Rogers, 2003, p. 258). Innovations with a clearly visible positive result are more likely to be adopted than innovations with poorly visible results.

e. Trialability: This is the extent to which an innovation can be tried out on a limited scale (Rogers, 2003, p. 258). Trialability has special importance in the early stage of innovation adoption and is more important for innovators and early adopters than for those who adopt the innovation later.

3- Adopter characteristics:

Understanding characteristics of the adopters can aid the understanding of their involvement in the innovation adoption process. Rogers defined these under three headings: socio-economic (social status, age and gender, social mobility, and the level of education); personality values (favourable attitude to change, intelligence, and empathy); and communication behaviour (contact with change agents, exposure to mass media communications, social networks and participation, and tendency to seek information about innovation).

This illustrates the need to bring together a mix of individual (personal) and institutional factors for optimal up-take of innovations.
B. Lewin’s Model for Change

Lewin’s model for change (1952) is one of the oldest models to address change. He proposed three essential constructive steps for change: unfreezing, change (moving), and refreezing (Figure 3.1).

![Figure 3.1: The change process according to Lewin’s model](Reproduced from: Alliance for Building Capacities Report, 2002)

- **Unfreezing**: A state that allows for entry of new forces which facilitate the system to change; this requires recognition of need, and willingness to give up old ways. It also describes the process by which users become ready to change as a result of the innovation introduction. Unfreezing can be achieved in one of three ways: 1) Increase the driving forces, which direct behaviour away from the status quo, 2) decrease the restraining forces, which hinder movement from the existing equilibrium, and 3) combining the two approaches.

- **Change (moving)**: Once unfreezing has been accomplished, the change itself can be implemented. However, the introduction of change doesn’t ensure that it will take hold if not sustained.
• **Refreezing:** Describes the situation after the innovation is formalized and becomes routine. Refreezing aims to stabilize the new situation by balancing the driving and restraining forces.

Thus the process of change as suggested by Lewin (1952) involves a mediating event of some sort, a period of change, followed by a period of no change.

C. **The Theory of Reasoned Action (TRA)**

Developed by Fishbein and Ajzen in 1975, this model finds its origins in the field of social psychology. The TRA focuses on the role of specific attitudes in defining behaviour. The individual’s behaviour is seen as a function of their intention, which in turn is comprised of the individual’s attitudes towards performing the behaviour in question and the influence of perceived social norms concerning the performance of the behaviour. Attitudes are affected by the person’s beliefs about the perceived consequences of performing a given action, and his or her subjective evaluation of each of the consequences. TRA postulates that the antecedents of the attitudes and subjective norms are comprised of external variables such as: Demographic factors, personality characteristics, beliefs concerning objects, attitudes towards objects, task characteristics, and situational variables. Adoption of e-health involves a behavioural aspect; hence this theory could help in explaining the individual’s attitude and behaviour towards e-health technology.
ICT ADOPTION AND ACCEPTANCE MODELS

Several innovation studies have discussed ICT in the perspective of diffusion, adoption, change, and acceptance of technology. Some of these studies address technology acceptance in developing countries (Al-Gahtani, 2001; Kamel and Assem, 2002; Kamel and Hassan, 2003), and a few studies assess the impact of technology on the Middle East Arab countries (Straub et al., 2001; Saidi, 2002; Checchi et al., 2002; Rizk, 2002).

These studies use models such as the: Diffusion of Innovations Theory (Rogers, 2003), IT Innovation Adoption Research Model (Agarwal and Prasad, 1998), Two Staged Innovation Adoption Model (Zaltman et al., 1973), the Technology Acceptance Model (Davis et al., 1989), and The Arab Policy and Information Technology Model, (Checchi et al., 2002), and have received widespread validation for technological innovations. Collectively these models identify multiple factors that can influence ICT adoption, including perceived benefits, barriers, top management support, ICT infrastructure, costs, internal pressures, external pressures, and ICT sophistication. In the following section two of them that serve the current study will be reviewed and others will be touched upon in the coming sections.

A. The Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Davis et al. (1989), is one of the early models to lay the base for numerous studies in the area of ICT. TAM proposes a method of evaluating user acceptance by assessing user’s beliefs, attitudes, intentions, and actual computer adoption behaviour. Davis and colleagues postulated that
behavioural intention to use information technology was predominantly correlated with usage. TAM is similar to diffusion theory, but places more emphasis on psychological predispositions and social influences. TAM uses a set of two external variables employed in many technology acceptance contexts (Figure 3.2):

- Perceived usefulness: “The degree to which a person believes that using a particular system would enhance his/her job performance”
- Perceived ease of use: “The degree to which a person believes that using a particular system would be free of effort”

![Figure 3.2: The Technology Acceptance Model](Modified from Davis et al., 1989)

In figure 3.2 “Attitude towards using” can be described as either a positive or negative feeling towards the ICT stemming from “perceived usefulness” and “perceived ease of use”. “Behavioral intention to use” is described as a function of “attitude towards using” and “perceived usefulness” and determines the "actual system use".

This model has been found to be simpler to use by researchers, while also being a powerful model for establishing the variables that influence user acceptance of new technology (Igbaria, 1993; Chau and Hu, 2002).
B. Arab Policy and Information Technology Model (APIT)

Of particular relevance to this study is the research produced by the Arab Policy and Information Technology (APIT) and Arab Culture and Information Technology (ACIT) groups. Their research projects (in the area of information technology transfer to the developing countries and Arab world in particular), hold relevance to Arab policies and culture (Checchi et al., 2002; Straub et al., 2001) and are based on the research model of information technology transfer, presented in Figure 3.3 and discussed in Table 3.1. Primary goals of the APIT/ACIT model are to answer three questions:

1) How do national IT policies and technology infrastructure affect Information Technology Transfer (ITT)?

2) Which transfer implementation factors affect ITT? and,

3) What role does culture and technological culturation play in ITT?

Figure 3.3: APIT/ACIT research model of information technology transfer
(Source: Checchi et al., 2002, p.5)
As per this model, national ICT policies and technological culturation positively influence ITT/ICT outcomes. Similarly, transfer implementation factors and cultural beliefs have positive or negative effects on ITT/ICT outcomes. In addition to their direct effects, the model argues that "culture-specific beliefs and values" and "technology culturation" both moderate the effects of "transfer implementation factors" on ITT/ICT outcomes.

This model base is very helpful for the current study, particularly because its theoretical constructs decompose carefully the policies and cultural components which enhance understanding of aspects that serve the current study.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>National ICT Polices</td>
<td>Status of the technology infrastructure of the nation. Polices aimed at encouraging or impeding ICT.</td>
</tr>
<tr>
<td>Transfer Factors</td>
<td>Factors that influence the success or failure of the deployment of a technology or technologies.</td>
</tr>
<tr>
<td>Culture-specific Beliefs and Values</td>
<td>Cultural and social responses of individuals and groups; beliefs and values; socio-culturally influenced motivation. This set is limited to those beliefs and values that are expected to have an influence on the adoption of ICT, and specific of the culture or ethnic group studied.</td>
</tr>
<tr>
<td>Technology Culturation</td>
<td>Influence of external, technologically advanced cultures on individuals/groups/culture as a whole.</td>
</tr>
<tr>
<td>(ITT/ICT) outcomes</td>
<td>Measure of outcomes include: prediction success; actual use; intention use; diffusion; success of system development.</td>
</tr>
</tbody>
</table>

Table 3.1: APIT/ACIT Research Constructs of Information Technology Transfer  
Source: (Checchi et al., 2002, p. 6)

Checchi et al. (2002) and Straub et al. (2001) both reviewed the pertinent literature to identify experiences with ITT, and stated that relatively few studies empirically tested cross-cultural impact on the adoption and diffusion of new IT.
However, a few studies (Straub, 1994; Raman and Yap, 1996; Straub et al., 1997; Al-Gahtani, 2003; Okoli, 2003) conclude that culture has a marked impact on ITT. Checchi also noted that an other study of national ICT infrastructures and policies by Hill et al., (1998) commented on their impact on information technology transfer.

The above review of the models and theories provides an understanding of the e-health adoption process and the variables that need to be examined in the assessment of readiness, particularly in the context of developing countries. Also, from this review the following conclusions are drawn:

1. The adoption and change process occurs in stages.
2. The characteristics of the technology and perceived benefits from its use may influence its adoption.
3. The organizations decision to consider adopting a new idea or practice is influenced by the organizations culture and a set of external and internal factors.
4. Individual human behaviour, and the different factors that formulate it (age, gender, education, attitude, and beliefs), plays an important role in determining the innovation acceptance.
5. There are numerous external environmental factors that contribute to the process of adoption and acceptance.

From the above conclusions, four domains were identified of value for use in this study readiness assessment process (bold italics above). Figure 3.4 was developed to illustrate these domains and their interaction.
The individual and organization are the main domains of interest. Each plays an important role in determining innovation acceptance and contributes to e-readiness. The following section focuses on understanding the adoption process in terms of *organization and individual determinants of innovation adoption.*
DETERMINANTS OF INNOVATION ADOPTION AT THE ORGANIZATIONAL LEVEL

Information technology has been used in both developed and developing countries to support operational, tactical, and strategic processes within healthcare organizations (Abdulgader and Kozar, 1995; Chieochan et al., 2000). However, a number of external and internal factors influence the adoption of ICT in the organization, such as organizational culture, structure, user acceptance, and the role of manager policies and national information infrastructure. Generally, the literature reports many ICT investments within healthcare organizations do not meet their objective. Reasons are rarely technical in origin, but instead organizational and human factors are the most cited reasons impeding ICT implementation (Hu et al., 2000; Aas, 2001; Checchi et al., 2002; Jennett et al., 2003; Scott et al., 2005).

Newer technology applications such as e-health, telehealth, or telemedicine enhance the quality of care delivered, at times also reducing the total cost of healthcare (Dlamini, 2001; Wootton et al., 2004; Hjelm, 2005; Kifle et al., 2006a). Despite the great availability of e-health solutions, implementation of these new technologies faces difficulty (Jennett et al., 2005; Robinson et al., 2003). Many reasons for this are identified by the research community; however, two of the primary causes relate to the highly mechanistic structural dimension of healthcare organizations, and the environment in which they operate (Kamal and Themistocleous, 2006).

With respect to organizational adoption, two main stages (each consisting of different sub-stages) are commonly distinguished: Initiation, and Implementation (Zaltman et al., 1973). The actual adoption decision occurs between these two stages.
1. Initiation stage: At the initiation stage, the organization becomes aware of the innovation, forms an attitude towards it, and evaluates the new idea. This stage encompasses the ‘awareness’, ‘consideration’, and ‘intention’ sub-stages.

2. Implementation stage: In the implementation stage, the organization decides to install and make use of the innovation. This stage encompasses the ‘adoption’ and ‘continued use’ sub-stages.

In an organizational context, adoption also occurs at the individual level (within the organization), referred to as ‘intra-organizational acceptance’. Where the usage of an innovation by organizational ‘end-users’ is uncertain or contingent upon a former organizational adoption decision, this state is referred to as ‘contingent innovation decisions’ or ‘forced adoption’ (Rogers, 2003).

The innovation adoption process can only be considered a success to the extent that the innovation is accepted and integrated into the organization (Rogers, 2003; Gopalakrishnan and Damanpour, 1997), and the target adopters demonstrate commitment by continuing to use the innovation over a period of time (Bhattacherjee, 1998).

Work by Frambach and Schillewaert (2002) describes two elements that influence the innovation adoption at the organizational level: The perceived innovation characteristics, and the adopter (organization) characteristics which are in turn influenced by external environment variables. Collectively, these elements reflect organizational readiness to adopt an innovation (e.g. e-health) and are each discussed below.
Perceived innovation characteristics

The characteristic of an innovation as perceived by potential adopters (organizational members) has an affect on their value assessment and their potential to adopt a new innovation. Rogers (2003) identifies five “perceived innovation characteristics” that influence the adoption decision: relative advantage, compatibility, complexity, observability, and trialability. These characteristics were discussed at the beginning of this chapter.

Adopter (organization) characteristics

Determinants of adopter characteristics at the organizational level are: Organization size, organization structure, and organizational innovativeness (Zaltman et al., 1973; Morrisson, 1996).

- Organization size: Most commonly, size is found to be positively related to innovation adoption. Larger organizations generally feel more need to adopt innovations in order to support or improve their activities and productivity.
- Organization structure: Formalized and centralized organizations are less likely to initiate innovation adoption decisions, but are better equipped to actually implement innovations (Zaltman et al., 1973). The opposite holds for organizations that are highly complex or specialized.
- Organizational innovativeness: The degree to which an organization is receptive to new ideas will influence its propensity to adopt new ideas. Hurley and Hult (1998) relate innovativeness (openness to new ideas) with the capacity to innovate (the ability of the organization to adopt and implement innovations successfully).
External environmental influences

In addition to perceived innovation and adopter characteristics, an organization’s external environment also has a considerable effect that would determine its innovation adoption behaviour. According to the work by Lusthaus et al. (1995) six key environmental factors affect an organization’s decision:

1- Legal factors: Understanding the legal environment is essential to determining if organizational change can take place. Multiple forces shape the legal environment including governmental and nongovernmental policies, as well as international, legislative, regulatory, and legal frameworks.

2- Technology factors: Both the types and the levels of technology in a society give insight about the capacity of an organization to introduce innovations and launch change.

3- Political factors: It is important to understand the relationship between governmental strategy or development plans and the organization. This will provide indicators about: i) the extent to which government and its bureaucracy supports and contributes resources to the organization; ii) the extent to which the political system is stable in order to undergo significant change; iii) whether the political situation allows the organization to receive external funding; and iv) ability to import equipment in support of change.

4- Economic factors: The economic situation directly impacts the type of project being considered. Labour force, labour laws, cost of equipment procurement and maintenance, and opportunity cost are examples.
5- Social and Cultural factors: Understanding the local values toward the innovation and change provides insight about the type and nature of innovation that is valued and accepted by the community.

6- Stakeholder Factors: The stakeholder environment consists of people and organizations external to the adaptor organization but who are directly concerned with the organization and its performance. Examples are suppliers, clients, sponsors, donors, potential target groups, etc. An organization seeks to learn the identity of these groups in order to assess their potential impact on the organization innovation adoption decisions.

These external environmental factors must be considered because they can become major facilitating or constricting forces on the organization as it works to accomplish its goals.

DETERMINANTS OF INNOVATION ADOPTION AT THE "INDIVIDUAL" LEVEL

Organizational innovations introduced into the work process are of little value if they are not used by organizational staff. The factors that explain the individual acceptance of innovation, and their interrelations are discussed in the following section.

Organizational determinants

Individual usage of innovations not only depends upon attitudes but also on organizational management strategies, policies, and actions (Leonard-Barton and Deschamps, 1988: Morrisson, 1996). These factors include: Training and education (Igbaria, 1993; Clegg et al., 1997), organizational technical support (Igbaria et al., 1996; Davis et al., 1989; Thompson et al., 1991), and incentives and control structures
(Bhattacharjee, 1998). Exposing individuals to these influences will enhance their awareness of the application of innovations, and their usefulness and fit with the job.

**Attitude towards innovation (Belief and Affect)**

An individual’s acceptance of innovation is based on his/her “belief and affect” formulated towards a defined innovation (Fishbein and Ajzen, 1975; Davis *et al.*, 1989; Rogers, 2003). The *beliefs* refer to ‘perceived usefulness’ and ‘perceived ease of use’, and an individual’s *affects* points to elicited emotions associated with using the technology e.g. like-dislike, pleasant-unpleasant, interesting-uninteresting (Davis *et al.*, 1989).

Studies in the field of ICT provide strong support that both cognitive and affective attitudinal components are important in explaining subsequent technology acceptance (Igbaria *et al.*, 1996; Trevino and Webster, 1992). There is research evidence that a person’s attitudes mediate the influence of external variables and stimuli. At the same time, the beliefs are also affected by external influences (Davis *et al.*, 1989).

**Personal dispositional innovativeness and personal characteristics**

Organizations may try to influence a subordinate’s attitudes towards favouring adoption of an innovation, resulting in some individuals readily accepting certain innovations while others do not.

Personal dispositional innovativeness refers to the disposition of a focal organizational member to accept any innovation independently of the communicated experience of others (Leonard-Barton & Deschamps, 1988; Agarwal & Prasad, 1998).
“Personal dispositional innovativeness” is determined by “personal characteristics” which are tied to a specific individual. Some examples of such variables are demographics, company and job tenure, experience, and personal values.

Figure 3.5 synthesises the many variables suggested by the literature review that influence organizational innovation adoption and its interrelations. Analysing this information, it is concluded that the “initiation stage” would be the best period for assessment of an organization's readiness to adopt the proposed innovation (technology), by examining factors that lead to the decision to adopt, such as external environmental factors, adopter characteristics, innovation characteristics, and organization characteristics.

In the following section, relevant definitions and concepts related to e-health and e-readiness are now introduced. Thereafter, the concept of e-readiness in general, and in the health sector in particular, is examined.
External environmental factors (National level)
Culture-specific beliefs and values, national ICT policies, socio-economic, technological, legal, political, and stakeholders factors

- Adopter characteristics
  - Demographics
  - Experience
  - Personal value
  - Social networks
  - Personal dispositional innovativeness

- Innovation (technology)
  - Characteristics
  - Associated cost
  - Perceived need
  - Perceived usefulness
  - Ease of use

- Organization characteristics
  - Size and structure
  - Innovativeness
  - Availability of needed resources (financial, human, others)

Decision

Awareness (Knowledge) → Persuasion Consideration → Intention → ADOPTION → Continued use

Initiation Stage → Implementation Stage

Figure 3.5: General framework displaying the variables that are generally found to affect innovation adoption at the organizational and individual level.
(Developed from Rogers, 1995; Zaltman et al., 1973; Checchi et al., 2002; Fishbein and Ajzen, 1975)
e-HEALTH

Rising costs and new types of health problems result in increasing pressure on the healthcare system, stimulating the search for new approaches or "innovations" for better healthcare (Brady, 2005; Moore, 2002; Nesbitt et al., 2005). e-Health initiatives represent potential solutions to improve healthcare accessibility and quality.

The term e-health was barely in use before 1999 and the majority of published papers using the term “e-health” have been recorded since the year 2000 (Eysenbach, 2001). The term was first used by health industry leaders and marketing people rather than academics, following a trend started by other "e-words," such as e-Commerce, e-Learning, or e-Government (Hagland, 2001).

e-Health is now accepted as the over-arching term to describe the wide range of application of ICTs in the health sector, from purely administrative applications through to healthcare delivery (Sevensson, 2002; Alvarez, 2002). This breadth of application has been summarized in the description recently provided by the European Union (European Union Commission, 2004):

“e-Health describes the application of information and communication technologies across the whole range of functions that affect the health sector. e-Health tools or solutions include products, systems and services that go beyond simply Internet-based applications. They include tools for both health authorities and professionals as well as personalized health systems for patients and citizens. Examples include health information networks, electronic health records, telemedicine services, personal wearable and portable communicable systems, health portals, and many other information and communication technology-based tools assisting prevention, diagnosis, treatment, health monitoring, and lifestyle management”.

Apart from providing accessible and quality healthcare, e-health innovations promote communication between primary healthcare centres and secondary or tertiary
hospitals. Further, e-health has been shown to speed up the referral process while also reducing unnecessary referrals (Harris, 2002; Kifle et al., 2005a). In some cases, the clinical applications of e-health (e.g. telemedicine) may be cheaper than the conventional practice (Edworthy, 2001; Kifle et al., 2006b). In addition, e-health has also been applied to medical education, home care, military and prison applications, and urgent distance care.

**Benefits of e-health Applications**

Literature shows that e-health improves continuity and quality of care, facilitates sharing of expertise and resources and reduces duplication and redundancy. e-Health also reduces travel requirements, waiting times, overall system management and patient costs, and improves the quality of information (Alvarez, 2002). It permits the transfer of different kinds of health data and information management data, provision or confirmation of diagnosis, and epidemiological monitoring. e-Health networks also allow doctors to refer to electronically distributed best-practice treatment protocols that keep them up-to-date with the newest treatment strategies and most effective medications.

**Factors affecting adoption of e-Health**

Little research has been done to identify factors that influence uptake of e-health, particularly in developing countries. Publications from the European Union’s 1997 high level conference on e-health (in Greece) collectively identify themes concerned with uptake of ICT mediated healthcare innovations. These include: insufficiently trained staff; weak infrastructure; privacy and confidentiality issues; cost and funding; poor
commitment of decision-makers; culture and organizational factors; non-user-friendly technologies; resistance to change; unclear incentives; and lack of organizational and community readiness (Iakovidis, 1998; Trakatellis, 1998; Iakovidis, 2000). These points are particularly valid for developing countries that suffer from information poverty, financial poverty, and misperceptions about the costs and benefits of network connectivity (Sadowsky, 1996). The language barrier, cultural specificity, unclear policy, and lack of individual readiness are additional factors to consider. Such factors have resulted in delayed investment in networking activities that affect the adoption and use of e-health in developing countries.

Jennett (1998) reported on a meeting of the Canadian and international telehealth communities where the key barriers to adoption of e-technology mediated healthcare were identified as: Fear of depersonalization; loss of privacy; poor readiness and preparation (people, environment); human resource needs (skilled personnel); lack of models and frameworks for evaluation; implementation; standards; and ethical, moral, and legal issues (licensure, remuneration). All these barriers are still valid.

Hailey and Crowe (2003) noted a number of issues to support successful technology adoption including: Stable financial support, perceived need of technology, reliability of equipment, stakeholder involvement, and stability of management structures. The concept of a champion or promoter, i.e. an enthusiastic person who promotes adoption of new technology, has also been described as important to the success of e-health adoption (Jennett et al., 2003).

In summary, e-health (telehealth plus Health Informatics) has been shown to be most successful when implementations are needs driven, and where local staff are
prepared (i.e. ‘e’ ready) not only technically, but also for the clinical and logistical challenges that result (Brebner et al., 2004).

e-READINESS

   e-Readiness has been defined as “the degree to which a community or an institution is prepared to participate in the networked world” (Computer System Policy Project, 1998). The notion of e-readiness however means different things to different people, in different contexts, and for different purposes (Choucri et al., 2003).

   Several e-readiness assessment tools have been developed by various groups aiming to provide benchmarks on the preparedness of countries or organizations to engage in the world of ICT. These tools include those developed by McConnell International, Computer System Policy Project (CSPP), Asia Pacific Economic Cooperation (APEC), the Economist Intelligence Unit (EIU), and the Center for International Development (CID). Table 3.2 below shows the key features for three of the popular guides.

   Objectives of the assessment tools were to evaluate the level of e-readiness through examining information policy, and collecting baseline statistics for benchmarking. Among the various tools available, the Center for International Development tool at Harvard University (2000), has been most responsive to the issue of developing countries. Although these tools do not deal specifically with e-health, they do provide insight on a number of areas relevant to the healthcare environment, such as: availability; quality of networking; use of ICT in the workplace; and ICT policies that can create new opportunities, help eliminate barriers, and promote efficacy.
<table>
<thead>
<tr>
<th>Source</th>
<th>Center for International Development (CID)</th>
<th>Asia Pacific Economic Cooperation (APEC)</th>
<th>Computer System Policy Project (CSPP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Assessments categorize countries along four stages of development for each of 19 indices, focusing on technology infrastructure, pervasiveness of technology, and the regulatory and business environment.</td>
<td>Assessments gauge a country’s readiness for e-commerce through a detailed questionnaire (100 questions), focusing especially on import exports and policy.</td>
<td>Assessments rate communities along four stages of development for each of five categories, focusing on existing infrastructure and the pervasiveness of technology in society. Based on a 23 question tool.</td>
</tr>
<tr>
<td>Guide objectives</td>
<td>The guide is intended to be a tool for government policymakers to assess the state of networked readiness of a community</td>
<td>To help governments develop their own focused policies, adapted to their specific environment, for healthy development of e-commerce.</td>
<td>To help individuals and communities determine how prepared they are to participate in the Networked World</td>
</tr>
<tr>
<td>Focus</td>
<td>Society, Access, Learning, Economy, Policy</td>
<td>e-Commerce Readiness</td>
<td>Existing Infrastructure</td>
</tr>
<tr>
<td>Target</td>
<td>Developing countries</td>
<td>Global</td>
<td>Global</td>
</tr>
</tbody>
</table>
| Indicators used | - Network Use  
- Enabling Factors  
Information  
- Access to network services (bandwidth, industry diversity, export controls, credit card regulation),  
- Internet use (in business, government, homes),  
- Promotion and facilitation (industry led standards),  
- Skills and human resources (ICT education, workforce),  
- Positioning for the digital economy (taxes and tariffs, industry self-regulation, government regulations, consumer trust). | - Infrastructure  
- Access  
- Applications and services  
- Economy; and  
- "Enablers" (policy, privacy, security, ubiquity). |

Table 3.2: Key features of three popular e-readiness assessment models and guides
e-HEALTH READINESS

e-Health Readiness has been described as the degree to which users, healthcare organizations, and the health system itself are prepared to participate and succeed in e-health implementation (Alliance for Building Capacity Report, 2002). Once planners have decided that e-health can provide the best solution for a given problem (after a proper needs-assessment), conducting e-health readiness assessment is the next important step in the planning process. This step facilitates the process of change and reduces the risk of failure. The assessment also helps to prevent losses in time, money, and effort, avoiding delays and disappointments among planners, staff, and users of services.

Similar to e-readiness, organizational and individual e-health readiness is important for the success of e-health adoption and contributes to planning of such services. Two recent studies, Alliance for Building Capacity (2002), and the National Initiative for Telehealth guidelines project (NIFTE, 2003) focused their work on defining readiness in organizations and communities and gathering evidence to support the development of measures of e-health (telehealth) readiness. Four types of readiness were described: “core readiness” where a need for change is identified; “engagement readiness” expressed by questioning and needs assessment; “structural readiness” where there is need for development of the human and technical infrastructure to operate the system; and “non-readiness” which means a lack of need or failure to recognize need.

Jennett et al. (2003) recommend that a readiness assessment should be conducted prior to implementation of any e-health application. They developed instruments to measure readiness for telehealth that would help researchers, decision makers, and stakeholders assess the situation in which telehealth introduction is most likely to
succeed. In addition, they stressed the importance of input from all key stakeholders into policy development, and the importance of increased awareness and understanding of e-health opportunities among community stakeholders.

In the above section the concept of e-readiness in general, and in the health sector in particular, was examined. Aligning these concepts, i.e. the relation of readiness to e-health policy, innovation adoption, the change process, and ICT policy is discussed below.

ICT AND e-HEALTH POLICY IN RELATION TO TECHNOLOGY ADOPTION AND e-HEALTH READINESS

Various studies have examined the effect of ICT policy on the development of the ICT infrastructure frame in terms of how national institutions either influence or regulate the demand or supply of ICTs and technology innovation (IDRC, 1998; Dutta, 2001; Checchi et al., 2002). They argue that these institutional effects occur through acts of knowledge building, knowledge deployment, mobilization, standard setting, and innovation directives. Checchi et al. (2002) in surveying ICT policies in Egypt found that one of the most fundamental policy-related measures that country implemented was to establish a Ministry of Communication and Information Technology. This provided a strong base of support to implement specific policies, such as reducing taxes on computer importation, increasing public awareness and computer literacy through training programs, privatizing telecommunications, and establishing tax haven “smart villages” for high technology firms.
These studies generally indicate that policies that favour the development of ICTs help the growth of national ICT infrastructures. There have also been a number of studies that examined the specific effects of ICT policy on e-health with similar findings (Scott et al., 2002; Johnston et al., 2004; Jennett et al., 2004).

The literature on e-health policy is relatively recent. During the last five years most national governments have developed ICT policies for healthcare (WHO, 2004). The objectives and goals of the various governments are rather similar. However, the level of defining and translating of the policy into projects and programs differs from country to country (Klecun-Dabrowska, 2000; Scott et al., 2002; Johnston et al., 2004).

Scott et al. (2002) defined e-health policy as “a set of statements, directives, regulations, laws and judicial interpretations that direct and manage the life cycle of e-health.” According to the WHO, policies help to develop a vision of the future, define short, medium, and long-term references, determine objectives, set out priorities, delegate roles and define means of action and institutional arrangements (WHO, 2000). These definitions illustrate clearly the contribution of e-health policy in framing institutional readiness to successfully adopt e-health.

Jennett et al. (2004) recommends that e-health be integrated into existing healthcare systems in a policy, not just a practicable manner, and that this be achieved with a “global’ perspective”.

Issues at the organizational and individual level were discussed earlier (Pages 38-44) in relation to innovation adoption. In the following section, issues related to “readiness” for technology adoption and change (as opposed to determinants of
innovation adoption and change) are discussed, again at the organizational and individual levels.

READINESS FOR ICT ADOPTION AND CHANGE IN THE HEALTHCARE ORGANIZATION CONTEXT

Healthcare organizations have their own specificity and differ from organizations in other sectors in terms of their customers, structure, employee loyalty, and motivations to adopt technology. These differences between healthcare organizations and other organizations require review of organizational and individual readiness for technological change in the context of healthcare particularly since the current study is focused on stakeholder readiness.

Many studies have described readiness in the context of process of change both at the organizational and individual level (Cheren, 2002; Casebeer and MacKean, 2004; Ouimet et al., 2005). Models for examining readiness for e-health found in the literature describe organizational change generally (Armenakis et al., 1993; Leanard-Barton, 1988; Rousseau & Tijoriwala, 1999), and organizational change due to technological innovation in particular (Kimberly & Evanisko, 1991; Orlikowski, 2001). Bashshur (2005) notes that health technology such as telemedicine is “a complex innovation bundle”, which includes technical, organizational, and social innovations. Jennett et al. (2003) perceived the introduction of telehealth into healthcare organizations as a novel IT innovation, and one that has been met with many challenges, including staffing changes, changed mechanisms for coordination and communication, and changes in an organizations internal system.
Innovation adoption changes, both at the organizational and individual level, are strongly related to each other. An organization is essentially a collection of individuals, so no change is possible in an organization without experiencing individual change. Similarly, organizations impact an individual’s readiness for change within the organization. Here, the organizational and individual levels are discussed but from the readiness perspective.

Organizational Readiness for Innovation Adoption and Change

Organizational change is defined as adoption of a new idea or new behaviour by an organization (Daft, 1985). Organizational readiness is an important factor for decision makers, because it reflects potential service volume, thereby determining the extent to which innovations can be translated into reality (Parasuraman, 2000).

