The IT Performance in Saudi Arabian Hospitals

Abdullah A Almarshad

Software Technology Research Laboratory

Faculty of Technology

De Montfort University

England

Supervisors:

Dr. Amelia Platt

Dr. Francois Siewe

This thesis is submitted in partial fulfilment of the requirements for the

Doctor of philosophy

July 2013

Abstract

The objectives of this research are first to examine the level of implementation of IT in Saudi's hospitals; to examine possible relationships between IT implementation and performance; to identify the challenges that Saudi's hospitals face to implement and perform IT. To achieve these objectives, the research will employ various methods. These include questionnaire survey, semi-structured interviews and evaluation methods.

The questionnaire survey data analysis showed that there was lack of organisational factors implementation in IT departments in Saudi Arabian hospitals. It showed also there were positive significant relationships between the organisational factors implementation and the IT performance indicator.

The semi-structured interviews data analysis suggested a number of factors that negatively affect the implementation of organisational factors in IT department in Saudi Arabian hospitals and these are: supporting the IT department has middle priority, lack of training and knowledge amongst IT department, lack of IT improvement, lack of IT planning, unclear of IT department objectives, customer's less satisfaction, shortage of expertise, IT professionals' turnover, lack of ambition amongst IT employees, lack of sharing knowledge.

The two evaluations indicated that the assessment for organisational factors implementation in IT departments developed in this research is applicable in practice. This tool can be used by the IT departments in Saudi Arabian hospitals to assess their organisational management implementation efforts. Through using this tool, hospitals can identify improvement possibilities and formulate an effective improvement plan.

Declaration

I declare that the work presented in this thesis is original work undertaken by me for the degree of Doctor of Philosophy, at Software Technology Research Laboratory (STRL), Faculty of Technology, De Montfort University, United Kingdom. No part of the material described in this thesis has been submitted for the award of any other degree or qualification.

Abdullah Almarshad

Acknowledgement

I would like to thank my supervisors, Dr. Amelia Platt and Dr. Francois Siewe, for their invaluable encouragement, patience, and never-ending support in my research and related activities. I am grateful to them for giving me the chance to work under their direction and expert tutelage.

My study was supported by the Kingdom of Saudi Arabia, and I would like to take this opportunity to express my heartfelt gratitude to my government for taking care of Saudi students by sponsoring them. I believe this will ensure a better future for the Kingdom and its people.

My warmest regards goes to my family (especially my mother, wife and daughters) for their tolerance and support while the programme lasted. Thank you for supporting me with your love and encouragement.

Many thanks to all my colleagues in the STRL Group and to all my friends who strived to ensure that I am doing my best in my studies and also offered their unflinching support to me in everything I needed.

Contents

List of Tables

List of Figures

Chapter 1 Introduction

1.1 Background

Nowadays, information technology (IT) and information system (IS) have become the strongest elements in any business which makes it impossible for any organisation to function without them. In fact, public and private organisations have invested a sum of money in this field, such as computer software/hardware [1]. The dependences and investment on the technology have increased the concern with the performance of these technologies. So, poor performance of IT could lead to business losses [2].

In fact, IT projects have difficulties in achieving their targets, not because of technical issues, but due to organisational or human factors, such as, having an inexperienced management team [3]. Furthermore, on the one hand, organisational performance cannot be achieved only by IT applications, in reality there are many factors which can affect this performance, for example, organisational culture and business strategy [4]. On the other hand, the impact of IT on overall performance is stronger [4]. In addition, total IT impact and alignment of IT with business needs have been seen as an important organisational performance measurement [5, 6].

A majority of IT projects still fail because of the diversity of different kinds of application, and this problem has existed for many years. The project of IT implementation is not often successful [7]. In reality, it has been recognized that *"there still are technical issues related to functionality and interoperability, discussion affirmed the emerging consensus that problems are due to sociological, cultural, and financial issues, and hence are more managerial than technical"* [7, p.291]. Due to the fact that managerial or organisational factors are one of the main problems in the failure of IT projects, healthcare organisations should investigate their interior factors which may cause problems to these projects.

1.2 Saudi Arabia: an overview

1.2.1 Background of Saudi Arabia

"Located in the southwest corner of Asia, the Kingdom is at the crossroads of Europe, Asia and Africa. It is surrounded by the Red Sea on the West, by Yemen and Oman on the South, the Arabian Gulf and the United Arab Emirates and Qatar on the East, and Jordan, Iraq and Kuwait on the North. Saudi Arabia's Red Sea coastline stretches about 1,760 kilo meters (1,100 miles) while its Arabian Gulf coastline is roughly 560 kilo meters (350 miles)" [10]. According to [10] the total population in 2011 in Saudi Arabia is above 28 million with a population growth rate of 2.9%.

The economy in Saudi Arabia is dependent on oil and its derivatives. In fact, the government wished to reduce the dependence on oil, therefore, the government announced a privatization programme in 1992 [10].

According to [10] the number of hospitals in Saudi Arabia is 408 which include the Ministry of Health, and other governmental sectors such as military hospitals and the private sector. Furthermore, the number of physicians, nurses, pharmacists, allied health personnel and IT professionals has increased in the last few years.

1.2.1.1 IT in Saudi Arabia

There is an increasing deployment of IT in developing countries which can help to solve their developmental problems. The awareness about IT benefit in Saudi Arabia is increasing, so both government and private sectors improved their business by enhancing the use of technology [11]. In the case of Saudi Arabia, government invested in this field via many projects, such as the Saudi National e-Government Portal [12]. Nowadays, technology can assist in helping citizens and non-citizens to gain services through the internet to save time and effort. For example, Saudi Arabia has a geographical problem where sometimes people have to travel from city to city for appointments or treatment; in this case technology can help to reduce their effort and time by emailing this appointment and arranging their treatment [11].

1.2.1.1.1 IT in healthcare

IT has become a vital part in any business and can help organisations to achieve their strategies and enhance the relationship between departments, for example sharing knowledge [3]. According to some studies, improved performance in IT is the key that helps health care sectors to accept the activities introduced, such as, essential changes in the structure of finance and the mechanisms used to pay for regulated care [8]. Improving quality, efficiency, equity between groups and expanding coverage were the major aims of these health changes [13, 14].

1.3 Research problem

According to [15] the adoption of information technology (IT) by firms is a question that has been analyzed from different points of view and theoretical perspectives, such as population ecology, resource dependence theory and transaction cost economics [16]. However, [15] claim that there is a shortage of specific research analyzing the factors that influences internet technology adoption by firms.

[17] mentioned that the IT adoption process can be divided into six stages:

"(1) initiation (active or passive search for opportunities); (2) adoption (negotiations for backing IT implementation); (3) adaptation (applying the IT and revising organizational procedures); (4) acceptance (company members are encouraged to use IT); (5) Routinization (the use of IT becomes standard); and (6) infusion (efficiency is increased as a consequence of the IT use)".

Many studies classified the factors influencing the adoption of technology [15]. These factors are grouped into: internal or organizational, external and technological factors [18]. While [15] in their study divided these factors into three groups:

1. Organisational factors;
2. External factors; and
3. Technological factors.

[19, 20] mentioned that internal and technological factors are more important than external factors. [15] listed some organizational or internal factors that have been studied most: "*IT users' community; organizational structure; firm's processes; firm size; technological capabilities of the organization's members; the technological and financial resources available; the culture of the organization; process of selecting and implementing the IT; management backing and support for the project; and the project leader"* [15].

[21], [22], [23] and [24] mentioned in their research some organizational factors that can lead to poor implementation and performance in the IT department, such as, top management support, training, process management and customer involvement. Although, [25], [26] and [17] insist on the importance of other factors, for example, size, IT expertise, organization (specialization, centralization and formalization) and level of IT use in the organization. Previous research on IT/IS improvement has concentrated on the technical and engineering aspects, while paying limited attention to the organisational and behavioural dimensions [27], [28], [29] and [30]. In reality, challenges facing IT/IS performances are largely organizational and not technical in nature [31], [32], [33], [34], [35], [36] and [37]. Furthermore, the difficulties relating to IT/IS implementation and development in Saudi Arabia are more organisational and behavioural than technical in nature [38], [39], [40], [41] and [42]. Thus, resolving IT/IS performance problems requires an understanding of the relationships between all the factors that lead to poor implementation and performance.

1.4 Significance of the study

In terms of IT performance in Saudi Arabia, many researchers mentioned that Saudi organisations are suffering from the affect of organisational factors on the business [38], [39], [40], [41] and [42]. From this view point, the researcher has done lots of research in terms of this problem and he found no evidence that mentioned this issue in the context of Saudi's hospitals. The lack of research and the needs to improve the IT performance are particularly important in health care where the growing population needs more improvement in health services. This research contributes to this field by: first, providing an analysis of the literature reviews of the organisational factors that affect the IT performance, so this understanding of the affected factors helped in providing a basis to understand the organisational factors. The second contribution is the identification of critical organisational factors in IT departments in the Saudi Arabian hospitals and also their relationships with the IT performance indicators, which obtained during a questionnaire survey to the IT employees in hospitals. The third

contribution is the investigation of the factors that affect organisational factors implementation in IT departments in Saudi hospitals. In the Saudi context, this will fill the gap in the literature review concerning developing countries. Finally, the analysed data enhanced the development of the assessment tool to evaluate the organisational factors implementation in the IT departments in terms of identifying strengths and weakness to help suggest a possible improvement.

1.5 Aim and Objectives

The overall aim of this study is to develop an assessment tool for organisational factors implementation in IT departments in Saudi's hospitals. The objectives of this research are first to examine the level of implementation of IT in Saudi's hospitals; to examine possible relationships between IT implementation and performance; to identify the challenges that Saudi's hospitals face to implement and perform IT. To achieve these objectives, the research will employ various methods. These include questionnaire survey, semi-structured interviews and evaluation methods.

1.6 Research questions

From the research problem, five research questions have been proposed:

1. What is the level of practice of IT/IS implementation in IT departments in the Saudi Arabian hospitals?
2. What are the main organisational factors that affect performance of IT in Saudi Arabian hospitals?
3. What are the factors that affect IT/IS performance in Saudi Arabian hospitals?
4. What are the relationships between organisational factors and IT performance indicators in IT departments in Saudi Arabian hospitals?
5. How can the organisational factors implementation assessment tool be implemented in practice?

1.7 Research methodology overview

This research aims to examine the relationship between organisational factors implementation and IT performance indicators and to investigate the factors affecting organisational factors implementation in IT departments in Saudi Arabian hospitals. The researcher selected descriptive/interpretive (literature review) and survey (questionnaire and interview) as

research methods. Descriptive or interpretive research can be focused on the literature or on past developments, in addition to actual current happenings [43]. The ability to develop theory depends on the in-depth review of our knowledge. Surveys are used to help to reflect the real situation at a particular point [44]. This can help to provide a variety of viewpoints for the accurate real world. This approach is particularly desirable when phenomena must be examined in their natural setting and when the control of variables influencing the phenomena is not possible [45].

1.8 Thesis structure

Ten chapters in this thesis are as follows:

Chapter One: the background to the study area was presented and the definition of the problem.

Chapter Two: the principles and concepts of the subject of organisational factors and IT performance indicators were introduced and highlighted. The common organisational factors were highlighted with focus on the successful implementation of organisational factors and the measures of IT performance indicators. In addition, organisational factors implementation in the IT field was discussed.

Chapter Three: presents the study framework. The organisational factors implementation and IT performance indicators were identified. Furthermore, the factors affecting organisational factors implementation was discussed.

Chapter Four: presents the methodology of this study. The research methods in the field of IT/IS, data collection techniques and sampling are described. The in-depth details of the research design and the adopted methods are discussed. The reasons for choosing a questionnaire survey, semi-structured interviews and evaluation are presented, furthermore, the reliability and validity of the study instruments were presented in this chapter. These instruments were used to collect information to assist measuring the organisational factors implementation and IT performance indicators. These instruments are empirically evaluated for their reliability and validity using data from IT departments in Saudi Arabian hospitals.

Chapter Five: investigates the level of practice of organisational factors implementation in IT departments in Saudi Arabian hospitals. In addition, it examines the hospitals variables (hospital characteristics and IT department characteristics) affecting organisational factors implementation and IT performance indicators.

Chapter Six: examines the factors that affect organisational factors implementation in IT departments in Saudi Arabian hospitals. The semi-structured interviews used to collect data from stakeholders in the hospitals are described.

Chapter Seven: presents the results of the Pearson Correlation analysis which examined the relationships between the organisational factors implementation and IT performance indicators. Multiple Regression analysis was used to examine the effects of organisational factors implementation on IT performance indicators. Correlation coefficients (r) were used for every organisational factors implementation and every IT performance indicators and the Multiple Regression coefficient between organisational factors implementation and IT performance indicators used to assign weights for organisational factors implementation.

Chapter Eight: presents the assessment tool for organisational factors implementation in IT departments also, the adopted scoring system.

Chapter Nine: presents and describes the assessment tool and their validation process, which included evaluation of the organisational factors implementation in two hospitals. The strengths and weaknesses of organisational factors implementation in IT departments were identified.

Chapter Ten: conclusion of thesis.

Chapter 2 Literature Review

2.1 Introduction

Information technology (IT) has become the backbone for any businesses to the point where it would be impossible for many to function without it. Over the years, public and private institutions have invested a lot in IT and in understanding how the power of these tools can be used to solve organisational problems. Based on research aims and questions, this study is concerned with the performance of IT. It concentrates mainly on two concepts, firstly the level of implementation of IT, and secondly, the efficiency of IT. Therefore, the purpose of this chapter is to carry out a literature search on the key factors that can affect the efficiency of IT. This can assist in the understanding of the key issues involved in the efficiency of IT in Saudi Arabian hospitals and to obtain a general view of the principle approaches in these fields.

Therefore, section 2.2 of this chapter focuses on the key elements of the healthcare performance concept, and it is the first approach towards the understanding of IT efficiency. Section 2.3 shows the second approach towards understanding IT healthcare efficiency. Section 2.4 the third approach towards understanding IT implementation in organisation, and section 2.5 the fourth approach towards the understanding of IT implementation in Saudi Arabian organisations is through a review of the implementation in the information technology field. Section 2.6 gives the fifth approach towards the understanding of technology effectiveness: section 2.7 the sixth approach towards the understanding of performance and IT investment. Section 2.8 provides the seventh approach towards the understanding of IT and health care organisations, and section 2.9 the eighth approach towards the understanding of IT failure. Section 2.10 shows the ninth approach towards the understanding of organisational factors affecting the adoption of technology, and section 2.11 the tenth approach towards the understanding of critical success factors in quality management. Section 2.12 gives the eleventh approach towards the understanding of factors influencing efficiency in organisations: section 2.12.1 the twelfth approach towards the understanding of internal or organisational factors affecting IT: section 2.12.2 the thirteenth approach towards the understanding of technical factors affecting IT performance, and lastly, section 2.12.3 the final approach towards the understanding of external factors affecting IT.

This research shows that no evidence had been found to be investigated and reported on the IT efficiency in the context of Saudi's hospitals. This will help to provide guidelines and frameworks for conducting the current research.

2.2 Definition of IT efficiency

Efficiency of IT is an important performance requirement [8], according to Sir Peter Gershon who stated efficiency is "*making the best use of the resources available for the provision of public service"* [8, p.1]. Efficiency can be achieved by [9]:

1. Maintaining the level of services that are used to be provided with less people and resources.

2. Resources which are provided for the services should be obtained at a lower cost.

3. Enhancing the additional outputs, such as quantity or quality of services with the same level of inputs, "*or improved ratios of output per unit cost of input"* [8, p.1].

Efficiency can help to reduce cost efficiency, cost effectiveness and medical errors. Furthermore, it can improve the workforce productivity sharply and the economic efficiency will improve. Researchers mentioned that efficiency in IT is seen as a key factor that can enhance the performance in many sectors and particularly in the healthcare sector. Thus, the community can benefit from the improved services to help people seeking treatment in hospitals, such as establishing an online appointment system. Furthermore, because of the geographical problem in Saudi Arabia this service can reduce effort and time for patients.

2.3 **Healthcare performance**

According to some studies, improved performance in IT is the key that helps health care sectors to accept the activities introduced, such as, essential changes in the structure of finance and the mechanisms used to pay for regulated care [8]. Improving quality, efficiency, equity between groups and expanding coverage were the major aims of these health changes [13, 14]. A report of 2000 multi-country evaluations clarified that few countries were able to make improvements in the quality of health care [48]. In fact, the development of the health care sector is dependent on a variety of factors which can enhance this step, such as; top management support, training and stakeholder participation. According to [49], in the last decade, the government in Saudi Arabia have invested a lot of money in healthcare sector by establishing new medical equipment and IT infrastructure.

2.4 **IT healthcare efficiency**

Nowadays, patients are looking for good service in health care, which technology can provide, for example, appointment systems. Technology can help to find solutions and improve the efficiency of health care organisations [8].