Nowadays, healthcare organizations are adopting new ICT such as e-health, telehealth, or telemedicine to support operational and strategic processes (Chieochan et al., 2000). This adoption is motivated by the desire to enhance the quality and increase access to healthcare; reducing the total cost of healthcare and, as a result of easy access to the most appropriate specialist experiences, increase the overall quality of healthcare delivered (Wootton et al., 2004; Hjelm, 2005; Kifle et al., 2006a;). For some researchers (such as Hu et al., 2000), organizational readiness and the availability of the appropriate conditions and needs are a motivation for the adoption of e-health in healthcare organizations. Others (Harkke et al., 2003) state that health technology initiatives can be challenged by organizational inertia and the prevalence of outdated organizational culture and work processes. Another consideration for e-health implementation in organizations
is healthcare professional’s decisions in the process of planning and implementing of e-health (Sheng et al., 1999).

A healthcare organization’s structure is another factor that can negatively affect adoption of e-health by healthcare organizations. Factors include the complexity of an organization’s structure, and the conflicting roles of key actors (such as physicians and managers), practitioner’s unfamiliarity with the technology, and ineffective management (Sheng et al., 1999), as well as organizational culture and medical norms, these factors limit the diffusion of e-health in organizations (Robinson et al., 2003). Aas (2001) also noted that the success of e-health (e.g. telemedicine) in healthcare organizations depends upon physician acceptance and organizational readiness.

According to Gustafson et al. (2003), a successful change process starts with an assessment of an organization's change readiness along three dimensions:

- **Creating the Pull:** Do key stakeholders understand the need and feel motivated to change?
- **Supporting the People:** Are organizational and stakeholder goals aligned to enable successful movement toward the change?
- **Managing the Process:** Can you leverage project and program management tools to plan, execute, and monitor the change?

This assessment of readiness to change provides organizations an opportunity to evaluate their probability of success, identify potential roadblocks, as well as strengths and best practices.
Kamal and Themistocleous (2006) conducted a literature review on ICT innovation adoption in governmental organizations and proposed a conceptual framework addressing:

1. Organizational factors: Formalization, centralization, critical mass, project championship, return on investment, benefits, managerial capability, and barriers.
2. Technological factors: IT capability, evaluation framework, technology risk, citizen data privacy and security.
4. Environmental factors: External pressure, market knowledge, citizen satisfaction, community size, and internal pressure.

In addition to the above, there are other characteristics that need to be addressed when e-health is introduced into healthcare organizations, specifically in developing countries. Some structural components of healthcare organizations that influence e-health technology diffusion should be included, such as size of the unit, its planning and control system, internal communication, and decentralization of power (Bashshur, 2005; Kamal and Themistocleous, 2006).

Doktor et al. (2005) argue that healthcare organizations which have a strategy to use the technology need to also re-address their organizational designs. Effectively integrating e-health into clinical practice requires major modifications in the structure of traditional clinical practice, with technical obstacles, organizational uncertainties, and policy barriers that must be overcome (Aas, 2001).
Individual Readiness for Innovation Adoption and Change

ICT in healthcare is not only hardware and software; it includes stakeholders, partnerships, polices, standards, data, and processes that together make-up a technology environment (UNDP, 2006). Stakeholders' behaviour towards health technology adoption thus contributes to their readiness to accept and use the technology.

Individual behaviour change is rarely a discrete, single event. Behaviour change has come to be understood as a process of identifiable stages through which individuals pass. Many studies have explained individual readiness in the context of the transtheoretical model of change (Prochaska et al., 1994). The model proposed that for most people, behaviour change occurs gradually in five distinct stages; moving from being uninterested, unaware, or unwilling to make a change (precontemplation stage), to considering a change (contemplation stage), and to deciding and preparing to make a change (preparation stage). Genuine, determined action is then taken (action stage) which over time, attempts to maintain the new behaviour (maintenance stage). Relapses are almost inevitable in the process of working toward life-long change and can be prevented by understanding the concept of readiness, and focusing on the successful part of the change plan. Other studies discuss factors that directly influence an employee’s voluntary behaviour and performance such as; motivation, ability, role perception, and situational contingencies (Dixon, 1999; Simpson, 2002; Lehman et al., 2002).

Success in making change at the individual level is definitely influenced by socio-cultural factors particularly the personal as well as social norms (Gagnon et al., 2003). Healthcare professional readiness and acceptance is a considerable challenge for e-health projects in developing countries (Kifle et al., 2006a). Stakeholder awareness and
educational programs are both required to alleviate the acceptance problem (Walker and Whetton, 2002).

Figure 3.6 displays e-health readiness levels (organizational and individual) and e-health readiness types (core, engagement, structural, and non-readiness) and summarizes the different variables that influence organizational and individual e-health readiness (adapted from previously reviewed models of e-readiness; mainly Jennett et al's. (2003) e-health readiness model).
Figure 3.6: General framework displaying e-health readiness levels and types, and the different variables considered in readiness assessment (Developed from: The models of e-readiness (Page 50) and mainly from telehealth readiness model (Jennett et al., 2003).
e-READINESS IN DEVELOPING COUNTRIES AND ITS IMPORTANCE FOR THE HEALTHCARE SECTOR

With respect to ICT development, developing countries struggle hard to follow in the footsteps of developed countries, especially as the digital divide widens (Rizk, 2000). Many policy makers and businessmen believe that developing countries have a golden opportunity for accelerating the development pace by establishing an independent ICT industry. This optimistic view is faced by a number of challenges, some relevant to infrastructure and e-readiness, and some to the content of the different aspects of the information society; the economy, culture, policies, and research and development environment.

Saidi (2002) in his paper *e-Government: Technology for Good Governance, Development and Democracy in the MENA countries* discussed e-readiness and analyzed the challenges that face the Middle East and North Africa countries (MENA) in this field. Building on this perspective, the major challenges to e-readiness and successful implementation of e-technology in MENA are:

1. **e-Leadership:** e-Technology requires strong, high-level leadership to supply the vision, establish a national e-strategy and ICT task force, and rally support from the public and private sectors. In the MENA region, the diffuse political consensus and the predominant role of government slow implementation of initiatives.

2. **Access, connectivity, and network readiness:** The main challenge here is the pricing, affordability, reliability and security of network access. Such indicators
for the MENA regions infrastructure are below the world average, and are a reflection of the absence of big private investment in the sector.

3. **e-Technology environment:** Political stability, government polices, and financial soundness definitely impact competition in the business sectors, and the network readiness of the MENA countries. The United Arab Emirates is a successful example in the region, having set up an attractive environment for e-technology business.

4. **Human resources:** The human factor is a major building block, and critical for success in e-technology adoption. MENA countries need to launch computer and ICT literacy educational programs, high quality ICT training, distance learning, and on the job training, and to generate the financial resources needed to support human capacity building.

5. **Information security and privacy:** Without providing security for users and businesses, e-technology will not achieve its desired objectives. This requires strengthening of the legal framework to address privacy protection and prosecution of computer crimes, creation of effective certification authorities, authorizing of digital signatures and enabling a public key or web of trust infrastructure. A survey of existing or “in gestation” legislations in the Arab countries shows that there are either no laws, or there are only draft laws (Alem & Co, 2002).

6. **Language:** Although a fair percentage of the areas population understand the English language, there is a need to target e-technology to the cultural and linguistic context in which it is delivered. There is evidence that healthcare
services are less likely to be initially accessed by those whose mother tongue is not consistent with that in which care is offered (Bowen, 2001).

Data on ICT in the MENA countries underscored their lack of e-readiness (CID at Harvard University, 2002). Excluding the United Arab Emirates, Bahrain, and Israel, the MENA countries have a relatively low Internet penetration rate. The number of Internet hosts and users are more than 60% below the world average. Moreover, the limited local content and language is an obstacle to Internet users, as is inadequate ICT infrastructure (Resnick, 2002).

Even though the MENA region still lies far behind in infrastructure projects, there has been a recent acceleration of investment. A few countries are currently benefiting from infrastructure projects with private participation, namely Egypt, Morocco, Lebanon, Jordan and Gaza (Saidi, 2002), other countries will benefit in the future.

With the challenges facing the Middle East Arab countries, including Palestine, the necessity for conducting an e-health readiness assessment for stakeholders of the Palestinian healthcare system is clear. Such an approach could help determine the exact level of e-health readiness, aid planning of implementation steps to ensure success, and support understanding of what differs in the context of e-readiness between the Middle East region and other regions.
PREVIOUS RESEARCH STUDIES RELATED TO PALESTINE

Although there is much literature discussing e-health, telehealth, or telemedicine in neighbouring countries (Israel, Egypt, and Jordan), nothing was found specific to Palestine except for two documents. The first was completed by the Global Health Initiatives (GHI) under the title “*Bringing the benefits of advanced medical technology to people worldwide, Focus: the public health needs of Palestine*” (No Date). This paper acknowledges that Palestinians have many health problems related to their location which can be dramatically improved by the provision of telehealth. The paper also describes eight categories into which telehealth applications fall; administrative, professional education, clinical, telemedicine, personal health, population-based, system coordination, and community networks. It is not clear how they determined these applications, and nothing is mentioned regarding needs assessment or system e-health readiness.

The second document "*Telemedicine and e-Learning System White Paper- Palestine project (The Wings of the Dove, 2004)*” was prepared by an Italian organization that focuses on the hospital sector. This paper provides basic information about telemedicine and e-learning services and proposes networked connections among different Palestinian and Italian hospitals to provide clinical consultations and e-learning services through videoconferencing. Similar to the earlier paper, nothing appears to have been determined about the real needs and e-health readiness of the people and the Palestinian health care system.

This lack of research specific to the Gaza Strip provides the rationale for a study to assess stakeholder e-health readiness and system needs prior to introducing e-health.
CONCLUSION

This chapter reviewed several models and theories related to the issue of innovation adoption, change, and ICT acceptance at both the organizational and individual level with a focus on the determinants of innovation adoption and acceptance. Perspectives around e-health, its applications, benefits, and factors affecting the uptake of e-health were also presented. Thereafter the concept of e-readiness in general, and in the health sector in particular, was introduced, again in relation to organizational and individual levels of readiness for change, and in the health context (e-health readiness) in the developing country context.

The literature review shows that there are few studies on e-readiness or e-health readiness in developing countries and none for the Gaza Strip. With ICT growing to be one of the world’s most influential industries, this in turn lays more burden on developing countries in general, and the Arab countries in particular, who must “keep up” with this ever-developing industry. It is of the utmost importance to set efficient policies and strategies, domestically and regionally, geared towards consolidating technology and promoting e-health readiness.

This literature review provides insight regarding what must be known about the people, culture, and healthcare organization of the Palestinian healthcare system in order to assess their preparedness to adopt e-health technology, that is, their e-health readiness. The next chapter outlines the conceptual framework for this study, developed from the perspective gained from the above literature review.
CHAPTER FOUR: CONCEPTUAL FRAMEWORK

INTRODUCTION

Use of ICT in the healthcare sector has been gaining momentum in recent times in both developed and developing countries, being viewed as a means of improving and maintaining cost-effective health outcomes. To achieve this goal an effective approach is needed that addresses human, organizational, cultural, socio-economic, and policy factors, apart from the technical aspects of ICT. However, a satisfactory understanding of the implications around investing in ICT is lacking, particularly factors that influence its acceptance by users and stakeholders in healthcare.

Two types of organizational technology adoption decisions have been identified from the literature; the decision made by an organization to adopt an innovation, and the decision made by an individual within an organization to make use of the innovation. Since healthcare services are utilized by the patients and the public, they are considered in e-health adoption and readiness decisions.

Based on the literature review, the conceptual framework for this study uses innovation adoption and change models, and uniquely aligns them with a more recent e-health readiness model, incorporating various determinants at both the organizational and the individual level. This creates a conceptual framework capable of guiding examination of factors that formulate the readiness for e-health adoption among identified stakeholders in the Palestinian healthcare system.
CONCEPTUAL FRAMEWORK FOR THE CURRENT STUDY

This study is based on three important concepts that facilitate the adoption of e-health in the healthcare organizations of developing countries:

1- The concept of readiness extends beyond technology preparedness to include other determinants at the organizational and individual levels that must be dealt with to gain maximum benefit from e-health applications.

2- An e-health readiness assessment facilitates the process of change for healthcare organizations, by reducing the negative impact of these determinants and optimizing the effectiveness of their e-health programs.

3- Readiness has a dynamic nature (related to the dynamic environment of both the ICT field and the healthcare systems), which will change depending upon where in time the assessment or adoption takes place.

Together, the Diffusion of Innovation Theory, Lewin’s model for change, the individual behavioural change models, the technology acceptance model, the perspective on Arab policy and culture, the information technology transfer model, and the recent model of e-health readiness provide valuable insights as to factors potentially influencing e-health adoption and readiness in the Palestinian healthcare system in the Gaza Strip. In chapter two (Gaza context), the national level of ICT (infrastructure, culture-specific beliefs and values) was highlighted. In the previous chapter, the detailed review of the literature revealed four domains related to e-health adoption and readiness: The organizational, individual, related technology, and external environmental domains. Each of these influence the conditions for adopting new technology (including readiness for
change), plus the process, and consequences of adopting e-health technology. This makes it very relevant in the case of the current study, where the Gaza Strip is faced with unique environmental, organizational, and technological factors.

Figure 4.1 illustrates the conceptual framework for this study. The framework depicts the steps in the process of innovation adoption and change in an organizational context, which forms the theoretical base for this study. As described earlier, innovation adoption has two distinct stages: Initiation and Implementation. During initiation the organization becomes aware of the innovation, forms an attitude towards it, and evaluates the new idea (i.e. "awareness", "consideration", and "intention" sub-stages). Then, during the implementation stage (adoption and continued use sub-stages), the organization decides to install and make use of innovation (Zaltman et al., 1973; Rogers, 2003). The initiation stage and its sub-stages are the best period for assessment of e-health readiness. The actual adoption decision occurs between the Initiation and Implementation stages.

The innovation adoption model suggests that a set of factors are present which influence the level of readiness for acceptance of innovation by organizations, and determine the failure or success of the process. Figure 3.5 in the literature review chapter illustrates these factors and their relationship and how they relate to the initiation stage. The determinants of organizational readiness can be grouped under the following headings:

1- Technology characteristics: The introduced technology must be appropriate, able to address the needs of the organization or community, affordable, and easily integrated with the existing healthcare system (Davis, 1989; Rogers, 2003).
2- Healthcare organization characteristics: An organization's size and structure, the degree to which it is receptive to new ideas, its style of management, and the availability of needed resources (financial and human) each influence e-health readiness and adoption decisions (Igbaria et al., 1996; Clegg et al., 1997; Rogers, 2003).

3- Individual characteristics, including: Age, gender, education, experience, personal values, and social network, determine an individual’s readiness to adopt technology (Agarwal and Prasad, 1998; Rogers, 2003).

4- External environmental factors: Organizational readiness and innovation acceptance are influenced by socio-economic factors, culture-specific beliefs, national technological infrastructure and policies, and the political environment (Checchi et al., 2002; Scott et al., 2005; Lusthaus et al., 1995).

All these issues can affect an organization’s readiness to adopt e-health. Hence, it is important to assess these factors as part of the e-health planning process, and prepare organizations and communities to reduce the negative impact and maximize the positive impact. These domains are included in the conceptual framework as the common elements that must be assessed in order to determine readiness at any given point in time.
Figure 4.1: The current study conceptual framework framing readiness assessment within adoption of innovation.
Given the dynamic nature of readiness, the time line at the middle of the diagram emphasises that readiness can be assessed (and will differ) at different points along the initiation-implementation continuum. This is an important feature of the framework and reflects the more recent and forward thinking readiness literature e.g. Center for International Development, Asia Pacific Economic Cooperation, and Computer System Policy Project (Bridge.org, 2005); and the organizational telehealth readiness assessment tool by Jennett et al. (2003). Within this framework readiness at the organizational and individual levels is calibrated using four categories of readiness: Core, engagement, structural, and non-readiness.

The lower portion of the diagram demonstrates the four domains (technological, organizational, individual, and external environmental factors) considered in the process of readiness assessment. The arrows indicate the interrelationships among the four domains in terms of their influence on the level of readiness to adopt e-health.

The conceptual framework for the current study thus links recent and modern readiness models with the traditional innovation adoption and change theories. Since readiness includes elements of change both at the organizational and individual levels, it can be understood within the innovation adoption and change theories. Using this framework provided the information required to examine the research questions related to readiness of stakeholder’s, the barriers and facilitators, and the e-health solutions that best fit the needs of the system and its stakeholders.
CHAPTER FIVE: METHODS

INTRODUCTION

The purpose of this study is to explore the readiness of stakeholders in the Palestinian healthcare system (in the Gaza Strip) to adopt e-health, and the factors that might facilitate or impede the adoption. Assuming that there are some objective factors pertinent to e-health adoption and others that are detrimental, the researcher chose to solicit responses from individuals believed to be most relevant to his inquiry and whose responses would be closest to the actual objective factors.

Generally, the choice of a research method depends on the topic area, the research question, the research background, and the intended audience (Palvia et al., 2004); this study utilized a qualitative case study design (Yin, 2003). Qualitative methodology is valuable for research on innovative systems (Marshall and Rossman, 1995), and best when the purpose is to understand an area where previous studies offer inadequate understanding (Morse and Richards, 2002). Within the qualitative method, case studies are ideally suited to examining phenomena, events, structures, situations, or people in their natural context (Stake, 1995; Yin, 2003). They capture both inter-community diversity, and the depth and breadth of intra-community responses to e-health. Because of its situation, circumstances, and people plus the lack of primary data, and novelty of this study, case studies were considered to be ideally suited to the Gaza Strip.

This chapter begins by detailing the rationale for selection of the approach, then describes the study design, and the process employed to conduct this study. Review of some concepts related to the study method and design are also presented.
THE CASE STUDY APPROACH

A case study is an empirical inquiry that “investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003). The rationale for selecting this approach is inherent in Yin’s three conditions that determine research strategy “the type of research question posed, the extent of control an investigator has over actual behavioural events and the degree of focus on contemporary as opposed to historical events” (Yin, 2003). Another reason for this approach is the opportunity to gather data on complex behaviours, such as the process of adoption and stages of change, which might be difficult to achieve with other approaches such as surveys (Harold, 1998).

Case studies look at a phenomenon naturalistically, and no control is exercised over behavioural events (Siedlecki, 2004). They examine contemporary events and differ from a survey as they do not need to limit the number of variables to be analyzed. They also provide an organizational framework for comparing and merging data from diverse sources in diverse formats. In a multi-case design, similar or identical units of analysis and data collection techniques are used to ease cross-case comparison, each case being treated as a separate entity.

Yin (2003) states that the goal of case study data analysis "is to treat the evidence fairly, to produce compelling analytic conclusions, and to rule out alternative interpretations" He recommends the use of multiple sources of evidence in case study methodology. A similar recommendation came from the study of the effect of technology on healthcare (Anderson & Aydin, 2005), and the most common reason stated is for purposes of triangulation (Cresswell, 1998). Sawyer (2001) suggests that triangulation
helps in seeing the same research events from different perspectives and becomes necessary when interviews are used to collect data (Maxwell, 1996; Stake, 2006).

Interviews, whether fully structured or completely unscripted, are an appropriate method of data collection for case study information and are a well known tradition in qualitative healthcare research (Yin 2003). A semi-structured interview is a popular approach that begins with a pre-established script, but is flexible enough to allow the researcher to pursue topics of interest and deviate from the script depending on the circumstances and person interviewed (Arksey & Knight, 1999).

The use of focus group as a data collection method is a relatively new method in health research (Morgan, 1998). Questions for a focus group should represent five distinct question categories: opening questions, introductory questions, transition questions, key questions, and ending questions (Krueger, 1998; Krueger and Casey, 2000). They also suggest small sized groups (6-8 persons) and note that there are benefits to using heterogeneous groups (groups drawn from across a variety of units of analysis).

Miles & Hubermann (1994) discussed approaches that are used for the task of sorting and organizing qualitative data: coding, non-cross-sectional data organization, and use of diagrams and charts. Coding is widely recognized as the basic element of qualitative data analysis and is the first task to sort data (Creswell, 1998; Miles and Huberman, 1994). Once data is organized and coded, the next step is explanation. Miles and Huberman (1994) suggest the use of matrices or graphical displays to extract patterns from data. Data thus synthesized provide context, and facilitate comparison and case report construction by providing a framework for understanding the relationships between events, statements, motivations, and opinions found in the raw data.
A multi-case study was chosen for this study (three hospitals and one primary healthcare center). Each case had multiple embedded units of analysis: Healthcare professionals, patients, public members, and healthcare organizations represented by healthcare decision makers and administrators. Their contributions will be considered within the context of the role they occupy. Figure 5.1 illustrates the structure of the current study. It shows that each case is completed and reported independently before cross-case analysis is undertaken.

ACCESS TO THE RESEARCH SETTING

In the early stages of project development contact was initiated between the researcher and his supervisor, and the Palestinian General Director of the MOH to explore the possibility of the researcher gaining access to Ministry and hospital premises to collect study data. A letter of acceptance was received from his Excellency welcoming the project and promising support and facilitation for data collection (Appendix 2a and 2b). In Gaza the researcher started his field work by contacting top-level officials in the MOH. Also, visits were made to the targeted healthcare facilities, meeting the directors, introducing the project, arranging for the awareness sessions, and discussing the process of data collection.
Figure 5.1: Gaza Strip case studies structure (adapted from Yin, 2003)
CASE SELECTION

For the purpose of this study the “case” is defined as “a healthcare facility” that provides healthcare services to the Palestinian people in the Gaza strip. It could:

- Be a hospital or primary health care centre
- Be operated by the government or NGOs
- Deliver services at the primary, secondary, or tertiary level of care
- Be located within the geographical area of Gaza Strip

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>European Gaza Hospital</th>
<th>Nasser Paediatric hospital</th>
<th>Al-Awda Hospital</th>
<th>Sheikh Radwan PHC* centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function</td>
<td>General and educational hospital</td>
<td>Specialized and educational hospital</td>
<td>General hospital</td>
<td>PHC center</td>
</tr>
<tr>
<td>Location</td>
<td>South Gaza Strip</td>
<td>Gaza City - west</td>
<td>North Gaza Strip-Jabalia refugee camp</td>
<td>Gaza City north</td>
</tr>
<tr>
<td>Level of ICT</td>
<td>Highly automated</td>
<td>Minimally automated</td>
<td>Minimally automated</td>
<td>Not automated</td>
</tr>
<tr>
<td>Run by</td>
<td>Government</td>
<td>Government</td>
<td>NGOs</td>
<td>Government</td>
</tr>
<tr>
<td>No. of beds</td>
<td>250</td>
<td>184</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>No. of employees</td>
<td>729</td>
<td>346</td>
<td>137</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 5.1: Characteristic of the four healthcare facilities investigated
* PHC: Primary Healthcare Center

For this study, four cases were chosen (with help from Palestinian MOH officials) considering Gaza's geographical areas, the healthcare facility function, and by whom the facility was operated; thus an effort was made to choose diverse cases. The selected cases intentionally differed in their ICT experience, ranging from highly automated (European
Gaza Hospital) to minimally automated (Sheikh Radwan Primary Healthcare Centre); also, the four investigated cases were different in composition, size, and geographical location. In addition, the availability of resources (especially human resources) and the interest of MOH officials in these facilities made them potential pilot locations for future implementation of e-health and contributed to the case selection. Table 5.1 shows the diversity of the cases.

UNIT OF ANALYSIS

Healthcare professionals and administrators are the expected users of the e-health technology and at the same time the producers and users of the patient information. Patients and the public are the main beneficiaries of the health service and therefore important partners in the system. As a result of this thought process, four groups were considered as stakeholders of the healthcare system, and identified to participate in the study: 1) healthcare professionals, 2) patients, 3) public members (from health advocacy groups), and 4) healthcare organizations (represented by healthcare decision makers and administrators). In each healthcare facility these stakeholder groups were the units of analysis, chosen for their anticipated different perceptions of the intervention (e-health), and as a core representing the healthcare system context. In this way each unit of analysis was embedded within the larger case (the hospital or primary healthcare center).

DATA COLLECTION

Data collection is a series of interrelated activities aimed at gathering good information to answer research questions (Creswell, 1998). For case studies, data
collection may involve a broad variety of techniques. The more techniques that are used in the same study, the stronger the understanding of the phenomena under study will be. Two sources of data were used in the study in an effort to validate the findings (the process of triangulation): Multiple semi-structured interviews with participants, and focus group sessions. The overall process included steps from preparing Arabic versions of the instruments to conducting interviews and focus groups (Figure 5.2).

*Study participant selection*

Qualitative samples are selected purposively, rather than randomly (Kuzel, 1992; Morse, 1989). For the purpose of this study, and to ensure a rigorous approach, both top-down expert review and bottom-up community input was applied (Jennett *et al.*, 2003). This approach assured the collection of data on e-health readiness as perceived from the healthcare professional’s level, as well as the lay community level.

The selection criteria for subjects from healthcare facilities were; willingness to participate, computer and technology literate, and employed by the healthcare facility with at least three years of experience in their current position. These criteria helped ensure that participants understood the situation inside and outside the hospital, their job requirements, and the factors that contributed to the job positively or negatively. The subjects who represented the *public* were selected with help from the healthcare facilities management team and were selected from groups that supported the healthcare facilities and advocated for community health and patient’s rights. Selection criteria included their consent to participate and living in the hospital’s neighbourhood. Criteria for *patients*
were that they were customers of the healthcare facility, educated, and had some knowledge of computers.

Figure 5.2: Data collection process
All potential study participants were contacted and scheduled for the interviews and focus groups through a collaborator identified by each healthcare facility’s Director. Efforts were made to ensure gender equality among the informants in the focus groups and interviews.

*Interview and focus group guide development*

Semi-structured questions were developed for each group of participants for key informant interviews, and another script for the focus group participants. The guides consisted of two sections: the first section contained general questions (demographics); the second section was specific to the research questions and focused on e-health readiness. The clarity and validity of the guide questions were assessed by expert faculty advisors from the University of Calgary. Drafts of the tools were shared with the study’s Advisory Committee members for critical review of the content as well as formatting. With input from these experts the questions were revised. Also the whole project, including the instruments, was reviewed and approved by the Conjoint Health Research Ethics Board (Appendix 1a). Translation of the guides to Arabic took place in Gaza by the researcher and a professional translator in the Palestinian MOH. Additional checks for accuracy were performed by an English language teacher, with final editing and review completed by a professor in the Gaza School of Public Health.

Piloting was done in the field at the European Gaza Hospital because of the easy access (researcher’s prior position in the hospital), convenience, and proximity. The guide questions were tested with a group of different job category employees at the European Gaza Hospital. Based on the outcome of piloting the order of questions was
altered and some terms and words changed to make them more comprehensible for the participants. A sample of an interview and focus group guide is presented in Appendix 6.

Awareness Sessions

Preceding the data collection process, five awareness sessions were held, two in the European Gaza hospital and one in each of the other healthcare facilities, in order to inform the target audience what e-health was, including its service applications, and the technology involved. These awareness sessions also served to collect opinions and to initiate contacts with the management and potential participants (sample of awareness session materials Appendix 7)

Interviews

Twenty semi-structured interviews were completed. They were guided by pre-scr ipted open-ended questions, and conducted between August and December of 2005 with five participants form each of four facilities. Written informed consent was obtained before each interview (Appendix 5). The interview was approximately one hour in length, conducted in the participant’s community and at a place of their choice, and was audio-taped for later transcription. The interviews were intended to provide general context for the focus groups, and confirm the relevance of questions posed to focus groups.

Focus groups

Five focus groups sessions were conducted following the interviews, two of them in European Gaza Hospital and one in each of the other three healthcare facilities. Six to
ten informants participated in each focus group. Participants for each focus group were recruited from the same healthcare facility and from different job categories (physicians, nurses, pharmacists, technicians (laboratory, physiotherapy, and radiology), public representatives, and administrators).

RIGOUR

Rigour is evident in qualitative research when the methods used are those that can represent the fullest, most detailed, rich, and expressive picture of a particular situation. The basic strategy to ensure rigour in qualitative research is systematic and self-conscious research design, data collection, interpretation, and communication (Mays and Pope, 2000). As Swepson (2000) described:

_A more appropriate criterion of rigour is the degree of the relevance of the methodology to the problem; the one which best allows the researcher to conduct systematic inquiry in order to present a warranted assertion - that is, the methodology is fit for a given function_

According to LoBiondo-wood and Harber (1990), rigour applied to the data collection process is the best check of validity and may be enhanced by describing the exact process of data collection.

In this study, many steps were taken to ensure rigour through all stages which involved systematic inquiry in terms of research design, data collection and analysis; selection of an appropriate method relevant to the research problem; and using different sources and ways of data collection. In addition, the exact process of data collection was
described in detail and the researcher consistently triangulated data, looking for literal
(similar results) and theoretical (contrasting results) replication. More so, the interview
and focus group guides were reviewed by experts, and the events audio-taped and
transcribed verbatim. The investigator took field notes to capture tones and gestures, and
focus was given to participants’ verbatim statements during data analysis. The
researcher’s past experience, biases, and prejudices were made explicit in the course of
the research. Transcripts, and interpretations of interviews and focus groups was
confirmed with the informants when needed, before the researcher left the field
/respondent validation) and this feedback considered by the researcher before writing the
final report.

ETHICAL CONSIDERATIONS

This study received ethical approval from the Conjoint Health Research Ethics
Board at the University of Calgary on June 29, 2005 (Appendix 1.a). Approval was also
acquired from the appropriate ethics review committee in Gaza where the project was
conducted and instruments validated (Appendix 1.b). Informed consent was obtained
from all focus group and interview participants to ensure that they understood the terms
of their participation in the study (Appendix 5). Participants were informed of the study
purpose, the voluntary nature of their involvement, and their right to refuse to participate.
They were also informed that during the interview or focus group they could refrain from
answering any question and terminate the interview or withdraw from the focus group.
Every effort was made to protect the identity of participants; for example in transcriptions
and also in this dissertation, numbers are assigned to differentiate informants. Transcripts
have been protected in computer files by passwords and only the principle investigator has access to this information. No identifying features will be included in any dissemination of study results. The data will be destroyed after the requisite five years.

CONCLUSION

This chapter has highlighted the case study approach and the rationale for its selection, described data collection process, and demonstrated the value of the multiple case study methodology. The next chapter will present the results and sections containing comprehensive reports for the cases with detailed findings from each case.

The four healthcare facilities involved in this study are referred to in this thesis as:

- Case 1: European Gaza Hospital
- Case 2: Nasser Paediatric Hospital
- Case 3: Al-Awda Hospital
- Case 4: Sheikh Radwan Primary Healthcare Center

Appendix 3.a shows a map for case location within the Gaza Strip.
CHAPTER SIX: RESULTS AND CASE REPORT

INTRODUCTION

This chapter presents the results of case reports, focused on e-health readiness, using four cases: European Gaza Hospital (EGH), Nasser Paediatric Hospital (NPH), Al-Awda Hospital, and Sheikh Radwan Primary Healthcare Center (SRPHC). It considers the various organizational, individual, technological, and external environmental readiness factors that influence the adoption of e-health. Data were collected between July and December, 2005 from twenty semi-structured interviews and five focus group sessions. The process of data collection was preceded by five "awareness" sessions attended by the facility staff, health care professionals from other healthcare facilities in the area, patients, and members of the community.

Field work data collection was completed over a six month period and was done in two phases. The first phase focused on establishing contacts with many meetings being held with Palestinian Ministry of Health (MOH) officials to brief them about the project and ask them for permission to access the targeted facilities. Instruments were translated to Arabic and awareness material was prepared prior to the sessions being conducted. Potential participants were identified, and the interviews and focus groups scheduled with the help of the assigned collaborator in each facility.

In the second phase, an information letter was sent to the hospitals and primary healthcare general directors, as well as to the directors of the four healthcare facilities. The letter described the purpose of the study, the intention of the investigator, in terms of recruitment of participants, and the arranged date and schedule for the data collection.
process. Consent forms were distributed among all identified participants. The focus group sessions followed the semi-structured interviews.

This chapter, organized in four main sections, begins by describing the steps of data management and analysis; it then explains the four major domains (organization, individual, technological, and external environment readiness) used to determine stakeholder readiness to adopt e-health. Thereafter, the general results of the study (case contexts, demographics, perceived major administrative problems, and stakeholder's e-health expectations) are presented. Finally, the results specific to the stakeholder's e-health readiness, the major barriers and facilitators for e-health adoption, and the best e-health applications that fit their need are presented separately for each case (case reports). Of note is that the results presented in this chapter are descriptive, while in-depth results analysis will be conducted in the following chapter of cross cases analysis.

SECTION I: DATA MANAGEMENT AND ANALYSIS

This study generated large amounts of data from the interviews and focus groups, at each level of stakeholder (i.e. practitioner, patient, organization, and public). Data analysis was performed at three levels:

1) Individual interviews and focus groups;

2) All interviews and focus groups for each case; and,

3) Across the four cases studies

Organization and analysis of data was conducted in consecutive steps that involved:

- Verbatim transcription of interviews and focus group audio-tapes and organizing each case using separate numbers and symbols on Microsoft Word files.
Transcription was started during ongoing data collection, and the ideas gained during the process guided further interviews.

- Listening to the tapes for inflection and flow of speech, and to become familiar with the content of focus groups and interviews.
- Taking notes and writing comments about interesting, relevant, or repetitive words and phrases, and ideas (coded later).
- Going through the transcripts piece by piece to extract the significant elements and organize separate documents.
- Extensive notetaking, highlighting and organizing relevant pieces of the text that aligned with elements in questions. The identified themes were grouped and memos were written for each category.
- Repeated and careful reading of the text to determine answers to the research questions. This process was approached at the three levels of data: individual interviews and focus groups, the whole organization interviews and focus groups, and all cases data.
- Quotations and categories were sorted according to the different groups of participants (practitioners, patients, organizational and public), and a pattern of comments was developed for each group.
- Finally, the results were outlined and written as separate reports for each case.

Data analysis was done manually due to the lack of any Arabic version of relevant software. Also, the analysis process was conducted using Arabic language text, and then the report for each case was prepared in English. This was done in recognition of the fact
that the translation to English could lead to loss of meaning and disturb the consistency of the data due to the difficulty in translation of many expressions and colloquialisms.

SECTION II: MAJOR DOMAINS TO ASSESS STAKEHOLDER'S E-HEALTH READINESS

Four major domains were used in the assessment of e-health readiness for the stakeholders in the Palestinian healthcare system in the Gaza strip: Technological, organizational, individual, and external environmental. In addition, four types of readiness (core, engagement, structural, and non-readiness) were assessed under each category. Table 6.1 illustrates these domains, which are incorporated into the following "Analysis Model" for the study data.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
<th>Non-readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Organization</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Public</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External environmental factors</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

Table 6.1: Analysis model

The variables of analysis were derived from several sources: the conceptual framework of this study, the organizational telehealth readiness assessment tool by
Jennett et al. (2003), and the ICT readiness tools discussed in the literature review chapter. The context of each domain in brief included data about the following:

1- **Technological readiness:** Typical factors in this domain that most commonly contribute to technological readiness are: network connection, technical support, policies and regulations, trained staff, physical access to technology, and availability of technological infrastructure (e-health equipment) needed to implement the program e.g. telephone lines and Internet connection, hardware, software, and computers).

2- **Organizational readiness:** This domain was assessed through the management staff (directors, managers, and administrators). Four categories of readiness were used to determine organizational preparedness to adopt e-health: 1) Core Readiness; comprised items such as perceived and clearly articulated need, dissatisfaction with the way care was delivered, and willingness to change, 2) Engagement Readiness; included e-health champion, perceived benefit, ability to match e-health applications with an identifiable need, and the availability of resources, 3) Structural Readiness; determined by workforce preparedness, installation of equipment and any network, plus the presence of related policies, regulations, standards, training plans, or a change management plan, and 4) Non-readiness (no identified need).

3- **Individual readiness:** Individual readiness (patients, healthcare professionals, and public members) was also assessed using the four categories of readiness. Data from each category addressed: Core Readiness comprised items such as perceived need, dissatisfaction with the current situation, and desire to change; 2)
Engagement Readiness included questioning of e-health advantages, expressing concerns (safety, security, and information confidentiality), engaging in the idea, and acknowledging e-health benefits; 3) Structural Readiness, referenced access to training access to e-health equipment, and ability to use the equipments; and 4) Non-readiness.

4- **External environmental readiness:** This domain raised factors such as: Country ICT policies and regulations, the political and legal environment, cultural beliefs and values, the socio-economic situation, technological infrastructure, and openness to technology. These factors were detailed in chapter two (the Gaza context), and in the case reports they are discussed within the context of the other domains of readiness.

**SECTION III: GENERAL RESULTS**

The general results of the four case studies are presented below. This includes the case contexts, participant's background (demographics), perceived major administrative problems (that might be addressed through the use of e-health), and stakeholders expectations of e-health.

*Case contexts*

Table 6.2 summarizes the characteristics of the four healthcare facilities (cases) investigated in this study.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Case 1 European Gaza Hospital</th>
<th>Case 2 Nasser Paediatric Hospital</th>
<th>Case 3 Al-Awda Hospital</th>
<th>Case 4 Sheikh Radwan PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographical location</td>
<td>South Gaza Strip</td>
<td>Gaza City - west</td>
<td>North Gaza Strip-Jabalia refugee camp</td>
<td>Gaza City – north (Sheikh Radwan district)</td>
</tr>
<tr>
<td>Type of facility</td>
<td>General hospital, referral, and educational</td>
<td>Specialized hospital and educational</td>
<td>General hospital</td>
<td>Primary healthcare</td>
</tr>
<tr>
<td>Run by</td>
<td>Government</td>
<td>Government</td>
<td>NGOs**</td>
<td>Government</td>
</tr>
<tr>
<td>Number of beds</td>
<td>250</td>
<td>184</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Number of employees</td>
<td>729</td>
<td>346</td>
<td>137</td>
<td>50</td>
</tr>
<tr>
<td>Level of IT* experience</td>
<td>Highly automated</td>
<td>Minimally automated</td>
<td>Minimally automated</td>
<td>Not automated</td>
</tr>
<tr>
<td>Style of management</td>
<td>Board Management</td>
<td>Traditional</td>
<td>Traditional</td>
<td>Traditional</td>
</tr>
<tr>
<td>Accessed by</td>
<td>South Gaza Strip population and referred cases from all Gaza Strip areas</td>
<td>All Gaza City, north and middle Gaza Strip population</td>
<td>North Gaza Strip population</td>
<td>Gaza City – Rimal district citizens</td>
</tr>
<tr>
<td>Staff</td>
<td>Stable with international health staff visitors</td>
<td>Stable</td>
<td>High turnover and international visitors</td>
<td>Stable</td>
</tr>
<tr>
<td>Composition of people served and size</td>
<td>Citizens and refugees (400,000)</td>
<td>Citizens and refugees (360,000)</td>
<td>Mainly Jabalia camp refugees (220,000)</td>
<td>Gaza citizens (100,000)</td>
</tr>
</tbody>
</table>

Table 6.2: Characteristics of the four healthcare facilities investigated
* Information Technology ** Non Governmental Organizations
In addition to these characteristics, the political environment, socio-economic status, and values held by service providers and recipients also determine whether e-health adoption will occur and to what extent stakeholders can engage in using e-health.

**Participant's background (demographics)**

The participants in both focus groups and interviews were healthcare professionals working in the healthcare facilities, patients attending the hospitals and primary healthcare center, or community members who are knowledgeable about the targeted healthcare facilities and their services.

<table>
<thead>
<tr>
<th>Participants Characteristic</th>
<th>Case 1 European Gaza Hospital</th>
<th>Case 2 Nasser Paediatric Hospital</th>
<th>Case 3 Al-Awda Hospital</th>
<th>Case 4 Sheikh Radwan PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average age</td>
<td>37</td>
<td>37</td>
<td>39.3</td>
<td>38.5</td>
</tr>
<tr>
<td>Average years working at the facility</td>
<td>4.8</td>
<td>6</td>
<td>5.5</td>
<td>5.1</td>
</tr>
<tr>
<td>Profession</td>
<td>Manager: 3</td>
<td>Manager: 3</td>
<td>Manager: 2</td>
<td>Manager: 2</td>
</tr>
<tr>
<td></td>
<td>Physician: 3</td>
<td>Physician: 2</td>
<td>Physician: 2</td>
<td>Physician: 2</td>
</tr>
<tr>
<td></td>
<td>Pharmacist: 1</td>
<td>Pharmacist: 1</td>
<td>Pharmacist: 2</td>
<td>Pharmacist: 1</td>
</tr>
<tr>
<td></td>
<td>Nurse: 3</td>
<td>Nurse: 2</td>
<td>Nurse: 2</td>
<td>Nurse: 1</td>
</tr>
<tr>
<td></td>
<td>Technician: 3</td>
<td>Technician: 2</td>
<td>Technician: 1</td>
<td>Technician: 3</td>
</tr>
<tr>
<td></td>
<td>Patient: 2</td>
<td>Patient: 1</td>
<td>Patient: 2</td>
<td>Patient: 1</td>
</tr>
<tr>
<td></td>
<td>Public: 2</td>
<td>Public: 1</td>
<td>Public: 2</td>
<td>Public: 1</td>
</tr>
<tr>
<td>Gender</td>
<td>Female: 7</td>
<td>Female: 7</td>
<td>Female: 3</td>
<td>Female: 8</td>
</tr>
<tr>
<td></td>
<td>Male: 10</td>
<td>Male: 8</td>
<td>Male: 8</td>
<td>Male: 3</td>
</tr>
<tr>
<td>Education</td>
<td>Doctorate: 3</td>
<td>Doctorate: 1</td>
<td>Doctorate: 1</td>
<td>Bachelor: 10</td>
</tr>
<tr>
<td></td>
<td>Master: 2</td>
<td>Master: 3</td>
<td>Bachelor: 5</td>
<td>Diploma: 1</td>
</tr>
<tr>
<td></td>
<td>Bachelor: 12</td>
<td>Bachelor: 11</td>
<td>Diploma: 2</td>
<td>High school: 3</td>
</tr>
</tbody>
</table>

Table 6.3: Background of participants at the four healthcare facilities
Table 6.3 describes the interview and focus groups participant’s background (i.e., age, gender, education, profession, and numbers of years at work) in the four cases. It might be argued that the participants' age works in favour of e-health readiness and acceptance because more youthful subjects may be less resistant to change, with high personal ambitions as well as familiarity with technology and ability to gain skills. The near equal gender participation helped to achieve a balanced input. Given the majority of healthcare professions were represented, the credibility of the data is enhanced and is more illustrative of organizational reality.

**Perceived major administrative problems**

Major administrative problems facing employees and the managers of healthcare facilities were explored. This question was used to probe whether any of these problems might be addressed through the use of e-health. In addition, knowing the nature and extent of current problems helped to assess preparedness for change, through needs expressed, ability to identify the extent of these problems, how they influence the care delivered, and desire to change the way care is delivered (core readiness). Moreover, the level of their engagement in the idea of e-health (engagement readiness) could be assessed. Table 6.4 describes the major administrative problems identified in the four cases.

Perceived problems were listed according to their indicated importance by the facility participants. Major administrative problems were similar across the four cases which is not surprising given that all of them are subjected to the same local conditions and exigencies.
Primary review led to the conclusion that many of these problems could be addressed by e-health applications. Some could be addressed in the short term e.g. coordination, communication, and staff updating, while other problems could only be solved in the long term when the system strengthens (e.g. lack of some specialties, treatment abroad, and consultation).

Exploring these problems across the four cases helped to understanding stakeholders' high expectations from the adoption of e-health applications and shed light on their desire to make the change.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Case 1 European Gaza Hospital</th>
<th>Case 2 Nasser Paediatric Hospital</th>
<th>Case 3 Al-Awda Hospital</th>
<th>Case 4 Sheikh Radwan PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to specialists</td>
<td>Some medical specialties not available (1)*</td>
<td>Some medical sub-specialties not available (4)</td>
<td>Many medical specialties not available (1)</td>
<td>No specialist services available</td>
</tr>
<tr>
<td>Communication</td>
<td>Weak (2)</td>
<td>Weak (3)</td>
<td>Weak (2)</td>
<td>Weak (6)</td>
</tr>
<tr>
<td>External</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral of patients abroad for treatment</td>
<td>Frustration for practitioners. (4)</td>
<td>Big problem due to lack of sub-specialities (2)</td>
<td>Problem</td>
<td>Not an issue</td>
</tr>
<tr>
<td>Resources</td>
<td>Some laboratory tests must be sent to a central laboratory or abroad (5)</td>
<td>General lack of resources to support diagnosis and treatment (1)</td>
<td>Lack of human and material resources (6)</td>
<td>Lack of any kind of technological infra-structure (computers) (4)</td>
</tr>
<tr>
<td>Access to accurate and timely data and information</td>
<td>- Available due to automated system used</td>
<td>- Not available - Too much paper work (5)</td>
<td>- Not available - Disorganized archives - Manual preparation of statistics and reports (5)</td>
<td>- Not available - Disorganized archives and work environment - Missing files, long waiting times, and paperwork (1)</td>
</tr>
<tr>
<td>Opportunities for staff upgrading</td>
<td>Limited (3)</td>
<td>Lack of staff upgrading (6)</td>
<td>Scarce opportunities (4)</td>
<td>Lack of staff upgrading (5)</td>
</tr>
<tr>
<td>Work load</td>
<td>Big volume of patients (6)</td>
<td>Big volume of patients (7)</td>
<td>Big volume of patients (7)</td>
<td>Big volume of patients (7)</td>
</tr>
<tr>
<td>Interacting with the public</td>
<td>Disrespectful treatment of hospital staff by some members of the public (7)</td>
<td>Uncooperative patients’ relatives and the public (9)</td>
<td>Problems caused by patients and their companions (3)</td>
<td>Dealing with issues of patient volume and clashes with the public (2)</td>
</tr>
<tr>
<td>Other factors</td>
<td>Equipment failure and insufficient maintenance</td>
<td>Uneven flow of patients and information (8)</td>
<td>Duplication of services (8)</td>
<td>Job dissatisfaction and frustration (3)</td>
</tr>
</tbody>
</table>

*(number) reflects the order of importance in each site based on frequency

Table 6.4: Major perceived problems in the four cases
Stakeholder's e-health expectations

Stakeholders' expectations of e-health adoption are illustrated by their perceived needs, willingness to change (core readiness), the extent of their engagement in the idea of e-health, and their ability to match their perceived need with the different e-health applications (engagement readiness).

In all cases, the stakeholders had high expectations of e-health adoption. One driver of these high expectations was the perception that e-health offered an opportunity to strengthen the system and add value to the work environment and could serve as a tool to resolve many of their organizational problems. Another important basis for these high expectations may be the relative youth of the sample and their familiarity with technology, together with their personal desire to build a strong career in the healthcare industry. Whatever the expectations, this situation is very encouraging and portends a future in which these individuals may be initiators and pioneers of ICT implementation.

1- Patients' expectations: Data showed that patients expected e-health to facilitate access to better care and information, and to decrease the need to travel to neighbouring countries for treatment. This in turn was expected to lead to elimination of physical, psychological, and financial burdens, plus faster diagnosis and treatment, and reduction in complications.

...I expect this technology to make things easy, instead of traveling for medical consultation; they can send all laboratory investigations, x-ray, and case description through the net. This is better than travel suffering and cost.

Another patient who participated in the interview not only expected these benefits of e-health, but also practiced it. He described an experience:
I initiated contact with specialized medical centre in Germany by using e-mail. I sent them description and reports about my medical condition with an attachment containing ten x-ray pictures...they replied to me the next day. Imagine if I had to travel to Germany and set an appointment, make new x-ray and investigation. See how much this process saved the time, effort, and cost. This technology is amazing.

Patients also expected that acceptance of e-health technology by people would be good, a view confirmed by other participants in both interviews and focus groups.

2- Public expectations: Similarly, the public expectations of e-health were that it would provide more options for diagnosis of difficult cases, promote quality of care, and change peoples attitude and employee satisfaction. Moreover, they expected e-health to be more beneficial to the healthcare professional in terms of improving their skills, developing their work environment, reducing medical errors, providing more concentrated experience for physicians through consulting on difficult cases. In addition, the public expected that e-health might face poor acceptance from patients in the beginning, due to a lack of awareness of its potential, but a gradual improvement in acceptance would result from successful experiences.

Of note was an expectation of excellent impact arising from websites aimed at improving awareness of patients and the public about their health and medical conditions.

A public participant explained:

*Using the Internet websites is excellent way; I can open the sites and see the subjects related to my family condition or other interesting health sites that provide general health information. Also, I think the others can do the same. It is effective in raising the people’s health awareness, understanding and attitude. Only one concern might slow down the use, the limited Arabic language websites.*

Another public expectation was the role of e-health technology in elimination of some administrative problems at the facilities. This included such issues as missing patient
files, a frustrating work environment, over crowding, and clashes between the public and workers.

...We face problems through the process of service provision, for example a patient who has follow up is looking for his file or report and he/she doesn't find it, the consequences are many. If the files are organized in a better way using the proposed technology, this would make better changes in term of easy access to patient information, minimize services duplication, and ensure smooth patient flow and so on. The results being less clashes, trust in relationships and a satisfactory work environment.

Public expectations from this technology seemed to go beyond the role of technology in healthcare services. An interesting idea was proposed by a public member participating in a focus group:

This technology could be very helpful to physically disabled people and we have huge number of them due to our political situation. They can use this amazing technology (computer and Internet) to do their job at home, continuing their university education, communicating with each other and their own organizations, and consult their physicians about their medical condition.

3- Management expectations: Managers and administrators had their own views and expectations. This was explained in the following comment:

e-Health is considered a distinguished addition to any hospital; distinguished in its work...its performance. It will totally change the work environment and the way we deliver the services. It will improve the communication and professional confidence, save time and efforts, facilitate national and international consultation, and increase patient’s and worker’s satisfaction

Managers expected that e-health will support more of a focus on continuing education, and also reduce costs of sending physicians, nurses, or administrators abroad for training or courses. This view was expressed in an interview:

e-Health use can maximize the utilities gained from education and training in a simple way, instead of sending a person to attend a course or training program abroad. We can bring this program here in our facility through the use of the videoconference and exposing many staff instead of one person. This will save our
resources and increase the number of trainees who are exposed to these programs.

A more interesting expectation of e-health, expressed by a manager in a focus group, was directed at tackling one of the important problems faced by the Palestinian MOH:

Firstly, as our land is physically separated into Gaza Strip and West Bank and a difficulty in physical contact, e-health is expected to provide excellent option for communication, exchange experience, and unify the system. Secondly, external communications with the neighbouring countries are necessary to enhance our staff development.

Another important expectation was described by a manager in a focus group:

By using the patient electronic medical record, I expect decrease in the medical errors which mostly in our case results from unclear physicians hand writing that interpreted by nurses in wrong drug or dose.

To summarize, management members and administrators had broad expectations of e-health. They expected e-health will improve system efficiency, the work environment, staff and patient satisfaction, service quality, and the ability to exchange patient information. Preventing duplication, minimizing patient waiting times, providing accurate and timely information, decreasing paper work, reducing stress, smoothing the flow of patients and information, and making more effective use of resources were also seen by managers as areas in which they expected e-health to have a profound impact.

4- Healthcare professionals' expectations: Healthcare professionals’ expectations of e-health can be depicted by the following anonymised extract from a focus group discussion in response to the question "What do you expect will be the e-health effect on your work and profession?"

--------: sure... it makes our work easy, save the time and effort and promotes the communication chances with other local health care facilities and applying the same systems and treatments protocols, and improve the professional culture.
Moreover it increase self confidence, feeling supported, helps us gaining the skills and experience, and better provision of services.

I can tell, everyone loves to learn if he finds an opportunity for that. e-Health is expected to provide us this opportunity for updating and development.

The patients also trust us more when they feel that our knowledge and skills are capable of solving his health problem.

As pharmacists...I expect it will be very helpful to us in term of organizing our work at the pharmacy, easy check of our stock, ordering our supply, searching information about medication, and minimize errors.

In my opinion e-health will help in organizing patient’s files that fasten the patient flow and the appointment system that give more time for patient’s consultation. These steps minimize the stress; positively impact our work result, and our professional satisfaction and development.

In addition, they believed that e-health would facilitate distance consultation, compensate for the shortage in certain specialties, provide a better work environment, and improve quality of information. Other expectations of physicians were that e-health would help in the wide distribution and use of medical "best practice protocols" which would standardize the process of chronic disease management. An interview participant hoped e-health adoption would promote the patient-medical staff relationship:

Absolutely, especially when the patient attends the clinic and the doctor uses the computer to access his full data without asking him to go back to the clerk to bring his file or to the laboratory to collect his investigations results...it will have a great positive effect on the patient and his family.

One central theme emerging from the data was the expectation that e-health would support distance learning, facilitate communications with other international health care professionals in their field, and increase confidence in their own skills.

We have no medical school or medical educational institutes; we finish our degree outside the country and then return back. Our knowledge and skills stop at that level. It is a big problem to feel yourself isolated, know nothing about what is new in your field. So, if e-health is implemented, it will be an excellent alternative for upgrading and continuous medical education.
A nurse in an interview described the current situation of the referral system and her e-health expectations:

*As an example, we have many problems regarding the referral system and feedback among the different levels of care, if it is governmental, NGOs, or UNRWA, there is no efficient communication as there should be. The referral system is poor and very weak in feedback. This is one of the main problems which we expect e-health would solve permanently.*

Overall, stakeholders uniformly expected that adoption of e-health could create a more productive workplace environment. They expected introduction of e-health to be very positive for patients, the public, healthcare organizations, and care providers.

The section which follows focuses on the research questions from the perspective of each of the individual case reports.

**SECTION IV: CASE REPORTS**

In this section, specific results are presented for each case. Perceptions of the facilitators and barriers that may contribute to the future planning and implementation process for e-health were explored. Finally, the e-health solutions are identified that would best serve the needs of the target population.

**Case One: The European Gaza Hospital (EGH)**

**INTRODUCTION**

This report examines the readiness of the European Gaza Hospital (EGH) and its stakeholders to adopt e-health. EGH is a distinguished medical center and considered the best hospital in Palestine in its facilities, services, and human resources. Periodically EGH receives international medical teams in different specialties to consult on difficult
cases and perform fine surgeries; this both solves clinical problems for patients and provides training for Palestinian medical staff. Data were collected between September 9 and October 15, 2005 from five interviews and two focus group sessions.

READINESS FOR E-HEALTH

*Stakeholder's technological literacy and familiarity with e-technology*

Use and familiarity with e-technology is an important component of readiness to adopt e-health. The hospitals staff are regularly exposed to training programs in different areas, particularly ICT programs. To assess this issue, the following questions were asked of both focus group and interview participants: Are you using the computer/Internet? How often? Is it related to your work/profession/your medical condition/other reasons?

Seventeen participants from EGH participated in the process of data collection, five in interviews and six in each of the two focus groups. Table 6.5 shows the responses of participants to these questions. The data shows that among the EGH stakeholders, computer and Internet use is common, with the majority being daily users of the technology for issues related to their work, profession, and other general use. This factor works in favour of e-health readiness and is an excellent facilitator to e-health adoption. Only one participant did not use the computer and Internet and the reason was:

"I do not know how to use it even though I have a computer at home. Also I have no time to learn. My kids use the computer in their study and e-mail".
<table>
<thead>
<tr>
<th>Stakeholder Participants</th>
<th>Use of Computer and Internet</th>
<th>How Frequently</th>
<th>Why and Where Use the Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital management (organization) participants</td>
<td>Yes 3 out of 3</td>
<td>Daily</td>
<td>They agreed that they use computers and Internet at work and homes to do their job, preparing statistics and reports, entry and storage of patient data, to update themselves about advances in the field, and to read the news and communicate by e-mail.</td>
</tr>
<tr>
<td>Healthcare professional participants</td>
<td>Yes 10 out of 10</td>
<td>Daily</td>
<td>They indicated that they use computers and Internet at work and homes to update their knowledge and skills in their field, to prepare educational material for lectures and presentations, to consult their colleagues when facing a difficult case in their field (by sending patient information by e-mail), communication, and entertainment.</td>
</tr>
<tr>
<td>Public participants</td>
<td>Yes 2 out of 2</td>
<td>Daily</td>
<td>They use computers and Internet at work as part of their jobs and at homes for communication (e-mail) and reading the news.</td>
</tr>
<tr>
<td>Patient participants</td>
<td>Yes 1 out of 2</td>
<td>Daily</td>
<td>The patient used computers and Internet at work as part of his job and at home searching general topics, for communication (e-mail), to read the news, and entertainment.</td>
</tr>
</tbody>
</table>

Table 6.5: Interview and focus group participant knowledge and use of computers and the Internet
Technological Readiness

Technological readiness was viewed by a participant as:

...the backbone and basic requirement for any healthcare organization to step forward and adopt e-health. It is important to have a certain level of technological readiness in order to participate effectively in an e-health program.

At the time of the study the technology implemented in EGH included: 165 computers, 20 printers, 20 working modems in hospital departments, 6 servers, a network capability at 100MB/s, a videoconference unit, telephone lines, Internet connections, faxes, five television video sets, and digital cameras. Moreover, the hospital had a resource centre that included computers, Internet lab, modern library, and access to books and journals through their website.

They also had a medical educational system connected to Al-Azhar and Al-Qudes Universities plus an educational program with the Palestine College of Nursing. According to the hospital technology department manager, the hospital systems were 80% computerized. The patient services department, the pharmacy, and medical laboratory were fully computerized. Network connections and servers were available in EGH whereby physicians could view a patient’s medical files and investigations on their computer. The problem, as described by a physician interviewed was:

I think we are ready in term of technological infrastructure here in the EGH, but unfortunately the other hospitals are neither ready in infrastructure nor in education/training. This prevents them from sharing information and exchanging patient data.

Therefore, despite availability, use of videoconference facilities was limited to the transferring of lectures to students in the faculty of medicine at Al-Quds University in the West Bank, minimizing the benefit of the EGH infrastructure.
Participants identified staff training and awareness as another factor contributing to technological readiness. They also thought that providing examples of e-health applications to the hospital staff, patients, and the public would be helpful in e-health acceptance as indicated in focus group comments:

-------: Many of our employees do not know what e-health is, others think it is only Internet. By awareness they’ll know the exact picture, the technical component and e-health potential which will let them behave differently.
-------: If you look for something that can promote technological and overall readiness and facilitates the e-health implementation, I can tell you it is the training and awareness.

Language, access to, and the cost of Internet connectivity were seen as impeding factors for stakeholder technological readiness.

Management (Organizational) readiness

Data regarding organizational readiness was collected through the participation of the hospital managers and administrators in interviews and focus group sessions. These data demonstrated the presence of 'core readiness' identified by recognition of needs, dissatisfaction with the current situation, and a willingness to change. Participants described the need for e-health for improving performance of their organization and promoting their ability to provide better services (administrative and clinical) to the population by changing the way care is delivered. They emphasized the need for networking, communications, and better decision-making for patients.

"The referral system is weak between the primary and secondary level of care, with neither patient information exchanges nor feedback. So the duplication of services is dominant in the system. All these problems lead to delay in decision, frustration for patients and physicians, and more errors. I think e-health can eliminate these problems and improve the work environment."
Engagement readiness was also demonstrated by the data. Participants showed an ability to match their needs with e-health applications, and also questioned the options, potential applications, cost-benefit, and more. Moreover, they provided examples of enthusiastic members in the area of e-technology and they acknowledge available resources.

Despite the readiness expressed by the other groups of stakeholders, and the demonstrated technological readiness, few management staff felt that more work needed to be done to attain greater readiness. However preparing the staff, patients, and the public, and the absence of well prepared e-health training programs were concerns identified by management that would affect the level of organizational readiness and successful adoption and use of e-health applications.

"The hospital is ready in term of infrastructure and some training. We need to educate and raise awareness among the patients and public about e-health, it’s potential, and uses. Another point is that we need to train and educate the staff; frankly, we have many of them who know nothing about the technology and its applications. All this needs time, concentrated efforts and cooperation to be achieved".

Another interesting point raised by management participants was the need for written policies and protocols to address issues such as organizing the process, data management and storage, privacy, security, and other issues related to e-health applications. This view was expressed as follows:

"Despite the Ministry of Health and the hospital having a set of policies and regulations, it is not directly related to the technology use. This implies the need to develop this policy and protocols. Still who is responsible to develop this policy and how is a topic under discussion".

Funding and required resources was another issue discussed in both interviews and focus group sessions. This issue was seen by participants, especially the management
members, as a fundamental factor that would impact success and sustainability of e-health services.