Efficiency of IT is an important performance requirement [8], according to Sir Peter Gershon who stated efficiency is "*making the best use of the resources available for the provision of public service"* [8, p.1]. Efficiency can be achieved by [9]:

1. Maintaining the level of services that are used to be provided with less people and resources.

2. Resources which are provided for the services should be obtained with lower costs.

3. Enhancing the additional outputs, such as quantity or quality of services with the same level of inputs, "*or improved ratios of output per unit cost of input"* [8, p.1].

Efficiency can help to reduce cost efficiency, cost effectiveness and medical errors. Furthermore, it can improve the workforce productivity sharply and the economic efficiency will improve. Researchers mentioned that efficiency in IT is seen as a key factor that can enhance the performance in many sectors and particularly in the healthcare sector. Thus, the community can benefit from the improved services to help people seeking treatment in hospitals, such as establishing an online appointment system. Furthermore, because of the geographical problem in Saudi Arabia this service can reduce effort and time for patients.

2.5 IT implementation in organisations

IT becomes a vital part in any business and can help organisations to achieve their strategies and enhance the relationship between departments, for example sharing knowledge [3]. During the IT implementation processes both internal and external factors can affect this progression and prevent any benefits from it [3].

Deploying new technology needs a great deal of cooperation between employees, divisions and departments inside the organisations [3]. "*The technical aspect of implementation is only one component of a chain of events that occur between initial investment and final evaluation. A wide range of factors, both internal and external to the corporate environment, react with implementation processes and will ultimately become part of the output value of the original technology investment "* [3, p.1].

Three factors are insisted on as being important for the implementation process [50]: user satisfaction, top management commitment and IT experience. Moreover, in a study about organizational factors influencing IT projects in Jordanian banking sector, it was found that management support, users participation and information technology culture are factors which can influence successful implementation of IT projects [51].

It was mentioned that between 47% and 59% of the successes in the value of IT implementation is related to contextual factors, which were generalized into three categories: organizational, environmental and strategic [52].

In fact, IT projects have difficulties in achieving the target not because of technical issues, but due to organizational or human factors, such as, having an inexperienced management team [3]. Furthermore, on the one hand, organisational performance cannot be achieved only by IT applications, in reality there are many factors which can affect this performance, for example, organizational culture and business strategy [4]. On the other hand, the impact of IT on overall performance is stronger [4]. In addition, total IT impact and alignment of IT with business needs have been seen as an important organizational performance measurement [53, 54]. So, organisations can benefit from the technology era by discovering the main issues that can affect the IT efficiency where many factors can cause problems in this useful equipment, such as organisational factors. Moreover, hospitals have been encouraged to improve their services in terms of providing a good service for patients. This study argues that using technology in health organisations should improve the work efficiency and enhance performance. In addition, organisational factors such as, management support and training are very important factors within an organisation which assists the IT employees to do their work; also other stakeholders can benefit from this improvement.

2.6 IT implementation in Saudi Arabian organisations

Saudi Arabia is a major oil producing country, and with a population above 28 million [10], and hence, the high price of obtaining and maintaining the latest technology, specifically computer technology is not a major barrier to the national computerization program [55].

IT has an important role in improving the efficiency and productivity in private and government organisations [11]. Successful IT adoption and implementation can enhance a significant improvement in performance [56, 57, and 58]. For example, in the empirical study which examined productivity levels before and after IT implementation, it was found that productivity had increased between 15% and 340% [11]. *These potential gains in productivity should compensate for the high investment cost in IT"* [11, p. 57]. Besides, there

is an increasing deployment of IT in developing countries which can help to solve their developmental problems. For example Saudi Arabia has a geographical problem where sometimes people have to travel from city to city for appointments or treatment; in this case technology can help to reduce their effort and time by emailing this appointment and arranging their treatment [11]. However, even though IT can assist in the achievement of the benefits, *"there is mounting evidence to suggest that this in itself is not sufficient"* [11, p. 58]. Changes are vital in the behaviour of individuals and organisations [59]. In Saudi Arabia the attraction for IT is not because of productivity gain. IT plays an essential role in controlling the demand for semi-skilled workers particularly, and workers in general [60]. In the Saudi IT market, observers are expecting very great growth in the next few years [11]. It is claimed that management support can enhance the attitudes on PC utilization amongst knowledgeable workers [61].

Experience with the benefits of computers does not stop some users from updating their records manually because of information safety [55]. Purchasing computer systems, in many cases depends on the advice of the suppliers company, and not on feasibility studies [55]. This comes with a lack of consistency amongst hardware and applications which have been used in public sectors, yet within the same organization [55]. Furthermore, IT department in hospitals should be aware of the required technology which can help them to improve their provided services. Purchasing and installing technology without planning can cause serious problems, such as delays in systems development and training the users [55]. As computer experts have said *"most agencies in this country have squandered large sums of money on acquiring computers for the sake of appearances only"* [55, p.87]. In fact, whilst this may have been correct in previous years where technology was used in very few public agencies, nowadays nobody accepts using technology just "*for the sake of appearances only"*, because life's activities are dependent on technology. On the other hand, *"there are persistent reports of agencies making significant gains from their computer systems"* [55, p.87]. In addition, hospitals should afford training to their IT people especially something belonging to their work.

In summary, Saudi Arabia populations are growing, and these new generations need some care about their health and education. On many occasions, it has been argued that the health system in Saudi Arabia is suffering from many issues, for example, organisational and technical issues. So, improving the health sector needs more investment in both humans and technology to make it more efficient. While, government spend a large amount of money

every year in this sector; citizens still complain about this service in particular, that is provided by governments' hospitals. Furthermore, this research argues that spending money alone is not enough to have a good health service, and issues related to organisational factors can damage and destroy any plan to improve this sector. Technology alone is not the only solution for efficient work; it needs a good combination between human and technology factors inside the organisation to work well.

2.7 Technology effectiveness

It has been argued that computer system technology should be evaluated in terms of higher operational efficiency and reduction of paper work [62]. The evidence comes from [63] when they define a successful management of information system (MIS) as an information system that is applied for a specific area in an organisation to help managers to improve their performance quality.

Information system (IS) effectiveness has been identified as the satisfaction of information user needs, assistance in decision making and encouraging job satisfaction [64]. End user involvement would help the communication process between computer personnel and users, which can bring valuable information in terms of user needs and feedback about problems using the system. In developing countries, public organizations find it difficult to challenge other firms when attracting qualified personnel, because the authorities do not offer a competitive salary and also because of the limitation of resources which is restricted by laws and regulations [55].

The effects of technical features and software capabilities have been considered [65], and results show that user involvement affects the technical quality of the system. *"Providing more and better computer services depends on how much of the computer potential is put to use"* [55, p. 92]. Moreover, involvement of a stakeholder from the beginning to chose or builds an IT system can enhance the value of this system; however, ignoring people who will work in this system can cause problems to the whole process. In reality this study argues, qualified people are usually looking for attractive job which will give them a good salary, training and support. While jobs with less opportunity cannot be an as attractive place to work. However, customers inside the organisation should have the opportunity to participate in any development that will target them.

2.8 Performance and IT investment

It has been mentioned that many researchers claim there is a positive relationship between organisational performance and IT investments [66]. It was found that there is a strong positive relationship between organisational performance and IT investments [67]. In the study in Hardee's store, it was found that IT had a significant impact on costs where tasks were more complex [68]. In a study of the insurance industry, it was found that *"the optimal level of investment in IT ranges between 15% and 25% of the total operating costs of the firm"* [69]. On one hand, it seems that money is not enough for a successful IT project, on other hand it needs a lot of factors working together to achieve the goals.

Claims have been made that *"the reasons that firms invest in IT is to achieve greater efficiency in their operations"* [70]. Investing in IT is giving firms and organisations a competitive advantage and reducing costs [71], [72] and [73]. Furthermore, the majority of the researchers insist that IT *"investment has a positive effect on firm performance"* [74, p. 3124]. In reality, international companies used technology in their operations to help them achieve their clients requirements wherever their geographical base.

Difficulties of getting information about IT productivity in developing countries has been described as [74], *"almost all findings on IT productivity are based on data collected in developed countries"* [74, p. 3124]. It was also argued that the investment in IT is a high priority [74]. Government may increase their investment on IT as much as 40% [70].

In summary, this research argues that, money alone cannot bring everything to organisation; it needs concerted efforts from all teams to achieve its goals. It also needs to focus on the goals and invest money in sufficient ways and to choose the right time. However, administration should invest in humans by letting them attend courses and by providing them with a good environment in terms of assisting the organisation to provide a good service to their customers.

2.9 IT and healthcare organisations

No one can argue about the value of IT which increases the growth and competitive edge of organizations, not because of new products and services but because the ability that IT has to reduce costs and time and its potential capability to deal with market change and new knowledge [75]. In the technological era, the market has become competitive and efficient. Organizations change their philosophy by dealing with this growth in the market as firms where all business processes have an effective relationship with consumers, "*suppliers and*

employees are digitally enabled" [76]. There is an increase in using a variety of IT in both public and private organizations [77]. In reality, it is impossible for public organizations to manage their work without the extensive use of information technology. Many researchers have mentioned that IT may assist in improving the quality of health care organisations and in reducing medical mistakes [78]. In past studies, IT has shown its value in a variety of industries outside health care. However, the health care field needs some large-scale quantitative studies to provide evidence that IT in health care, and specifically in hospitals, will have a similar impact [79].

Nowadays the healthcare industry is highly information-intensive [79]. Outside health care organisations, IT has positive outcomes [80]. Also, it provides lower costs and greater efficiency [81], greater quality and timely outcomes [82]. IT assists in better decision making [83], higher productivity [84, 71], good communication and coordination [85]. These positive effects of IT enhance the ability of information technology to have the same effect on health care organisations [86]. IT in hospitals can provide accurate information which may affect the quality of health care [78].

"A systematic review of the health IT literature concluded that "health IT has the potential to assist in dramatically transforming the delivery of health care, making it safer, more effective, and more efficient" [87, 88].

IT affords support for professionals in health care through databases, online journals, books and CD-ROMs [89]. In developed countries, health care systems have been used for many years. During this period of time many lessons were learnt from the experiences of dealing with IT especially in primary health care systems [89]. Examples of this include medical records in hospitals; examinations and hospital admissions; use of the internet to exchange information and communicate; user identification by magnetic cards and electronic systems for appointments [89]. Furthermore, health care sectors in developed countries have increased considerably the use of many types of IT, such as a large variety of computers, electronic patient's registration, telecommunication technology and electronic records [89]. In health care organisations IT has become essential which can help to provide a better quality of care, improve efficiency and productivity [90, 91, 92, 93 and 49]. Also, patient management can benefit from IT which supports new approaches [95, 96, and 97]. Nowadays, the technology is used as a tool in health care systems to address most challenges.

In summary, almost all of the work without IT equipment will waste time and effort, IT becomes a very helpful tool in the health sector where time is very important to save an individual's life. Nowadays it has become impossible to manage any area of healthcare

without these tools. So, by choosing the right people and the right equipment, work becomes easy.

2.10 IT failure

A majority of IT projects still fail because of the diversity of different kinds of application, and this problem has existed for many years. The project of IT implementation is not often successful [7]. In reality, it has been recognized that *"there still are technical issues related to functionality and interoperability, discussion affirmed the emerging consensus that problems are due to sociological, cultural, and financial issues, and hence are more managerial than technical"* [7, p.291]. Due to the fact that managerial or organisational factors are one of the main problems in the failure of IT projects, healthcare organisations should investigate their inside factors which may cause problems to these projects.

In a healthcare sector, as in other sectors, failure in IT projects is happening and is repeated because mistakes are ignored, covered up and/or rationalized. Problems and barriers in health IT have still continued over the years [98, 99].

Some research has reported 70% failure rates [100]. Other research has illustrated that as few as one in eight IT projects is truly successful, while more than half struggle with timetables and budgets and do not deliver what was promised [101]. Only 35% of IT projects were completed within budget, on time and met user requirements [98].

Some organizations such as The Standish Group International Inc (Boston); KPMG (Toronto); Gartner, Inc (Stamford, CT); and the Aberdeen Group (Boston) reported IT project failure as a serious problem [103]. Some studies show that there are similar failure rates in health IT [104, 105]. Furthermore, hospitals are suffering from the problem of delays and cancellations of IT projects which are endemic [106]. In the 1970s studies analysed hospital information and patient record systems and this problem still remains today [107, 108]. In his study [109], estimated that nearly half of IT projects are interfered with or sabotaged by staff. Also [105] pointed out that health information systems failed in some way. Media and recent studies noted difficulties in health information technology applications [7]. Over the years, countries are still suffering from some problematic issues, such as, electronic record and hospital information systems [110, 111, 112, 113, 114 and 115]; public health systems [116, 117]; community, regional, and National Health Information networks [118, 119, 120, 121, 122 and 123]; physician order entry [108, 124, 125, 126, 127, 128 and 129]; ambulance services [130, 118]; and patient education [131]. The situation is even more disturbing when high-profile failures, partial successes, and unsustainable IT undertakings are coupled with

accumulating evidence of negative unintended consequences, increased error rates accompanying IT use, and the need for workarounds [132, 133, 134, 135, 136, 137, 138 and 139].

A study of 18 health care cases within 214 projects in a selection of sectors in 2007 identified that 65% of the failure of projects was associated with management practices such as accounting [7]. 35% of the failed projects were associated with technical factors such as design, user documentation, technical support, poor or inappropriate requirement, test planning, and development tools [101], and all management issues [7]. Problems with healthcare IT projects are similar to other fields [103, 106], and this is related to cultural, financial and sociological issues. From previous projects, system success requires a combine of social factors organizational, cognitive and behavioural [7]. While at least of 40% of IT projects fail or are abandoned because they are not successful in meeting business requirements; fewer than 40% of large systems obtained from external suppliers meet their goals [7]. This study argues that IT professionals are the main key to managing all types of work related to IT, so hospitals can improve their efficiency by focusing on them. In addition, giving them support and assisting them to develop their skills will help the hospital's operations. In another word, administration should make sure these people get what they deserve.

2.11 Organisational factors affecting the adoption of technology

Many theoretical perspectives about the adoption of information technology (IT) in a firm's context have been analyzed from various points of view [15], such as population ecology, resource dependence theory and transaction cost economics [16]. However, it has been stated that there is a lack of specific research analyzing the factors that affect internet technology adoption by organisations [15]. Studies have considered internet technology adoption as a package of innovations [140, 141]. In literature, the innovation of an IT in terms of adoption process and factors that influence this adoption has been studied. Some ideas regarding an innovation adoption process are [142]:

- agenda-setting;
- matching;
- redefining/restricting;
- clarifying; and

- routinizing.

These processes can be put in two phases [143]:

1. Initiation; and

2. Implementation.

In the initiation stage organisation introduces the innovation which includes many steps: (1) search information (2) training is carried out (3) resources are planned (4) the process is evaluated and (5) the judgment whether to adopt this innovation is made. In the case of implementation, the use of the innovation is the start, and "*subsequently organisational routines are modified appropriately*". Similarly to that in an adoption process five phases have been discovered [25]:

1. awareness;

2. persuasion;

3. decision;

4. implementation; and

5. confirmation.

In the first phase awareness is important to enhance the knowledge about new technology or equipment, after that persuasion can help to influence this knowledge to be accepted, then the decision to use this technology has to be made, implementation is started and finally, confirmation of the adoption process is completed.

It has also been mentioned that the IT adoption process can be divided into six stages [17]:

"(1) initiation (active or passive search for opportunities); (2) adoption (negotiations for backing IT implementation); (3) adaptation (applying the IT and revising organizational procedures); (4) acceptance (company members are encouraged to use the IT); (5) Routinization (the use of the IT becomes standard); and (6) infusion (efficiency is increased as a consequence of the IT use)".

Many studies classified the factors influencing the adoption of technology [15]. These factors are grouped into: internal or organizational, external and technological factors [15]. In summary, this research argues that the intention of the organisations' administration is a very important factor in the decision to adopt or not to adopt technology, and sometimes the

educational background of the person who is responsible for making a decision will affect the choice.

From the literature, Table 1 summarises the main factors that influences technology adoption in organisations.

Table 2.1: The main factors influences technology adoption in organisations (Adopted from Aguila-Obra and Padilla-Meléndez 2006)

	Organisational factors	**External factors**	**Technological factors**
Cooper and Zmud (1990)	User community (job tenure, education, resistance to change) Organisation (specialization, centralization, and formalization)	Organisational environment (uncertainty, inter-organisational dependence)	Technology being adopted (complexity) Task to which the technology is being applied (task uncertainty, autonomy)
Iacovou *et al.* (1995)	Perceived financial cost	Perceived industry pressure	Perceived direct benefits
Iacovou *et al.* (1995)	Perceived financial cost	Perceived industry pressure	Perceived direct benefits
Kuan and Chau (2001)	Perceived technical competence	Perceived government pressure	Perceived indirect benefits
Vadapalli and Ramamurthy (1997)			
Teo *et al.* (1997); Teo and Tan (1998)	The organisational features of the firm Championship of internet adoption		Ranking of internet application Objectives of web sites Benefits of adopting the internet Reasons for not adopting the internet Criteria for selecting internet access service providers
Fink (1998)	Internal resources In-house IT expertise Organisational culture Availability of IT IT selection	Outside support External resources External environment	Benefits of intranet Benefits of IT

	IT implementation		
Igbaria *et al.* (1998)	Demographic variables	External pressure (government and large businesses)	
	Interorganizational factors (internal technical and top management support, experience, training)	Extra-organisational factors (external IS support, training)	
Premkumar and Roberts (1999)	Top management support	Competitive pressure	Relative advantage
	Size	External support	Cost
	IT expertise	Vertical linkages	Complexity
			Compatibility
Mehrtens *et al.* (2001)	Level of IT knowledge among IT professionals	Internet user expectation	Advantage over traditional methods
	Level of IT knowledge among non-IT professionals		Improved communication
			A business tool
	Level of IT use in the organisation		
Sadowski *et al.* (2002)		Competitive pressure	Improved communication
		External support	
		Incentives	
Doherty *et al.* (2003)			Potential inhibitors and facilitators
			Internet strategy
			Internet target segment
			Infrastructure and development capability
			Market development opportunity

			Internet marketplace
			Relative advantage
			Internet communications
			Internet cost opportunity
			Market development opportunity
			Cost of internet trading
			Concerns
			Consumer sensitivity
Santarelly and D'Altri (2003)			Advantage over traditional methods (marketing channels)
Kim and Galliers (2004)	Lower cost structure	Internet business	*External*
	Near-zero inventory	Global electronic markets	Interactivity
	High quality customer service	Dynamic market	Connectivity
			Feasibility
			Internal
			Secure payment system
			Order fulfilment system
			Shipping information system

2.12Critical success factors in quality management

In terms of implementation in organisations, researchers with an empirical study in the quality management field discovered the critical success factors which can lead to successful or unsuccessful implementation. In one study of 20 firms [23] which involved 162 general managers and 89 quality managers, eight critical factors were recognised:

- The role of management leadership and quality management;
- Role of the quality department;
- Training;
- Products and service design;
- Supplier quality management;
- Process management;
- Quality data and reporting;
- Employee relations.

This result claimed this study as a reliable measurement, but others [24] insist there is a weakness in this research, because the study did not include an important factor which is customer focus.

One study depended on practices in the U.S.A and Japan at plant level rather than having an organisation as the unit of analysis [143]. It sampled 716 respondents in electronics, transportation components and machinery field. These factors were considered:

- Top management support (leadership, improvement rewards);
- Quality information (process control, feedback);
- Process management (maintenance, cleanliness and organisation);
- Product design (product quality, simplicity, inter-functional design process);
- Workforce management (labour skills, selection for team potential, team work);
- Supplier involvement (supplier relationships);
- Customer involvement (customer interaction).

This study also claimed to be a reliable measurement. The weakness of this study is that it excluded employee empowerment and benchmarking [24]. 12 factors were recognized and confirmed in an empirical study of 371 manufacturing companies in the USA [24]. The factors included:

- Top management commitment;
- Customer focus;
- Supplier quality management;
- Design quality management;
- Benchmarking;
- Strategic Performance Contract (SPC) usage;
- Internal quality information usage;
- Employee empowerment;
- Employee involvement;
- Employee training;
- Product quality;
- Supplier performance.

However, the importance of high performance for organisations has been stressed, and a 14 step method to help organisations to achieve high performance, such as management commitment, training of all supervisors and giving formal recognition has been suggested [21]. In another study 10 benchmarks to direct the improvement process were mentioned [144]. For example, quality is what the customer says it is, quality requires both individuals and helpful teams, quality requires continuous improvement, quality is the most cost-effective, least capital-intensive route to productivity, and quality is implemented with a total system connected with customers and suppliers. In summary, the health care sector as another field needs more investigation about organisational factors that can affect the efficiency inside the organisation with more focus on the IT department, because IT is a backbone in any business. Furthermore, nowadays all business cannot run without support from IT.

Table 2.2: Critical success factors in quality management

Organisational factors

Saraph et al. (1989)	**Flynn et al. (1994)**	**Ahire et al. (1996)**
The role of management leadership and quality management;	Top management support (leadership, improvement rewards);	Top management commitment;
Role of the quality department;	Quality information (process control, feedback);	Customer focus;
Training;	Process management (maintenance, cleanliness and organisation);	Supplier quality management;
Products and service design;	Product design (product quality, simplicity, inter-functional design process);	Design quality management;
Supplier quality management;	Workforce management (labour skills, selection for team potential, team work);	Benchmarking;
Process management;	Supplier involvement (supplier relationships);	SPC usage;
Quality data and reporting;	Customer involvement (customer interaction).	Internal quality information usage;
Employee relations.		Employee empowerment;
		Employee involvement;
		Employee training;
		Product quality;
		Supplier performance.

2.13 Factors influencing efficiency in organisations

Organisational performance is influenced by many internal and external factors. In their study about business and information technology strategies and their impact on organizational performance [4] grouped factors that were used in their study which are: business strategy; organizational culture; information technology strategy; technological deployment; implementing of IT successfully (IT project management); quality of information provided by IT; and impact of IT on individuals intellect and each of these factors has several sub-factors. In their study about soft factors (non-technical) affecting the performance of software development teams, [143] classified the factors that affected the software development teams performance into four categories:

(1) technical;

(2) non-technical;

(3) organizational; and

(4) environmental [145].

Whereas another model of internet technology diffusion in firms came up with four categories of factors [146]:

1. external market factors;

2. external technical factors;

3. internal organisation factors; and

4. internal systems factors.

While in another study these factors were divided into three groups [15]:

1. organizational factors;
2. external factors; and
3. technological factors.

In summary, this study will focus on the organisational factors which are very significant, and the first steps of the modification should be from inside.

From the literature, many factors are seen as significant in organisational performance and these factors have been classified into three groups.

2.13.1 Internal or organisational factors affecting IT

Internal factors have been seen as an important factor that influences organisational performance. However, external factors researchers mentioned were less important than internal. Researchers noticed that some factors are common regarding IT adoption and especially internet adoption: "*pressure from competitors, customers or suppliers; the role of government (incentives); partners' alliances; technological infrastructure; technology consultants; image of internet technology; and users' expectations"* [15]. Internal and technological factors have been mentioned as being more important than external factors [19, 20]. In fact, technological factors belong to technology adoption and the benefits of using this technology. However, managers can see this benefit either directly or indirectly, for example, potential opportunities to enter new markets and publicity [147]. Organisations must perceive the benefit of adoption technology before carrying on with the process [148]. Some organizational or internal factors that have been studied most frequently have been listed: "*IT users' community; organizational structure; firm's processes; firm size; technological capabilities of the organization's members; the technological and financial resources available; the culture of the organization; process of selecting and implementing the IT; management backing and support for the project; and the project leader"*[15, p.99].

Some believe the most important factor in the adoption process is the project leader [16]. While, others stressed the manager factor in the innovation process in the organisation [141]. In a study of internet adoption in seven SMEs it was discovered that three factors had an incredible effect on this adoption: perceived benefits, organisational readiness and external pressure [149]. Furthermore, a study of small and medium US businesses in terms of electronic commerce adoption noticed that four factors influenced this adoption: organisational readiness, external pressure, perceived ease of use and perceived usefulness [150]. Also, it was realized that managers had a positive attitude about electronic commerce when they were aware of the strategic value of it. Moreover, it was found that many factors affected the adoption of the internet in SMEs firms, such as, competitive pressure and previous technology use [151]. Once the internet level of involvement increases these factors decrease. A collection of 13 information centre managers' views about the critical factors for success was made [152]. These factors were: top management support, effective training, quality of staff, assisting the user to achieve their needs and sufficient resources.

Some organizational factors mentioned in research that can lead to poor implementation and performance in IT departments includes top management support, training, process management and customer involvement [23, 24, 143, 22]. Although others insist on the

importance of other factors, for example, size, IT expertise, organization (specialization, centralization and formalization) and level of IT use in the organization [25, 17 and 148]. [153] in their empirical study indicate that top management commitment to the use of IT, the knowledge of IS managers about business and top management confidence in the IT department are three critical success factors. Previous research on IT improvement has concentrated on the technical and engineering aspects, while paying limited attention to the organizational and behavioural dimensions [27, 28, 154 and 155]. In reality, challenges facing IT performances are largely organizational and not technical in nature [31, 32, 33, 34, 35, 158 and 37]. Furthermore, the difficulties relating to IT implementation and development in Saudi Arabia are more organizational and behavioural than technical in nature [38, 39, 40, 41, 42 and 159]. Thus, resolving IT performance problems requires an understanding of the relationships between all the factors that lead to poor implementation and performance. This study argues that organisational factors are very important rather than other factors, such as technical and external. In reality, it is very difficult for any organisation to process their operations without any human participation, so these people need to be happy to do their job. Factors within an organisation will affect them and their effort, for example management support, training and reward.

2.13.2 Technical factors affecting IT performance

[160] mentioned some technical factors in his study about information systems development team's performance and these factors include project complexity, project size, team processes, team composition, user support, top management support, collective expertise and technology currency[160]. [161] insisted on the important of inconsistency of the software development environment, for example, operating systems, web server, IDEs (Integrated Development Environment), application servers, deployment tools, debugging tools, testing tools, build tools, compliers, databases and source code are big issues facing software development projects. Also, [162] stated that knowledge of the team members, abilities; experience and skills have an impact on the project performance. [163] clarify that poor project management can lead to poor team performance.

2.13.3External factors affecting IT

In their study [164] identified some external organisational factors that had an effect on the success and failures of national IT projects in Iran, such as requirements, requirement accessibility, using suitable technology, consultancy and project management continuity.

[17] insisted on the importance of the organizational environment (uncertainty, inter-organizational dependence). While [165] claimed that outside support, external resources and external environment are very important factors that face such organisations. [22] mentioned that external pressures (government and large businesses) extra-organizational factors (external IS support, training) are significant and can make pressures on the organisation's administration. Furthermore, [166] pointed out that competitive pressure and external support are difficult factors for any organisation to deal with. Internet business, global electronic markets and dynamic market are seen as factors that can challenge any organisation [167, 146]. In summary, this research argues that external factors are important issues that face health organisations, such as finical support from governments. In reality, the health sector should concentrate on the factors that affect the organisation from inside where many issues arise from. Organisational factors have been seen as significant factors which can make a huge change in the performance of any business.

2.14 Summary

As it is presented, in the literature there is a clear understanding of the concept of IT efficiency, and more essentially as part of the initial foundation for IT healthcare efficiency and performance. Following this, the principles and history of IT implementation in Saudis' organisations was discussed which can help to understand the healthcare sector situation. Attention was paid to IT and healthcare organisation and IT failure. This was followed by a discussion in depth about factors that affect an organisation's IT efficiency. Examples from other fields, such as critical success factors in quality management were analysed, including the fact that it can help institutions to improve and, in the process, to serve their communities and their own employees better.

What has become clear is that organisational factors are the main issues that face the healthcare sector. Factors such as management support, training, reward and customer focus which can affect the work in this field were discussed. Finally, in the following chapter, an attempt will be made to develop a framework for the IT efficiency in hospitals. In particular, attention will be paid to the most important organisational factors that affect IT efficiency as discussed in the literature in order to integrate them into the framework.

3.1 Introduction

Chapter 2 introduced a clear understanding of the concept of IT performance in the health sector, IT performance indicators and organisational factors highlighting their concept and principles. The history and principles of IT implementation in Saudis' organisations were discussed in terms of understanding the health care sector situation. The main purpose of this chapter is to illustrate in more detail the individual constituents which will be used later in the data collection instruments.

3.2 A Proposed Research Conceptual Framework

According to [168] developing a framework can assist the researcher to understand the dynamics of the situation of research. The researcher developed a conceptual framework in order to help achieve two aims. The first aim was to examine the relationships between organisational factors and IT performance indicators. The second aim was to examine the factors that affect IT department performance in Saudi Arabian hospitals. The following figure 3.1 shows the general overview of the research conceptual framework.

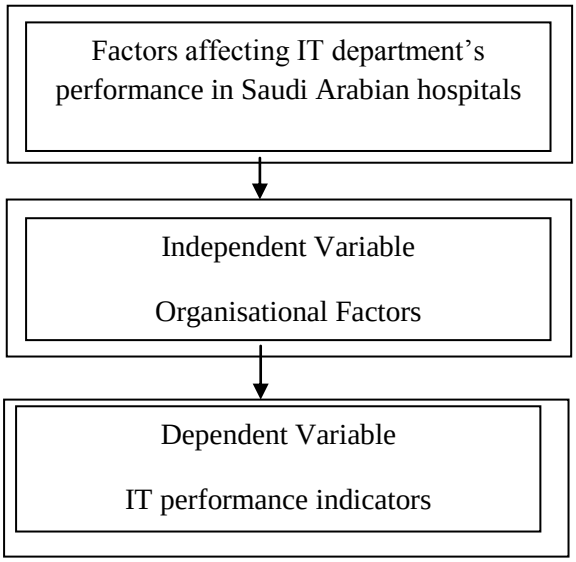


Figure 3.1: An overview of the research conceptual framework

The following subsections will identify the elements of organisational factors and IT performance indicators, as well as the relationships between the organisational factors and IT performance indicators. Subsections will also identify the factors affecting IT department performance.

3.3 The elements of organisational factors

In the field of organisational factors that affect IT, there are referenced articles written by some researchers and this study used the following four articles in this area [22], [25], [15] and [169] respectively. However, in the field of quality management implementation with concentration on organisational factors there are three commonly referenced articles written by [23], [21] and [24]. According to [24], a combination of three frameworks should be used in future work, this study followed his recommendation.

Table 3.1 lists the ten organisational factors in this research, factors in [22], [25], [15] and [169] and the quality management implementation factors in [23], [21] and [24] frameworks.

Table 3.1 Organisational factors comparisons

This study	Saraph et al. (1989)	Flynn et al. (1994)	Ahire et al. (1996)	Igbaria et al. (1998)	Premkumar and Roberts (1999)	Del Aguila-Obra and Padilla-Meléndez (2006)	Rosacker et al. (2010)
IT Top management responsibility	The role of management leadership	Top management support	Top management commitment	Top management support	Top management support	Top management support	Top management support
Recruitment and retention						Considered under IT expertise among employees	Considered under personal (Recruitment, selection and training)
Employee participation	Employee relations	Workforce management	Employee empowerment; Employee involvement	Considered under Employee experience	Considered under IT expertise	Considered under IT expertise among supervisors	Considered under communication
Reward and recognition		Considered under top management support		Considered under top management support	Considered under top management support	Considered under top management support	Considered under top management support (necessary resources and authority present)
Training and education	Training	Labour skills	Employee training	Training		IT training	Considered under personal (Recruitment, selection and training)
Supplier	Supplier quality	Supplier	Supplier quality			Considered under obtaining information	Considered under technical tasks

management	management	involvement	management			from suppliers	(availability of required technology and expertise)
Process management	Products and service design Process management	Products design Process management	Design quality management	Considered under top management support	Considered under top management support	Considered under internal communication	Considered under project schedule/plan (detailed specification of actions required for project implementation)
Measurement	Quality data and reporting	Quality information	Benchmarking Internal quality information usage				Considered under monitoring and feedback
Continuous improvement						Considered under Improve organization image	Considered under project mission
Customer focus		Customer involvement	Customer focus			Considered under offering information to consumers	Considered under client consultation

Table 3.2 indicates factors from the previous articles that are not included in this study and the reason behind that.

Table 3.2 Elements not included in this study

Article	**Elements**	**Reason**
Ahire et al. (1996)	• Product quality • Supplier performance	Both of these factors focus on the outcomes of quality management.
Igbaria et al. (1998)	*"External IS support provided by vendors, consulting firms, and consulting centres (operated by government agencies, universities, or computer vendors)".* Igbaria et al. (1998, p.105)	This factor concentrates on external factors, whereas this study focuses on internal factors.
Premkumar and Roberts (1999)	• Product champions • External environment	• Considered as a support for the innovation. • This factor concentrates on external factors, whereas this study focuses on internal factors.
Rosacker et al. (2010)	• Troubleshooting	Because it is focus on ability to handle unexpected crises and deviation from plan.

However, this researcher included two more factors, 'continuous improvement' and 'recruitment' which are not included in these frameworks. The first factor was obtained from the eight quality management principles in ISO9000 standard [170]. According to [171] the organisation should improve the efficiency in the IT department by using the quality objectives, performance measurement results, analysis of data, corrective and preventive actions and management reviews. Recruitment was added because projects need qualified persons who can assist in the success of these projects. Individuals that need to have ability, skills, motivation and ability to work within a team. In the context of Saudi Arabia these individuals are scarce and are generally costly resources [38, 39]. This research will cover a broader scope of organisational factors in comparison with [23, 21, 24, 22, 25, 15, 169].

The follow subsections will identify the ten organisational factors and their practices.

3.3.1 IT top management support

According to [172] top management support is *"a continuing commitment, backed by words and deeds over a long period of time. Management truly committed to training and development will demonstrate that commitment by strong personal involvement"* [172, p.38]. Moreover, [169] illustrated that top management support refers to the willingness of top management to provide the required resources to assist project success.