Despite concerns raised by the management staff, organizational readiness for EGH was high. Core, engagement, and a certain level of structural readiness were also identified by the perceived need, appreciation of benefits, the presence of technological infrastructure, trained staff, and initiative in the area of e-health policies and regulations.

*Individual (healthcare professionals, patients, and the public) readiness*

**1- Healthcare professionals' readiness:**

The most obvious aspect of readiness expressed by informants was the real sense of need, based on the negative effect of isolation from advances in their field and dissatisfaction with the current situation. Especially relevant to the members of the physician's group was the need for continuous medical education (CME) as they may go for years without CME, or have to travel abroad to obtain it. A physician participant in an interview explained this situation:

...*after I finished my medical degree in 1992 I have not been exposed to any educational or training program. So my knowledge and skills stop at that level. It is hard to feel isolated; knowing nothing about what is new in your field. Medical websites on the Internet help me to refresh my knowledge. So, if e-health is implemented, it can be an excellent alternative for updating and continuing medical education.*

In addition, they showed a driving desire to be able to address locally the difficult or unresolved health problems of patients. The study data also suggested that healthcare professionals go through a process where they actively engage with the idea of e-health. They asked questions about its applications, and expressed their concerns, hopes, and
fears about adopting such technology. Additionally, the participants noted the importance of a pioneer (champion) to shoulder the responsibility of promoting acceptance and use of e-health within the healthcare professional community. Few people in the practitioner community devoted extra time to learning about e-health, and encouraging acceptance of e-health through example, demonstration, and instruction.

Interaction between the practitioner groups and other stakeholder groups was found to be an important part of readiness for the healthcare professionals group to adopt e-health. Participants in interviews, confirmed by the majority of the focus group participants, expressed their frustration at the lack of cooperation and communication amongst different healthcare providers; for example, as evidenced by the earlier quotation of a nurse participant (page 102).

Previous experience and evidence of e-health applications in similar settings might affect a practitioner’s readiness, positively or negatively, in this process of e-health adoption. Some experiences elaborated from the interviews can be seen as good examples that benefit the potential for e-health.

*It is a dream for me to have e-health here in Gaza Strip like other countries. I used to benefit from its application when I worked previously in Saudi Arabia in consultation with physicians in United States in the area of histopathology, radiology, and patient consultation. If implemented in Gaza, we can expect to solve many of patient’s problems quickly without the need for travel and compensate the shortage in some subspecialties.*

A few participants in the focus groups raised concerns that e-health applications would be an add-on to their already busy schedules, but overall they expressed their willingness to use e-health if it reduced their workload and facilitated service provision. Following is part of a focus group discussion that reflects different views:
If it is going to be helpful to us in laboratory in reducing the waiting time to receive the result of the sample we send, we will be the first in cooperating and using this technology.

I could speak for myself; in nursing we have heavy workload and responsibility, if this e-health technology brings more work I doubt we could be ready to enter data on computer and do other stuff.

It could be time consuming but it will add value to delivered healthcare.

In conclusion, it was evident that EGH healthcare professionals possessed clear core, engagement, and structural types of readiness.

2- Patient readiness:

Patient readiness for e-health was investigated through the participation of patients in both interviews and focus groups. In addition, participants from other stakeholder groups acted as surrogates and engaged in addressing the concerns of patients. The data collected for this particular stakeholder group were rich with examples of needs resulting from the isolation created by the political situation. It was noted that patients are dissatisfied with the lack of access to information regarding their health conditions, beyond that which is currently offered by local doctors. They also expressed the constant need to endure considerable emotional, physical and financial distress having to either wait through long periods to receive an accurate diagnosis or travel abroad for diagnosis, treatment, or follow-up care. The following is a description of an experience with travel abroad for treatment:

Travel to receive treatment for cancer in Egypt was very hard. It consumed a lot of time, effort and money. To be in a place where you do not know anybody and being away from your family with a fatal disease is something indescribable. I tell you I am not going to do it again even if I may die.
This kind of dissatisfaction and feeling of isolation (core readiness) indicates potential for acceptance and use of e-health by patients if adopted. For example, another comment on the potential of e-health to solve the problem of having to travel abroad for treatment directly also addressed this:

“If we offered an alternative can eliminate our suffering, the need to travel, and solve our health problems, why not?”

The patient took another step forward by asking for more information about e-health: what it is, what benefits could it bring, and how much it might help to resolve health problems (engagement readiness).

Focus group participants for other stakeholders confirmed this apparent readiness of patients to accept and use e-health applications. They believed this service will offer patients good opportunity to find faster solutions to their medical conditions, eliminate the travel burdens identified, and promote their confidence in the local healthcare services. Education and awareness were suggested by the group as tools to promote patient acceptance to e-health applications still more.

“One important task is to educate and raise the awareness of patients and the public. Their perception of the potential benefit of the e-health contributes remarkably to their acceptance and readiness. They are an important party in the process of e-health adoption.”

Of note is a nurse's astute observation that patients are an important part of the solution. Also important were other issues identified, such as a patient’s technical skill, and the affordability of these elements; both were raised by participants as determinants of both patient and public readiness for e-health.

Concerns were identified about privacy, equipment safety, security of information on the Internet, and the impact of cultural traditions and beliefs. How these factors might
affect patient readiness to accept e-health was explored during interviews and focus groups. Different points of view arose regarding the issue of privacy. The question posed was: Are patients ready to accept videoconference as an alternative method of handling their health problems? Participants responded:

“Sure...if this help in solving his problem and with assurance of his privacy and confidentiality of his information; I am sure they will be happy.

Another response to the same question came from a nurse:

I think there are many factors considered when we want to answer this question such as the level of education, the gender, the cultural norm, his/her awareness about e-health, and the confidence in the staff working on this equipment.

Also, the focus groups addressed this issue:

**Interviewer:** As patients or public do you feel safe, secure, and comfortable to use the videoconference as a method of handling the health problems?

-----: It depend on his/her awareness of this method...

-----: I think our people are highly educated and open, they will accept it.

**Interviewer:** This means that you believe that patients accept to be seen on the screen and exposed to cameras? What if the patient is a female?

-----: Yes, even a female patient, she would accept that if she wants to solve her problem. It is a necessity not luxury.

-----: I have a different opinion; I think there are a lot of women in our society who are not willing even to remove their face cover when they visit a male doctor.

-----: Despite the presence of this kind of people I can tell we are open to the idea of e-health and to all ideas that offer a serious solution to our problems.

-----: But still not all because it is not easy to change this culture...it needs time...it needs time.

Overall, results demonstrated core and engagement readiness for patients.

**3-Public readiness:**

Data showed that public readiness to e-health was determined by dissatisfaction with the current situation, as well as by their need to access services not available locally
in order to resolve the medical conditions of their family members or relatives (core readiness).

Our society has the right to access advanced services and adequate information concerning the patients who do not have diagnoses or treatment for their medical conditions locally. Any solution that can bring a relief for our suffering will be welcomed, appreciated and acceptable.

Participants described dissatisfaction with the limited time available per patient and feeling that the information delivered by healthcare practitioners is not enough and sometimes not satisfactory to relieve their worry. Such data show how e-health applications might provide a more comfortable alternative for obtaining health information. In addition, they indicate that public readiness exists for use of e-health applications, especially educational applications to search for satisfactory information regarding their medical and health problems.

A physician participant in an interview when asked about public readiness for e-health applications commented: “Things have to change… people are willing to look at different ways of receiving services”.

Public members also wanted to know more about e-health, including its potential benefits, safety and security issues, confidentiality and privacy issues, thereby demonstrating ‘engagement readiness’. They also identified the need for more awareness sessions to increase the public’s readiness to adopt e-health. Challenges raised by participants that warrant careful consideration in future planning were: access to the Internet, accurate and reliable information, language, and technology familiarity.
**Overall EGH readiness**

The data indicate that there are different types and levels of readiness at the EGH. Besides a real sense of need (based on the imposed isolation, and dissatisfaction with the current situation), this readiness was promoted by the technological resources and infrastructure already available in the hospital, and by the highly qualified and experienced staff who operated the hospital. Also, the stakeholders were motivated by their perception of the high potential of e-health to address many of their problems. Overall, the readiness of EGH to adopt and use e-health applications was graded as “high”. Table 6.6 summarizes the types and levels of readiness found among EGH stakeholders.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>organization</strong></td>
<td>High</td>
<td>High</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Practitioners</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>- Patients</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>- Public</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The technological readiness is fairly high</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External environment</strong></td>
<td></td>
<td></td>
<td>Found to be supportive for e-health adoption</td>
</tr>
</tbody>
</table>

**Table 6.6: Types and levels of readiness found among EGH stakeholders**

Readiness, although assessed within the three "types" shown in Table 6.6, is composed of many individual components that can vary in number (up to ten) according to type of readiness. Using the proportion of components demonstrated in any single setting
provides a simple yardstick within a qualitative study by which to grade overall readiness. Thus, four grades were assigned as follow:

**High:** Graded when the majority of components for readiness were clearly present.

**Good:** Graded when more than half of components for readiness were clearly present.

**Fair:** Graded when half or less of components for readiness were clearly present.

**Poor:** Graded when one or none of components for readiness were clearly present.

**PERCEIVED BARRIERS AND FACILITATORS OF e-HEALTH**

Exploring and understanding the different factors that might facilitate or impede e-health implementation is crucial and necessary. Table 6.7 summarizes the responses of the participants about the perceived factors that might facilitate or impede e-health adoption. These factors reflected the prevailing political, socio-economic, cultural, and technological challenges and realities.

The respondents also suggested solutions to overcoming these barriers.

*Referrals of patients to get treatment abroad cost us around $100,000 US per year...this amount of money can build a complete system of e-health as a one-time investment that can be a saving in the long term. Another option is to look for external support from the international donating agencies, and I am sure we can find some who will be interested to help.*

Participants recommended international expertise for successful management of an e-health program in order to compensate for the lack of trained and experienced local staff.

Concerning resistance to change of some medical staff and administrators:

“At the beginning, surely you’re going to find this resistance to change from the old generation because they considered no need for this technology.”
<table>
<thead>
<tr>
<th>Perceived Facilitators</th>
<th>Perceived Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder awareness and education about e-health</td>
<td>Lack of sustained financial resources</td>
</tr>
<tr>
<td>Availability of needed resources (financial and others)</td>
<td>Lack of qualified, experienced, and trained staff.</td>
</tr>
<tr>
<td>Perceived need and benefits</td>
<td>Resistance to change</td>
</tr>
<tr>
<td>Cooperation and coordination among the different sectors</td>
<td>Cultural tradition and beliefs</td>
</tr>
<tr>
<td>Management commitment to change</td>
<td>Weak patient and public technical skills and the accessibility and affordability of technology</td>
</tr>
<tr>
<td>Adequate infrastructure and preparedness</td>
<td>Lack of stakeholder awareness</td>
</tr>
<tr>
<td>Administrative and technical support</td>
<td>Worry about privacy, safety, and information security</td>
</tr>
<tr>
<td>Public and patient cooperation.</td>
<td>Political situation in the Gaza Strip</td>
</tr>
<tr>
<td>Dissemination of success stories and experiences</td>
<td>Lack of policy, regulation, and protocols</td>
</tr>
<tr>
<td>Clear policy, regulation and protocols</td>
<td>Resistant to change (older staff)</td>
</tr>
<tr>
<td>Management - strong will</td>
<td>Lack of efficient technical support and maintenance</td>
</tr>
<tr>
<td></td>
<td>Language barrier</td>
</tr>
<tr>
<td></td>
<td>Israeli security ban on equipment</td>
</tr>
</tbody>
</table>

Table 6.7: factors perceived by EGH stakeholders to facilitate or impede e-health adoption

Reasons suggested included a lack of familiarity with the technology, and fear that their lack of technical skills would result in a loss of power and position. The suggested solution was to provide gradual training to increase their awareness, encourage them to engage in the process, to reassure them about their position, and to explain how their participation will help the organization.
It was suggested that patient concerns about privacy, safety, and information security could be solved by selection of highly qualified staff known to have high scientific and ethical standards to run the e-health program. In addition, efforts could be made to assure patients by demonstration and experience, including the presence of clear policy and regulation.

The Palestinian political situation and isolation of Gaza Strip was also perceived as a concern. Thus it is possible that the Israelis may prevent required equipment from being allowed into Gaza hospitals citing security as their rationale for such a decision.

One of the management staff mentioned previous experience in similar situations:

*From my position and experience, I can tell that the Israeli occupation is the major barrier of technology implementation. There is a ban applied on many types of equipment. With pity, I say that our choices of the system and equipments are determined by the Israeli occupation. They even prevented us from importing e-health microscope for histopathology.*

In sum, the facilitators and barriers identified, although termed ‘perceived’, are likely to be those that in reality impact the process of e-health adoption and successful implementation. Each should be considered seriously and studied well, before stepping forward in the process of implementation.

**e-HEALTH APPLICATIONS PERCEIVED TO BEST SERVE THE NEEDS OF EGH STAKEHOLDERS**

Although the respondents varied in their opinions as to which e-health applications would best serve the needs of the Palestinian population in the Gaza Strip, they agreed that e-health had great potential to relieve many of the healthcare system’s pressing problems, and to improve the quality of the care provided to the population.
Based upon the participants’ commentary, the e-health applications perceived to best fit the real needs of EGH stakeholders are: educational applications, followed by clinical applications (in particular tele-consultation). This ranking is explained by the strong desire of healthcare professionals to update their knowledge, and establish relationships with the international academic and medical community. The expanding number of cases referred for treatment abroad, consuming a large portion of the MOH budget, also beckons for clinical e-health solutions. Some e-health applications, such as administrative and electronic medical record capability, are already in use.

**Case Two: Nasser Paediatric Hospital (NPH)**

This case report examines the readiness of stakeholders from the Nasser Paediatric Hospital (NPH) to adopt e-health. Data were collected between November 16 and November 29, 2005 from five interviews and one focus group session. Fifteen participants from NPH participated in the process of data collection. Five informants participated in the interviews and ten in the focus group session.

**READINESS FOR e-HEALTH**

*Stakeholder's technological literacy and familiarity with e-technology:*  

To assess this issue, the same questions as for EGH were asked of both focus group and interviews participants: ‘Are you using the computer / internet’? ‘How often’? ‘Is use related to your work / profession / your medical condition / other reasons’? Responses to these questions are shown in Table 6.8. Computer and Internet use was not uncommon among NPH stakeholders.
<table>
<thead>
<tr>
<th>Stakeholder Participants</th>
<th>Use of computer and Internet</th>
<th>How frequently</th>
<th>Why / Where Use the Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Management</td>
<td>Yes</td>
<td>Daily</td>
<td>The hospital management members use computers and Internet at work for reports, statistics, and searching study materials for courses. Also, they use it at home to update themselves, to read the news, and communication (e-mail).</td>
</tr>
<tr>
<td>Healthcare professionals</td>
<td>Yes</td>
<td>8 out of 10 daily 2 out of 10 twice per week</td>
<td>All agreed that they used the computer and Internet at home to update themselves, searching materials and literature to study for specialization, prepare lectures and presentations materials, e-mail communication, and entertainment.</td>
</tr>
<tr>
<td>Public</td>
<td>Yes</td>
<td>Daily</td>
<td>The public member indicated use of the computer and Internet at work all the time as part of the job. Also, at home for searching women websites, communication (e-mail), and kids education.</td>
</tr>
<tr>
<td>Patient</td>
<td>Yes</td>
<td>Daily</td>
<td>The patient member used the computer and Internet at work all the time as an office administrator and at home for communication by e-mail.</td>
</tr>
</tbody>
</table>

Table 6.8: Interview and focus group participant knowledge and use of computers and the Internet (NPH)
Technological Readiness

The technology implemented in NPH included: Five computers, one printer, a videoconference unit, telephone lines, high-speed Internet connection, faxes, and a television and video set.

The majority of the participants in interviews and the focus group cited the lack of basic technological infrastructure (such as networks, computers, trained personnel, technical support, and polices and regulations) as the primary hurdle for e-health adoption. Even though NPH had a videoconference set, they were unable to use it due to a lack of experience and technical skills. A participant in an interview described this issue:

*We are suffering from the lack of technological infrastructure; the hospital only has four or five computers. We have the telemedicine set but we never succeeded in using it. We need a lot of stuff.*

The need for a certain level of technological readiness was also raised by focus group participants in their discussion, especially in recognition of NPH as an educational hospital for Faculties of Medicine at the universities in Egypt. Participants identified training and awareness of e-health applications as necessary for hospital staff, patients, and the public. Lack of financial resources, the centralized decision system, and access and cost for Internet connectivity were other factors raised by all informants as influencing technological readiness.

Participants indicated it was hard to anticipate the state of technological readiness at NPH would improve in the short term, but they hoped that within a couple of years they will move to a new hospital facility, now under construction, where computer networks will be included as part of the basic infrastructure. The only encouraging factor
in the current NPH situation was the high literacy and familiarity with technology and its use by all participants.

*Management (Organizational) readiness*

Core readiness, formulated by feelings of dissatisfaction, professional isolation and willingness for change, was expressed by all management members. The following comment explained the situation:

*We need the technology for improving the hospital’s performance and increasing the ability of administrative and clinical systems to provide better service to the people. We not satisfied doing reports and statistics manually.*

The management members of NPH engaged enthusiastically with the idea of e-health, questioning various aspects, and looking for the e-health application that might address their problems (Engagement readiness). Organizational structural readiness seemed to be absent in NPH, with none of its components clearly identified.

*Individual (healthcare professionals, patients, and the public) readiness*

1- **Healthcare professional's readiness:**

In reviewing the collected data, the most obvious form of readiness expressed by informants stemmed from a real sense of need (through the negative effect of isolation, preventing access to new advances in their field), and a resulting dissatisfaction with the current situation.

*The opportunities for specialization is very scarce and the conditions not helpful. If you, as a physician, decide to travel for postgraduate study... you have two options...to take vacation without pay or to resign your job. e-health can provide us with updating and education without taking these risky steps.*
In addition, they showed a particular need to address difficulties in tackling unresolved health problems of local patients.

...shortage in the diagnostic aids and equipment limit our ability to solve some of patient’s problems such as difficult cases and rare diseases, which oblige us to refer these cases for treatment abroad. This disturbs the patient’s confidence in the medical staff. The presence of e-health application such as distance consultation will help in resolving some of these problems

Participants also expressed willingness to interact with other hospitals and medical institutes internally and externally, especially since the hospital is recognized as an educational hospital. They pointed out that although initiatives in this direction take place, they are seen only by a few people, and also gave the example of how people cooperated and financed the connection of the library to the Internet, and undertook other activities in the area of technology application.

Literacy and familiarity with technology use was clear for NPH healthcare professionals, all health workers reported having used the Internet or a computer. One nurse described the effect of Internet use on his professional life:

*The use of computer and Internet helps me too much in preparing the educational material which I present to nurses in the hospital. This improves my readiness in term of recent information in nursing field*

It was evident that NPH healthcare professionals possessed core and engagement types of readiness as individuals, but the lack of training programs, access to technology, and needed resources affected their structural readiness. The healthcare professionals indicated their hope that when a clear plan was formalized, they would be able to get donations to fund and support e-health adoption.
2- Patient readiness:

The readiness of patients for e-health was also investigated through patient participants and the respondents from other groups engaged in addressing patient concerns. In spite of different views expressed in the focus group discussion, participants confirmed that patients seem to be ready to accept and use e-health applications.

The components of core readiness were revealed from the comments of a respondent, with a Master in Law, who was a father of a child with cancer and experienced the process of referral for treatment abroad.

_The process of disease diagnosis and the helping facilities is very poor and frustrating, which gives one no choice other than traveling abroad. Traveling abroad is like traveling to hell, it is a big suffering to the patient and his family: psychological, physical, and financial. The presence of the e-health technology is great idea and I encourage it strongly hoping it brings the changes we need. It will help in quick diagnosis, prevent complications and save time, effort, and money._

Patients appreciated the idea of using the Internet to access more information about their medical conditions if recommended by their treating doctors. The healthcare professionals in the focus group also supported this idea, and saw it as a helpful aid to understanding physician’s instructions, as well as providing information to raise health awareness and promote cooperation with health workers. Informants in the focus group discussed the issue, sharing different views as exemplified by part of a conversation:

------: I believe the use of website by patient to know about his/her disease is helpful for us in terms of the patient being more cooperative.
------: This is a good idea if these websites become accessible by patients.
------: Also, this issue promotes the patient’s confidence in us
------: As a physician I have some worry about this issue, we should be a bit cautious as a patient may misunderstand some topics related to his health. I can’t deny it is a good idea, but only after patient is educated about this use and he is made to understand that not all what he reads is necessarily his case.
Focus group participants recommend patient education and awareness about e-health to be incorporated during planning of services in order to promote acceptance of these applications. Access, cost, and language were identified by patients and healthcare professionals as factors that affect patient readiness. Privacy issues were also a potential concern, and respondents suggested solutions such as patient education and awareness, developing policies and regulations to control the process, and signing of an oath of confidentiality by healthcare employees.

3- Public readiness:

Similar to the patient and other groups, the data gathered indicated that the public shows readiness to adopt e-health. Public readiness was shaped by their prevailing dissatisfaction with current services, the perceived potential e-health benefits, and their desire to improve the services delivered and compensate for the shortage in hospital diagnostic capabilities. The perceived benefits of e-health were described by the public member:

*Using this technology might solve the problem of diagnosing the difficult cases, minimize the need to travel, improve the experiences and educate the medical staff. I follow shows around the use of technology in TV; it is wonderful, amazing what this technology can contribute to the health sector development. Frankly, our medical staff need a lot of development, updating and to follow-up the recent in medicine world.*

Similar to patients, the public accepted the use of Internet as an alternative to obtain health information. The focus group participants also confirmed these views, and suggested other family members (e.g. son or daughter) who have the technical skills necessary could help those who do not have access to such information. The group also
stressed the need for public education and awareness about e-health and saw this as an effective tool to improve public readiness. Issues of privacy, safety, and information security were seen as factors where greater awareness could improve public readiness.

Public members also inquired about e-health benefits, safety, applications, and the types of problems addressed by its use, demonstrating engagement readiness. Challenges for public readiness were identified as language and lack of familiarity with the technology, both of which should be considered in future planning.

*Overall NPH stakeholder's readiness*

In the NPH case, the organizational and individual readiness for e-health adoption was demonstrated by the presence of two types of readiness (core and engagement). The basic technological infrastructure needed to adopt e-health was poor and not helpful. Other factors of concern are staff training, funding, and policies and protocols. The readiness of the NPH to adopt and use e-health applications was graded as "fair" (see criteria on pg. 115). Table 6.9 summarizes the types and level of e-health readiness.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Practitioners</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>- Patients</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>- Public</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
<td>The technological readiness is fair</td>
</tr>
<tr>
<td>External</td>
<td></td>
<td></td>
<td>Socio-cultural factors seem to be in favour of e-health readiness</td>
</tr>
<tr>
<td>environment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.9: Types and levels of readiness found among NPH stakeholders
PERCEIVED BARRIERS AND FACILITATORS OF e-HEALTH

Table 6.10 summarizes the responses of informants to questions about the perceived factors that might facilitate or impede e-health adoption. Perceived facilitators and barriers are listed according to their frequency of response to the question. The first in the list had the higher frequency.

<table>
<thead>
<tr>
<th>Perceived Facilitators</th>
<th>Perceived Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Adequate infrastructure and preparedness (technological)</td>
<td>- Inadequate financial resources</td>
</tr>
<tr>
<td>- Management commitment to change</td>
<td>- Lack of infrastructure</td>
</tr>
<tr>
<td>- Presence of trained and technical staff</td>
<td>- Resistance to change</td>
</tr>
<tr>
<td>- Sufficient financial resources</td>
<td>- Unaware management, staff, and people</td>
</tr>
<tr>
<td>- Raised stakeholder awareness and education about e-health</td>
<td>- Lack of qualified, trained, and experienced staff.</td>
</tr>
<tr>
<td>- Follow up, result evaluation, and support</td>
<td>- Unfriendly user technology</td>
</tr>
<tr>
<td>- Presence of team leader (champion)</td>
<td>- Lack of interest or perceived need.</td>
</tr>
<tr>
<td>- Understanding of e-health potential by policy makers</td>
<td>- Cultural factors and privacy</td>
</tr>
<tr>
<td>- Good results support future applications</td>
<td>- Lack of management support</td>
</tr>
<tr>
<td>- Step by step introduction of applications</td>
<td>- Administrative bureaucracy</td>
</tr>
<tr>
<td></td>
<td>- Current political and economical situation</td>
</tr>
</tbody>
</table>

Table 6.10: Factors perceived by NPH stakeholders to facilitate or impede e-health adoption

Respondents also suggested solutions to overcoming some of the barriers identified such as:
- Concentrated effort to raise the stakeholder awareness and readiness,
- Training and staff preparedness with technical skills, and
- Circulation of successful experiences from a similar setting.

e-HEALTH APPLICATIONS PERCEIVED TO BEST SERVE THE NEED OF NPH STAKEHOLDERS

Informants had different perceptions about this issue, each informant having his/her reasons for ranking the e-health applications. For example, the participant who ranked clinical applications highly focused on its benefits in addressing difficult cases which need referral abroad for diagnosis and treatment. In addition, this individual also ranked highly e-health’s potential to provide CME, experience, and interactions with other medical institutes and hospitals. It was mostly healthcare professionals that were in favour of these applications and who also supported the electronic medical record application. In contrast, the desire of management stakeholder’s was to adopt all applications in one package; their reasons as explained were:

... We are in needs for all e-health applications. Education is needed, research activities also needed, it is an important ingredient in the development, and also administrative application especially electronic medical record. We are poor in advanced diagnosis facilities so we need the consultation. No preference of one over another, all of them go in parallel and serve each other.
Case Three: Al-Awda Hospital

This case report examines the readiness of Al-Awda Hospital and its stakeholders to adopt e-health. Data was collected between November 9 and November 21, 2005 from five interviews and one focus group session. Eleven informants participated in the process of data collection; five informants participated in the interviews and six participants in the focus group session.

READINESS FOR E-HEALTH

Stakeholder's technological literacy and familiarity with e-technology

The same questions as for EGH and NPH were asked of both focus group and interview participants: “Are you using the computer / Internet? How often? Is it related to your work / profession / your medical condition / other reasons?” Table 6.11 shows the responses of participants to these questions.

Three participants out of eleven were non-computer /Internet users. Their reasons, as stated by the participants, were:

“The reason behind not using it (even I have a computer at home) is the lack of time. I am a mom and I have kids and home responsibilities besides my work”.

“I do not know how to use it, and I am a house-wife. We have a computer at home and my kids (university students) are using it”.

The data suggested that although some segments of the community may not be familiar with the new technology or understand its importance in healthcare, most people were already immersed in the computer lifestyle that relies heavily on technology to facilitate global communication and information seeking.
<table>
<thead>
<tr>
<th>Stakeholder Participants</th>
<th>Use of Computer and Internet</th>
<th>How Frequently</th>
<th>Why and Where Use the Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital management (organization)</td>
<td>Yes 2 out of 2</td>
<td>Daily</td>
<td>The management members indicated that they use computers and Internet at work for reports, statistics, financial and resource matters, contact with equipment manufacturing companies for maintenance and materials, and communications. Also, they use the Internet at home to read the news, searching web pages and e-mail.</td>
</tr>
<tr>
<td>Healthcare professionals</td>
<td>Yes 4 out of 5, No 1 out of 5</td>
<td>Daily</td>
<td>They use computers and Internet at home in issues related to their profession, updating their knowledge and skills, communications (e-mail), and entertainment.</td>
</tr>
<tr>
<td>Patients</td>
<td>Yes 1 out of 2, No 1 out of 2</td>
<td>Twice per week</td>
<td>The patient used computers and Internet at home for kid's education, searching educational websites, communications, and entertainment.</td>
</tr>
<tr>
<td>Public</td>
<td>Yes 1 out of 2, No 1 out of 2</td>
<td>Twice per week</td>
<td>Use the computer and Internet at home for following the news, communication, and entertainment.</td>
</tr>
</tbody>
</table>

Table 6.11: Interview and focus group participant knowledge and use of computers and the Internet (Al-Awda)
Technological Readiness

The technology implemented in Al-Awda hospital included: Telephone lines, high-speed Internet connection, faxes, two television sets, video and digital cameras, and three computers located in administration offices. According to the hospital director, Al-Awda hospital has plans to fully computerize the system over the next three years.

Lack of technological infrastructure to adopt e-health, trained staff, resources, and high cost were seen by participants in the interviews and the focus group as a concern to readiness to adopt and implement e-health.

The technological infrastructure for e-health is our main concern. It is a big issue for us. We need the network connection; the computers, the videoconference set, and other equipment are costly. Also, we cannot forget the need for training our staff to use this equipment. What we have now are three computers, a fax, and telephone lines. I do not think this is enough to establish this program.

A potential solution to combat high costs associated with setting up the necessary infrastructure was proposed by an interview participant:

Well, I think that we can solve the problem of the high cost of a network connection by seeking funding from international donating agencies through the international cooperation department at the Ministry of Health. Also, we can share the resources and cooperate with other health organizations to overcome this problem.

Absence of staff training programs also contributed to the poor technological readiness of Al-Awda hospital. The only factors that worked in favour of technological readiness at this hospital was the stakeholder's literacy and familiarity with the technology and its use.

Management (Organizational) readiness

Strong indicators of the organization’s readiness to adopt e-health came from the hospital management indicating their awareness of the solutions offered by e-health, as
well as by their perception of need to introduce changes to the services that keep them competitive. The following comment explains the idea:

> We try our best to keep the services provided by the hospital high in quality and competitive in price to keep these financial resources supporting the hospital’s work, otherwise, we should look for another area of activity. We suffer a lot from missing data and information, especially the patient’s files. We seriously think of e-health as an option that will help to maintain our quality of services and solve these problems and others such as documentation, and archives.

The presence of innovators or pioneers to facilitate the process of technology uptake was acknowledged by the management interview participant and promoted by a focus group participant who said: “We need a type of people who are knowledgeable in this area to start the initiative and guide the process of implementation”

Beyond upon this, organizational readiness was recognized to need infrastructure, trained staff, technical support, other facilities ready to be connected, and policies and regulations to organize the use. Unfortunately, data indicated that Al-Awda hospital lacked these requirements.

*Individual (healthcare professionals, patients, and the public) readiness*

1- **Healthcare professional readiness:**

The most obvious form of readiness of Al-Awda hospital informants was ‘core’ readiness. Healthcare practitioners expressed their feeling of isolation and dissatisfaction with the current static situation which limits their access to opportunities for upgrading and CME, and creates conditions that necessitate expensive travel to upgrade their skills. The scarcity of medical journals, magazines, and research articles worsened their inability to upgrade and seek information in their fields. Absence from work for travel
abroad to attend courses or pursue postgraduate studies could cost the practitioner their job. Further the practitioner may sometimes be prevented by Israel from crossing the border citing security reasons.

Practitioners also identified the needs of the public and patients in terms of shortages or the complete unavailability of some subspecialties thus creating the need for patients to travel to neighbouring countries for specialized treatment. Practitioners also considered this to contribute to a loss of patient confidence in the services provided locally. Conditions like these were viewed by healthcare professionals to be a source of frustration that promoted their readiness to participate and succeed in the implementation of e-health. Their enthusiasm to make changes was expressed frankly in the interviews and confirmed by the focus group participants.

*We are quite dissatisfied with the current situation. We are always facing problems with nervous patients circling around many health care facilities and private clinics looking for solutions to their health problems. They usually are asking for referrals to be treated abroad. Our practice becomes very difficult and frustrating. The current situation must be changed and we are going to be in the front line of this change.*

The healthcare professionals were actively engaged with the idea of e-health, as demonstrated by them asking questions of what e-health could do, and by expressing their concerns about adopting such technology (engagement readiness). The following comments were part of the focus group discussion:

-----: *I think most of us do not know about e-health until we attended your presentation. So, we need to learn more to understand better how it is working?*

-----: *We want to see it in action and how it is applied to our problems.*

-----: *How could I find more literature about e-health?*

Moreover, the focus group discussion outlined the importance of awareness, training, and demonstration by example, to provide evidence of the utility of e-health:
------: I want to give you example about the importance of demonstration. I had an ECG on the phone, if someone talked to me about that I wouldn't believe it, but because I was exposed to such an experience, I know how amazing it is. It is so helpful if it is used in the hospitals. For example, if you have Electro Cardiogram (ECG) for a patient and you have no idea how to read it, in this case, you can send it to the cardiologist, who is going to send you back; see how much you save the patient time and referral travel to another center, how much support and confidence you have, beside the good opportunity to learn and build good relation with other colleagues.

In general, healthcare professionals at Al-Awda hospital showed strong core and engagement readiness but their structural readiness was faint.

2- Patient readiness:

The data for this particular group contained examples of perceived needs that resulted from the geographical isolation created by the political situation. It was noted that patients were dissatisfied with the lack of access to information about their health conditions, as well as by the burden (financial, emotional, and physical) incurred by traveling abroad for diagnosis, treatment, or follow-up care. In an interview the patient participant recalled their experience with travel abroad:

Oh my God... it was a very hard trip, costly and a lot of suffering from the beginning to the end. To cross the border from Gaza to Egypt, you need at least 10 hours waiting under summer sun or winter rain to allow you to cross. Many times the border is closed by the Israelis for political reasons for many days or even weeks... come and see thousands of people waiting on the Egyptian side to cross to Gaza. Old people, women, kids, patients, students, and visitors are staying, waiting for the opening of the check point without any basic needs. What do you need me to say...It is terrible to be sick and exposed to these circumstances. It is better to die at home than endure this suffering and the costs.

This kind of dissatisfaction, aside from complaints about traveling abroad, indicated the potential for acceptance and use by patients of e-health if it were adopted. The patient who participated in the focus group commented on the potential of e-health in solving the
problem of having to travel abroad for treatment. “If we were offered an alternative to eliminate our suffering, need to travel, and solve our health problems why not accept it?”

Patient concerns about their privacy, the security of information on the Internet, and the cultural traditions and beliefs were investigated as factors that could impede patient readiness. Different points of view arose in response to the question "if patients are ready to accept videoconference as a method of handling their health problems": A conservative point of view was:

*The first thing is the people are not aware about the e-health. Secondly, our society likes to keep their conditions secret...confidential. I do not believe they will trust the use of video camera or the Internet to dispense their complaint or show their pictures during a videoconference.*

The interviewer prompted the conversation by adding “even though they are assured and informed that this e-health application will be secure, safe, and keep the patient privacy and their information confidential.” The response was:

*In this case it is possible that they can use this technology, but still not all, because it is not easy to change this culture...it needs time...it needs time*

Another balanced point of view came in response to the same question from an interview:

*Sure...as Palestinian society, we have our own traditions and beliefs. If the organization has a good reputation and takes care of the patient’s security and privacy in this field, particularly the patient’s concern is that his condition must not be known by other people... I mean the patient privacy. So, any organization that deals with this technology must have credibility, but only experience will tell. At the end, traditions and beliefs have their effect but the patient forgives everything to be cured of his disease.*

A liberal point of view came from a female participant to the same question:

*This is the best thing. We find our country developing and becoming advanced by using the technology like other countries in the world. This is will benefit the people and patients. I have no problem to receive consultation through videoconference. I believe our society accepts this application, because they will benefit from it Yap... they all will accept it ...Yap even if they are women.*
3- Public readiness:

Similar to the patient and other groups, the study data showed that public readiness to e-health stems from their dissatisfaction with the current situation and the need to access services not available locally to resolve the medical conditions of their family members or relatives. The following comment illustrates this view:

*Palestinian people have the right to access advanced services and adequate information. For the patients who don’t have diagnoses or treatment for their conditions locally, any solution that can bring for them a relief for their suffering will be welcomed, acceptable and appreciated.*

Another participant in the focus group acknowledged the need and desire to change. They commented: “*Things have to change...the people are willing to look at different ways of receiving services*”. A strong sense of dissatisfaction with the current way of obtaining health information was expressed by this respondent. This state could promote the readiness and acceptance of the public for e-health applications as a source of information. One interview informant described the way people seek information:

*I see a lot of people phone the medical and health shows on the radio and television. Some of them do not want to go and see the doctor, they feel their condition does not need doctor visit; other seeks more information about their conditions and other just feel more comfortable to call*

The results suggested e-health applications could provide a more comfortable alternative for obtaining health information. In addition, they indicated there is public readiness to use e-health applications to search for satisfactory information regarding their medical and health problems. The public, similar to other groups, identified the need for more awareness sessions and education. Challenges mentioned for public readiness were the need for greater access to the Internet, more accurate information, language, and technical skills.
**Overall stakeholder’s readiness**

Excitement for e-health technology by stakeholders at Al-Awda hospital could be identified by their comments about perceived need, willingness to change, feelings of professional isolation, and dissatisfaction with the current situation. Despite the challenges of lack of basic technological infrastructure, the need for staff training, and policies, stakeholders were ready to accept e-health as a complement to existing services. Stakeholders were motivated by their perception of the high potential of e-health to overcome many of their problems resulting from the difficult political situation. In conclusion, the readiness of the Al-Awda hospital to adopt and use e-health applications was graded as "fair" (see criteria on pg.115). Table 6.12 summarizes types and levels of readiness found among Al-Awda hospital stakeholders.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>Individual</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Practitioners</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>- Patients</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>- Public</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td>The technological readiness is poor</td>
</tr>
<tr>
<td><strong>External environment</strong></td>
<td></td>
<td></td>
<td>Socio-cultural factors seem to be in favour of e-health readiness</td>
</tr>
</tbody>
</table>

*Table 6.12: Types and levels of readiness found among stakeholders (Al-Awda)*
PERCEIVED BARRIERS AND FACILITATORS OF e-HEALTH

Table 6.13 summarizes the responses of informants on the questions posed about factors perceived to facilitate or impede e-health adoption, listed according to their frequency in the informant’s responses to the question. The first in the list is the most frequent noted variable.

<table>
<thead>
<tr>
<th>Perceived Facilitators</th>
<th>Perceived Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Raise the level of awareness and education of stakeholders about e-Health</td>
<td>- Lack of sustained financial resources</td>
</tr>
<tr>
<td>- Recognize perceived need</td>
<td>- Resistance to change</td>
</tr>
<tr>
<td>- Sufficient financial resources/funding</td>
<td>- The fear of poor privacy, safety, and information security</td>
</tr>
<tr>
<td>- Coordinated efforts.</td>
<td>- Cultural tradition and norms</td>
</tr>
<tr>
<td>- Management commitment to change</td>
<td>- Lack of management commitment</td>
</tr>
<tr>
<td>- Adequate infrastructure</td>
<td>- Lack of stakeholder awareness</td>
</tr>
<tr>
<td>- Disseminate success stories</td>
<td>- Lack of trained, experienced staff to manage the project successfully</td>
</tr>
<tr>
<td>- Public and patient cooperation</td>
<td>- Political situation in the Gaza Strip</td>
</tr>
<tr>
<td>- The good reputation of staff engaged in e-health activities</td>
<td>- Lack of policy support</td>
</tr>
<tr>
<td>- Clear policy, regulation and protocols</td>
<td>- Unsupportive staff / colleagues</td>
</tr>
<tr>
<td>- Innovator / pioneer presence</td>
<td>- Unfriendly users of technology</td>
</tr>
<tr>
<td>- Administrative and technical support</td>
<td>- Lack of technical support</td>
</tr>
<tr>
<td>- Address privacy and confidentiality</td>
<td></td>
</tr>
</tbody>
</table>

Table 6.13: Factors perceived by Al-Awda stakeholders to facilitate or impede e-health adoption
Respondents also suggested solutions to overcome the potential barriers to e-health implementation. These were similar to those proposed by stakeholders from the other cases.

**e-HEALTH APPLICATIONS PERCEIVED TO BEST SERVE THE NEEDS OF AL-AWDA HOSPITAL STAKEHOLDERS**

Review of the collated data suggested the e-health applications that best fit the needs of stakeholders of the Al-Awda Hospital are clinical applications, followed by educational applications.

This ranking can be viewed as being supported by the majority of the participants, but other views existed. For example a few participants considered administrative applications as the most important:

*I think we should go with the administrative application first because I deeply believe that if the administrative system is upgraded, the other components of the system will be improve, and develop. In this case I am 100% sure that, this will reflect positively on the other activities. So the other applications of e-health will adopt easy and successfully after.*

Another participant suggested one package adoption:

*I believe these applications should not be separated. While I am conducting a medical consultation for my patient with medical centre abroad through videoconferencing, I am solving my patient’s problem and learning knowledge and skills in the same time. Also the patient information is stored on the computer, which makes it easy for me to prepare my statistics and make reports or conduct research. So, we can see that the e-health applications goes parallel, and if you start one you find yourself doing the others.*
Case Four: Sheikh Radwan PHC Centre (SRPHC)

This case report examines the readiness of stakeholders of the Sheikh Radwan Primary Healthcare Centre (SRPHC) to adopt e-health. Data were collected between November 25 and December 13, 2005 from five interviews and one focus group session involving eleven respondents; five of them participated in the interviews and six in the focus group session.

READINESS FOR E-HEALTH

Stakeholders’ technological literacy and familiarity with e-technology

Table 6.14 shows the responses to the same questions posed to other group and interview participants: “Are you using the computer / Internet? How often? Is it related to your work / profession / your medical condition / other reasons?” Two participants out of eleven were non-computer users. The reasons, as stated by the participants, were:

"Lack of technical skills and time to learn and use are the reasons behind not use of the computer and Internet"

"Lack of training opportunity to gain the technical skills is the reason behind not using the computer and Internet. I wish to learn and become a user of the computer and Internet"
<table>
<thead>
<tr>
<th>Stakeholder Participants</th>
<th>Use of computer and Internet</th>
<th>How Frequently</th>
<th>Why and Where Use the Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital management (organization)</td>
<td>Yes 2 out of 2</td>
<td>Daily: 1 Twice per week: 1</td>
<td>They use computers and Internet at home to search general topics and update their knowledge in management, as well as for entertainment, and e-mail communications.</td>
</tr>
<tr>
<td>Healthcare professionals</td>
<td>Yes 5 out of 7 No 2 out of 7</td>
<td>Daily:3 Trice per week: 1 Twice per week: 1</td>
<td>They use computers and Internet at home to prepare educational material, e-mail communication, searching general website, entertainment, and to update their knowledge and skills in their field.</td>
</tr>
<tr>
<td>Patient</td>
<td>Yes 1 out of 1</td>
<td>Daily</td>
<td>Use computers and Internet at work (part of job), and at home to read the news, search general topics, and communication by e-mail.</td>
</tr>
<tr>
<td>Public</td>
<td>Yes 1 out of 1</td>
<td>Daily</td>
<td>Use computers and Internet at work all the time as part of job and at home for communications (e-mail), reading news, and search different websites for general information.</td>
</tr>
</tbody>
</table>

Table 6.14: Interview and focus group participant knowledge and use of computers and the Internet (SRPHC)
Technological Readiness

The ICT implemented in SRPHC included: Telephone lines, fax, one computer, high-speed Internet connection, and a TV/video set located at the health education department. Technological readiness for e-health (upgrading to provide network capability, Internet connectivity, technical service support, trained staff etc) was not available nor expected to be so in the near future. Lack of infrastructure, negligence of primary healthcare centers, and the centralized health system were seen by the participants as major barriers for e-health, as the following comment indicates:

*The lack of technological infrastructure in our centre is devastating for any development dream. We understand and realize the difficult financial situation of the Palestinian MOH and the high cost of technology as a barrier, and expect this situation to limit our technical ability to e-health adoption in near future.*

An interview participant explained -with anger- the lack of basic technology needed:

*The most important thing for us now is a number of computers, internet connection, some training to start some technological change to improve the work environment. I do not think the ministry is unable to provide these stuff, they just fail to put the right priorities. They are focusing on hospitals and neglect the primary care centers.*

This need for basic technological infrastructure was also raised by focus group participants in their discussion, recognizing the MOH situation; one participant commented: “*We are not asking for sophisticated equipment like the hospitals, we clearly ask the basic needs*”.

Moreover, it was evident from the discussion that participants were aware of the financial resources required, and the high cost of equipment, as factors that influence technological readiness. Overall, the state of technological readiness at the SRPHC to adopt e-health is not viewed as encouraging and was categorized as "poor".
Management (Organizational) readiness

Data regarding organizational readiness was gained through the participation of the Center manager and administrators. Once again, this data indicated the presence of a real need for e-health services, as well as dissatisfaction and willingness to change (core readiness). Also the management members acknowledged the potential of e-health to address their problems, which demonstrated engagement readiness.

Individual (healthcare professionals, patients, and the public) readiness

1- Healthcare professional readiness:

Readiness of SRPHC healthcare practitioners for e-health adoption was assessed through their identification of need for technological change. This need was evidenced by expression of their feelings of professional isolation and dissatisfaction with the current unorganized work environment (core readiness). They were comfortable with the use of the technology e.g. computers and Internet, and most were technologically literate and familiar with the technology. A practitioner who participated in an interview described the staff need for e-health:

The idea of e-health is acceptable to all staff. We need it, understand its benefits, but its costly equipments and the MOH resources to support the implementation is questionable. In general I can tell that all healthcare workers love the development and have the acceptance, have felt the need, and acknowledge its benefits to our work.

Also, the need of e-health and appreciation of its benefits was confirmed by focus group session participants:
Our need to e-health is un-doubtable. So it will be acceptable...as we accept the cellular phone which sends messages and picture.

Most people have internet connection at home using it in e-mail, chatting, sending pictures. I think it will be accepted easily.

Our society is very flexible and open to new idea. Healthcare staff as part of this society is open to this new technology. We need it to improve our workplace and services.

We need it; it will help in addressing our problems, staff education, updating, system development, and more. Many of us unable to travel abroad for different reasons, here is the solution for this problem coming to your hands.

This strong expression of need for e-health, demonstrated high core readiness of SRPHC healthcare professionals. Participants also expressed their willingness to interact with local hospitals and medical staff in different healthcare facilities to improve the referral system, to provide quality services to patients, to exchange their experience and patient information, and at the same time to promote the practice and culture of healthcare professionals.

I hope e-health to be implemented nationally to improve the referral system with hospitals and facilitate the communication with specialists to solve the patient's problems and enhance the practice environment

2- Patient readiness:

The data collected for patient readiness showed the presence of core and engagement readiness. The patient interview was instructive, as they had experienced the benefit of using the technology. They were very excited about the potential of e-health to address patient needs, such as reduced travel plus savings in time, effort, and cost. The patient also expressed frustration and dissatisfaction with the current situation (describing an experience with the current inefficient system), and the need for change.

This system suffers very poor capabilities of disease diagnosis; they are treating the symptoms not the disease. I spent months circulating between different hospitals and private clinic without right answer. I lost the hope until I found the
website of a medical centre in Germany. I sent them reports, x-ray and pictures by e-mail and my problem solved within days. For these reason I feel how much this technology going to help not only patients but also the physicians. We need big changes in our system.

Despite the negative comments regarding the current system, this example showed the patient’s potential acceptance and use of e-health, if adopted.

Other participants raised issues of privacy, equipment safety, and security of information on the Internet, and the influence of cultural traditions and beliefs. Patients also expressed some fear concerning access to the Internet and its cost, in addition to the lack of the technical skill and website language. They considered these factors as constraints for their readiness.

3- Public readiness:

The data indicated that the public possessed core readiness to accept e-health. Similar to the patient and other groups, they perceived certain benefits and expressed their dissatisfaction with the current situation, and their willingness to see changes in the way services are delivered. The perceived benefits of e-health were described by the public as distance consultation, arranging of appointments to visit specialists, providing opportunity for health education to improve the publics understanding of health issues, minimizing the need for referral abroad, and more importantly updating and improving the knowledge and skills of the medical team. An interesting view of the general benefits of e-health was explained in the following comment:

...another benefit, adopting this technology will activate the market and provide new job opportunities to IT technicians and businesses. This is a good drive for technology diffusion and economic development help in improving our devastated economy.
The public also perceived that e-health will positively impact the healthcare system by decreasing waiting times, smoothing workflow, organizing patient files, improving quality of care, and optimizing use of resources. Similar to the patient the public view acknowledged the need for more information than that currently provided by health staff. The focus group participants confirmed this view and further suggested the involvement of the public in the process of future service planning and heavy engagement in future awareness sessions. They also suggested the use of demonstrations to help all stakeholders capture the value of e-health and thereby promote their readiness. Similar to the patient, challenges identified for public readiness were language and familiarity with the technology, issues considered as impediments to readiness.

**Overall SRPHC stakeholders’ readiness**

The data indicate that SRPHC exhibits a few indicators of core and engagement readiness at the individual level. The presence of this kind of readiness does not compensate for the lack of organizational readiness described above. Thus, despite the excitement of stakeholders for this technology, unfortunately, it is hard to think of technological change in SRPHC under prevailing circumstances, where many basic requirements are absent. The unstable political situation and weak financial resources of the Palestinian MOH make it unlikely the needed infrastructure can be established in the near future. Overall the readiness of SRPHC to adopt and use e-health is therefore graded as "poor" (see criteria on pg. 115). Table 6.15 summarizes the types and levels of readiness found among SRPHC stakeholders.
<table>
<thead>
<tr>
<th>Domains</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>Individual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Practitioners</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>- Patients</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>- Public</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td></td>
<td>The technological readiness is poor</td>
</tr>
<tr>
<td>External environment</td>
<td></td>
<td></td>
<td>Socio-cultural factors seem to be in favour of e-health readiness</td>
</tr>
</tbody>
</table>

Table 6.15: Types and levels of readiness found among SRPHC stakeholders

PERCEIVED BARRIERS AND FACILITATORS OF e-HEALTH

Table 6.16 summarizes the responses of informants to questions asked about factors perceived to facilitate or impede e-health adoption. These facilitators and barriers are listed according to the frequency of response to the question, with the first in the list being the most frequent response by participants.

The Participants also suggest solutions to overcome these barriers which, once more, were similar to those proposed in the earlier cases.
Table 6.16: Factors perceived by SRPHC stakeholders to facilitate or impede e-health adoption

<table>
<thead>
<tr>
<th>Perceived Facilitators</th>
<th>Perceived Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Raise stakeholder awareness and education about e-health</td>
<td>- High cost of infrastructure</td>
</tr>
<tr>
<td>- Management commitment and support for change</td>
<td>- Lack of qualified, trained, and experienced staff.</td>
</tr>
<tr>
<td>- Presence of trained and technical staff</td>
<td>- Lack of management commitment</td>
</tr>
<tr>
<td>- Sufficient financial resources</td>
<td>- Resistance to change</td>
</tr>
<tr>
<td>- Spread successful experiences</td>
<td>- economic, and political situation</td>
</tr>
<tr>
<td>- Raise understanding of e-health potential by policy makers</td>
<td>- Cultural factors (traditions and beliefs)</td>
</tr>
<tr>
<td>- Develop technical skills and enthusiasm among the young</td>
<td>- Lack of understanding, perceived need, and benefits</td>
</tr>
<tr>
<td>- Conduct of scientific research to clarify the picture</td>
<td>- Patient privacy and information confidentiality</td>
</tr>
<tr>
<td>- Examine cost effectiveness</td>
<td>- No clear plan or strategy</td>
</tr>
</tbody>
</table>

e-HEALTH APPLICATIONS PERCEIVED TO BEST SERVE THE NEEDS OF SRPHC STAKEHOLDERS

Informants differed in their perception of the best application, although each had their own rationale for selection. The majority of participants chose to adopt administrative applications considering their local healthcare centre problems. They saw this as the first step to organizing the system at their facility, and that thereafter they could move to another application. Focus group discussion also reflected this view with
administrative and educational applications predominating. The idea of adopting multiple e-health applications as one package was also raised.

CONCLUSION

The case reports are rich in valuable information worthy of being considered by cases management staff and decision makers in the Palestinian MOH. The information and perspective gained might provide many tips to avoid the risk of failure. Planners and policy makers could do well to listen closely and consider the concerns and suggestions of the various stakeholders before taking steps towards adoption and use of e-health.

In this chapter, the results of this study were presented in a descriptive manner. The next chapter (cross cases analysis) will provide further results analysis. In this process, commonalities and differences among the four cases will be highlighted, explained, and compared with the literature.
CHAPTER SEVEN: CROSS-CASE ANALYSIS

INTRODUCTION

This chapter presents a cross-case analysis of the four cases investigated, and draws conclusions regarding the e-health readiness of stakeholders in the healthcare system in the Gaza Strip. Guided by the research questions, the study conceptual framework, and the analysis model, it begins with examining the context, participant background, and perceived administrative problems of each case (general results). The cross case analysis also considers the four major domains presented in the analysis model (technological, organizational, individual, and external environment factors) plus the types and level of readiness, highlighting the commonalities and differences among the cases in the process, explaining and comparing the finding with the literature. Finally, the cross-case analysis focuses on the four aspects discussed in the cases (specific results) and is organized around the four research questions that guide this study, namely:

1) How ready are stakeholders to accept and implement e-health?

2) What ICT infrastructure needs exist?

3) What are the perceived barriers and facilitators to the e-health adoption?

4) What e-health application would best serve the need of the population?

The summary of findings presented provides an answer to the overall research question “How ready the stakeholders are in the Palestinian healthcare system in the Gaza strip to adopt e-health”.

GENERAL RESULTS

Context of cases:

Table 6.2 in the previous chapter summarizes the characteristics of the four healthcare facilities. Despite differences in characteristics, and other noted variables, all cases have been shown to have the same positive attitude towards e-health. The only characteristic that might distinguish the readiness and capability amongst cases to adopt e-health is the existing level of experience with ICT, which ranged from highly automated (Case 1) to not automated (Case 4). To a lesser extent, the hospitals may show more obvious readiness for e-health adoption than the primary healthcare center.

Governmental management of three cases (1, 2, and 4) would affect them similarly in terms of centralized decision making, scarce resources, and particular system problems. In comparison, Case 3 run by NGO’s gives the management staff more flexibility in decision making, although they experience the same scarce financial resources and Palestinian healthcare system problems. This situation clearly influences e-health adoption in spite of their perceived need and desire to change, as the decision is still the responsibility of higher officials in the MOH. Therefore the MOH higher official's attitudes may potentially influence the adoption of e-health despite appeared readiness of stakeholders.

This finding aligns with the literature where formalized and centralized organizations are known to be less likely to initiate innovation adoption and change decision, but are (ironically) better equipped to actually implement innovations (Rogers, 2003; Zaltman et al., 1973; Damanpour, 1991). Thus leadership vision and awareness of e-health potential are important factors for the decision to introduce e-health particularly
in Gaza Strip, since the decision to adopt or not will be centralized and usually will be the role of higher officials in the Palestinian MOH.

*Participant background:*

Demographics and participant characteristics were influential issues, and were also examined across all cases (Table 6.3). A review of the variables that determine these characteristics reveal that:

- The average age of participants across the four cases was 38 years. This age of the participants reflects the average age of hospital employees, and aligns with the general age distribution of the Gaza population (described earlier in chapter 2). This might favour e-health readiness and acceptance, because more youthful subjects are often less resistant to change, have greater personal ambition, are familiar with technology, and have greater ability to learn new skills.

- Study participants worked at their facility for an average time span of five and half years, which is sufficient time to understand a facility well, be aware of local work problems, be able to match facility problems with potential e-health applications, and to recognize e-health adoption barriers and facilitators. These advantages contribute effectively to raise e-health readiness.

- Out of fifty four study participants, twenty five of them were female, which fairly represents both genders and achieves balanced input.

- The study data was sourced from participant's representative of the majority of healthcare professions, and also provided the perspective of patients and public
members, increasing the credibility of data and making it more illustrative of organizational reality.

- Education level was highest at the European Gaza Hospital (doctorate 3, master 2, bachelor 12), and lowest at the Sheikh Radwan PHC (bachelor 10, diploma 1). The high level of education at the EGH compared to other facilities can be expected to enhance readiness for e-health adoption.

Collectively, these variables work in the favour of e-health readiness and adoption among the four cases.

Theories and models (theory of Reasoned Action (Fishbein and Ajzen, 1975), Innovation Diffusion Theory (Rogers, 2003), and Technology Acceptance Model (Davis et al, 1989)) and study findings (Kukafka et al., 2003; Venkatesh et al., 2003) suggest that individual characteristics are important determinants of adoption and implementation success. Demographic factors (e.g., age, gender), and factors more instrumental to human-technology interaction (e.g., computer experience and self-efficacy, level of education) directly and or indirectly affect attitudes, usage, and satisfaction (Agarwal & Prasad, 1999). The results of this study are thus consistent with these theories and findings regarding the importance of adopter (individual) characteristics in determining the readiness and acceptance of e-health.

*Perceived administrative problems across the cases:*

The major perceived administrative problems would be expected to be similar across the four cases, as all are influenced by the same healthcare system and prevailing
local conditions. Table 6.4 in the previous chapter summarises the major administrative problems identified in the four cases.

The Table shows that the four cases do share some common problems e.g. limited opportunities for staff upgrading (e.g. CME), and problems related to dealing with the public. However, differences exist except for EGH; other cases lack accurate and timely information, and suffer from a disorganized work environment, archives, and filing systems, as well as poor flow of patients. This in turn affects the attitude of people towards the facilities and their staff and at times leads to patient-provider clashes, and job dissatisfaction of health workers, particularly evident in Case 4 in the physician and administrator communities.

With respect to differences, Case 1, in addition to local problems (such as uncooperative staff for data entry), issues from outside their premises impact them too, such as a weak external communication network. On the other hand, for Case 4, the problems are limited to their own facility culture, such as a disorganized work environment, lack of an appointment system, and lack of technological infrastructure that could help in organizing patient files and data archives. The desirability of automating manual clerical tasks was one of the primary reasons for potential acceptance of e-health applications to increase efficiency and productivity.

Exploring these administrative problems in detail would help to determine exactly how the stakeholders in these facilities understand the problems, to what extent the perceived needs drive them to engage in the idea of e-health, and how they may be able to match their real needs with different e-health applications. In addition to know if these problems could be addressed by using e-health applications.
In the following section, cross-case analysis will analyse the study specific results by addressing the study research questions.

SPECIFIC RESULTS

Q 1: How ready are the stakeholders to accept e-health?

Study results demonstrated stakeholder readiness for e-health through the following aspects:

1) Stakeholders technological literacy and familiarity with e-technology:

Participant use and familiarity with the e-technology is known to be an important factor that contributes to readiness to adopt e-health. Readiness here is considered to be the degree to which technology has diffused into the daily activities of groups within the case, and the degree to which these groups were comfortable with the technology.

Table 7.1 summarises technology parameters for the cases. The data show that the majority of participants across the cases were computer and Internet literate, with most using the technology for work, and for professional or other general use, e-mail, and entertainment. The few who did not use computers or the Internet explained this as due to their lack of technical skills, time, or that they used someone else to do the job for them (thus benefiting indirectly from the technology).

Such broad technological familiarity works in favour of e-health readiness. Since the level of technology use among people is expected to increase in coming years, as schools in communities are equipped with computers in classrooms and the students are instructed in the use of technology, familiarity should continue to grow.
<table>
<thead>
<tr>
<th>Use of a computer and Internet</th>
<th>Case 1 European Gaza Hospital</th>
<th>Case 2 Nasser Paediatric Hospital</th>
<th>Case 3 Al-Awda Hospital</th>
<th>Case 4 Sheikh Radwan PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How frequently</strong></td>
<td>16 used it daily</td>
<td>13 used it daily</td>
<td>6 used it daily</td>
<td>7 used it daily</td>
</tr>
<tr>
<td></td>
<td>1 non-user</td>
<td>2 used it 2-3 times/week</td>
<td>1 used it 3 times/week</td>
<td>2 used it 2-3 times/week</td>
</tr>
<tr>
<td><strong>Reasons for use</strong></td>
<td>- Related to work and</td>
<td>- Related to work and</td>
<td>- Related to work and</td>
<td>- Related to work and</td>
</tr>
<tr>
<td></td>
<td>profession</td>
<td>profession</td>
<td>profession</td>
<td>profession</td>
</tr>
<tr>
<td></td>
<td>- General use</td>
<td>- General use</td>
<td>- General use</td>
<td>- General use</td>
</tr>
<tr>
<td></td>
<td>- e-Mail</td>
<td>- e-Mail</td>
<td>- e-Mail</td>
<td>- e-Mail</td>
</tr>
<tr>
<td></td>
<td>- Entertainment</td>
<td>- Entertainment</td>
<td>- Entertainment</td>
<td>- Entertainment</td>
</tr>
<tr>
<td><strong>Reasons for none use</strong></td>
<td>- Lack of technical skills</td>
<td>- Lack of technical skills</td>
<td>- Lack of technical skills</td>
<td>- Lack of technical skills</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7.1: Use and familiarity of participants with e-technology across the four cases investigated.
Agarwal and Prasad (1999) found that individual differences in level of education and in amount of relevant experience and familiarity with technology positively influenced the perceived ease of use, readiness, and acceptance. Thus corroborate findings from other studies that user literacy, familiarity, experience and skills related to ICT are important determinants of e-health readiness for adoption of technology by stakeholders.