Top management support has been seen as a fundamental of a successful project, and particularly in the field of IT where there are many risks involved [15]. In the area of IT, researchers mentioned that top management support is essential for IT success [22] and [25]. Furthermore, [173] mentioned that top management support is required *"to affect other facets of organisational effectiveness"* [173, p.15]. In addition, for example in the quality management field [23, 2, 124] mentioned that IT top management responsibility is a major theme in quality management. In fact, it seems that lack of top management support can lead to an unsuccessful project. Furthermore, in some organisations top management has the power to support (financially and logistically) what they believe is a good idea.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H1: Top management support is positively affecting the IT performance indicators.

3.3.2 Recruitment and retention

Recruitment of professionals a key concern of any organisation. There was an agreement of the importance of human resources for an organisation success [174, 175]. Without qualified and motivated persons, organisations cannot reach complete success [174 and 175]. In his study about the effects of human resources management on project effectiveness and success [175] mentioned that *"little attention has been paid to the human resource factor"* [175, p. 21]. Project Management Body of Knowledge (PMBK) identified human resources as one of the six *"fundamental basic functions of project management"* [175, p. 21]. [176] mentioned that individuals with knowledge, high levels of motivation, communication skills and dependability are vital for the success of a project. [177] stated that both technical and organisational skills can assist IT personnel to perform better. [178] illustrated that

information system employees required some degree of skill in many areas, such as technical and organisational. These skills are technology management knowledge/skills, technical knowledge/skills, interpersonal and management knowledge/skills and business functional knowledge/skills. Higher quality products and services are associated with higher personnel ability [[179, 180]. In other word, the organisation performance relies on many factors and one of the important factors is the human factor. Recruitment of professional people can enhance the organisation performance and achieve the organisational goals.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H2: Recruitment and retention is positively affecting the IT performance indicators.

3.3.3 Employee participation

According to [181] employees should be encouraged and allowed to take part in decision making process. Management should make sure that employees are given the opportunity to contribute and to influence the improvement of the organisation [181]. The degree of participation *"by non-managerial employees in decision making varies from one organisation to other"* [182, p.126]. Performance, satisfaction and productivity have been seen as a benefit from the employee's participation [183, 148].

[185] defined the purpose of employee participation as:

1. *"Articulation of individual dissatisfaction- to rectify a problem with management or prevent deterioration of relations;*
2. *Expression of collective organization – to provide a countervailing source of power to management;*
3. *Contribution to management decision making – to seek improvement in work organization, quality and productivity; and*
4. *Demonstration of mutuality and cooperative relations – to achieve long term viability for the organization and its employees"* [185, p.23].

Teamwork and empowerment are the best methods which can enhance employee participation. Empowerment can assist the employee to do their job and creates an environment of cooperation, respect, trust and open communication [186]. In the IT field, studies mentioned the positive effects of employee participation on customer satisfaction, quality performance and the overall success of software quality [187, 188, 180]. In

conclusion, employee participation is a very important factor for any organisation, because these people are dealing with the customers and they can understand customers' needs.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H3: Employee participation is positively affecting the IT performance indicators.

3.3.4 Reward and recognition

According to [189], rewarding employees' on their achievements *"is one of the most important factors to motivate employees"* [189, p.113]. Recognition is a powerful solution to stop the loss of your qualified employees [190]. [191] mentioned that a reward and recognition programme can enhance performance, help to keep qualified employees and engage them in satisfying consumers. [192] pointed out that reward and recognition can show the employees that the organisation values their efforts. In a study of 500 companies [193] found that management consultants, middle managers and professional/technical workers believe that their pay is linked to their performance.

Researchers in quality management implementation illustrated that reward and recognition is one of the main factors to success [194, 195, 21, 196, 197, 198, 188, 199]. During the quality improvement process, recognition is seen as one of the most important steps [144]. Furthermore, reward and recognition can encourage cooperation and assist working toward common goals [193]. Also, enjoying working can make a difference, so reward and recognition may create a positive work environment [189]. In reality, rewarded people feel warm towards their organisations and that can assist them to work hard to help the organisation to achieve their goals.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H4: Reward and recognition is positively affecting the IT performance indicators.

3.3.5 Training and education

[200] mentioned that training and education are needed to assist staff to gain the necessary skills and knowledge they need to achieve the hospital goals. [201] identified 10 factors that influence project success, and they insist that training can help each person in the team to

understand the project roles. Training and education is recognised in the quality management field as a significant component for success [202, 19, 20, 204, 205, 197, 206, 207]. Staffs need to improve their skills and knowledge through training. Education can help individuals towards self-development and that can reduce the reliance on external resources [205]. According to [199] training and education can improve influence in two ways; 1. Improve employees' abilities and skills that are related to their tasks and. 2. Can enhance their satisfaction about their jobs and workplace. Training and education should be provided to all employees, which can cover all levels in the organisation [208]. [209] found that training in some issues related to management techniques such as, project management; and skills belonging to quality control for example; use of statistical methods has a significant impact and that can enhance the success of the software quality.

In fact, organisations should provide training to their staff which can enhance their ability and skills. Training and education can improve the organisation's performance and enhance the value of their production.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H5: Training and education is positively affecting the IT performance indicators.

3.3.6 Supplier management

In their study [210] indicated that higher levels of supplier management practice *"can lead to enhanced competitive advantage and improved organisational performance"* [210, p.107]. According to [202, 195, 23, 21, 211, 24, 212, 213, 214] supplier management has a significant impact on quality management success. [215] mentioned there are three dimensions that illustrated supplier management:

- *Effective supplier selection;*
- *Innovative supplier development strategies; and*
- *Meaningful supplier performance assessment mechanisms* [215, p.11].

Many researchers have written about the significance of supplier management [215]. Supplier selection has been addressed in many studies, for example [216] investigated supplier selection for firms at different points in the supply chain. Furthermore, studies have outlined issues belongings to the global market, such as [217, 218, 219, 220, 221]. Specific areas in

supplier selection have been investigated by many researchers, such as health care [222], systems/software [223] and the electronic industry in Japan [224]. Furthermore, hospitals need to choose the best suppliers which can deliver good services/products and in sufficient time. Therefore, a bad relationship with suppliers can cause lots of problems to the hospitals' operations.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H6: Supplier management is positively affecting the IT performance indicators.

3.3.7 Process management

According to [225] *"process is the way in which the abstract goal of putting customers first gets turned on its practical consequences. Without process, companies decay into a spiral of chaos and internal conflict"* [225]. [226] mentioned that business process management are now *"considered critical corporate assets"* [226, p.532]. Business process management can help organisations to reduce costs and gave those opportunities to improve their performance, effective decision making and developing their market share [226]. In fact, in this global competitive environment business process management can be seen as the key differentiators [226]. In fact, business process management *"is widely seen as the top priority in organizations wanting to survive the current competitive markets"* [227]. Furthermore, primary stakeholders that benefit from business process management are organisations, the vendors and the experts who work on this approach to support user and vendor agendas [228]. Organisations face lots of change in market environment and the way that they can be helped to cope with this circumstance is to keep their business models flexible [229]. Business models are *"made up of business processes and these are crucial in supporting a culture of innovation"* [229, p. 1]. Many research in the fields of IT/IS have focused on the designing, managing and improving of processes [230, 231, 232, 233, 234, 214, 235, 236, 237]. In fact, process management can bring together vision, mission and strategies of the organisation to help achieve the target goals.

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H7: Process management is positively affecting the IT performance indicators.

3.3.8 Measurement

In the public sector, performance measurement has seen as "new public management" that can drive organisations towards being efficient, effective and accountable [238, 239]. According to [240, 241] the use of Performance Assessment Framework is one of the key developments to assist local NHS organisations' to deliver the governments' targets. A study of the use of multi-dimensional performance measurement in the UK's public sector, discovered that the achievement of the local units is often not consistent with central government's performance targets [242]. Measurement is used to collect, analyse and report data that belongs to the services and products which are delivered to customers. Therefore, measurement plays an important role in comparing performance against standards, discovering opportunities for improvement and identifying progress against organisational goals [243, 244]. [245] mentioned that the effective measurement is to know what to measure, how you are going to measure it and how to use data for measurement. Effectiveness, efficiency, productivity, quality and impact are the main things to be measured [243]. Methods can be used for measurement, such as balanced scorecard, customer and stakeholders satisfaction surveys, financial measurement and benchmarking [245, 243, 246].

Balanced scorecard can be measured by answering four basic questions:

- *How do customers see us?*
- *What must we excel at?*
- *Can we continue to improve and create value?*
- *How do we look to stakeholders?* [247, p.71].

Customer satisfaction can be measured by collecting information from customers concerning products and services. Useful techniques to evaluate customer satisfaction may include customer surveys, complaints and feedback [245]. *Financial measurement* can be measured by cash flow, the least cost to achieving a quality job, products and services. While success can be measured by quarterly sales growth and *"operating income by division, and prosperity by increased market share by segment and return on equity"* [247, p.77].

These helpful methods cannot improve performance alone; it needs support from the management which can make sure the information obtained is used to avoid mistakes and increase benefit. In fact, researchers in IT/IS field insisted on the importance of process, products and services measurement [245, 214, 199]. User satisfaction measure in IS

departments can improve the service's quality [248]. [245] mentioned that well-designed measures can help to discover the opportunities for process improvement, using benchmarks to compare with other organisations, and assist in developing goal setting.
Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H8: Measurement is positively affecting the IT performance indicators.

3.3.9 Continuous improvement

According to [249] continuous improvement (CI) is defined as *"the planned, organized and systematic process of ongoing, incremental and company-wide change of existing practices aimed at improving company performance"* [249, p. 1260]. Continuous improvement is an organisation-wide *"process of focused and sustained incremental innovation"* [250, p. 1106]. The organisations members' participate in improving performance by implementing changes in their work processes [249]. The potential for continuous improvement is to enhance the learning mechanism in organisations [251, 252, 253, 250]. In fact, continuous improvement can be applied to people, products, processes and services. CI cycles enhance the organisation value through learning and documenting the excellent experience and improving the outputs from previous success [243]. In the field of IT, it has been recognised the increasing of attention benefits towards CI concept [188, 199].

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H9: Continuous improvement is positively affecting the IT performance indicators.

3.3.10 Customer focus

In their study about implementing total quality management, [254] mentioned that every organisation's customers have expectations which they patronize. *"If those expectations are not met, they get dissatisfied, and stop patronizing the organization"* [254, p. 913]. For quality improvement purposes, organisations focus on four main areas; customer focus, environmental focus, process focus and innovation focus [255]. Furthermore, in a study about total quality management strategy [255] insisted on the importance of customer focus and he said that total quality management is customer oriented. [195] insisted on the importance of understanding the consumers' needs, so organisations can design their products and services

depending on customer's requirements. In the context of information systems, the importance of participation and involvement of consumers has been recognised [256, 257, 258, 259, 260]. Participation of customers can help to improve the quality of system and consumer satisfaction [261, 257, 256].

Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H10: Customer focus is positively affecting the IT performance indicators.

3.4 The element of IT – performance indicators

Researchers have suggested many approaches to evaluate the IT/IS service in terms of quality and performance:

1. A number of researchers have concentrated on the requirement of the IT/IS which include both the IT/IS that produce the information and the information that is created by the system [262, 263, 264, 265] (IT/IS product quality, systems and information).
2. A number of researchers have concentrated on the quality of services [258, 259, 260, 254] (service quality).
3. A number of researchers have concentrated on the customers attitudes using and benefiting from IT/IS products and services [266, 267, 263, 264, 265] (customer satisfaction).
4. Others have concentrated on the effects of IT/IS products and services on workers, managers, operations and business performance [262, 263] (organisational performance).

Therefore, the follow subsections will cover the four indicators of IT/IS which are: IT service quality, IT product quality, customer satisfaction and organisational performance.

3.4.1 IT service quality

[264] mentioned that service quality can enhance company *"performance and sustained competitive advantage"* [264, p. 4]. Within an organisation IT/IS plays an important role in design, construction, development and implementation of a system to assist in improving organisational performance. Nevertheless, the IT/IS includes a very important service element [265, 266, 263, 264, 265]. Quality can be identified as an *"excellence, value,*

conformance to specifications, or meeting or exceeding consumer expectations" [263, p. 184]. In fact, the IT department can help other departments on hardware and software selection, training and maintenance. In addition, in decision making IT professionals can help in gathering, analysing, and retrieving data to produce supportive information [270; 263; 265]. Furthermore, organisations should discover the challenges that face consumers in terms of service quality and not wait until complaints arise from them [264]. Converting data to information requires personal interaction between users and IT staff [263]. A researcher insisted on the importance of services quality as a measure for IT/IS success [266, 267, 270, 263, 264, 265].

3.4.2 IT product quality

In fact, both information quality and system quality should reflect in high IT/IS product quality [262, 263]. In their study about information quality (IQ) and product and service performance (PSP) [263], mentioned that the product quality should indicate that database information meets standards of accuracy, completeness, freedom-from-error and meets customers expectations. While the service quality focused on the information that consumers used to acquire the product for their use. In addition, [27, 28, 271, 272, 273, 274, 264] identified that systems quality is concerned with such issues as zero defects; performance; accessibility; reliability; flexibility; response time; integration; good user interface; ease of use; quality of documentation; and quality and maintainability of the program code. While information quality is concerned with such issues as content; relevance; timeliness; accuracy; format; completeness; and currency of information generated by an information system [271, 272, 273, 274, 264]. 275 listed the required software product characteristics that cover system and information quality:

- Functionality (e.g. suitability, accuracy, interoperability, and security);
- Reliability (e.g. maturity, fault tolerance, and recoverability);
- Usability (e.g. understandability, learnability, operability, and attractiveness);
- Efficiency (e.g. time behaviour, resource utilization);
- Maintainability (e.g. analyzability, changeability, stability, and testability); and
- Portability (e.g. adaptability, installability, co-existence, and replaceability).

3.4.3 Customer satisfaction

According to [264] customer satisfaction plays an important role in customer loyalty. Furthermore, studies about customer satisfaction noticed the relationship between customer satisfaction and loyalty [275; 277; 278; 279; 280 and 281]. Everyone in the organisation is responsible for helping consumers to remain satisfied [264]. Employees should compete to help and serve customers [282]. In their study about competing through quality [283] emphasize the importance of encouraging employees bring purpose and meaning to their job. In addition, [284] mentioned that it is essential to adopt the "right first time" philosophy which can help to change the organisational culture. Monitoring the satisfaction of the customers can help organisations to improve their services [264]. Several previous studies have developed instruments to measure customer satisfaction regarding IS [285; 286; 287 and 288]. [285] developed a measuring tool for analyzing computer user satisfaction and they discovered 39 items that can affect user satisfaction. [286] have improved Bailey and Pearson work and reduced the number of items which can affect user satisfaction. [288] identified their 12 items user satisfaction scale. While, [288] come with 3 measurement items:

1. IT/IS department provided expected IT/IS products that can meet customer expectations.
2. IT/IS department staff provided expected IT/IS services that can meet customer expectations; and
3. Consumers can make complaints about IT/IS department products and services.

3.4.4 Organisational performance

According to [289] measuring the performance of organisation is difficult, particularly when what has to be measured keeps changing. Also, measuring IT/IS influence on the whole organisation performance is difficult [262]. In future, measuring organisation performance becomes more complex [289]. In most large organisations, the process for measuring performance is internally [289]. [28] mentioned that IT/IS performance can be affected by organisational goals, strategy and customer policy. [290] illustrated that most researchers mentioned that organisations identified performance as a dependent variable. The influence of IT is dependent on management improvement, increased productivity and the organisation becoming competitive [263]. In their study about organisational performance in the technology manufacturing sector, [291] mentioned that researchers highlighted that internal factors influence the organisation performance. Many scholars found that there is a clear relationship between organisational innovation and organisational performance [292]. A previous study focused on the economic benefit of IT/IS success [293]. Furthermore, [294] insisted that the researcher's concentrated on business organisations, with only limited studies

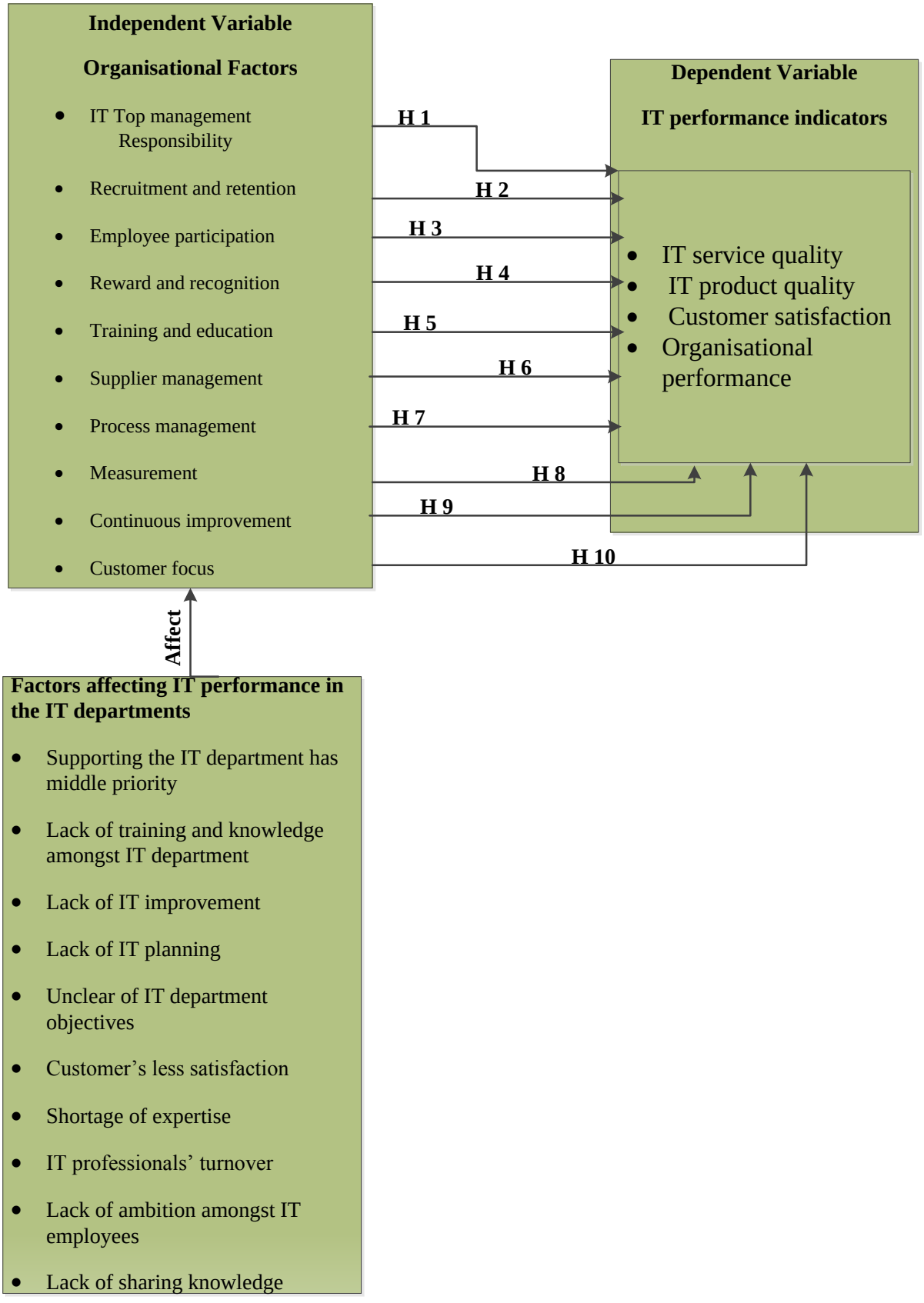
in public hospitals. Researchers have been measuring the organisational performance from different perspectives [294]. Normal profit-making enterprises are different from public hospitals, so they should measure their organisational performance from several aspects [294]. The adoption of IT/IS in healthcare organisations can involve difficulties in recognising costs and intangibles. In fact the main problem is worse when it comes to evaluate the benefits of IT/IS from a financial perspective.

3.5 Discussion and summary

Based on the literature review, a proposed conceptual framework depicting the organisational implementation factors and IT performance indicators variables and their relationship were presented. The Factors affecting IT department's performance in Saudi Arabian hospitals were also presented. Figure 3.2 below illustrates the research conceptual framework in detail.

The organisational implementation factors are the independent variables and IT performance indicators are the dependent variables. An independent variable is one that affects the dependent variable in a positive or negative way [168]. In this research, the ten organisational implementation factors were considered as independent variables. Dependent variables (outcome variables) are the variables of primary interest to the researcher (e.g. organisational performance could be dependent variables). The goal of this research was to give an explanation or prediction of variability in the IT performance. In fact, IT performance was the main variable that could be investigated. The four indicators of IT performance were considered as dependent variables. Following chapter details the research methodology that was employed in this study, and describes an operational plan that was undertaken in order to complete the study.

Figure 3.2: The research conceptual framework



Chapter 4 Research Methodology, Reliability and Validity of the Instruments

4.1 Introduction

Chapter 2 provided general background literature in the research area and Chapter 3 introduced the research framework's complex components and their attributes, which provided a guideline for proceeding with this research. This chapter describes the research methodology of the work presented in this thesis. This description is within the context of research methods that are used in the field of IT/IS. Section 4.2 discusses a variety of philosophies and their most considered characteristics. The following is highlighted the major research methods employed in the area of IT/IS. Then, the advantages and disadvantages of each method, discussion about the chosen methods for this research and their rationale are followed. The researcher identified the techniques that are used in this study, and their use.

In this research, questionnaire surveys were used to collect data from IT departments in the Saudi Arabian hospitals in order to help examine the level of organisational factors implementation in IT departments and to examine the relationships between organisational factors implementation and IT performance indicators. To measure organisational factors implementation and IT performance indicators, the researcher used two measurement instruments in the questionnaire survey. These instruments had a measurement scale (see appendix A). To help investigate the level of organisational factors implementation and examining the relationships between the organisational factors implementation and the IT performance indicators, it was very important to evaluate the reliability and validity of these instruments for several reasons. According to [24] these reasons are as follows:

- A perfect evaluation can help to provide the confidence in the empirical results which reflect the accuracy of the proposed factors and/or indicators.
- Future studies can benefit from empirically validated scales in the same field with a different population.
- Also, empirically validated scales can help practitioners to evaluate their programmes.

In this study, reliability and validity analysis will be used with these two instruments.
Section 4.10 discusses the methods used for empirically measuring the reliability and validity of the instruments scales. Section 4.11 presents the results of measuring the reliability and

validity of the organisational factors implementation and IT performance indicators instruments. Finally, a number of conclusions are presented in Section 4.12.

4.2 Philosophical Perspectives

[295] mentioned that research methods can be classified as qualitative and quantitative. However, all studies (whether qualitative or quantitative) depend on the appropriate methods and their validity. [296] insisted that quantitative research is associated with empirical positivist philosophies and that the collect data is can be used for statistical analysis. Statistical analysis will enable the researcher to find out if the data collected can support the research hypothesis or research question. Qualitative research is widely used in social studies in recent years [296]. Qualitative methods can help to gather evidence through interview record, open ended questionnaire and observation [296]. Table 4.1 shows a listing of the research methods/approaches. The terms tools, techniques and instruments are used to indicate the employed tool in particular research, such as questionnaire, observation and interviews. In this study, the researcher adopted a combination of both qualitative and quantitative approaches because of the nature of the current research.

4.3Review of Research methods

4.3.1 Research methods

According to [44] it is possible to divide the research methods into two categories as can be seen in the following table:

Table 4.1: Research Approaches/Methods (Adapted from Galliers, 1992)

Scientific	**Interpretivist**
Laboratory experiments	Subjective/Argumentative research
Field experiments	Reviews
Surveys	Action research
Case studies	Descriptive/Interpretive research
Theorem proof	
Forecasting	futures research
Simulation	game/role playing

However, [297] mentioned that in the information system society forecasting/future research, theorem/proof, game/role playing and simulation never get much attention. The literature shows that several of these methods can be used for either qualitative or quantitative research. This section explores the different research methods, their strengths, and weaknesses and features to assist in choosing methods for the current research.

There are a number of research techniques for each research method that have been employed to conduct research in information systems.

4.3.1.1 Laboratory experiments: experiments can be used in a controlled environment [159]. Furthermore, laboratory experiments can be used to discover accurate relationships between chosen variables [298]. The strength of this method is that it helps the researcher to control a small number of variables that are proposed to be examined. The weaknesses of this method, as [299] mentioned lies in their artificiality. Moreover, [44] argued that it is difficult to find an organisation to be experimented on and to provide anyone with sufficient control over variables. The current research cannot use this method because of the difficulties of controlling variables.

4.3.1.2 Field experiments: can be applied in real situations, such as society and organizations, and are very similar to the laboratory experiments. Strengths and weaknesses in the field experiments are similar to laboratory experiments [44]. In fact, because it is impossible to control the environment, so the replication becomes very difficult. Current research is focused on obtaining data in a natural setting, where there is no control on variables, so the field experiment approach is clearly inappropriate.

4.3.1.3 Surveys\questionnaires: surveys are used to help to reflect the real situation at a particular point [44]. This can help to provide a variety of viewpoints for the accurate real world. This approach is particularly desirable when phenomena must be examined in their natural setting and when the control of variables influencing the phenomena is not possible [300]. One possible disadvantage of surveys is the likelihood of bias on the part of the respondents or the researcher, or arising from the time at which the research is undertaken. In addition, surveys can produce a mountain of data in a short time for a fairly low cost. This approach sounds ideal for this research because of the large number of variables to be investigated and hence it was one of the methods employed in this research. [301] indicates that the survey is a research strategy i.e. an overall approach to undertaking research rather than a tactic or specific method. [302] state that questionnaires can be used to determine

points of view regarding ideas, activities, previous experience and future plans. Questionnaires, also, helps to cover a large number of people and obtains straightforward data which explores the perspective of the research's sample [303; 304].

[194, 305, and 302] consider that questionnaire data describes rather than explains. Table (4.2) below presents the advantages and disadvantages of using questionnaires.

Table 4.2: Advantages and disadvantages of a questionnaire (Adapted from Robson 2002)

	Advantages	**Disadvantages**
General to all surveys using respondents	○ They provide a relatively simple and straightforward approach to the study of attitudes, values, beliefs and motives. ○ They may be adapted to collect generalised information from almost any human population. ○ High amounts of data standardization.	○ Data are affected by the characteristics of the respondents. ○ Respondents will not necessarily report their beliefs, attitudes, etc. accurately
Postal and other self-administered surveys	○ Usually it is the only, or the easiest, way of retrieving information about large set of people. ○ They can be extremely efficient at providing large amounts of data, at relatively low cost, in a short period of time. ○ They allow anonymity, which can encourage frankness when sensitive areas are involved.	○ Typically have a low response rate. ○ Ambiguities in, and misunderstandings of, the survey questions may not be detected. ○ Respondents may not treat the exercise seriously.
Interview surveys	○ The interviewer can clarify questions. ○ The presence of the interviewer encourages participation and involvement.	○ Data may be affected by the characteristics of the interviews. ○ Data may be affected by interactions of interviewer/respondent characteristics. ○ Respondents may feel their answers are not anonymous and be less forthcoming or open. ○ Consume time

4.3.1.4 Case studies: A case study is an attempt to describe the relationships, which exist in reality, usually within a single organisation or organisational grouping. According to [306], a case study "*examines a phenomenon in its natural settings, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations*" [306, p. 369]. [307] mentioned that a case study is considered to be the most common qualitative method used in the real world. Interviews, questionnaires, observation and documents are used as a data collection method in a case study. Furthermore, it can be used in many different ways. Case research can be a highly structured, positivist, deductive investigation of multiple cases; it can also be an unstructured, interpretive, inductive investigation of one case; lastly it can be anything in between these two extremes in almost any combination [308]. Although the positivist approach to case research is undoubtedly the most widely used, there has been a marked increase in the use of interpretive case research [309]. A case study method enables the capture of reality in considerably greater detail and with a greater number of variables which is seen as strength in this method. Whereas, the weaknesses include the fact that its application is usually restricted to a single organisation/event and that can make it difficult to obtain similar statistically meaningful data from similar organisations. Thus, it includes the problems associated with making generalisations from individual case studies. Due to the nature of this research, the distance from the study population and time limitation, the case study approach is clearly inappropriate.

4.3.1.5 Subjective/Argumentative research: The subjective/argumentative method captures creative research and is based on opinion and speculation taken from observation. [297] insisted that this method is suitable for individual concern rather than group activity. This sort of creative process can enhance a valuable contribution to the building of theories, which can be tested by more formal means. [297] pointed out the strengths of this approach are the creation of new ideas and insights. While, the weaknesses of this approach arise from the unstructured, subjective nature of the process. Current research is based on observing and enquiries to IT/IS managers and staff rather than on speculation or opinion. Therefore, the subjective/ argumentative method is clearly inappropriate.

4.3.1.6 Action research: Action research is sometimes considered as a subset of the case study and field experiment [310]. The strength of this approach is the very practical benefits to the consumer organisations as a result, and the fact that the researcher's biases are made overt when undertaking the research. The weaknesses of this approach are almost the same as

those of case study, which was discussed earlier. Current research is based on observing and enquiries to IT/IS managers and staff rather than on speculation or opinion. Therefore, the subjective/ argumentative method is clearly inappropriate.

4.3.1.7 Descriptive/Interpretive research: Descriptive or interpretive research can be focused on the literature or on past developments, in addition to actual current happenings [43]. The ability to develop theory depends on the in-depth review of our knowledge. The advantages of this approach lie in its ability to represent reality following an in-depth self-validating process in which presuppositions are continually questioned, and the understanding of the phenomena under study is refined. The disadvantages of this approach are the researchers' ability and skills to recognise their biases and assumptions. In this research, this approach was employed to review the literature related to the subject in hand.

4.3.2 Research techniques

In the following table 4.3 there is a list of research techniques and brief description presenting of each techniques.

Table 4.3: Major research techniques (Adapted from Beynon-Davies 2002)

Research method	Key features	Use
Experiments	Experiments are normally designed in terms of hypothesised relationships between independent variables (those presumed to cause certain phenomena) and dependent variables (those presumed to indicate the presence of certain effects). To study these relationships closely all other variations in the environment have to be controlled.	Laboratory and field experiments
Documentary analysis	A form of research which relies on the collection and analysis of written documents or other forms of artefacts produced by organisations and groups	Case studies, action research, ethnographies
Questionnaires	A questionnaire is a set of formulated questions on a topic. The answers to questions in a questionnaire may be either predetermined or open. Questionnaires may be used in association with interviews or sent to a group of respondents to be completed independently.	Survey, forecasting/ future research

Interviews	This research technique is frequently used as a means of gaining data from surveys and in-depth case study of some phenomena. Interviews essentially involve either a structured or unstructured discussion with relevant persons on a certain topic.	Surveys, case studies, action research, ethnographies
Observation	This research technique is important as a means of obtaining detailed data on what people actually do. The observer may participate in the activities of the observed group or be independent of these activities. Observation may also be explicit or covert.	Case studies, action research, ethnographies

4.3.3 Selected research methods and techniques

There are a variety of information system research methods, so researchers can use one or more approaches to satisfy their research requirements. [295] mentioned that greater confidence in the results can be achieved by using multiple methods. However, several factors play an important role in choosing a single or multiple methodologies, such as the research questions, the research topic area, the researcher's background and the intended audience [312]. This research aims to examine the relationship between organisational factors implementation and IT performance indicators and to investigate the factors affecting organisational factors implementation in IT departments in Saudi Arabian hospitals, so the researcher selected descriptive/interpretive (literature review) and survey (questionnaire and interview) as research methods. The following subsection will explain the reason behind this adoption.

4.3.3.1 Literature review

Descriptive/interpretive was an appropriate method to assist focusing on literature and actual current happenings. [43] explained that descriptive study can help to collect, organise and summarize information about the issue being studied; it can help to make complicated matter understandable. Literature review can help to provide in-depth information about IT in the health care context; and it can also assist in understanding the current situation in terms of its research and its application within their fields. In other words, the literature review identified what is important for measuring the IT performance for IT department on all aspects of IT performance.

4.3.3.2 Questionnaire survey

This research used a questionnaire survey to acquire information about organisational factors implementation and IT performance indicators from a wide range of Saudi Arabian hospitals. This data can be used to examine the level of practice of organisational factors implementation in IT departments and to examine the relationships between organisational factors implementation and IT performance indicators. Researchers in the area of IT performance used questionnaire surveys to collect information (e.g. [22, 25, 15, 169]). They tested the relationship between organisational factors and performance using questionnaire surveys. [304] and [312] mentioned that questionnaire surveys can help to capture data from individuals that is difficult to observe. Furthermore, questionnaire surveys can be used to capture points of view regarding ideas, pervious experiences, future plans and activities. Using questionnaire surveys has been seen as a cheap way to collect data conducted by a single researcher [305]. Moreover, another advantage is that the respondent can complete the questionnaire when it is convenient and can check personal records if necessary. These advantages are vital for this study because other methods are costly and time consuming and that can cause problems during data analysis. However, this method has weaknesses and disadvantages. A questionnaire requires simple, easily understood questions and instructions; a questionnaire cannot help the researchers to obtain additional information or to clarify answers; also the researcher cannot control the response rates and response's fills of the questionnaire [194, 305].