2) Technological readiness:

Technological readiness is a basic requirement for any healthcare organization to adopt e-health, requiring the presence of a certain level of technological infrastructure to participate. Table 7.2 shows the technological infrastructure and technical capabilities available in each case.

The data shows that Case 1 (built in the late 90s) is by far the most advanced in technological infrastructure capability and technological readiness components. The hospital design and construction was conducted by The European Union with due consideration to the installation of technology infrastructure. Case 4 demonstrates the lowest technological infrastructure, while Cases 2 and 3 have a big gap between them and Case 1.

Within the study cases, it was perceived that technical skills and language barriers might also affect the use of technology by some stakeholders. In contrast, cultural barriers to the use of technology were expected to have only a limited effect on the decision to use (and attitude to use of) e-health. This contradicts popular opinion.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Case 1 European Gaza Hospital</th>
<th>Case 2 Nasser Paediatric Hospital</th>
<th>Case 3 Al-Awda Hospital</th>
<th>Case 4 Sheikh Radwan PHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phones and faxes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Videoconference set</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Computers</td>
<td>165</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>High-speed Internet</td>
<td>Yes 100MB/s</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Network connection</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Technical support</td>
<td>Yes (IT department)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Policies and regulations related to e-Health</td>
<td>Initiatives present</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Trained staff to use e-health equipment</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 7.2: Technological infrastructure of the four cases

That ICT infrastructure influences e-health adoption and capabilities have been consistently documented by prior research (Adam, 1996; Meso and Duncan, 2000; Datta and Mbarika, 2004). This indicates that lowering technology barriers and technical skills, is critical to e-health adoption. This is particularly important in this study, because e-health can be used to deliver tertiary healthcare services to the isolated people of Gaza and compensate for the shortage in some sub-specialities. The current study results also reveal that networks and computers are unavailable to cope with the demand of three out of the four healthcare facilities investigated in this study. This is quite crucial when one
considers adopting e-health technology in the existing Palestinian healthcare system, where there exists inadequate ICT infrastructure.

3) Management (organizational) readiness:

Table 7.3 illustrates the types and levels of organizational readiness across the cases.

<table>
<thead>
<tr>
<th>Case</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGH</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>NPH</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>Al-Awda hospital</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>SRPHC</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Table 7.3: Types and levels of organizational readiness across the four cases

Across the cases, the data regarding organizational readiness gleaned from managers and administrators showed similarity with that from other groups of respondents. They reveal ‘core readiness’ in their recognition of needs for e-health, dissatisfaction with the current situation of administrative work done, and willingness to change. They also demonstrate ‘engagement readiness’ through asking about e-health, including options for using it, possible applications, cost benefits, and more.

Despite these similarities, there are clear variations across cases particularly in variables determine structural readiness. While case 1 enjoys the best technological infrastructure in Palestine, the other cases lack even basic infrastructure needs (Table 7.2). Also, case 1 is distinguished by the presence of trained staff, technical support, and initiatives in preparing protocols, policies, and regulations that are absent in the other
cases, although in Case 3 the manager reported that they plan to fully computerise the hospital over the next three years.

The high core and engagement readiness of management individuals in all cases bodes well for overall e-health readiness, but organizational readiness requires more. This observation leads to the conclusion that the organizational readiness for e-health in Cases 2, 3, and 4 is not satisfactory.

Edmondson and Moingeon (2003) suggest that ICT adoption in organizations is not driven strictly by technology factors; instead, adoption is determined largely by the interaction of technology and the organization. Numerous studies (Agarwal and Prasad, 1999; Igbaria, *et al.*, 1996; Venkatesh and Davis, 1996) found the organizational factors most affecting success are training and organizational support. Training has also been reported to predict both perceived usefulness and perceived ease of use. Additionally, top and local management support and commitment to the adopted ICT has also been suggested to affect readiness, adoption, and usage (Ash *et al.*, 1997; Aas, 2001).

The current study findings indicate that increased management support and commitment, training, championing, and awareness are significant. These findings are consistent with the above mentioned study findings as important components of organizational e-health readiness enhanced organization readiness for e-health.
4) Individual (healthcare professionals, patients, and the public) readiness:

*Healthcare professional readiness*

The readiness of healthcare professionals to adopt e-health was gauged through multiple variables across the cases. Each healthcare professional group agreed that their need for technological change was driven by feelings of professional isolation from new advances in their field, dissatisfaction with the current situation, and the perceived benefits of e-health, thereby demonstrating core readiness. Table 7.4 presents the readiness of healthcare professionals across the four cases.

<table>
<thead>
<tr>
<th>Case</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGH</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>NPH</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>Al-Awda hospital</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>SRPHC</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
</tbody>
</table>

Table 7.4: Healthcare professional readiness across the four cases investigated.

Across all cases the group of healthcare professionals who most strongly expressed the feeling of isolation was the physicians, who also felt a strong need for CME. The lack of opportunity for CME creates conditions that necessitate travel abroad which is expensive (or unaffordable), carries the risk of job loss (due to time away), and in some cases can be prevented through the inability to cross the border for security reasons. The study results confirm the literature (Doolittle and Cook, 1999; Hu et al., 2000; Brady, 2005) in that dissatisfaction with existing conditions, such as the lack of opportunities for healthcare professionals updating, unorganized work environment, the
need to contain the growth of healthcare expenditures, the need for better resource allocation, and the rising awareness of and need for "quality" healthcare, potentially encourage the adoption of e-health.

The data also suggest that all healthcare professionals across the four cases are actively engaged with the idea of e-health. This ‘engagement readiness’ was demonstrated through their asking questions about e-health applications, expressing their concerns about adopting such technology, and by acknowledgement of potential e-health benefits.

The shortage of some medical sub-specialties was identified by healthcare professionals across Cases 1, 2, and 3 (hospitals). Cases 2 and 3 complained about a lack of resources such as diagnostic aids and equipment, as well as trained staff to carry out sophisticated investigations to facilitate accurate and swift diagnosis. They saw the clinical application of e-health (consultation) offering them an option to solve the health problems of patients locally, to improve their own experience and skills, and to promote patient confidence in the locally provided healthcare services. Literacy and familiarity with technology and its use was present for healthcare professionals across all the four cases. The healthcare professionals in Cases 2, 3, and 4 realized the potential of this technology (perceived usefulness) to provide them with a more organized work environment, access to accurate and timely patient information, and less paper work. While these facilities (Cases 2, 3, and 4) expect these benefits, the healthcare professionals of Case 1 already experience some of them in reality.

Cooperation between the practitioner groups is a key theme recognized as part of readiness to use e-health applications effectively. Healthcare professionals in all cases
expressed their frustration about the lack of cooperation and communication amongst different healthcare providers. Despite EGH being technologically ready, e-health applications cannot be used due to the lack of infrastructure in other healthcare facilities.

The clearly perceived usefulness of e-health applications enhances the attitude of healthcare professionals to accept and use e-health. This finding is consistent with the literature of the Technology Acceptance Model (TAM). This states that a person’s belief that using a particular technology would enhance his/her job performance is a primary factor in adoption (Davis, 1989).

It is evident that readiness for technological change is fairly high among the healthcare professionals in EGH (Case 1). The data show they possess core, engagement, and structural readiness. They enjoy the presence of technological infrastructure, experiencing some of the advantages of e-health, and look to maximizing its benefits by applying more applications in the future. In the other three Cases (2, 3, and 4) healthcare professionals have exhibited core and engagement readiness, but the lack of the needed infrastructure was a fundamental weakness that reduced their overall readiness.

Patient and public readiness

The data across the four cases from the public and patient participants show their readiness to adopt e-health is derived from their dissatisfaction with the current situation, and their need to access services not available locally to resolve their own health problems, or those of family members or other relatives. Table 7.5 displays types and levels of e-health readiness for patients and the public across the four cases investigated.
<table>
<thead>
<tr>
<th>Case</th>
<th>Core readiness</th>
<th>Engagement readiness</th>
<th>Structural readiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGH</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>NPH</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>Al-Adwa hospital</td>
<td>High</td>
<td>High</td>
<td>Fair</td>
</tr>
<tr>
<td>SRPHC</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
</tr>
</tbody>
</table>

Table 7.5: Types and levels of patient and public readiness across the four cases

No difference is seen across the cases for ‘core readiness’, where needs result from the isolation created by the political situation and border closure. The participants uniformly asked for more information about e-health, its benefits, and how it may help to resolve their health problems, making additional inquiries about e-health safety and security, information confidentiality, and privacy demonstrating their common ‘engagement readiness’.

Travel abroad for medical services was viewed negatively by patients and the public, as well as by healthcare professionals. The use of e-health for remote consultation would thus receive a positive response due to overall dissatisfaction with the need for travel for medical purposes.

A strong sense of dissatisfaction was also expressed across cases with the current way of obtaining health information. Study data indicated that the public and patients are ready to use e-health applications to search for satisfactory information regarding their medical and health problems, particularly if encouraged to do so by their treating doctors. Healthcare professionals also supported this, and saw it as helpful to improving patient understanding of physician instructions, as well providing them with information to raise
their health awareness and promote their cooperation with health workers. An interesting perceived usefulness of e-health was as a tool in helping physically disabled people to do their jobs, education, communications, and medical consultation easily from home.

The technical skills of patients and the public, accessibility to Internet, and affordability were commonly identified as determinants of patient and public readiness for e-health. But participants expressed little worry that these variables would affect their readiness. Common challenges were identified for public and patient readiness to use websites for accessing information including availability of accurate and reliable information, language, and technology familiarity. Overall, data showed the potential for acceptance and use of e-health by the public and patients could be viewed as fair to good.

Previous research (Perednia et al., 1998; Checchi et al., 2002; Mbarika et al., 2005) addresses most stakeholders (providers, physicians, patients, and public) concerns. These Studies show that issues like privacy, confidentiality, and standardization of ICT is very important, and consequently increases the quality of transmitted data, satisfies stakeholders, and reduce the total costs. The study results are consistent with previous studies that e-health, data security, and patient information confidentiality have an impact on the healthcare system stakeholders' readiness (patients and the public in particular) and are important components that affect the readiness of Palestinian healthcare system stakeholders.

It is necessary for any e-health application to have standards and procedures established for privacy, security, and confidentiality, when an e-health program gets into routine delivery of healthcare services.
5) External environment readiness:

External environmental factors identified in this study were the national ICT infrastructure, political environment, economic situation, culture-specific beliefs and values and physical land separation.

**National ICT infrastructure:** The capability of national ICT infrastructure to influence healthcare sector adoption of technology has been documented consistently by prior research (Adam, 1996; Datta and Mbarika, 2004). Many indicators identified in this study might work in favour of e-health readiness of Palestinian stakeholders in the Gaza strip. These include government acknowledgement of the importance of ICT and its impact on the development process, creation of the Ministry of Telecommunications and Information Technology (MTIT), measures taken by the MTIT to encourage domestic and foreign investment in the ICT sector (including policies and regulation to protect customers and companies), support for ICT by other sectors (public sector, universities, private sector, financial institutions), and technology availability, accessibility and affordability. Thus it can be concluded that overall ICT diffusion will be continuously increased due to government policy and support. In addition, the young age of the majority of Gaza’s people, and the competition free tele-communications environment will also bolster e-health readiness and diffusion.

**Political environment:** The political situation strongly impacts the readiness and acceptance of e-health in two ways. Firstly, due to isolation, border closures, and the physical separation of Palestinian land, e-health could provide an important alternative to provision of tertiary level care by neighbouring countries (Egypt, Jordan, and Israel) and maximize the use of national resources. Secondly, the political situation could inhibit e-
health adoption in terms of the ability of organization to receive external funding, to use international technical assistance, and to import the technology required for change.

**Economic situation:** Currently people and organizations in the Gaza Strip suffer from a very hard economic situation due to the strict sanctions imposed by many parties. This economic situation does not favour e-health adoption at either the organizational or individual levels. The Palestinian MOH budget, which is mainly provided by external funding, is not consistently available due to the political sanctions. Yet access to, and the cost of, Internet connectivity is seen by the public and patient participants as a constraint to their readiness to engage in e-health programs. The current economic situation pressures people to dedicate their scarce financial resources to basic needs. These findings confirm the ideas proposed by Lusthaus *et al.* (1995) regarding the effect of external environmental factors on the decision to adopt innovation and change.

**Cultural-specific beliefs and values:** Socio-cultural aspects and the culture-specific beliefs and values were discussed in detail in Chapter 2. The Palestinian people are found to be open to e-technology, part of that is related to the high literacy rate among Palestinians and the other part is related to the influence of external, technologically advanced cultures on individuals, who have traveled to industrialized countries for education and work.

Other indicators such as life expectancy, the adult literacy rate, and the combined primary, secondary, and tertiary gross enrolment ratio are expected to enhance overall e-readiness and to have a direct impact on the acceptance of technology. For these indicators, Palestine has a better ranking than neighbouring countries (Jordan and Egypt).
Information gleaned from the case reports regarding political, socio-economic, and cultural factors indicates that the effects of these factors were the same in all cases. This can be explained and understood by the small area of the Gaza Strip (360 sq. km with 1.4 million inhabitants). In effect, the people are homogenous and all experience the same political, economical, and cultural circumstances.

**Physical land separation**: Alvarez (2002) believes in the ability of ICT to reduce the effects of geographic isolation. Other literature shows that the geographical separation is the main reason for the acceptance and development of e-health programs (Bashshur *et al.*, 2005; Roine *et al.*, 2001; Wootton *et al.*, 2004). The Palestinian land is physically separated into the West Bank and Gaza Strip, in addition the political situation enhances this separation with the surrounding countries. This situation demands duplication of government services including healthcare services. There is evidence in the Palestinian situation that major contributions of e-health include increasing access to medical care, reducing unnecessary referrals, decreasing the isolation of physicians, following a continuing education course, or accessing medical information from digital libraries. This is particularly significant in countries where a shortage in medical sub-specialists is the case, and where limited resources and quality of infrastructure hinder services. The study findings are also consistent with prior research stating that geographic barriers, or inadequate healthcare as a primary factor limiting access to care, may be overcome by e-health (Brauchli *et al.*, 2004; Swinfen and Swinfen, 2002). This implies that e-health can help healthcare providers in many ways that might improve Gaza's MOH ability to manage and transform scarce resources to meet healthcare needs.
In view of the healthcare requirements of the Palestinian people, e-health holds a distinct promise of providing complementary support to conventional (face-to-face) methodologies of healthcare. Thus it makes sense that e-health is seen in terms of addressing citizens’ right to health services. In light of this possibility, the study results support the belief that e-health could help in overcoming the problems resulting from the physical and political land separation.

Except for the current (temporary) political and economic situation, the external environmental factors are encouraging and supportive for e-health readiness and acceptance by the Palestinian people and other healthcare system stakeholders.

6) Overall stakeholder readiness:

Review of the data gathered for this study reveals different types and levels of readiness among the four cases investigated. The strongest form of readiness - core readiness - resulted from a combination of real need (based on isolation) and a feeling of dissatisfaction with the current situation and willingness to adopt new practice (i.e. e-health) to create change. The data also show significant engagement readiness, given that the respondent groups actively engaged with the idea of e-health, evaluating its perceived benefits and drawbacks during the awareness and focus group sessions. This kind of engagement gives valuable insight into the factors that might facilitate or impede the readiness to adopt and use e-health in the Palestinian healthcare system.

Individual readiness is often related to stakeholder perceptions of the preparedness of the e-health structure at the organizational level. In this respect, evidence of the third type of readiness (structural readiness) emerged from the data. Structural
readiness exists when the focus is on building efficient structure to support successful implementation of e-health. Evidence of this arises in the four cases where participants suggest solutions to overcome the perceived barriers to e-health adoption. These findings demonstrate how structural readiness (all dimensions of e-health services at the organizational level, including infrastructure and human resources) may enhance stakeholder attitudes and willingness to change.

It is noted that many components of e-health readiness are shared between the different groups of stakeholders, but not necessarily expressed at the same level. For example, all groups at the individual level shared the sense of isolation, dissatisfaction with the current situation, perceived need, and appreciation of the e-health benefits. On the other hand, their healthcare facilities show wide differences in the level of organizational and technological infrastructure available.

The organizational data (management members) reflects the recognition of needs in the area of dissatisfaction and willingness to change and also the process of engagement in term of the idea of the pioneer to shoulder the responsibility of pushing the implementation and playing an educational role in spreading the idea of e-health.

Despite the lack of satisfactory structural readiness among three of the investigated Cases (2, 3, and 4), participant’s perception of the structural need of e-health adoption can be related to willingness of the stakeholders to adopt e-health as a potential to address their own and their healthcare system problems. They are able to identify the components of structural readiness and determine how the lack of these components can affect their level of readiness as well their healthcare facilities readiness.
For the domain of organizational readiness, the availability of e-health infrastructure created structural readiness for Case 1, but by its absence reduced structural readiness of the other cases. This is reflected in the structural readiness assessment of the EGH (Case 1) to adopt and use an e-health application which was assessed as high, while that for the NPH and Al-Awda hospitals were assessed as fair and that for the SRPHC as poor.

Table 7.6 summarises the types and levels of e-health stakeholder readiness found by the study across the four cases investigated, and considering the four domains used in the readiness assessment and data analysis.
### Table 7.6: The overall types and levels of e-health stakeholder's readiness across the four cases

<table>
<thead>
<tr>
<th>Domain</th>
<th>EGH (case 1)</th>
<th>NPH (case 2)</th>
<th>Al-Awda (case 3)</th>
<th>SRPHC (case 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual readiness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Healthcare professionals</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>- Patients</td>
<td>High</td>
<td>High</td>
<td>Poor</td>
<td>High</td>
</tr>
<tr>
<td>- Public</td>
<td>High</td>
<td>High</td>
<td>Good</td>
<td>High</td>
</tr>
<tr>
<td><strong>Organizational readiness</strong></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>Technological readiness</strong></td>
<td>Fairly high</td>
<td>Fair</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td><strong>External environment</strong></td>
<td>Supportive for e-health adoption</td>
<td>Supportive for e-health adoption</td>
<td>Supportive for e-health adoption</td>
<td>Supportive for e-health adoption</td>
</tr>
<tr>
<td><strong>Overall readiness</strong></td>
<td>High</td>
<td>Fair</td>
<td>Fair</td>
<td>Poor</td>
</tr>
</tbody>
</table>

* Engagement readiness    ** Structural readiness
**Q 2: What ICT infrastructure needs exist?**

Appropriate levels of technological infrastructure are necessary to attain organizational readiness and to provide e-health service. Table 7.7 shows the available infrastructure across the cases.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Case 1 EGH</th>
<th>Case 2 NPH</th>
<th>Case 3 Al-Awda</th>
<th>Case 4 SRPHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network connection</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Videoconference set</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Computers</td>
<td>160</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>High-speed Internet</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Phones and faxes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Table 7.7: The available technological infrastructure among the four cases**

The requirement for technological infrastructure was identified by respondents as an important part of their readiness for e-health, and as a basic need to launch e-health programs. The study data show that Case 1 enjoyed the most advanced technological infrastructure capability, while Case 4 showed the lowest technological infrastructure. Cases 2 and 3 were in between, but by some measures still showed a big gap between them and Case 1.

The greatest technology infrastructure need is for a network connection that links all healthcare facilities, followed by appropriate local infrastructure such as videoconferencing capability and computers.
Q 3: What are the perceived Barriers and Facilitators of e-health adoption?

Review of the study data from across the Cases revealed great consistency regarding those factors perceived by participants to positively or negatively affect the process of e-health implementation, and also reflected the political, socio-economical, cultural, and technical challenges for e-health adoption.

Respondents in all four cases agreed that stakeholder awareness and education about e-health were the most important facilitators. These were followed by availability of the needed resources, management commitment, perceived need and benefits, cooperation and coordination among the different sectors, adequate infrastructure and preparedness, and circulation of success stories and experiences. On the other hand, respondents perceived the lack of sustained financial resources as the main barrier. Additional barriers were the lack of qualified (trained and experienced) staff, lack of needed technological infrastructure, resistance to change, prevailing political and economic circumstances, lack of interest or perceived benefits, user un-friendly technology, language, and to a certain extent cultural traditions and beliefs. Solutions proposed by the participants to overcome these barriers and facilitate the process of implementation were similar across cases, and consistent with Jennett et al. (2003) in terms of the facilitators and barriers for telehealth in rural areas.

In sum, the facilitators and barriers identified, although termed ‘perceived’, are likely to be those that in reality impact the process of e-health adoption and successful implementation. Each should be considered seriously and studied well before stepping forward in the process of implementation of e-health solutions.
Q 4: What e-health applications would best serve stakeholder needs?

Clinical (consultation), educational (e-learning), and administrative applications were identified as those that would best serve the needs of stakeholders. In all cases participants reported an appreciation for the expected opportunities offered by e-learning applications, viewing this as responsive to their needs and an acceptable solution to their professional isolation. e-Learning was described as a necessity in Cases 2 and 3. However in these same cases, the first preference was to deliver services that directly affected the care of the patient and enhanced the confidence of people in the local healthcare services. Moreover, they suggested that educational programs must specifically address local needs and address those fields that suffer most from shortages in local resources. In Case 1 (EGH), stakeholders felt that a consultative process should be pursued to determine the local need for e-learning, and that such a thorough consultative process would yield a program of education for local healthcare professionals and community members that directly addresses their overall need.

Healthcare professionals to varying degrees had an expectation that videoconferencing would allow access to specialist care in neighbouring countries. Such an application was expected to reduce the number of patients transferred abroad, and at the same time enable local physicians to gain experience and skills. This was a very strong theme in Case 1, whereas in Case 4, their expectation was limited to solving their local facility problems as shown by their making administrative applications of e-health their first priority. Their goal was to improve the flow of patients and information, reduce clashes with the public, and gain an organized work environment.
SUMMARY OF STUDY FINDINGS

e-Health readiness assessment of the stakeholders in the Palestinian healthcare system can facilitate the planning and implementation of e-health in the healthcare institutions in developing countries in general, and in the Palestine and Middle East Arab countries in particular. The key findings of this study were:

1- The major perceived administrative problems are relatively similar across the four cases and many of these problems could be addressed using e-health applications.

2- The main organizational and individual predictor of readiness, which strengthened the capability to adopt e-health, is the existing level of experience with ICT.

3- The political environment, socio-economic status, and the values held by those who provide and receive the services are important factors that determine whether e-health adoption will be accepted, and to what extent stakeholders can engage in using e-health.

4- Stakeholders across the four cases are ready to adopt and use e-health applications, despite the types of e-health readiness (core, engagement, or structural) and levels of e-health readiness (high to low) identified differing among the stakeholder groups in the Palestinian healthcare system.

5- Readiness for e-health is more obvious at the hospital level than at the primary healthcare center.

6- Palestinian culture, traditions, and beliefs seem unlikely to constrain e-health adoption.
7- Clinical (consultation), educational (e-learning), and administrative (medical record) e-health applications were identified as those that would best serve the needs of all stakeholders across the cases.

8- The lack of financial resources and technological infrastructure are major barriers for adoption.

9- Awareness, education, management commitment, trained staff, and perceived needs are the main facilitators that will support e-health adoption.

10- Limited opportunities for upgrading, training, and postgraduate studies are repeatedly identified concerns for healthcare professionals.

11- Referral of patients abroad for diagnosis and treatment, and the lack of diagnostic aids and equipment, is a frustration for both healthcare professionals and patients.

12- Stakeholders uniformly perceived a need and appreciation for the ability of e-health applications to address many of their own problems (such as CME need), and also problems of healthcare facilities (such as achieving high quality services with reasonable cost, and minimizing expenditure on treatment abroad).

13- The differences in the case characteristics (e.g. geographical location, number of beds, level of services provided, workforce, population served) did not seem to have any clear impact on the decision to adopt e-health, with all cases having the same positive attitude towards e-health regardless of these differences. Also, readiness for e-health seems to have no relation with organization governance (operated by government or operated by NGOs).

14- Management participants consider e-health a ‘distinguished addition’ to any hospital, and understand its potential to overcome the problem of their physical
separation, and to help in reducing the duplication of services and jobs on both sides (Gaza and West Bank). But, they worry about cost-benefit, and the resources needed to establish and sustain the service.

15- Stakeholders uniformly expect that e-health will create a productive workplace environment that enhances their ability to serve patients through efficient procedures, and that increases the confidence of healthcare providers in solving their patient’s problems.

Planners, policy-makers, and other parties involved in the provision of healthcare services should consider these findings in future e-health planning and implementation activities.

In the next chapter (Discussion), the main findings and their implications will be discussed followed by emphasizing the dynamic nature of e-health readiness as a measure, advantages of using case studies methodology, the practical aspect of adoption of ICT in the healthcare sector of developing countries, and this study's contributions and implications. The chapter concludes with the study strengths and limitations.
CHAPTER EIGHT: DISCUSSION

INTRODUCTION

In the absence of research evidence specific to developing Arab countries in terms of e-health readiness, the main objective of this study was to examine the Palestinian healthcare system stakeholders’ readiness to adopt e-health technology in the Gaza strip. It is important to determine stakeholder readiness for ICT related change, because it helps to understand the factors that might facilitate or impede e-health implementation and thus contributes positively to successful e-health adoption.

This study is a first of its kind in the area of e-health readiness assessment within Arab countries in the Middle East region. The study addresses the research question:

*How ready are the stakeholders in the Palestinian healthcare system in the Gaza strip to adopt e-health?*

The study has resulted in a unified understanding of e-health readiness in healthcare in general, to developing countries and countries in the Middle East in particular, and specifically to Gaza. Considering the rapid growth in the field and potential future of e-health adoption by Palestinian MOH, the study was a timely investigation of the stakeholders’ readiness and of the facilitators and barriers to e-health adoption.

This chapter highlights and discusses important issues stemming from the study. After a brief discussion of the study results, the dynamic nature of readiness is emphasized, and the advantages of using case study method and cross case analyses are noted. Some practical observations are made on the adoption of ICT in the health sector of developing countries, and how healthcare organizations can move their agendas
forward by using this study information. Thereafter, the implications of study findings are discussed and finally, the strengths and limitations of the study addressed.

DISCUSSION OF STUDY RESULTS

The discussion of study results will be performed in the context of findings from other relevant studies, and will be organized in a sequence to relate them easily with the research questions.

The study provided strong evidence that stakeholders in the Palestinian healthcare system recognized the potential of e-health applications to improve the value and outcomes of healthcare services, and to alleviate professional isolation. Stakeholders demonstrated strong core and engagement readiness to adopt e-health built on their sense of segregation (a result of the tenuous political situation, land separation, and the ongoing and sporadic closure of borders), and dissatisfaction with the current situation (perceived needs, and usefulness of e-health), confirming findings in previous studies (Doolittle and Cook, 1999; Hu et al., 2000; Brady, 2005).

There are significant factors that contribute to difficulties for providing healthcare services in the Gaza Strip, such as the limited access to existing healthcare services; shortage in some medical sub-specialities; need to refer patients to receive tertiary level care abroad; and the impact of this issue on healthcare professionals, patients, and Ministry of Health. These factors are incentives to finding alternative healthcare solutions. It is also difficult to separate these circumstances from the poor availability of medical schools, research institutes, or ongoing educational and
professional development opportunities in the Gaza Strip. All these factors are seen as fundamental conditions for which e-health services should be considered.

In developing countries, a strong sense of hierarchical relationships (UNCTAD, 2002; Vreede et al, 1999), influence the extent to which top management may support e-health development and would have significant impact on the outcome. Study findings confirmed this relationship of management commitment to e-health adoption and acceptance. In their role, managers can serve as planners, organizers, controllers of resources, and supporters of training, and thus serve as internal catalysts for change. Healthcare professionals were likely to accept and participate in the process of e-health adoption when the programs were introduced and promoted by a peer with considerable authority and influence and familiarity with the practices.

Social information processing models suggest that an individual's readiness to accept innovation may also be shaped by the readiness of others (Armenakis et al., 1993; Jennett et al., 2005). Thus, the “e-health champion” was another factor that is vital to readiness for e-health adoption. Creating readiness involved proactive attempts by the change agent (champion) to influence the beliefs, attitudes, intentions, and behaviour of change participants. In this study, leadership in the field of ICT was clearly expressed by the stakeholders and demonstrated by their enthusiasm and the examples they cited as mentioned in the case report in chapter six. However, despite their apparent readiness to adopt e-health as part of the healthcare system, the strong and substantial role of higher level officials (MOH) could not be ignored in the decision-making process for e-health adoption. Current challenges in the political situation may divert the Ministry’s focus to more urgent and fundamental needs and thus e-health may be sidetracked.
The results show healthcare professionals, management, patients, and the public in the Gaza strip were highly computer literate and ready for technological change. They felt e-health would be a positive addition to the healthcare system and facilitate more services being offered locally, and bring about a greater degree of self-sufficiency among the healthcare practitioners. These findings were consistent with other studies that showed that prior experience, literacy, and familiarity with technology enhanced stakeholder readiness to adopt and implement e-health successfully.

The study also provides valuable information about the perceived facilitators and barriers to e-health adoption, each worthy of consideration in the process of planning future implementation. Awareness, training, and education around e-health applications, its potential benefits, and their limitations represented an effective solution to many of the perceived barriers to implementation, as it makes people more accepting of its adoption. Awareness and education can be achieved via information sessions, awareness campaigns, demonstrations, and circulation of success stories. Learning about e-health through example and demonstration was one technique stressed as valuable by healthcare professionals and hospital management, and considered more effective than lectures or pamphlets in producing readiness.

While there is increased interest in the adoption of technology in the healthcare sector, significant adoption challenges remain, particularly in the area of non-technological factors. Organizations face great financial challenges in adopting health ICT. The study informants consistently discuss the importance of sufficient financial resources necessary to deploy and sustain e-health systems.
Members of all stakeholder groups expressed some worries related to privacy, equipment safety, and information confidentiality. The suggested solutions to alleviate these concerns included: hiring highly qualified and respected staff capable of operating the equipment; providing assurance to patients; using education and awareness sessions; developing policies and regulations to control the process; and signing of an oath of confidentiality by employees. Prior research (Perednia et al., 1998; Checchi et al., 2002; Mbarika et al., 2005) shows that issues like privacy, confidentiality, and standardization of ICT are very important and when addressed increase the quality of care and satisfaction of stakeholders.