4.3.3.3 Interviews

To explore the factors affecting organisational factors implementation in IT departments in Saudi Arabian hospitals, interviews were used as the second data collection technique in this research because an interview was able to make a difference. The current knowledge can help to create a full structured guide; and the choice of the interview was made because of the exploratory nature of the research. [312] stated that interview is a research method where information is obtained by direct questions or open-ended questions. Furthermore, interview is defined as "*an interaction between an interviewer and a respondent, from which the interviewer can infer whether the answers have relevance to the research questions"* [194]. In addition, an interview is dependent on the skills that the researcher already has to conduct a conversation [299]. Using the interview allows the researcher to use a variety of techniques to obtain depth answers in terms of exploration and explanation. Direct connection between the researcher and participated employees can help to check the information in terms of accuracy and relevance [299, 313]. The researcher should consider bias so that it can be

avoided during the interview process. Numbers of suggestions to help avoid bias have been mentioned in [314] the interviewer should avoid:

- Mentioning ideas related to the research nature.
- Giving any signals to the interviewee answering the questions.

Persons during the interview vary from one to another and that can be time-consuming; however, analysing data that has been gathered is also different; in fact it depends on the cooperation of the interviewee to give information. Structured, semi-structured, unstructured interviews, group interviews and focus group are seen as a type of research interview [299]. Semi-structured interviews assist the researcher to provide questions in many ways to help the interviewee provide details and speak widely to cover the questions raised by interviewer.

4.4 Review of sampling techniques

4.4.1Sampling Techniques

In the information system field, it is very important to decide the population, sample frame and the sample of organisations. Population can be identified as "*the universe of units from which the sample is to be selected*" [305] and is "*the aggregate of all cases that conform to some designated set of specifications*" [194]. Sample is "*the segment of the population that is selected for investigation*" [305]. The sample frame is "*an objective list of 'the population' from which the researcher can make his or her selections*" [299] and is "*the listing of all units in the population from which the sample will be selected*" [305]. The sampling frame should be produced from more than one source which conforms to specifications and limitations of the research [299, 315]. According to [299] the sampling frame has to be up-to-date, precise, relevant and complete. Sufficient numbers must be carefully selected and represent the population. Large samples are considered as more effective than a small one. Even though, samples between 30 and 250 cases are used with questionnaire in social research [299]. In addition, the ability of the sample to represent the population should be considered, and this ability is not related to the size of the sample but must be dependent on accuracy. The literature shows that there are many types of sampling techniques but all fall into one of two main categories: probability samples, which are often called random samples, or non-probability samples. An outline of each category is given below. Probability sampling is based on chance selection procedures. Population in this technique is known as a non-zero probability of being selected [194, 305, 299]. The advantages of this technique are in reducing error and eliminating bias in the sample [305]. Probability can be divided to four

main types: simple random sampling, systematic sampling, stratified sampling and cluster sampling [194, 305, 299, 316]. *Simple random sampling* means each individual has the chance to be chosen and selected. *Systematic sampling* has the same principles of simple random sampling with systematic selection of people or events. *Stratified sampling* means dividing the population into subgroups (groups/strata) and then taking a simple random sample in each subgroup. *Cluster sampling* means the researcher selects from groups (clusters) already existing in the target population.

Non-probability sampling is based on the subjective judgment of the researcher. In this technique some people have a greater probability of being included in the sample, though the probability inclusion for each member is unknown [305, 315]. The advantages of this technique have encouraged researchers to select it instead of probability sampling. Non-probability samples can help in terms of convenience and economics, while probability samples are expensive and time consuming [194]. Researchers choose non-probability sampling because of population [194, 316]. Non-probability sampling is divided to four types: convenience sampling, quota sampling, snowball sampling and purposive sampling [194, 305, 299, 316]. *Convenience sampling* included a population who are easily located and willing to participate. *Quota sampling* is as in *stratified sampling* where the population is divided into groups according to some fixed quota. The *Snowball sampling* technique allows the researcher to contact a small group of people who are interested in the study's topic and that also allow the researcher to establish contact with others. *Purposive sampling* is the technique where the researcher selects the sample with a specific purpose in mind. As the accuracy of a sample depends mostly on the sampling frame, the researcher must ensure that there is a high degree of correspondence between a sampling frame and the entire population. In this study, the procedures adopted for choosing the accurate sampling frame are outlined below.

4.4.2Research sample selection

Selecting the research sample is not easy, so the researcher has to focus on characteristics of the organisation rather than on the management description. Selection processes included the Saudi Arabian hospitals both public and military. Hence, the sample will include hospitals of different sizes. In an attempt to select a representative sample of Saudi Arabian hospitals, the researcher first contacted the Health Ministry, Defence Ministry, Interior Ministry, National Guard and King Faisal specialist hospital and research centre which the chosen hospitals

belong to. The response of these agents was very slow and limited. However, the researcher tried alternative methods using the following steps:

1. The researcher phoned directly those hospitals outside Riyadh city to investigate if they have an IT department.
2. Then, the researcher visited directly those hospitals inside Riyadh city to make sure they have an IT department.

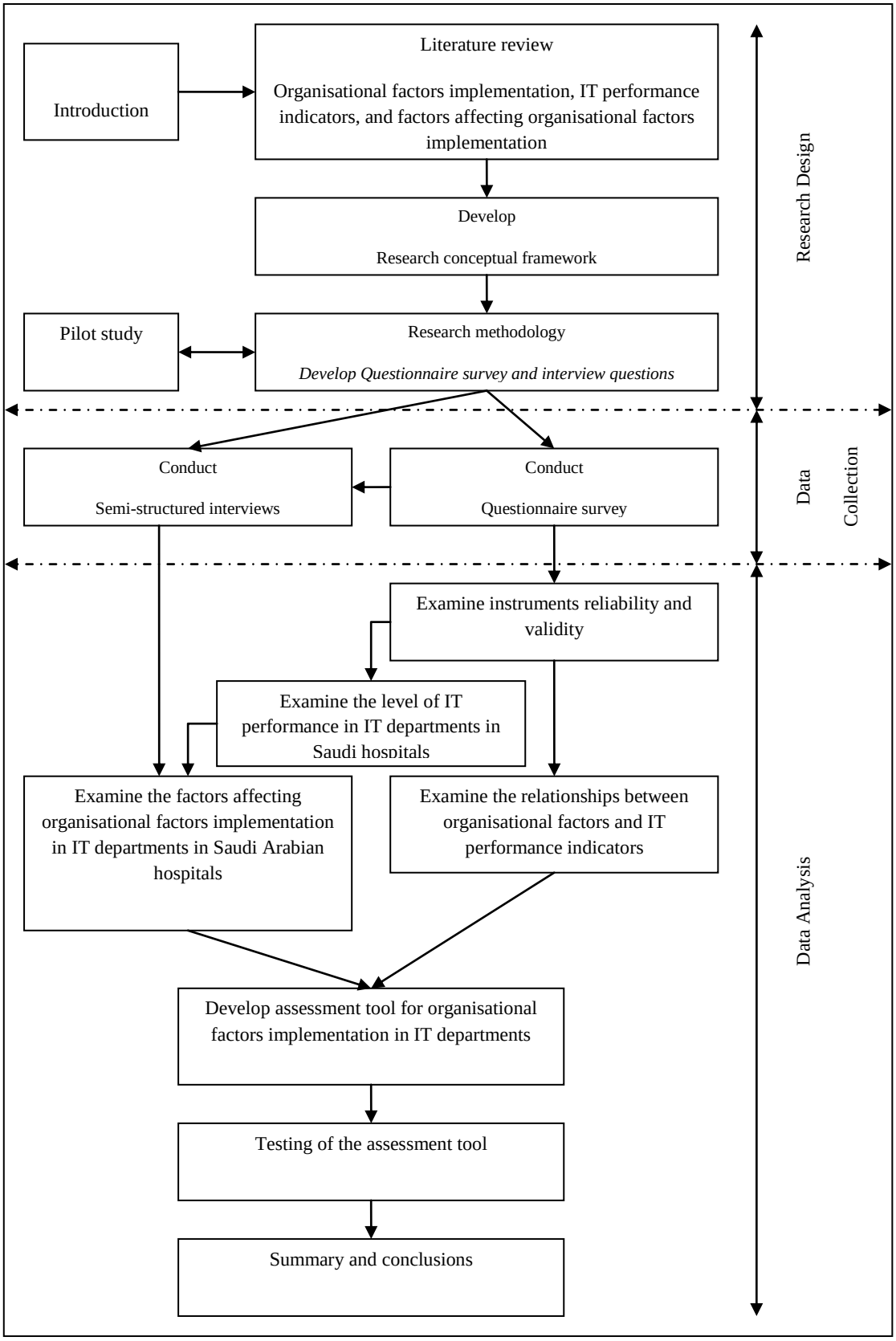
In fact, all hospitals included in this study have their own IT department. The study asked the IT managers and supervisors in those hospitals to answer the questionnaire.

4.5 Research design

As the first step in this study, the researcher had to decide the type of research: confirmatory or exploratory research. According to [317] cited in [56] confirmatory studies focus on hypotheses testing. A hypothesis testing research identified the nature of certain relationships or establishes the differences within groups or the independence of two or more factors in a situation. While, an exploratory study can explain possible relationships in a general form, and the data can identify the nature of these relationships.

To study the relationship between organisational factors implementation and IT performance indicators in Saudi Arabian hospitals, the research will be based on both exploratory and confirmatory research type. There is no information available about the situation in the past. Therefore, this research identified possible relationships in a general form between organisational factors implementation and IT performance indicators. In addition, the research hypotheses will be tested. Research design is a plan which includes ideas, for example, research approach, research framework, research sample, and the tools and procedures to be used in data collection and analysis [43].

Figure 4.1: Research design



4.6 Developing the research conceptual framework

The research conceptual framework includes three components:

1. The first component is the organisational factors implementation which includes the issues of top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement, and customer focus.
2. The second component is the IT performance indicators which include IT service quality, IT product quality, customer satisfaction and organisational performance.
3. The third component is the factors that may affect organisational factors implementation in IT departments in Saudi Arabian hospitals.

4.7 Questionnaire survey administration

4.7.1 The questionnaire survey development

Many researchers have used questionnaire surveys. For example, [22, 25, 15, and 169]. They developed their questionnaires to assist them in data collection, so these questionnaires were developed based on the research's aims and objectives. In fact, these questionnaires were examined in terms of meeting the research requirements and in some cases researchers had to develop new research questionnaires.

In order to evaluate the relationships between organisational factors implementation and IT performance indicators, the questionnaire survey was aimed to measure the respondent's perception. Therefore, the questionnaire should cover the scope of these two areas. The developed items to measure organisational factors implementation should be based on the concept of organisational factors and the ten organisational factors implementation. Furthermore, item development should cover the organisational factors implementation practices which are presented in chapter 3. However, items developed for measuring IT performance indicators should be based on the concepts of the four indicators also presented in chapter 3. To develop the measurement items of the organisational factors and IT performance indicators in the IT setting, the following process was used:

- From the information system literature, add related items of organisational factors.
- In the IT setting, remove items that are not applicable in each factor; and
- For better understanding, respondents should be provided with examples from the literature which can describe each item.

The organisational factors implementation and IT performance indicators instruments were structured questionnaires. Questions in these two instruments were descriptive. In these two instruments respondents consider their hospital's practice of organisational factors implementation and IT performance indicators. (See Appendix A).

These questions can help to obtain the respondents' degree of agreement or disagreement. The questionnaires were divided into four sections as follows:

1. Section one was responsible for gathering information about the respondents and their background (nationality, gender, age, educational level, field of study, position, and years of experience).
2. Section two focuses on the hospital and IT characteristics (hospital size, IT department size, and information system development).
3. Section three contained the IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance).
4. Section four covered the organisational factors implementation (top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement and customer focus).

4.7.2 The pilot study

According to [304] a questionnaire instrument should be pre-tested to discover any possible shortcomings before it is finally administered. A pilot study is an essential step to identify any problems that can affect the proposed method of data collection. It can help to assess the research questions or hypotheses; and may lead to improving them or in developing new ones. A pilot test can assist the researcher in terms of approaches, thoughts and indications. It can make sure the words in the questionnaire are understandable and clear. In addition, the Arabic language was more convenient for some respondents. Therefore, the researcher translated the English version of the questionnaire into Arabic (see Appendix B). Some English terms were provided with additional explanations to make it easier for respondents to understand it.

After that, both versions were sent to five IT professionals (two IT managers, two IT employees and one IT leader). They were looked at for the vocabulary, that items were clear, any biased wordings, the ability to answer these questions and their comments and suggestions to improve the questions. In reality, IT employees find it difficult to answer most

of these questions because it is directed to higher level management. Comments and suggestions from others were received and questionnaires developed according to their comments. For instance, they suggested providing some explanation in Arabic to help respondents understand terms clearly.

4.7.3 Data collection procedure

When the questionnaires were ready for distribution, the researcher contacted respondents by phone first, and then visited every IT department himself to make sure the questionnaire reached the right person. The advantages are that the response rate will improve and in the case of missing data, researcher can ask the respondent to complete the missing information. In some cases, the respondent may refuse to fill in the questionnaire because the higher level management in the hospital not allowed them to do it. In fact, that can waste effort and time, so the researcher had to visit some hospitals many times to help complete this questionnaire. The researcher distributed 114 questionnaire forms to 114 IT managers, supervisors and IT division managers. The response rate can be influenced by many factors, such as topic, sample and the length of questionnaire [304, 316]. Time is an important factor which can influence the response rate. The returned completed forms were 82 with response rate 71.9%.

4.7.4 Statistical data coding and analysis

4.7.4.1 Data coding

For the data coding the researcher used one strategy for coding the questionnaire. Coding starts with number 1 for the first category and 2 for the next and so on. In the following example, the question was about the IT/IS employees in the hospital:

How many IT/IS employees are there in your hospital?

- <10 employees
- 11-20 employees
- 21-30 employees
- 31-40 employees
- >40 employees

The answers were coded (<10 employees) was coded as 1, (11-20 employees) was coded as 2, (21-30 employees) was coded as 3, (31-40 employees) was coded as 4 and (>40 employees) was coded 5.

The organisational factors implementation and IT performance indicators scales use a five-point Likert response scale which indicates the respondents agree or disagree with every statement. This can lead to higher statistical variability. The five-point response scale was 'strongly disagree' coded as (1), 'disagree' coded as (2), 'neutral' coded as (3), 'agree' coded as (4), and 'strongly agree' coded as (5).

4.7.4.2 Statistical data analysis

After the answers were coded, the researcher used the Statistical Package for Social Sciences (SPSS). Two types of statistical analysis were used in this research, descriptive and inferential statistics. With descriptive statistics the data processed is easy to understand such as frequencies and averages. While, inferential statistics tries to identify relationships between variables such as ANOVA and correlation [Sekaran 1992; Cohen et al. 2000].

During the analysis, many techniques were used; descriptive statistics (frequencies, percentage, mean and cross-tabulation), ANOVA, Pearson correlation and Multiple regression. Following subsections explain these techniques.

4.7.4.2.1 Descriptive statistics

In this study, the researcher used a frequency analysis to create a table of frequency, percentage and mean which can help to provide the value of individual variables. In addition, this table provided descriptive information such as frequency, percentage and mean of response. It was used in this research to identify any relationships between IT managers, hospital characteristics and IT/IS characteristics variables.

4.7.4.2.2 ANOVA

The one-way ANOVA can assist in testing the differences in a single interval dependent variable among a variety of groups (e.g. two, three or more groups) which are formed by the categories of a single categorical independent variable [17]. The 'Sig.' or '*p*' probability value of a one-way ANOVA indicates whether the difference between groups is 'statistically significant'. The probability value of .05 or less on the F test leads the researcher to conclude the effect is real and not due to chance of sampling, however, probability values do not identify the degree to which the two variables are associated with one another. If F is significant, then the researcher concludes that there are differences in group means, indicating that the independent variable has an effect on the dependent variable. A one-way ANOVA was used to examine the variance between means of IT managers, hospital characteristics and

IT/IS characteristics variables in response to organisational factors and IT performance indicators. Therefore, the IT managers, hospital characteristics and IT/IS characteristics variables were considered as *'independent variables'* and both organisational factors implementation and IT performance indicators were considered as *'dependent variables'*. This test can identify the significant relationships between those independent variables and the dependent variables and those who do not have a significant relationship. Furthermore, as a result, the researcher can identify those independent variables which have a significant relationship with the dependent variables as factors affecting organisational factors implementation in IT department in Saudi Arabian hospitals.

4.7.4.2.3 Pearson correlation

[318] state that the Pearson correlation test can help to measure the strength of the relationship between two variables which vary from -1 to +1, while, 0 indicates no relationship and 1 indicates a perfect relationship. The Pearson correlation is used to examine if there is a correlation between one set of interval data (e.g. organisational factors implementation) and another set of interval data (e.g. IT performance indicators). Furthermore, they mentioned using a correlation coefficient as the size conjunction of the direction of the strength. In addition, [302] suggests interpretation of correlation coefficient (effect size) as follows:

<+/- 0.1 weak

<+/- 0.3 modest

<+/- 0.5 moderate

<+/- 0.8 strong

>= +/- 0.8 very strong

The 'Sig' or *'p'* probability value of Pearson correlation (r) indicates whether the relationship between the two variables is 'statistically significant'. The probability value of .05 or less on the correlation coefficient (r) so the relationship is real and not due to chance of sampling. If r is significant, then there is a significant relationship between the two variables.