Another concern raised by the public and shared by providers was the language barrier that exists when searching the web for health information. This was an influential factor for e-health adoption in Gaza and therefore may be expected to be an issue in other Arabic and developing countries. It is an issue that must be considered by the wealthier Arab countries so they can dedicate efforts and resources to creating websites in Arabic to facilitate the use by the public.

Various studies in the context of other sectors in developing countries indicated that cultural traditions, norms, and values, have a marked impact on ICT adoption (Checchi et al., 2002; Straub et al., 2001; Al-Gahtani, 2003; Okoli, 2003). However, findings from the current study do not support these findings. The majority of study participants felt the effect of cultural traditions on e-health readiness and adoption would be minimal, with a few participants seeing it as only a temporary barrier. A possible explanation for this limited effect could be the high literacy rate among the Palestinians, most of them being foreign-trained, which exposed them to other cultures and makes
them receptive to the technology. The young age of Palestinian people (48% under 15 years old and 49% from 15-64 years (Palestinian Ministry of Health Annual report, 2004)) may have a role in this too. Palestinian society may be seen by others as a closed society; this is not true. Palestinian people, despite all their surrounding circumstances and political situation, are neither closed (for example compared to Afghanistan) nor controlled by religion (for example compared to Iran). Palestinian people are very open to the world, highly educated, and their prolonged contact with Israeli people and culture has, despite the political problem, had some positive impact on development. The influence of this cannot be ignored.

Interestingly, for some healthcare professionals, e-health adoption raised concerns of increasing their workload. This issue could be resolved by gradual engagement in the process, training, and demonstration of the benefits of this technology at individual and organizational levels. The need for an adequate and efficient technological infrastructure to facilitate e-health adoption was recognized by stakeholders; that include reliable and easily maintained equipment, a network connection, and properly trained staff.

The final issue demonstrated through the study was identification of clinical, educational, and administrative applications of e-health, as the potential “best solutions” to fit the needs of Palestinian healthcare stakeholders. Part of this e-health applications selection was related to the desire of practitioners to update their knowledge and skills and to improve the workplace environment, as well as to perceived benefits by physicians and management in minimizing patient referrals abroad. Although the respondents varied in their opinions they agree that e-health has the potential to relieve many of the health care system’s problems.
When introducing e-health it is very important to listen closely to, and address the concerns of, local stakeholders before taking steps towards actual adoption and use of e-health. All of the study results offer valuable information to hospitals and primary healthcare center management, and decision makers in the Palestinian MOH, as well as other developing countries.

THE DYNAMIC NATURE OF e-HEALTH READINESS

Despite the extensive literature on change, the concept of 'readiness' is fairly new. The concept of 'e-readiness' (a measure of the degree to which a country, nation or an organization may be ready, willing or prepared to obtain benefits which arise from ICTs (Dada, 2006)) is newer still. The ICT sector is very dynamic in nature, growing and evolving each day. All the measures that define the sector are changing continuously also. Consequently, e-readiness assessment is also changing over time and can measure an organization or community preparedness only at a certain point of time. As shown in the conceptual framework (Figure 4.1) it may be necessary to apply the e-health readiness assessment process at several points in time to address this dynamic aspect.

A good example for the dynamic nature of the e-readiness measure is revealed in the Economist Intelligence Unit annual ranking of countries' e-readiness and the changes observed in the countries' rank. It is therefore important to note that this study reflects a snapshot in time. It is based on the most reliable information available at the time of data collection (July-December 2005). This implies the need to follow the changes over time to keep it on par with the constantly changing nature of the ICT environment, ensuring that the assessment is continually relevant to the time of use. In addition, researchers,
leaders, and managers of e-health programs should consider this issue of dynamicity in their process of planning and implementation.

THE ADVANTAGE OF USING CASE STUDY METHOD

Using a case study method to investigate stakeholders' e-health readiness in the Palestinian healthcare system is well suited to the research topic, the research question, and the unique situation of the Gaza strip.

Each country has its specific culture and circumstances; using existing survey-like tools to assess e-readiness will not capture the unique characteristics of the individual country or the demands for specific applications, particularly in developing countries. Many studies on readiness measures (Bridges.org, 2001; Bridges.org, 2005; Maugis et al., 2003; Bakry, 2003; Picci, 2006; Dada, 2006) point out that e-readiness tools tend to focus on the wider environment while neglecting the level of organization. Other studies see that there is serious limitation in term of flexibility and applicability, and a lack of standardization of measures (Ifinedo, 2005; Dada, 2006).

The current study, by using a case study method, gives importance to all domains of readiness: the external environmental factors, the technology, and its acceptance and adoption at individual and organizational levels in order to gain a richer understanding of the situation. The combination of these domains provides a broader perspective of the situation and determine whether a technology is likely to be adopted and then institutionalised, thereby reaching higher levels of integration into an organization's working process. Practically, the case study method provides the opportunity to
understand the context of these domains by being in the field and collecting data in its natural setting.

PRACTICAL ASPECTS OF ICT ADOPTION IN THE HEALTHCARE SECTOR IN DEVELOPING COUNTRIES

In this study, an area always under change (e-health readiness) was investigated, and in a sector (healthcare) which is unique in its high complexity, dynamicity, and which is "characterized by multiple actors, multiple choices, multiple hand-offs… no natural team and no one with hospital-wide authority to make changes and insure quality" (Leape, 1997). This fact makes changing in this sector a challenging task and supports the significance of assessing the readiness of this system from different perspectives prior to introducing a technological solution (e.g. e-health) that creates system-wide changes.

An additional level of complexity is the adoption of e-technology in developing countries. Some argue that it is not important for developing countries to have ICT; they point out that the people and governments do not have the financial flexibility to spend on a luxury like the Internet (Kirkman, 2001). In fact, this claim is far from true. ICTs are not a luxury in the 21st century - the era of globalization - where there are effectively no borders, placing the whole world ‘in the same boat’. The capacity of ICT to alleviate some of the most rudimentary problems makes it a necessity for the developing world.

For many developing countries including Palestine, the lack of a strong ICT infrastructure is apparent, which affects their readiness to adopt the e-health technology. The literature suggests developing countries should wait until the level of ICT infrastructure improves and they obtain sufficient level of e-readiness before ICT
adoption (Adam, 1996; Meso and Duncan, 2000; Datta and Mbarika, 2004). But practically, people adopt the technology in a piecemeal fashion as it becomes available. Many innovations in organizations occur as "good ideas" which then spread informally and in largely uncontrolled way through "diffusion" (Greenhalgh et al., 2004).

Developing countries can succeed in adoption and implementation of e-health program if they match the applications with their real needs, choose the most cost effective applications, and have human resources and management leaders ready to support the change. There are numerous examples where developing countries such as Tanzania and South Africa have achieved success in adoption and use of e-health to suit their health problems (Vreede et al., 2003). There are other examples such as Hong Kong where the technology and infrastructure were available but they did not achieve success (Dada, 2006). A high level of readiness alone does not mean that organizations will adopt and succeed with ICT programs.

The current study demonstrated that despite the low level of technological infrastructure, the stakeholders showed high readiness to adopt the technology, and recognized e-health’s potential benefits in addressing many of their system problems. Specific organizational factors were seen to be more important when differentiating between success and failure (Dada, 2006). Other important considerations identified included the management, commitment of individuals involved, and the availability of resources (Molla, 2004). Therefore, developing countries should consider areas where it is possible to achieve benefits in the current situation, rather than remaining focused on improving the external environment. Results from the current study may question the concept of technological readiness. But do low figures in technological e-readiness
assessment mean that developing countries are not able to reap the benefit provided by ICT until they gain a more favourable ranking? Must they first invest heavily in infrastructure, legal issues, and skills required before truly becoming e-ready? How can developing countries focus on those factors that are important to them, and start by small incremental projects in addition to undertaking wider efforts?

CONTRIBUTIONS AND IMPLICATIONS OF THE STUDY

The study contributed to three levels of influence within the field of e-health: locally in the Gaza Strip, in the broader applied area of policy and practice, and most broadly in the field of e-health research.

A. Local contribution

This study laid the groundwork for e-health adoption and use in the Palestinian healthcare system in Gaza Strip. It has contributed to this process in a number of ways:

1. Assessing of stakeholder readiness with respect to social, political, economical, and cultural factors.
2. Clarifying expected opportunities and threats associated with e-health.
3. Providing valuable information based on scientifically sound research.
4. Identifying e-health applications which best fit stakeholder needs.
5. Providing a benchmark study that can guide future actions.
6. Providing an impetus to place the Gaza Strip on the map of e-health and ICT users, thereby attracting the attention of international funding bodies to help support the process of e-health adoption.
Overall, it is anticipated this study will provide formative input to help optimize the future implementation and use of e-health in the Gaza Palestinian healthcare system.

**B. Implications for practice and policy**

The study findings have important implications for practice. They could provide direction and motivation for policy-makers in similarly structured communities in the Middle East region, as well as in other developing countries for future e-health applications. Moreover, international companies involved in e-health and other ICT projects could better understand the factors influencing the readiness and acceptance of e-health technology in developing countries. This study was also important to e-health infrastructure providers, such as telecommunication equipment manufacturers and service providers; the findings could improve their corporate direction by providing insight into local healthcare organizational practices and cultural aspects that have to be considered when designing e-health system in developing counties.

**C. Contribution to the broader field of e-health research**

e-Health applications have the potential to greatly improve quality and accessibility of healthcare. While the practice and research of e-health is still at its early stages in developing countries, the ICT community researchers can serve as major players in addressing e-health readiness, adoption, and implementation issues in these countries by investigating the factors that pose challenges to adoption of the technology.

The literature review revealed no existing studies investigating e-health readiness and adoption related to Palestine and other Arab countries in the Middle East region.
Therefore, this study contributes to filling this gap, and adds new information to the body of knowledge in the e-health field. The current study contributed three new concepts:

1- Understanding e-health adoption in the context of developing countries: This research offers a distinctive perspective, focusing on the readiness for e-health adoption in developing countries, specifically the Gaza Strip, and providing insight for Arab countries in the Middle East region. Although the use of e-health, telehealth, or telemedicine applications is growing in the Middle East region, this study provided insight into the factors influencing stakeholder's readiness to adopt e-health. Issues related to technological and non-technological factors necessary for assessing stakeholder readiness were investigated.

2- Linking old and new models: Recent and modern readiness models have been linked with the traditional innovation adoption and change theories to predict the e-health readiness of Palestinian healthcare system stakeholders to adopt e-health.

3- Extending ICT theoretical research validity and empirical applicability to e-health technology application in the developing countries context.

STRENGTHS AND LIMITATIONS OF THE STUDY

Study strengths

An important strength of this study was use of the case study method to explore stakeholder readiness among the four cases. This helped:

- Address the study objectives and answer the research questions in rigorous and in-depth manner.
• Utilize multiple data sources (different locations, different health professions in addition to patient and public participants) and techniques (interviews and focus groups) to collect the data, which can be triangulated to support the study rigour.

• Gather data on a complex behaviour e.g. the process of innovation adoption and change.

The data were gathered from a variety of settings (public sector, NGOs, general and specialized hospitals, and a primary health care centre) and from participants who represented the majority of healthcare professions as well as patients and public members. In addition, the gender issue was considered (46.3% female) which increased the credibility of the findings and made them representative of organizational reality.

Additional study strengths were related to the data collection process and the researcher. The researcher was fluent in Arabic and data collection was performed in the local language. Having lived and worked in Gaza, the researcher was very well familiar with the setting and culture, allowing accurate capture of the meaning of responses through understanding use of local phrases and terms. This ensured that comprehensive and accurate data were obtained.

Study limitations

While the study followed rigorous methods, certain limitations of this research were identified. e-Health in Palestine and other neighbouring countries is still in its early stages. During the literature review, the researcher found a lack of e-health, telehealth, or telemedicine publications related to developing countries, specifically in Middle East region. Thus most of the literature reviewed came from other areas of the world, like
North America, Australia, and Europe. This may not accurately describe the phenomena and situation in the study context, especially with the infrastructural and cultural differences between industrial and Middle East countries.

As in all qualitative data collection, biases due to the selection, transcription, and interview processes were possible. The interviewer was familiar with a few of the subjects, especially in the European Gaza Hospital (as he was a former employee). In addition, the purposive sampling process could have inadvertently led to selection of subjects who had similar thoughts about the research topic. The investigator was careful to minimize such possible limitations through:

- Applying the selection criteria among the cases and the subjects with the help of each facility’s management members.
- Triangulating the data from different sources; e.g. using focus group data to confirm interview data.
- Carrying out the study objectively including making every effort to remain aware of possible researcher influence.

Although a positive feature, the data collection tools and responses were in Arabic, and the data analyses were therefore done manually due to a lack of any Arabic version of relevant software. Further, the process of translation of the case reports from Arabic to English may have affected the quality and accuracy of data, although quotations were prepared as verbatim as possible.

Another potential limitation relates to the researchers’ background. While efforts were made to objectively carry out the study, the data analyses and reporting of findings
may have been influenced by the researcher’s background as well as previous work and experience in the study setting.

Confidentiality was difficult to maintain in the study cases, as it has not practiced to the similar degree in this culture, where people often know each other (or of each other) at an individual or family level. Every effort was made to protect the respondents’ identity by using letters and numbers for names, jobs, and cases during data collection and analyses. No names were used in reporting focus group discussion themes.

Finally, the political situation and state of instability disturbed the field study timetable and may have had some impact in the findings. In particular, the recent change in government has brought into question the relevance of this study and its findings. Contact was made with the MOH and some respondents following the field work and the comments received suggested that there is still support for addressing the local healthcare needs of Gaza using e-health. Therefore this study, including its findings and recommendation are believed to remain valid.

Although this research study utilized established research methods that have provided very rich information, wider applicability of such qualitative findings is limited. However, there may be some key findings that will be transferable to similarly structured Arab communities.

The next chapter concludes the study by putting key findings of the study in a model for e-health readiness, followed by recommendations for future study, and policy development.
CHAPTER NINE: CONCLUSION

INTRODUCTION

Technologies will continue to be adopted by healthcare organizations at a rapid pace for the foreseeable future (Karsh and Holden, 2006). e-Health technologies hold the promise of improving the quality of care delivered to patients, provide continuous professional development, promote the exchange of health data and information, and support the health research environment. However, positive outcomes are in no way guaranteed unless the manner in which e-health solutions are implemented is carefully designed. In this study, theoretical and empirical evidence have been presented showing that there are known variables related to e-health readiness that impact the success of e-health technology adoption and acceptance. Predictors of success have also been translated into practical recommendations which, if followed, should facilitate successful e-health adoption in Gaza and other developing countries. The risk of losses in resources (financial, time and effort) is still a threat, but through scientific-based assessment of the system e-health readiness and sound implementation design, the risk can be reduced.

Conducting e-readiness assessment within countries is extremely worthwhile (Bridges.org, 2005) as the process can facilitate concrete planning, and can therefore foster positive changes for the country. This principle also applies to assessing e-health readiness. It can also be useful in providing networking opportunities for relevant experts and organizations, thus starting essential dialogue.
This final chapter begins by putting key findings of the study in a model for e-health readiness, and then provides thoughts for future studies, recommendations, policy suggestions, and conclusions.

THE MODEL

A model of e-health readiness has been developed based on the case reports, the cross-cases analysis, and the study findings (Figure 9.1). The purpose of creating this model is to provide a simple summary tool to understand the relationships between e-health readiness and the different determinants that shape this readiness for any organization and its people. This tool is a unique contribution to the field of e-health implementation, the application of which by any organization or country will ensure relevant aspects that influence e-health readiness have been identified and addressed.

EXPLAINING THE MODEL

The model of e-health readiness for Gaza is shown in Figure 9.1. The concentric ovoids build and overlap with one another indicating a complex relationship. This model has as its goal explanation of the e-health readiness of stakeholders (organizations and individuals) in the Gaza health system (lowest ovoid). Their domains of readiness can be categorized as individual, organizational, technological, and external environment (ovoids radiating outwards). Expression of each of these is necessary to demonstrate a ‘ready’ setting.

The individual one is the basic domain of readiness represented by three types of readiness; core (demonstrated by perceived need, dissatisfaction with the current
situation, and a willingness to change), engagement (where people show interest in the idea of e-health and express willingness to learn more about it, raising their awareness, appreciation, and understanding of the benefits and potential of e-health), and structural (demonstrated by access to equipment, ability to use the equipment, and access to training). It is situated at the focal point of the model because without the presence of individual readiness (in particular core readiness) e-health adoption will not be achieved.

The second domain is organizational readiness. This occupies the second level and can also be characterised by the same three types of readiness. Here, core readiness is demonstrated by perceived need, willingness to change, and benefits appreciation. Engagement readiness is demonstrated by engaging in the idea of e-health and an ability to match needs with different e-health applications. Finally, structural readiness is expressed by policy formulation, availability of resources, management commitment, and the presence of training plans and e-health champions. The technological domain is the next level, and is represented by building the technological infrastructure that best suits the organizational capability and people in terms of technology availability and affordability. Moreover, it includes the required technical support, trained staff, and policies and regulations. Ideally this infrastructure will relate to the identified e-health applications that best serve stakeholders need. The fourth level in this model represents factors associated with the external environmental domain which play a critical role in influencing the types of readiness, and determining overall readiness of stakeholders.

Although the model appears sequential, this is for simplicity and clarity. There is in fact strong interrelationship between the different levels of the model, and with the external environment domain, which collectively influence the types of readiness. For
example socio-cultural factors, such as tradition and beliefs can affect the acceptance of
technology by people, which in turn can affect an organization’s readiness.

RECOMMENDATIONS FOR FUTURE RESEARCH

This research framework could lead to further testing of new theoretical models
grounded in the ICT literature that explain the processes of e-health adoption in the
context of developing countries. With such an approach, ICT researchers can offer further
important contributions to the academic and scientific community, industry, and
government sectors in developing countries. Potential contributions of the study for
future research can be categorised under two titles:

Recommended future research specific to Palestine and Middle East Arab countries

While much has been learned about the readiness for e-health adoption in Gaza,
there are many unanswered questions which future research should consider. Some of
these unanswered issues are:

- What of the situation in the West Bank; do stakeholders there (of the same health
  system) have the same readiness as in the Gaza Strip?
- What lessons can be learned from the use and experience of the European Gaza
  Hospital in applying e-technology?
- How can a rigorous, empirically driven theory base for e-health adoption in the
  Arab countries in the Middle East region be established? As mentioned, no known
  previous study has examined e-health technology adoption within the region
  context.
Figure 9.1: Model of e-health readiness showing different determinants and their relationship
General recommendation for future research

- Use findings of the study to hypothesize similar e-health and other ICT related issues in the context of other countries in the region as well as developing countries.

- Increase research regarding healthcare systems in general and e-health in developing countries; research in this area is rare and important.

- Examine the current asymmetry of information, where there exists an imbalance of information between healthcare professionals and patients' ensuring all decision-making is in the hands of healthcare professionals. What will be the impact of e-health on this relationship when the patient can know more about their medical condition through the use of websites?

- Can utilization of services be affected by introducing e-health technology into the system and how? And how could appropriate utilization be defined and measured?

- Why did this study contradict others that have shown innovation adoption is influenced by culture in different countries? Relatively little is known about the relationship between cultural factors and innovation adoption in developing countries - including the impact of e-health on culture - providing another area for investigation.

- How can the lack of clear and specific polices and regulation governing e-health use and dissemination in developing countries be addressed? Research is required prior to diffusion of this technology to ensure responsible bodies have the ability to optimize and rationalize use and application.
Finally, given that ICT adoption (e-health in particular) has the power to cause remarkable change in developing countries, how can the potential consequences of these expected changes be researched and be directed to ensure they best serve the interests and needs of each country and community sector.

RECOMMENDATIONS AND POLICY SUGGESTIONS

The following recommendation and policy suggestions were generated from the findings of this study. They are intended to support future planning and implementation of e-health applications in the Palestinian healthcare system, in particular Gaza, and in similarly structured Arab settings. In making these recommendations and policy suggestions, it is assumed that stakeholders have considered all aspects related to introduction of e-health solutions and determined that their adoption and implementation in the local context is appropriate.

A. Local level recommendations

1) Referral services: The public, patients, and healthcare professionals have negative attitudes towards the need for travel abroad for medical services. As a result, acceptance and anticipated use of e-health applications will be high, if implemented. Further, government funded travel penalizes the poorest who cannot afford to travel, and other groups such as those who are unable to travel for security reasons. Policy suggestion: Adopt e-health solutions to provide more equitable access to healthcare services.

2) Readiness assessment: Within each community it is necessary to gauge the level of readiness of healthcare organizations, professionals, and other members. This
is considered essential for any e-health strategy that considers the West Bank, and requires the dynamic nature of e-readiness to be considered by researchers, health services planners, and policy makers. **Recommendation:** Ensure any e-health implementation is preceded with a thorough readiness assessment in each target community.

3) Focused and progressive strategy: Sophistication of the services offered via e-health must be tailored to the community being targeted. Given the small size of the Gaza Strip, there is no purpose in establishing the same services in many facilities. **Recommendation:** Build upon the available resources and develop existing services. **Policy suggestion:** Create a hub for e-health at the European Gaza Hospital while the other major healthcare facilities should develop infrastructure that facilitates connection with the EGH, enhances data and information exchange, and strengthens the referral system for different levels of care.

4) Infrastructure: It is necessary to provide primary healthcare centres with the required infrastructure to allow them to organize their work environment, develop appointment systems, and to engage in systematic referral between them and the secondary level of care (hospitals) within Gaza. **Policy suggestion:** Assess the need and provide the primary healthcare centers with the needed ICT infrastructure to support staff engagement in the selected e-health applications.

5) Multi-stakeholder involvement: Early engagement of NGOs and the private sector in the process of e-health strategy development and deployment is necessary. This will enhance the likelihood of success by achieving harmony in the system, and
preventing waste of resources through unproductive duplication of services.

**Policy suggestion:** Encourage NGOs and the private sector engagement in the process of e-health strategy development to gain their cooperation and optimal use of resources.

6) Flexibility in planning and piloting are keys to success; Implementation of e-health applications should reflect existing models of technology adoption and change that consider the factors and determinants of the process. These models contain guidance to help manage the process of adoption and change successfully.

**Recommendation:** Develop flexible plans that consider unexpected challenges, pilot whenever possible, and benefit from the other experiences.

7) Efficient use of existing resources: e-Health applications might save the Ministry of Health financial resources. Funding currently directed towards referrals abroad could be invested locally to support e-health implementation. This will, in turn, maximize use of scarce resources, and offer additional benefits such as: Offering staff continuing professional education and training, organizing medical records, and providing accurate and timely information for service planning. In the long-term this will improve service quality and internal and external customer satisfaction. **Recommendation:** Consider e-health applications in managing and maximizing the benefits of scarce resources.

**B. Regional (Arab Countries in the Middle East region)**

Arab governments should encourage research in this area as well as planning their technology adoption in the healthcare sector based upon sound scientific research. This
will optimize the use of resources, maximize the benefits gained from the local available healthcare professionals, and promote the cooperation among the healthcare communities and professional bodies.

Another recommendation that could be very important to the Middle East Arab wealthy countries is to direct more attention and effort towards the needs of Arab people for action, helping them to overcome the language barrier in accessing information in their language in health in particular and other sectors in general.

Furthermore, there is a cost-benefit to some applications such as store-and-forward solution, due to their low cost and ability to leverage the rapid growth of the Internet in the region. Fields such as tele-radiology, tele-dermatology and tele-pathology, are examples that have reached different maturity levels, are easy to use, can be applied to non-emergent situations, and are low costs, and therefore worth being considered by Palestinian and other un-wealthy Arab countries.

General recommendations

1. e-Health must address patient and population needs at the primary care level where most of the problems can be easily solved through virtual second opinion services, such as radiology, dermatology, pathology.

2. Acceptance of e-health depends on system stakeholders (including patients) who must own the system; therefore their involvement is crucial in the development and implementation of such programs.

3. Adoption of e-health requires a real commitment of all the involved parties, especially support from governments.
4. e-Health technology should be reliable, efficient, and easy to use and maintain. In addition, users must be well trained and supported to function effectively.

5. Standards, policies, patient privacy, information confidentiality, and equipment safety are often mentioned as relevant points. Therefore they should be considered in the process of planning and implementing of e-health services.

6. Education in medical schools and arrangements of seminars and workshops for specialists in the use of e-health technology is necessary.

Conclusion

This study set out to explore the readiness of Palestinian healthcare system stakeholders in the Gaza Strip to adopt e-health. Four domains of e-health readiness were identified (technological, organizational, individual, and external environmental factors) as those likely to affect the readiness for e-health adoption and success.

Using a conceptual framework developed for the study, it has been possible to explore these four major domains and provide valuable insights into the factors influencing e-health readiness and acceptance of stakeholders to adopt e-health.

The first domain related to technological infrastructure for e-health adoption. Stakeholders described that the availability of reliable, efficient, and easily maintained ICT infrastructure, trained staff, and technical supports are a necessity to enhance their readiness for e-health. The second domain related to organizational factors. Here, stakeholders identified organizational factors such as management commitment, staff training, resource availability, e-health champions, policies, and change management plans as necessary to promote organizational readiness and enhance the process of
adoption. The third domain related to individual factors. Stakeholders expressed need, dissatisfaction with the current situation, the desire to change, and appreciation of e-health readiness as the main issues required to promote their readiness to adopt e-health. The fourth domain related to external environmental factors (at the national level). In this domain study participants noted factors such as the socio-economic situation, political environment, national ICT infrastructure, openness to technology, types of system problems, culture specific beliefs and values, and external and internal alliances as influential factors that could facilitate or impede the adoption of e-health.

Similar to other developing countries, the Gaza Strip is in great need of adequate and quality healthcare services. There is increased demand for healthcare services exaggerated by the prevailing political situation, scarce resources, isolation, and physical separation from the West Bank. e-Health has made significant contributions to facilitating healthcare services in the industrial world. Nevertheless, the adoption of this technology in developing countries faces many challenges because of technological, economic, organizational, and cultural issues. These include lack of reliable and affordable infrastructure, high cost, resistance to changes, and lack of government awareness.

Given that developing countries have their own health problems and that resources (financial and infrastructure) are limited, looking for simple and economically affordable e-health solutions will be important for successful adoption and positive outcomes. It becomes necessary to match real needs with low-cost e-health applications and that do not demand sophisticated equipment. This include using store and forward approaches which have been proven effective for tele-radiology, tele-pathology, teledermatology, and even consultation and exchange of patient information via the Internet.
In summary, e-health readiness refers to the general preparedness of stakeholders to adopt any program using ICT in the healthcare setting, specifically to the degree to which a community or an organization is ready to participate and succeed in e-health. The study revealed that respondents believed that e-health readiness in the setting of the Gaza Strip is related to perceived needs (dissatisfaction with the status quo), understanding of the potential benefits of e-health technology, and willingness to try e-health applications as a solution to many of their problems. In order to engage in the innovation adoption and change process, and avoid the risk of failure associated with unknown barriers and resistance to change, planners must listen closely to the concerns of various stakeholder groups. Doing so will build a strong, flexible, and responsive e-health program within the existing system of healthcare. Awareness and education programs that demonstrate successful e-health applications will promote e-health readiness. This includes dissemination of information that enhance the publics understanding of e-health benefits, applications, and limitation, which will contribute to their weighing e-health advantages and help in matching suitable applications to specific needs and problems. Doing so will contribute to e-health readiness and lead to successful adoption and use of appropriate e-health solutions.

Lastly, investments in e-health, stimulated by application of the results of this study, could be an important source of productivity, economic growth and democracy in the region. The link between the free flow of information and movement toward democratization, and the strong correlation between information, communication, and economic growth cannot be ignored (Sadowsky, 1996).
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Appendices

Appendix 1.a: Ethical approval from the Conjoint Health Research Ethics Board at the University of Calgary

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2005-06-29
Dr. R.E. Scott
Community Health Sciences
HMRB
Calgary, Alberta

Dear Dr. Scott:

RE: How Ready are the Stakeholders in the Palestinian Healthcare System in Gaza Strip to Adopt e-health?

Grant ID: 18537
PhD Student: Baroud, Radwan

The above-noted proposal including the Thesis Proposal (Version dated May 2005), the Informed Consent for Focus Group Participation, the Informed Consent for Interview, the Focus Group Questions; Health Care Facility Members, the Interview Guidelines for Health Care Facility Management, the Patients, the Public and the Health Care Professionals have been submitted for Board review and found to be ethically acceptable.

Please note that this approval is subject to the following conditions:

1) access to personal identifiable health information was not requested in this submission
2) a copy of the informed consent form must have been given to each research subject, if required for this study;
3) a Progress Report must be submitted by 2006-06-29, containing the following information:
   i) the number of subjects recruited;
   ii) a description of any protocol modification;
   iii) any unusual and/or severe complications, adverse events or unanticipated problems involving risks to subjects or others, withdrawal of subjects from the research, or complaints about the research;
   iv) a summary of any recent literature, findings, or other relevant information, especially information about risks associated with the research;
   v) a copy of the current informed consent form;
   vi) the expected date of termination of this project.
4) a Final Report must be submitted at the termination of the project.

Please note that you have been named as the principal collaborator on this study because students are not permitted to serve as principal investigators. Please accept the Board's best wishes for success in your research.

Yours sincerely,

Christopher J. Dolg, MD, MSc, FRCPC
Chair, Conjoint Health Research Ethics Board

CJ/akm

cc: Dr. T. Noseworthy (information)  Research Services  Dr. Radwan Baroud (PhD Student)
Office of Information & Privacy Commissioner
Appendix 1.b: Ethics review committee (Helsinki Committee), MOH, Gaza

Palestinian National Authority
Ministry of Health
Helsinki Committee

Date: 30/10/2005
Mr./ Radwan Baroud

I would like to inform you that the committee
has discussed your application about:

How Ready Are The Stakeholders in The
Palestinian Care System in Gaza Strip to
Adopt e-Health

In its meeting on October 2005
and decided the Following:-
To approve the above mention research study.

Signature
Member
Member

Conditions:-
- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

Gaza Etwam – Telefax 972-7-2878166
Appendix 2.a: A letter of the supervisor to the Palestinian General Director of the MOH explore the possibility of the researcher gaining access to Ministry premises to collect study data.