In this research, the Pearson correlation was used to examine the relationships between the organisational factors implementation and IT performance indicators. Moreover, the

correlation coefficients can be used between every organisational factors implementation and every IT performance indicators to identify the relative importance of each organisational factors implementation by assigning weights to each one and use it in developing the organisational factors implementation in IT department assessment instrument.

4.7.4.2.4 Multiple Regression

Multiple regression can help to set independent variables which are able to explain a proportion of the variance in a dependent variable at a significant level (through a significance test of the multiple correlation or the coefficient of multiple determination (R^2)). In addition, by comparing beta weights, multiple regression can be used to assist in the establishment the predictive importance of the independent variables [318; 316]. Enter and Stepwise are type of methods for Multiple Regression.

Enter regression method is used to calculate the percentage of the variance in the dependent (IT performance indicators) which are explained by the independents (organisational factors implementation), as measured by the R-Square. Stepwise regression can target the independent variables before they are entered into the model by employing a systematic screening. So, in step one the independent best correlated with the dependent is included in the equation. In the second step, after being entered the highest partial correlation independent that remains with the dependent, which controls the first independent. At each step, this process is repeated for previous entered independents, and this continues until the remaining independent stop increasing R-squared by entering all variables or significant amounts are shown.

In this research, Enter and Stepwise were used to explore which of the organisational factors implementation had a significant effect on the IT performance indicators. Furthermore, to develop the assessment tool for organisational factors implementation in IT departments in Saudi Arabian hospitals, the results of the Stepwise regression analysis can be used to assign weight to each organisational factors implementation.

4.8 Semi-structured interviews administration

This method was used in this study to collect qualitative data in terms of the factors affecting organisational factors implementation in IT departments in Saudi Arabian hospitals. Open-ended questions were used in this semi-structured interview while interviewing the stakeholders in the hospital. A semi-structured interview allows the researcher flexibility to

explore the organisational factors practices employed by the IT departments. In addition, a semi-structured interview can assist the researcher in gaining in-depth understanding of the real situation about the factors influencing organisational factors implementation in IT departments.

One member of academic staff in King Abdulaziz Sciences and Technology City in Riyadh and one IT professional assisted in checking the interview questions in order to ensure that the questions were clear and avoid any ambiguity which could help the researcher to collect the right information (see Appendix B). The participating hospitals in the questionnaire survey were chosen to apply this semi-structured interview by conducting interviews with stakeholders inside the hospital. The researcher became aware of problems that may face this study such as the time required for each interview.

4.8.1 Sample determination

The sample of the hospitals was a very important issue to be decided, so the researcher considered the participation in this phase would be on the hospitals who participated in the questionnaire survey, which would make it easier for the researcher to obtain the in-depth information required for this study. Of the 16 hospitals that completed the questionnaire, only 10 hospitals agreed to participate in the interview phase. The researcher conducted interviews with fourteen managers in many areas in these hospitals.

4.8.2 Data collection procedure

Fourteen interviews with managers were conducted in many areas between January and March 2011. They had years of experience in their field. The aim of the interview was explained to the interviewee during a telephone call. All of them agreed to participate in this study. Then, the appointments were made. During the interview they all used Arabic language. The researcher explained that for the respondents the information in this study would only used for research purposes. The assurance of the anonymity was given to the respondents. Also, assurance was repeated at the beginning of each interview. The researcher encouraged interviewees to speak about their points freely. Changes of the interview time or cancelations were major problems that faced the researcher during this phase. Interruptions because of some urgent event during the interview were another difficulty that the researcher had to face.

4.9 Evaluating organisational factors implementation

Organisational factors implementation assessment tool would be based on the previous stage. Questionnaire survey and interviews data analysis helped in developing this tool. This tool can suggest improvements by assessing the strengths and weaknesses of the organisational factors implementation in IT departments.

[319] defines evaluation as "*the systematic collection of information about the activities, characteristics, and outcomes of programs for use by specific people to reduce uncertainties, improve effectiveness, and make decisions with regard to what those programs are doing and affecting*". [320] defines evaluation as "*An evaluation is action oriented. It is conducted to determine the value or impact of a policy, programme, practice, intervention, or service, with a view to making recommendations for change*".

4.9.1 Evaluation types

According to [320] the simple typology of evaluation is based on formative and summative evaluation. Formative can be used to improve the programmes whereas, summative can be used to help making a decision about the programme's effectiveness [319]. Through formative evaluation, descriptive and in-depth information about the strengths and weaknesses of programmes will be provided [321]. Comparison between formative and summative evaluation follows in Table 4.4.

Table 4.4: Formative and summative evaluation comparison (Robson 2002)

	Formative	**Summative**
Main evaluation approach	Evaluation of processes	Evaluation of outcomes
Main audience	Program team	Policy/decision makers sponsors
Main tasks	Clarifying goals Gathering information on program processes and implementation, problems and progress	Documenting outcomes and implementation
Methodology	Typically mainly qualitative	Typically mainly quantitative
Data collection	Ongoing	Usually mainly towards the end
Reporting	Several occasions, mainly through meetings and discussions Emphasize on suggestions for change and development	Formal written report at end Emphasize on outcomes and their implications
Your credibility depends on	Demonstrated understanding of program and rapport with team	Technical competence and impartiality

In terms of data collection techniques [301] mentioned that "*Observation and interviewing (often of an informal type) are commonly used, together with the analysis of existing data such as program materials and records of meeting. This appears to many evaluators to be the most appropriate way of capturing the complex and fluid stream of events taking place when a very simple program involving people takes place*". [320] stated that "*it is rare to find an evaluation study based on only one method of data collection. Normally a range of techniques from the core of an overall research strategy, thus ensuring that the information*

*acquired has the depth and detail necessary to enable the evaluator to produce a report from which conclusions can drawn with certain degree of confidenc*e".

In this research, the goal of the evaluation process is to investigate to what extent IT departments are practicing the identified organisational factors implementation elements. The study adopted the formative evaluation type and observation and interviews will be used as data collection techniques.

4.9.2 The evaluation procedure for organisational factors implementation in IT departments

The following steps will identify the evaluation process:

1. **Design the assessment tool**: an assessment tool was developed to help IT departments evaluate their organisational factors implementation easily. This tool was built of ten organisational factors implementation and 48 practices. By suggesting areas to improve the organisational factors implementation, this tool can help to identify the strengths and weaknesses.
2. **Arrange for evaluation process:** two hospitals agreed to participate in this process. First, a telephone call was made to each IT manager to explain the aim of this interview. They were willing to cooperate in this study. Appointments for the telephone interview were set. They all refused to record the interview, because they should have permission from the top management in the hospital. The assessment tool helped in drawing the questions (see Appendix D) and the measurement criteria (see Appendix E).
3. **Calculating the overall scores:** after the interview, each organisational factors implementation will have its own compliance values (0, 1, 2, or 3). The score for each organisational factor is the sum of all its items divided by the total score for each factor and then multiplied by its weight. The researcher calculated the overall score for a hospital by summing up all organisational factors implementation scores. This is to provide a better understanding of the result.

4.10 Instruments Measurement Methods

4.10.1 Reliability

To support a measure of validity, the reliability of factors should be determined [322]. Reliability is defined as the degree of consistency of a measure [159]. According to [323] it is "*a statement about the stability of individual measures across replications from the same source of information (within subjects in the case)*". To assess reliability four methods are frequently used as follows:

1. The test-retest method.
2. The alternate-form method.
3. The split-halves method and;
4. The internal consistency method [322].

Test-retest reliability is using different times with the same set of respondents to complete a survey to see if the instrument can produce the same scores every time. *Alternate-form* reliability is using the same set of respondents to complete two alternate forms of the measurement instrument at different times. *The split-halves* method divided the sample randomly in half and then the findings from both halves are compared. According to [322] *internal consistency* is using a psychometric measure to assess reliability of survey instruments and scales. It can work as an indicator to measure the same concept with different items. Also, it can measure by using a reliability coefficient, for example, Crobach's alpha [324]. When the alpha coefficient is greater than 0.70 the scale is considered reliable. However, in the exploratory study, the reliability coefficient of 0.60 will be sufficient [322].

For the field studies, it can be seen that the first three methods have several limitations. For example, the limitations of using the same group of people with two independent administrations which require two alternate forms of the measuring instrument. Internal consistency works well in the field studies and that is because there is no need for repeating or splitting of items. It needs only one administration. It works as a general form of reliability estimation [322]. Therefore, to evaluate the reliability of survey instruments in this research the internal consistency will be used.

4.10.2 Item analysis

[322] came up with a method which considers the correlation of each item with each scale. The mean of scores of the items should be computed to obtain the scale-score. When the correlation coefficient is higher, that means the items belong in the scale. Whereas, if the coefficient is less than 0.30, that means the item is dropped from the scale [316]. In the quality management field measuring the implementation factors, [23], used this method to evaluate the assignment of items to scales.

4.10.3 Validity

Validity is an instrument measure and their degree is also the target of the measure. Construct validity, content validity and criterion-related validity are common methods used to evaluate validity of a measurement instrument [325; 326]. The following subsections focus on the methods that are used to validate the research instruments.

4.10.3.1 Construct validity

It is used to measure the items in a scale; all measure the same construct [21]. It is a measurement between constructs [327]. Factor analysis can be used to consider some ways to summarise the information into a smaller set, while (factor analysis) refers to several statistical techniques [325; 316]. The ten organisational factors implementation and the four IT performance indicators can be evaluated by using principle components to analyse the items of each of the scales. Eigenvalue rule [325] and scree plot test [328] are the most used criteria to help deciding how many factors to extract. If the eigenvalue factors greater than 1.0 are considered significant, while factors with an eigenvalue of less than 1.0 are considered insignificant and are disregarded [318]. Scree plot test is related to a subjective examination of the plot of eigenvalues for each successive factor, under an ‘elbow’ in the plot. Each item has its own final loading on each factor. Therefore, these loadings can be the correlations between factor and items, so the square of a loading is seen as the amount of variance. In his study [325] mentioned that loading of those factors could be considered very significant if they were greater than 0.50, more important than those with greater than 0.40 and significant for those with greater than 0.30. The researcher in this study, decided to use both of eigenvalues namely: 1. Factor loading of 0.30. 2. Cut-off points of the scree plots.

4.10.3.2 Content validity

Content validity can be established from the specialist judges and literature review [323]. The content validity evaluation includes a review of the survey’s contents. The reason behind that is to ensure that every element required is included, and to avoid everything that can be

harmed. Therefore, the researcher evaluated the content validity of the instruments by the literature review and the IT professionals during the pilot study.

4.10.3.3 Criterion-related validity

It is concerned with the independent measure and their related measuring instrument in a relevant criterion. In terms of quality management [21] identified criterion-related validity as "*a measure of how well scales representing the various quality management practices are related to measures of quality performance (the criteria)*". The criterion-related validity can be evaluated by the exploration of the multiple correlation coefficients computed for the ten measures of organisational factors and four measures of IT performance.

4.11 The instruments' reliability and validity analysis

In this study, to discover the possible relationships between the research variables, reliability and validity should be examined and evaluated. In addition, to understand the reliability and validity of measurement instruments item analysis, reliability analysis, construct validity, content validity and criterion-related validity should be examined. SPSS was used during the evaluation process.

4.11.1 Reliability

To measure the organisational factors implementation for Saudi Arabian hospitals, ten scales were used. Furthermore, four scales were set up to measure IT performance indicators. Appendix A provides the items for measure. The data was entered into the computer which analysed all scales used in this study.

Table 4.5 shows a list of Cronbach's alpha for the organisational factors implementation scales. The number of measurement items, their scales and Cronbach's alpha can be seen from this table. Also, the table shows that the reliability coefficient ranged from 0.915 to 0.928, which indicates that there some reliable differences between scales. Therefore, the instrument developed to measure organisational factors implementation was reliable. In addition, since not one of the Cronbach's alpha was below .70, there was no need to maximize the alpha coefficient [21].

Table 4.5: Overall internal consistency of organisational factors scales

Scales	Number of items	Cronbach's alpha
1 Top management responsibility	7	.918
2 Recruitment and retention	3	.925

3 Employee participation	6	.915
4 Reward and recognition	5	.920
5 Training and education	3	.926
6 Supplier management	3	.928
7 Process management	5	.915
8 Measurements	8	.919
9 Continuous improvement	3	.921
10 Customer focus	5	.918

Table 4.6 shows a list of Cronbach's alpha for the IT performance indicators scales. The number of measurement items, their scales and Cronbach's alpha can be seen from this table. Also, the table shows that the reliability coefficient ranged from 0.794 to 0.826, which indicates that there some reliable differences between scales. Accordingly, the instrument developed to measure organisational factors implementation was reliable. In addition, since not one of the Cronbach's alpha was below .70, there was need to maximize the alpha coefficient [21].

Table 4.6: Overall internal consistency of IT performance indicators scales

Scales	**Number of items**	**Cronbach's alpha**
1 IT Service Quality	5	.794
2 IT Product Quality	6	.820
3 Customer Satisfaction	3	.816
4 Organizational Performance	4	.826

4.11.2 Item analysis

Table 4.7 shows a list of the correlation matrix for the organisational factors scales and the measurement items. While, table 4.8 lists the correlation matrix for the IT performance

indicators scales and measurement items. As can be seen from these tables all items come with high correlations in the scales. [316] suggested that the cutoff should be above 0.3 which all correlations achieved. In the following example, it can be seen that item 3 in scale 2 (Recruitment and Retention) had correlations of .378, .787, .487, .427, .430, .364, .544, .455, .396, and .454 with the organisational factors scales. The value of scale 2 (Recruitment and Retention) was the mean of the three items, the high correlation between scale 2 and its item 3 (.787) was expected. Furthermore, item 3 showed that other scales had smaller correlations, so that item 3 in scale 2 had been assigned appropriately to this scale. Other items were examined in a similar way.

Table 4.7: Item to scale correlation for organisational factors scales

Factor	**Item No.**	**Scale**									
		1	2	3	4	5	6	7	8	9	10
Top Management Responsibility	1	**.685**	.362	.411	.423	.309	.438	.454	.506	.396	.440
	2	**.854**	.430	.479	.514	.315	.447	.460	.598	.522	.513
	3	**.876**	.506	.491	.538	.421	.370	.501	.598	.464	.566
	4	**.853**	.457	.584	.531	.418	.489	.507	.583	.537	.584
	5	**.837**	.511	.608	.416	.338	.447	.682	.605	.616	.642
	6	**.788**	.661	.624	.454	.409	.317	.664	.598	.510	.641
	7	**.788**	.514	.693	.442	.323	.367	.616	.712	.569	.582
Recruitment and Retention	1	.375	**.742**	.288	.374	.308	.116	.356	.329	.338	.303
	2	.686	**.874**	.655	.601	.474	.386	.643	.655	.554	.576
	3	.378	**.787**	.487	.427	.430	.364	.544	.455	.396	.454
Employee Participation	1	.534	.497	**.699**	.425	.378	.323	.648	.542	.482	.488
	2	.576	.530	**.774**	.556	.458	.445	.605	.627	.555	.607
	3	.632	.483	**.883**	.538	.484	.326	.662	.662	.598	.591
	4	.510	.361	**.801**	.511	.515	.396	.590	.543	.469	.519

	5	.606	.508	**.809**	.532	.404	.384	.654	.649	.629	.581
	6	.434	.476	**.798**	.741	.623	.429	.626	.587	.580	.600
Reward and Recognition	1	.564	.555	.710	**.835**	.612	.408	.561	.640	.535	.514
	2	.399	.442	.496	**.853**	.714	.442	.382	.476	.374	.397
	3	.505	.471	.649	**.853**	.688	.447	.528	.614	.523	.554
	4	.499	.508	.552	**.879**	.647	.436	.444	.618	.418	.438
	5	.539	.536	.583	**.854**	.679	.386	.532	.595	.457	.450
Training and Education	1	.334	.349	.518	.698	**.922**	.448	.398	.358	.306	.383
	2	.459	.502	.633	.703	**.910**	.425	.578	.542	.473	.469
	3	.378	.521	.501	.726	**.886**	.361	.420	.419	.360	.312
Supplier Management	1	.448	.364	.442	.473	.439	**.875**	.470	.555	.516	.529
	2	.445	.389	.463	.443	.435	**.913**	.402	.552	.536	.464
	3	.411	.374	.379	.359	.387	**.790**	.453	.592	.506	.460
Process Management	1	.623	.460	.655	.479	.368	.448	**.805**	.686	.638	.638
	2	.537	.484	.654	.360	.340	.342	**.830**	.613	.615	.619
	3	.531	.549	.665	.440	.416	.377	**.871**	.675	.596	.633
	4	.542	.571	.660	.533	.482	.452	**.825**	.665	.628	.728
	5	.544	.524	.574	.499	.461	.467	**.712**	.682	.582	.633
Measurement	1	.570	.560	.612	.571	.442	.578	.713	**.838**	.675	.605
	2	.572	.521	.711	.615	.462	.423	.723	**.821**	.702	.651
	3	.590	.513	.701	.547	.386	.505	.742	**.841**	.698	.622
	4	.649	.482	.582	.495	.280	.555	.656	**.853**	.647	.675
	5	.732	.505	.682	.648	.422	.583	.738	**.908**	.700	.671

	6	.706	.552	.716	.698	.496	.508	.743	**.898**	.681	.644
	7	.674	.489	.650	.555	.375	.671	.725	**.869**	.755	.663
	8	.492	.439	.428	.506	.403	.613	.489	**.720**	.538	.450
Continuous Improvement	1	.587	.431	.571	.480	.372	.639	.627	.689	**.906**	.659
	2	.617	.384	.611	.486	.324	.588	.683	.751	**.913**	.609
	3	.488	.488	.652	.458	.402	.379	.685	.675	**.830**	.592
Customer Focus	1	.520	.436	.630	.479	.353	.515	.690	.660	.588	**.824**
	2	.628	.493	.499	.299	.360	.410	.657	.589	.608	**.799**
	3	.547	.517	.538	.558	.490	.443	.536	.602	.564	**.731**
	4	.457	.299	.557	.463	.309	.390	.592	.469	.440	**.720**
	5	.498	.320	.449	.231	.264	.465	.576	.438	.438	**.721**

Table 4.8: Item to scale correlation for IT performance indicators scales

Factor	**Item No.**	**Scale**			
		1	2	3	4
IT Service Quality	1	**.702**	.611	.482	.462
	2	**.821**	.633	.500	.515
	3	**.813**	.579	.592	.528
	4	**.701**	.455	.393	.393
	5	**.709**	.429	.390	.451
IT Product Quality	1	.589	**.850**	.659	.540
	2	.657	**.861**	.611	.508
	3	.601	**.850**	.575	.496

	4	.729	**.879**	.646	.587
	5	.665	**.892**	.668	.545
	6	.484	**.739**	.602	.378
Customer Satisfaction	1	.596	.727	**.883**	.533
	2	.584	.595	**.835**	.622
	3	.413	.539	**.790**	.443
Organisational Performance	1	.516	.523	.568	**.826**
	2	.602	.515	.595	**.909**
	3	.505	.471	.542	**.889**
	4	.599	.606	.519	**.896**

Since tables 4.7 and 4.8 show that all items had high correlations with their scales, it comes to the conclusion that all items had been appropriately assigned to scales and that no items should be deleted.