Dr. Barouwi
General Director of the Palestinian Ministry of Health
Gaza Strip

By Fax
2004-10-25

Dear Dr. Barouwi,

Re: Doctoral Study of Dr. Radwan Baroud

As I believe you are aware, Dr. Baroud is pursuing a doctoral thesis and field research that focuses on identifying opportunities and barriers in regard to introduction of e-health into the Gaza Strip. This field research will involve 4 health facilities (3 hospitals and 1 Primary Health Care Centre), interviews, focus groups, and questionnaires.

As Dr. Baroud pursues this work, it is necessary to seek funding opportunities and approval from our Institutional Review Board. These activities would be greatly facilitated by an indication of support from you. As a result, I would like to ask for you to forward a letter of support that provides permission to conduct the study and collect data from healthcare facilities within the Gaza Strip. The research will seek general demographic information plus opinions through surveys and interviews, and healthcare information related to patients will NOT be included in the research.

I am hopeful you will be able to support this request, which I believe to be important and helpful to the future development of e-health within the Gaza Strip.

Sincerely,

Richard E. Scott PhD
Harkness Associate and
Associate Professor,
Health Telematics Unit

G204 Health Sciences Centre, 3330 Hospital Drive NW, Calgary, Alberta, Canada, T2N 4N1
www.ucalgary.ca/telehealth
Appendix 2.b: The received letter of acceptance from the Palestinian MOH to collect the study data from MOH healthcare facilities

Palestinian National Authority
Ministry of Health
Director General Office

Date: 27/10/2004

Dear Dr Richard E. Scott, PHD
Harkness Associate and Associate Professor,
Health Telematics Unit

Greeting...

Subject: Doctoral Study of Dr. Radwan Baroud

The Ministry of Health thanks you very much for your letter, and with reference to the above-cited subject, we highly appreciate and will facilitate the work of Dr. Baroud on data collection from Ministry of Health facilities regarding e-health.

With best regards.

Sincerely

Dr. Abdel Rahman Barqawi
Director General
Appendix 3.a: The investigated cases location within Gaza Strip

Nasser Paediatric Hospital

Al-Awda Hospital

Sheikh Radwan PHC center

European Gaza Hospital
Appendix 3.b: The physical separation of the Palestinian land

This map show the two wings (West Bank and Gaza Strip) of the proposed Palestine State separated by Israel.
Appendix 4: Diagram to illustrate the data collection plan

In Canada

- Research proposal ready
- Interviews and focus group guides reviewed by expert.
- Research proposal approved by ethics committee.

- Write cross-case report
- Prepare the thesis and defense
- Disseminate the result.

Data Analysis
- Verbatim transcription of interviews and focus groups.
- Organizing, coding, and categorizing data
- Triangulation, cross-case analysis, and pattern matching

- Meeting with the study supervisor and supervisory committee members to brief them about the field work, and receiving their comments and recommendations for the next step.
  (the meeting and communication with the supervisory committee is to ensure rigour)
- Prepare the strategy to complete the data analysis and thesis writing

In the Gaza Strip

The first phase of field work:
* Establish contacts
* Letters to all administrative bodies introducing proposal and steps to start
* Ask permission to access targeted cases
* Prepare interview and focus group instruments in Arabic language
* Prepare the awareness sessions materials
* Conduct the awareness sessions
* Identify the participants
* Schedule the interviews and focus groups

The second phase of field work: Data collection
* Informed consent form signed prior to interviews and focus groups.
* 20 Semi-structure interviews with 5 subjects from each healthcare facility.
* Five focus group sessions, one for each healthcare facility.
* Verbatim transcription and primary data analysis started.
* Researcher journal kept throughout study
* Data collection finalized
* Visit to the MOH to thank the officials
* Thank you letter prepared and handed to the healthcare facilities management.
* Back to Canada

Data Collection
- Visit to the MOH to thank the officials
- Thank you letter prepared and handed to the healthcare facilities management.
- Back to Canada
Appendix 5: Informed consent forms sample

**INFORMED CONSENT - Focus Group**

**Research Project Title:** How ready are the stakeholders in the Palestinian healthcare system in the Gaza Strip to adopt e-health?

**Investigators:** Dr. Radwan Baroud, Dr. Richard Scott; University of Calgary, Calgary, Alberta, Canada

**Funder:** International Development Research Centre

This consent form, a copy of which will be given to you, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

**BACKGROUND**

e-Health is the use of any type of information or communication technology to help in supporting health or healthcare. It is being used more and more in almost all developed countries and many developing countries throughout the world. Before introducing e-health to a country, an organization, or to a population it is very important to understand how ‘ready’ they are to use the technology and to adopt e-health.

**WHAT IS THE PURPOSE OF THE STUDY?**
The purpose of this research is to explore the needs and readiness of stakeholders in the Palestinian health care system in Gaza Strip to adopt e-Health. This will be done by 1) assessing the health needs and e-health readiness of patients, practitioners, health care
organization and the public, 2) determining the best solution to meet these needs, and 3) understanding the factors that might facilitate or impede e-health implementation. To do this we will use case study methodology.

Each of the four selected health care facilities in the Palestinian health care system will be studied separately. We are studying your local health care facility because it was chosen as one of the health care facilities that meet the selection criteria. We are asking you as a member or user of the institution to take part in a focus group to talk about e-health readiness.

**WHAT WOULD I HAVE TO DO?**
A total of 40 people, ten from 4 healthcare institutions, will be asked to take part in Focus Groups. You are being asked to participate in one of these focus groups with up to 9 other people to explore your opinions of how ready you are for introduction of e-health. We will be talking about the need for e-health applications in providing health care services, the perceived facilitators and barriers to this, and the best e-health solutions to serve the needs of Palestinian health care system stakeholders such as you.

This session will be around two hours long. To help researchers the session will be audio-taped or videotaped, if all participants agree at the beginning of the focus group, and the information transcribed verbatim. You may be contacted after the focus group and asked to review the transcripts for clarification of comments and to provide feedback.

**WHAT ARE THE RISKS?**
There are no known risks to you as a participant in this study, because you will only be asked take part in the focus group discussion.

**DO I HAVE TO PARTICIPATE?**
Participation in this study is voluntary for both you as an individual, and the healthcare institutions. You may withdraw from the study at any time by calling the researcher at the local number (2838127) or the primary investigators at the numbers mentioned below. There will be no consequences or risks associated with your withdrawal from the study.

**WILL I OR THE INSTITUTION BENEFIT FROM TAKING PART?**
If your institution agrees to participate in this study there may or may not be a direct benefit to you or the institution. Overall your e-readiness, or that of the healthcare institution, may be improved as a result of participating but there is no guarantee that this research will help you or the institution.

**WILL I OR THE INSTITUTION BE PAID, OR DO I HAVE TO PAY FOR ANYTHING?**
No participant or institution will be paid for participating in the study, nor will there be any expenses that you have to bear in order to participate in the focus group.

**WILL THE RECORDS BE KEPT PRIVATE?**
All the information shared during the Focus Group will be kept confidential by the investigators, and although all participants will be asked to keep information confidential
we cannot guarantee that they will do so. Only the investigators will have access to the transcripts and tapes. All the documents will be stored safely with the researcher during the field work. Afterwards the data will be safely stored in password protected computers and in locked facilities (Health Telmatics Unit, University of Calgary). All the raw data will be retained for seven years and then destroyed. Also, no individual will be identified in the final report or publication.

SIGNATURES
Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in the research project and you agree to participate. In no way does this waive your legal rights, nor release the investigators or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time without jeopardy. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. If you have any further questions concerning matters related to this research please contact the researcher, Radwan Baroud, at the local number 2838127.

If you have any questions concerning your rights as a possible participant in this research, please contact Pat Evans, Associate Director, Internal Awards, Research Services, University of Calgary, Canada, at 403-220-3782.

If you have further questions concerning matters related to this research, please contact the researcher at the local number (provided to you with the consent form), or call Dr. Richard Scott in Canada at (403) 220-7017

Participants Signature: ________________________________ Date:______________

Investigator Signature: ________________________________ Date:______________

Witness’ Signature: ________________________________ Date:______________
The University of Calgary Conjoint Health Research Ethics Board has approved this research study.

A copy of this consent form will be given to you to keep for your records and reference.

APPENDIX 6: FOCUS GROUP AND INTERVIEWS GUIDES SAMPLE

a- Focus group guide

How ready are the stakeholders in the Palestinian health care system in the Gaza Strip to adopt e-health?

This focus group session is intended to explore the opinions of health care facility members about the readiness of the health care facility to e-health introduction.

1. Welcome – purpose of the focus groups
Thank you for joining us today. My name is Radwan Baroud, and I am a researcher and PhD student at the University of Calgary. You all received information about this focus group which let you know that we are going to be talking about e-health today, and about if it is needed to your community. The information you provide me with today will be used in my dissertation – the paper I will be writing for my PhD and in other academic papers and presentations on this topic. As you may know, e-health is the use of information communication technology: videoconferencing, phones, e-mail or the Internet to provide you with health information and healthcare services. In the case of your community, we will be talking about the need for e-health applications in providing health care services, the perceived facilitators and barriers to this, and the best e-health solutions to serve the needs of Palestinian health care system stakeholders.

2. Consent and audio-taping of the session
I’ll remind you now, that even though you agreed to take part in this session, and signed the consent form, if at any time you feel uncomfortable or choose not to continue, you are free to leave or stay and simply listen to the discussion. You can say as little or as much as you are comfortable saying.

It is difficult to ask questions and write down all of your answers. We don’t want to miss any of the things you say, so we will be videotaping the session. Someone will listen to the tape and type what you have said. We will use these typed summaries to write the final report. No one’s name will be used in the final report and the audiotape will be destroyed after five years (the standard time for keeping research materials).

3. Focus group introduction
Before we start the discussion, perhaps we can go around and have a short introduction. I’ll start with myself. As I said, my name is Radwan. I’m a PhD student at the University of Calgary. I’m in Gaza this time to collect information about the e-Health needs and
readiness. Now let’s go around - tell us your first name and a bit about yourself – how long you’ve worked in this health care facility, that kind of thing.

1. Tell us your name and how long you’ve worked in ___________________?
2. What kind of work do you do in this hospital /PHC?
3. What do you think are three major health problems in your health facility?
4. What does it mean to you to have to leave town for health reasons?

   FOLLOW-UP:
   For follow up (i.e. Post heart surgery, chemotherapy treatment)?
   For medical consultation
   To visit or accompany a family member or friend

   Financial
   Emotional
   Travel

5. How do the e-Health applications affect the health of your patients?

   FOLLOW-UP:
   Tele-learning: Do you provide better health care? Do they take better care of themselves?
   Tele-consultation: Does it prevent unnecessary transfers? Does it ensure the safety of patients who stay in the community for treatment?

6. How do you think the e-Health applications affect your community?

   FOLLOW-UP:
   Health of people
   Happiness/well being of people
   Feeling safer as a result of ability to consult with remote experts
   Employment

7. According to Palestinians traditions and beliefs does the patient accept e-Health technology as a mean for his condition diagnosis and treatment, do he / she feel safe and secure?

8. How do you think the e-health applications affect your profession/work?

   FOLLOW-UP:
   Less travel
Clinical services support? The quality of care you are providing?
e-Health learning: Upgrading / education / your confidence in
skills / Job satisfaction
The quality of life of the patients / families
Work flow
Referrals
Communication with health research teams and organizations
Information valuable for planning of future health services

9. What future applications of e-health would be useful in the community (meet people needs)?

10. If you were asked to select the best e-health application/s suit the Palestinian health care services, what would you like to choose and why?

11. In your opinion, what are the perceived barriers and facilitators of e-Health adoption?

12. How can we eliminates those barriers

13. What kinds of Information and Communication Technology infrastructure needed for e-Health introduction are available?

14. If you were talking with the officials of the Palestinian ministry of health, what would you like to tell them?

Thank you
b- Sample Interview guides

1- HEALTH CARE FACILITY MANAGEMENT MEMBER

This interview is intended to explore the opinions of health care facility management member about the needs and the readiness of the health care facility to e-health introduction.

How ready are the stakeholders in the Palestinian health care system in the Gaza Strip to adopt e-health?

Date: ________________ Place: ________________ Time: ________________

Interviewer: ______________________________________________________

Interviewee (subject number): _________________________________

I. Introductory Questions

1- What is your date of birth?
   - Day ______ Month _______ Year _______
   - Do not know
   - no response

2- What is the highest level of education you attained?
   - Secondary school
   - College diploma
   - University degree
   - Postgraduate degree
   - Other
   - No response

3- How long you are working in this health care facility?
   - Three years
   - From 3-5 years
   - From 5-10 years
   - More than 10 years
4. What are your position and the kind of work you do?

5. What do you think are three major health/management problems in your health facility?

II. Core Questions

1. Are you using the computer/Internet? If yes how often, is it related to your work/profession or for other reasons? If the answer no, why not

2. In your opinion, what are the primary issues or problems that you think are being addressed through the application of e-Health?

3. How do you expect the adoption of e-Health to affect the Palestinian health care system?

   What changes in workplace culture? Team development

   What changes in the health care delivery system do you expect to see?

   What changes in the quality of care?

   What changes in the health of people?

4. What kinds of Information and Communication Technology infrastructure needed for e-Health introduction are available in your facility?

5. In your opinion, what are the primary benefits of e-Health applications?

   What are the benefits to community / caregivers / patients / health care organization of e-Health learning?

   What are the benefits to community / caregivers / patients / health care organization of e-Health clinical application?

   What are the benefits to community/caregivers/patients/ health care organization of other application of e-Health (health research, information system and administrative)?

6. How do you think that the e-health applications might affect your profession/work?

7. How ready did you think that the stakeholders to accept e-Health?
8. According to Palestinians traditions and beliefs does the patient accept e-Health technology as a mean for his condition diagnosis and treatment, does he/she feel safe and secure?

9. If you were asked to select the best e-health applications suit the people needs and the Palestinian health care services, what would you like to choose and why?

10. In your opinion, what are the perceived barriers of e-Health adoption?

   - Economic
   - Social and cultural
   - Resistance to change
   - Other

11. How can we eliminate those barriers?

12. What are the perceived facilitators of e-Health adoption?

13. If you were talking with the officials of the Palestinian ministry of health, what would you like to tell them?

14. Do you have anything else to add to this? Did I miss anything?

Thank you
Appendix 7: Sample of Awareness Session Materials

**INVITATION**

**YOU ARE INVITED TO A E-HEALTH / TELEHEALTH SESSION**

Al- Awda Hospital administration invites you to attend **Dr. Radwan Baroud** important presentation

**USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN HEALTHCARE SECTOR**

The presentation will be conducted on Monday November 17, 2005 at Al-Awda hospital 5th floor 1:30 pm. The presentation is open to all.

Dr. Marwan Abusada
الصحة الإلكترونية

e-HEALTH

مقدمة:

إن التطور السريع في مجال تكنولوجيا المعلومات والاتصالات له تأثير كبير على جوانب عديدة من حياتنا وكذلك على مستوى الأزدهار والرفاهية التي ننعم بها الآن. وتتغير خدمات الرعاية الصحية واحدة من القطاعات التي تأثرت كثيراً بهذا التقدم في مجال تكنولوجيا المعلومات والاتصالات.

هناك العديد من الدول في أنحاء العالم تواجه أنظمتها الصحية الكثير من المشاكل المتعلقة بزيادة الضغوط الاجتماعية والتوزيع غير معاد اللخدمات الصحية المقدمة وأيضاً شح التعليم الطبي المستمر وعدم توفر المعلومات الدقيقة والصادقة عن وضع الخدمات الصحية. هذه المشاكل وغيرها تستدعي التفكير في طريقة مبتكرة قادرة أن تغلب على هذه المشاكل وتساهم في تقديم الخدمات الصحية ذات الجودة والنجاح وتحقيق التعاون الجيد وال التواصل بين القطاعات الصحية المختلفة و أيضاً تضمن نتائج طبية ممتازة.

في هذا المجال بترت الصحة الإلكترونية بما لها من مجالات متعددة كأداة قادرة على تحسين الطرق التي تقدم بها الخدمات والموارد الصحية. فهي قادرة على تقديم التعليم الصحي والطبي من على بعد و توفير البنية الأساسية لنظام معلومات يدعم ويوصف الخدمات الصحية وتحسين الوضع الصحي وكفاءة الأنظمة الصحية.

إن التجربة الناجحة لدول العالم المتقدمة في مجال الصحة الإلكترونية للتلقيح على مشاكلها الصحية شجع الكثير من الدول النامية لاستخدام الصحة الإلكترونية في محاولة لحل مشاكلها الخاصة. ولقد ظهر هذا التوجه واضحًا من خلال توجيهات ورشة العمل التي انعقدت في الفترة من 2001 تحت مظلة منظمة الصحة العالمية والتي وجد المشاركين فيها أن الصحة الإلكترونية يمكن أن تكون حلًا فعالًا وادجودة أقتصادية للتغلب على القصور في الأخصائيين في مجالات طبية متعددة في المناطق الرفيعة والليبية كما هو الحال في المدن والعمر وأكثر من ذلك فقد شدد المؤتمرين في توجيهاتهم على أن تعتبر الصحة الإلكترونية أحد المكونات الإستراتيجية في الأنظمة الصحية لكل دولة وكذلك لمرتكثها على ترويج الخدمات الصحية والتعليم الصحي بعض النظر عن المسافات وتوفر الأجواء.

ولقد حظيت الصحة الإلكترونية على الاهتمام من قبل المسؤولين في وزارة الصحة الفلسطينية وكذلك الأطباء والإداريين كأداة مساعدة في حل بعض مشاكل النظام الصحي وتقديم أوجه خدمة صحية ممكّنة. ولكن التي الأساليب المتّقدم فيها هو أي المجالات من الصحة الإلكترونية يحتاج إلى النظام الصحي الفلسطيني؟ وما هي درجة جاهزية المشاركين في هذا النظام للإجابة؟

وإذا الرد على وجود العديد من قصور النجاح في مجال نظام وتطبيق استخدامات الصحة الإلكترونية فإن التركيز على ذلك يؤدي إلى أن الاستناد إلى استخدامات الاتصالات والمعلومات محفوف بنسبة عالية من الفشل تصل في بعض الأحوال إلى 30% ومن أجل أن يكون تطبيق هذه التكنولوجيا بالنجاح فإن من الأهمية بمكان أن نفهم ونقيم الاحتياج الحقيقي لجهة JEJJE ونعمل على تطبيق هذه التكنولوجيا باستخدام طريقة البحث العلمي الصحية من أجل عمل هذا التقييم وتكييف الاحتياج.
ما هي الصحة الإلكترونية:

تعرف الصحة الإلكترونية بأنها استخدام تكنولوجيا المعلومات والاتصالات في تزويد الخدمات الصحية والتعليم الطبي وتبادل المعلومات عن بعد. وتشمل الصحة الإلكترونية العديد من الأنشطة والتي يتم من خلالها تبادل البيانات الصحية عن طريق الإنترنت أو بالصوت والصورة.

استخدامات الصحة الإلكترونية:

1- الاستخدام الطبي: ويشملوظائف الجسم الحيوية.
2- التعليم الطبي والصحي للمهنيين الصحيين والجمهور والمرضى.
3- البحث الصحي والتنمية والتطوير.
4- الشؤون الإدارية والمالية.
5- خليط من الكل.

فوائد الصحة الإلكترونية:

هناك الكثير من الفوائد لاستخدام الصحة الإلكترونية مثل تبادل الخبرات-تбежل الازدواجية و التكرار-تحسين استمرارية وجودة الخدمات-تقليل الحاجة للسفر-تخفيض التكلفة. تحسن أسلوب الإدارة و فوائد عديدة أخرى.

د. رضوان بارود

This paper was distributed to the participants who attended the awareness sessions. It explains the e-health use and application in other countries and how it addresses the problems of healthcare services sector. Also, the paper defines the e-health, its different applications, uses and potential benefits for the Palestinian healthcare system.
هل النظام الصحي الفلسطيني والعاملين به لديهم الجاهزية لاعتماد وتطبيق الصحة الإلكترونية؟

مقدمة:

إن التطور السريع في مجال تكنولوجيا المعلومات والاتصالات له تأثير كبير على جوانب عديدة من حياتنا وكذلك على مستوى الأداء والرفاهية التي نعم بها الآن. وتعتبر خدمات الرعاية الصحية واحدة من القطاعات التي تأثرت كثيراً بهذا التقدم في مجال تكنولوجيا المعلومات والاتصالات.

هناك العديد من الدول في أنحاء العالم تواجه أنظمة المشاكل الكبيرة من المشاكل المتعلقة بزيادة الضغوط الاقتصادية والتوزيع غير عادل للخدمات الصحية، وتخصص في المهنيين الصحيين وكذلك جودة الخدمات الصحية المقدمة وأيضاً التعلم الطبي المستمر. وعدم تطور المعلومات التقنية والمضادة عن وضع الخدمات الصحية. هذه المشاكل ون踦ها تستدعي التفكير في طريقة متبقية قائمة أن تتغلب على هذه المشاكل وساهمة في تقديم الخدمات الصحية ذات الجودة والنجاح وتحقق التعاون الجيد وال التواصل بين القطاعات الصحية المختلفة أيضاً تضمن نتائج طبية ممتازة.

في هذا المجال برزت الصحة الإلكترونية بما لها من مجالات متعددة كبداية قادرة على تحسين الطريقة التي تقدم بها الخدمات ومعلومات الصحية. فهي قادرة على تقدم التعليم الصحي والطبي من على بعد وتوفير البنية الأساسية للاستخدامات في استخدام واستخدام الخدمات الصحية وتحسين الوضع الصحي وكفاءة الأنظمة الصحية.

إن التجارب الناجحة لدول العالم المتقدم في مجال الصحة الإلكترونية تتطلب على مشاكلها الطبية شعج الكثير من الدول النامية لاستخدام الصحة الإلكترونية في محاولة لحل مشاكلها الخاصة. ولقد ظهر هذا التوجه واضحًا من خلال توجيهات ورش العمل التي انعقدت في القاهرة سنة 2001 تحت مظلة منظمة الصحة العالمية والتي وجد المشاركين فيها أن الصحة الإلكترونية يمكن أن تكون حلًا رائعًا ودوريًّا للاستخدام الطبي للتقنيات في الأخصائيين في مجالات طبية متعددة في المناطق الرقية والبدنية كما هو الحال في الدوائر العامة والتحسينات الأثر أو بعض من ذلك فقد شدد المؤتمرين في توجيهاتهم على أن تعتبر الصحة الإلكترونية أحد المكونات الاستراتيجية في الأنظمة الصحية لكل دولة وذلك لقدرته على تزويج الخدمات الصحية والتعليم الطبي بغض النظر عن المسافات وتوفير الأطباء.

ولقد حظيت الصحة الإلكترونية على الاهتمام من قبل المسؤولين في وزارة الصحة الفلسطينية وكذلك الأطباء والإداريين كأداة للمساهمة في حل بعض مشاكل الصحة وتقدم أجود خدمات صحية من مكنة. ولكن بيئات السياق المتغير هى أي المجالات من الصحة الإلكترونية نحتاجها النظام الصحي الفلسطيني؟ وما هي درجة جاهزية المستخدمين في هذا النظام لاستخدام وتطبيق هذه التكنولوجيا؟

وعلى الرغم من وجود العديد من قصص النجاح في مجال استخدمات تكنولوجيا المعلومات والاتصالات في مجال الفحص والرعاية الصحية، فإن هناك العديد من الدلالات التي تشير إلى أن الاستخدام في مجال تكنولوجيا المعلومات والمعلومات محفوف بنسبة عالية من الأخطاء، إلى أن تكنولوجيا الصحية بالنجاح فإن من أهمية يمكن أن نفهم ومقدرة الاتجاه الحقيقي ومن جهة جاهزية النظام الصحي الفلسطيني والعاملين به لاعتماد وتطبيق هذه التكنولوجيا باستخدام نظام البحث العلمي الصحي من أجل عمل هذا التغيير والاتجاه.

إن الفائدة العظيمة للصحة الإلكترونية تظهر فقط عندما يكون هناك احتياج حقيقي لها ونستطيع أن تضيف منافع وفوائد للخدمات الصحية. وإن لمن الضروري أن يتم صائعي القرار والسياسات في وزارة الصحة على
المعلومات الصحيحة والدقيقة ل مدى احتياج النظام الصحي الفلسطيني لهذه الخدمة وذلك بأن يُتعرف على العوامل التي تساعد على نجاح أو فشل اعتماد هذه الخدمة.

أهداف البحث:

يأتي هذا البحث في سياق الدراسة في تقديم حاجة النظام الصحي الفلسطيني لهذه الخدمة وتلقيح على مدى جاذبية المسابعين في هذا النظام لاعتماد وتطبيق الصحة الإلكترونية وفي نفس الوقت للتعرف على أي الإحصاءات التي تقدمها الصحة الإلكترونية، في الأسباب للجهاز الصحي الفلسطيني وتحديد المعرفات وعوامل النجاح لهذا التطبيق وإقتراح الطرق المناسبة لتطبيق هذه الخدمة مستقبلاً.

أهمية هذا البحث:

تكمل أهمية هذا البحث وجود الاعتماد القوي بأن تقوم وزارة الصحة الفلسطينية بالاعتماد وتطبيق هذه الخدمة على مدى القريب للإستفادة من إمكانية الصحة الإلكترونية والمساهمة في تقديم الخدمة بتغيير مشاكل النظام الصحي الفلسطيني، فوجود دراسة علمية لهذا الموضوع ستتوفر لصانعي القرار في الوزارة المعلومات المتعلقة والتي تستند على اتخاذ القرار المناسب والصائب في هذا المجال، وكذلك فإن التكلفة المرتفعة للإبتعاث في هذا المجال تستند عرفة الاحتياج الحقيقي للنظام الصحي الفلسطيني لملل هذه الخدمة وتساعد في الاستخدام الأمثل للموارد المتوفرة وأيضاً تساهم هذه الدراسة في إعطاء متخذي القرار داخلياً وخارجاً قاعدة أساسية للتعاون في تطوير وتنفيذ خطوات ضرورية لضمان نجاح التطبيق لهذه الخدمة.

إذن لم يسبق أن قام أي جهة من قبل بعمل مثل هذه الدراسة وخاصة على النظام الصحي الفلسطيني مما يعزز فائدة هذه الدراسة وكذلك فإن هذه الدراسة ستكون علامة بارزة واطلاعية لخطوات مستقبلية مميزة، وأنه من المتوقع لهذه الدراسة أنها تساهم على وضع النظام الصحي الفلسطيني على خارطة الصحة الإلكترونية العالمية ومستخدمي التكنولوجيا الاتصالات والعلومات وما يساعد على جذب التمويل الدولي والجهات الممولة للمساعدة في دعم وتنفيذ هذا المشروع في وزارة الصحة الفلسطينية.

بالمقابل، أيضًا تطور أهمية هذه الدراسة على صعيد التنمية الاقتصادية والبشرية وتطوري العلاقات مع الدول المجاورة ودول العالم، ولإمام هذه الدراسة نحتاج إلى جمع البيانات من المؤسسات الصحية الفلسطينية عن طريق عمل بعض المقابلات والمجموعات المركزية لاستيفاء وجبات نظر العاملين وإدراكهم ل مدى الحاجة لهذه الخدمة وناسب المجالات التي يمكن أن تطبق بها، وسيتم تحليل نتائج هذا البحث باستخدام الطرق المناسبة وسريع التقرير الذي سيستفيد منه الجهات المطلوبة في وزارة الصحة الفلسطينية لمساهمتهم مستقبلاً في اتخاذ القرار الصائب والسليم لاعتماد وتطبيق هذه الخدمة.

د. رضوان بارود

This paper was attached to the letters which directed to the Palestinian MOH officials and hospitals directors. It explains the e-health use and application in other countries and how it addresses the problems of healthcare services sector. Also, the paper states the study objective in addition to significance of the study.
e-Health

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Important definitions

- Telemedicine
- Telehealth
- e-Health
- e-Health Readiness

**Telemedicine** defined as:

“a system of health care delivery in which physicians examine distant patients through the use of telecommunications technology”

(Preston, 1993)
Telemedicine

- Emphasize the role of doctors in providing health care to distant patients.
- Emphasize a wider range of applications involving a range of health professionals.
- Includes specific terms such as teleradiology, telesychiatry and telepathology.

Telemedicine

Continue...

- Real time
  - teleconferencing
    - Provide high quality audio-video image
    - Requires professional expertise to set up and operate
    - Very expensive to set up and to maintain
    - Limited to a maximum of ten access points
  - Netconferencing
    - Offers multipoint
    - Easier to set up and to use
    - less expensive
    - Deliver health and medical education

- Store-and forward
The use of advanced telecommunications technologies to exchange health information and provide health care services across geographic, time, social and cultural barriers.

(Reid, 1996)

Educational application: e-learning (skills and knowledge)
Telehealth
- CLINICAL -

- Tele-Triage
- Pre-
  Catheterisation
  Consult
- Home Telehealth
- Post Surgical
  Consult

e-Health

E-health is defined as:
“the use in the health sector of digital data - transmitted, stored and retrieved electronically - for clinical, educational, and administrative purposes, both at the local site and at a distance”

(the unstoppable Rise of e-Health, 1999)
Technologies are supporting:
✓ Progress in medical research.
✓ Better management.
✓ Diffusion of medical knowledge.
✓ Shift toward evidence-based medicine.

e-Health Service

Clinical application
Clinical application

- Clinical applications
- Research and development
- Education to all health care professional and the public
- Administrative
- Mixed application
e-Health

- Describe the combined use of electronic communication and information technology in health sector

- e-Health = telemedicine + Telehealth + information system

- MIXED MODEL -

Universal equipment capable of use for any of CREAM (clinical, administration, research, education, and mixed)

- Requires:
  - adequate, interoperable equipment and policy / procedure
  - Familiarity (adequate training and ongoing use)
What Priority should e-Health Have?

Inexpensive solutions

• low-cost telemedicine system – digital camera and email
• spinal injuries hospital in Bangladesh
• referrals to international specialists

e-Health Readiness Definition

The degree to which users, health care providers, health care organizations and the health system itself are prepared to participate and succeed in e-Health implementation.

(Harvard, 2002)
There are four types of readiness:

1. Core readiness
2. Engagement readiness
3. Structural readiness
4. Non-readiness
Important Questions

- Does the Palestinian health care system is ready for e-Health?
- How ready are the stakeholder to adopt e-Health?
- What e-health solutions are needed?