4.11.3 Construct validity

SPSS programme assisted in providing the factor analysis and each scale was analysed separately by using principle component analysis. The following tables 4.9 and 4.10 show the detailed results.

All items in table 4.9 had a high factor loading greater than 0.35 on factor 1. In addition, all items in 10 of the 10 scales formed a single factor. Eigenvalue, scree plot test and factor loading were used in this study to help to decide the number of factors to extract.

Table 5.6 shows that all items had a high factor loading greater than 0.50 on factor 1. All items in 4 of the 4 scales formed a single factor. Again, Eigenvalue, scree plot test and factor loading were used in this study to help to decide the number of factors to extract.

Table 4.9: Results of factor analysis for organisational factors scales

Scales	Factor Number	Eigenvalues	Factor loading								% of Variance
			Items								
			1	2	3	4	5	6	7	8	
1	1	5.637	.685	.854	.876	.853	.837	.788	.788		70.464
2	1	2.938	.742	.874	.787						73.461
3	1	4.802	.699	.774	.883	.801	.809	.798			68.604
4	1	4.656	.835	.835	.853	.879	.854				77.593
5	1	3.463	.922	.910	.886						86.582
6	1	3.222	.875	.913	.790						80.555
7	1	4.284	.805	.830	.871	.825	.712				71.392
8	1	6.716	.838	.821	.841	.853	.908	.898	.869	.720	74.620
9	1	3.347	.906	.913	.830						83.677
10	1	3.899	.824	.799	.731	.720	.721				64.986

Scale 1: Top management responsibility; Scale 2: Recruitment and retention; Scale 3: Employee participation; Scale 4: Reward and recognition; Scale 5: Training and education; Scale 6: Supplier management; Scale 7: Process management; Scale 8: Measurements; Scale 9: Continuous improvement; Scale 10: Customer focus.

Table 4.10: Results of factor analysis for IT performance indicators scales

Scales	Factor Number	Eigenvalues	Factor loading						% of Variance
			Items						
			1	2	3	4	5	6	
1	1	3.836	.702	.821	.813	.701	.709		63.928

2	1	5.308	.850	.861	.850	.879	.892	.739	75.834
3	1	3.104	.883	.835	.790				77.602
4	1	4.104	.826	.909	.889	.896			82.082

Scale 1: IT service quality; Scale 2: IT product quality; Scale 3: customer satisfaction; Scale 4: organisational performance.

4.11.4 Content validity

The evaluation of content validity cannot be shown numerically. The high review of the literature review and the evaluations of the IT/IS field by professionals and academicians argued that the ten scales for measuring organisational factors implementation and the four scales for measuring IT performance indicators had content validity. During this study, chapter 2, chapter3 and chapter 4 illustrated the reviewed literature review and the collection of items and their scales that were used in this research.

4.11.5 Criterion-related validity

In this research, the criterion-related validity used to examine the multiple correlation coefficient was computed for the ten measures of organisational factors namely, top management support, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement and customer focus and IT performance indicators namely, IT service quality, IT product quality, customer satisfaction and organisational performance. The multiple correlation coefficient computed for the ten organisational factors implementation and the four IT performance indicators was 0.604(Adjusted R = .505, F=6.104, *P*= .000). This means that the organisational factors implementation explains 0.0% of the variance in IT performance indicators. As a result, the ten factors have a high degree of criterion-related validity [302].

4.12 Summary

This chapter discussed the methodologies in information systems research. Also it provided an outline of the population and sampling techniques. That was followed by the research design based on the research questions and theoretical framework hypothesized in this research. Then, the questionnaire survey and the semi-structured interviews were described. This chapter provides in detail the reliability and validity of the organisational factors

implementation and IT performance indicators instruments. Item, validity and reliability have been analysed for the two instruments of organisational factors implementation and IT performance indicators and they have all been tested and validated for their reliability and validity. It can be concluded that these instruments are reliable and valid, and that the obtained data will be used for data analysis. The following chapters will use the data from these two instruments, chapter 6 examines the level of practice of organisational factors implementation and the level of IT performance indicators and chapter 8 examines the relationships between the organisational factors and IT performance indicators.

5.1 Introduction

This chapter is to explore the level of practice of IT departments in Saudi Arabian hospitals. Section 5.2 presents the descriptive analysis for the respondent's variables (nationality, gender, age, educational level, field of study, position and experience). Section 5.3 presents the hospital and IT department profile variables (numbers of employees in hospital, numbers of IT employees and information system development). Section 5.4 presents the level of IT efficiency-performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance). Section 5.5 presents the effect of the respondents' variables and the hospital and IT department on the performance indicators and organisational factors. Section 5.6 presents the level of practice of IT efficiency-implementation factors (top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continues improvement and customer focus).

5.2 Respondents' descriptive statistics

Following the data entry using the SPSS programme, descriptive statistics were used to produce frequencies analysis and to provide a general idea about the nature of the data collected. In this study, frequencies analysis was used to produce percentage and means of the respondents. To detect any relationships between respondents, organisational characteristics and IT characteristics variables cross-tabulation were used. Descriptive statistics were used to generate respondents' profile, organisations' characteristics and IT characteristics.

5.2.1 Respondent nationality

Table 5.1 shows the frequency distribution of IT workers nationality. Forty-five (54.9%) of the respondents were Saudis and thirty-seven (45.1%) were Non-Saudis. As in other organisations in Saudi Arabia health care sector positions are more attractive for foreign IT workers because these organisations afford them lots of benefits, such as health insurance, travel tickets and property. Furthermore, foreign IT workers will accept lower salaries although they have more practical experience.

Table: 5.1 respondent nationalities

Nationality	Frequency	Percent
Saudi	45	54.9
Non-Saudi	37	45.1
Total	82	100.0

5.2.2 Respondent gender

As can be seen from Table (5.2), sixty-two (75.6%) are male, while twenty (24.4%) are female. In Saudi Arabia, culture is an important factor, preventing many females from working with males in the same place. In fact, nowadays, many business sectors have combined female and male workers in one place, and the number of female workers in IT has increased in the last few years.

Table: 5.2 respondent genders

Gender	Frequency	Percent
Male	62	75.6
Female	20	24.4
Total	82	100.0

5.2.3 Respondent age

Table (5.3) shows that age profile of the respondents. Twenty-two (26.8%) were older than 40 years. Among the 82 respondents, sixteen (19.5%) were under 26 years, while fifteen (18.3%) of respondents were aged between 26 and 30. Fifteen (18.3%) were in the age category 31-35, and just fourteen (17.1%) were between 36 and 40. This indicates that this kind of work maybe prefers younger people where they are aware of modern technology and

able to do business in new ways. They also have the opportunity to develop their skills and ability.

Table: 5.3 respondent ages

Age	Frequency	Percent
<26	16	19.5
26-30	15	18.3
31-35	15	18.3
36-40	14	17.1
>40	22	26.8
Total	82	100.0

5.2.4 Respondent educational level

The profile of the educational level present in Table (5.4), shows that forty-seven (57.3%) of the respondents held a Bachelor degree, while just seven (8.5%) were below this level of education. Fifteen of the respondents (18.3%) held a Master degree and thirteen (15.9%) had a Higher Diploma. These figures indicate that the majority of respondents had qualified degrees in their field. Well qualified people are open to learning and will enhance the benefits of the organisation to improve the field of IT.

Table: 5.4 respondent educational levels

Education level	Frequency	Percent
Below Bachelor	7	8.5
Bachelor	47	57.3
Higher Diploma	13	15.9
Master	15	18.3
Total	82	100.0

5.2.5 Respondent field of study

As can be seen from Table (5.5), sixty-three (76.8%) of the sample hold a degree in the computing field, five (6.1%) management, two (2.4%) accounting and twelve (14.6%) indicated 'other'. They included sciences, engineering and information management. The vast majority of respondents were holding a degree in a computing field because of the description of vacant jobs in the IT department which indicate that they wish to recruit qualified people. However, due the nature of the health organisation, some IT departments are forced to recruit specialists with different backgrounds (e.g. laboratories).

Table: 5.5 respondent field of study

Educational background	Frequency	Percent
Computing	63	76.8
Management	5	6.1
Accounting	2	2.4
Other	12	14.6
Total	82	100.0

5.2.6 Respondent position

Table (5.6) shows that twenty-one (25.6%) of the sample hold positions at manager level, thirty-one (37.8%) were ‘other’; they included a computer specialist, technician, coordinators for medical departments and a medical secretary. Eighteen (22.0%) had a position as a programmer, while twelve (14.6%) classified themselves as IT supervisors. It is interesting to note that the IT department in these hospitals make a nice combination between IT specialists and other fields to work together as a team.

Table: 5.6 respondent positions

Position	Frequency	Percent
IT supervisor	12	14.6
Programmer	18	22.0
Manager	21	25.6
Other	31	37.8
Total	82	100.0

5.2.7 Respondent experience

As can be seen from Table (5.7), twenty-six (31.7%) had experience of less than six years which indicated that they still needed more training and support to build their knowledge for a successful career. Eighteen (22.0%) had worked for more than 11 years which indicated that they had a certain level of experience which could help them to understanding the IT implementation and performance and that can assist them in being aware of the difficulties that face their career. Sixteen (19.5%) had worked between 6-10 years, eleven (13.4%) have experience of between 16-20 years which allowed them to be able to practise their knowledge to develop their department. Eleven (13.4%) had worked for more than 20 years and this indicated that these departments have numerous experienced workers which allows them to share their knowledge and experience to help younger people to improve their skills and ability.

Table: 5.7 respondent years of experience

Experience	Frequency	Percent
<6	26	31.7
6-10	16	19.5
11-15	18	22.0
16-20	11	13.4
>20	11	13.4
Total	82	100.0

5.3 Hospital and IT department profile

5.3.1 Numbers of employees in hospital

The number of employees is one of the variables used to measure an organisation's size. Table (5.8) shows that the vast majority of samples (92.7%) have worked in a hospital with more than 200 employees, which indicated that these workers provide services for a number of customers/users in their hospital. Two (2.4%) had less than 60 employees in their hospital, and two (2.4%) between 61-100 employees. Two (2.4%) had between 101-200 employees which indicated that hospitals in Saudi Arabia are growing faster, due to the population increase in the last few decades. This provides evidence for the importance of improving services for hospitals' stakeholders which can also reflect on patients' services.

Table: 5.8 numbers of employees in hospitals

Numbers of employees	Frequency	Percent
Less than 60	2	2.4
61-100	2	2.4
101-200	2	2.4
More than 200	76	92.7

Total	82	100.0

5.3.2 Numbers of IT employees

The number of employees in the IT department is one of the variables used to measure a department size. The vast majority of departments have recruited more than 40 employees. Table (5.9) shows that fifty-eight (70.7%) of the samples were above 40 employees which indicated that the top management in hospitals are aware of the importance of technology for their job and that this technology can enhance the value of their services. Ten (12.2%) mentioned their department had 31-40 employees, whereas, four (4.9%) had 21-30. Three (3.7%) had were 11-20, while seven (8.5%) had less than 10 employees.

Table: 5.9 numbers of employees in IT departments

No. IT employees	**Frequency**	**Percent**
<10	7	8.5
11-20	3	3.7
21-30	4	4.9
31-40	10	12.2
<40	58	70.7
Total	82	100.0

5.3.3 Information system development

As can be seen from Table (5.10), forty-two (51.2%) indicated that some of IT departments in Saudi Arabian hospitals find it difficult to develop and manage their information system in-house, so they prefer to outsource it to a professional company do it for them. Furthermore, some IT department managers may not believe in the ability of their employees to undertake the work in a professional way. Twenty-five (30.5%) mentioned that they developed their information system inside the department which shows that employees can do their job if they get support and training to help them do it professionally. Fifteen (18.3%) indicated

some in-house development and others were outsourced which meant that those hospitals tried to enhance their employees performance by making them work in some IT projects to give them more confidence so that they would be able to do almost of this work in-house in future.

Table: 5.10 Frequency distribution of develops of information system

Develops of information system	Frequency	Percent
In-house team	25	30.5
Professional company	42	51.2
Develop some in-house and outsource others	15	18.3
Total	82	100.0

5.4 Level of practice of IT – performance indicators

This section will identify the performance indicators in IT departments with focus on the IT service quality, IT product quality, customer satisfaction and organisational performance. Statistical results will be classified in terms of level of performance. Respondents were asked what they believe in terms of judging their department success. Three categories: high level performance, middle level performance and low level performance were suggested by the researcher. Thus, to identify the category range of IT performance indicators of each level of practice the researcher will follow the following equation to obtain the category range of the practicing level;

(HighScoreMean – LowScoreMean)/3= (4.15 – 3.08) /3= 0.35

New ranges have been identified for each level of practice by adding the category range 0.35 to the minimum average 2.50 and so on. So, the new category ranges are as follows:

High level practice range = 3.22 – 3.57

Middle level practice range = 2.86 - 3.21

Low level practice range = 2.50 – 2.85

Thus, considering the level for practice of each item is based on its average and through comparing it with the practice level range.

5.4.1 IT Service quality

The result of the study showed that the IT service quality items fell in the high level category. As can be seen from Table (5.11) the mean of service quality performance ranges from 3.79 to 4.15. The result suggested that IT departments are working hard to improve their service quality which can help to improve the work in their hospitals.

Table: 5.11 Level of practice of IT – performance indicators – IT service quality

No	Statement	N	Mean
1	IT department has up-to-date hardware and software.	82	3.7927
2	IT department is dependable and reliable.	82	4.1220
3	IT employees give prompt service to users/customers.	82	4.1585
4	IT employees have required skills and knowledge to do their job well.	82	4.0488
5	IT department has users' best interests at heart.	82	4.0732

5.4.2 IT product quality

Table 5.12 shows that the IT product quality fell in the high level of performance. The mean of IT product quality ranges from 3.42 to 3.82. From these figures it can be seen that hospitals are working hard to improve their information systems and yet they will need more support to enhance their performance in this field.

Table: 5.12 Level of practice of IT – performance indicators – IT product quality

No	Statement	N	Mean
1	IS are meeting functional requirements (the capability of the software product to provide functions which meet stated and implied needs).	82	3.7927

2	IS are reliable (the capability of the software product to maintain a specific level of performance).	82	3.8293
3	IS are usable (the capability of the software product to be understood, learned, used and attractive to the user).	82	3.7927
4	IS are efficient (the capability of the software product to provide appropriate performance, relative to the amount of resources used).	82	3.7073
5	IS are maintainable (the capability of the software product to be corrected and improved).	82	3.8049
6	IS are portable (the capability of the software product to be transfer from one environment to another).	82	3.4268

5.4.3 Customer satisfaction

Customer satisfaction has been seen as an important key for the final product. Table 5.13 indicates that the mean of this area fell in the middle and high levels and their ranges were between 3.08 and 3.87. This illustrated that there was less confidence between service provider and their customers, and that the IT departments in these hospitals should work hard to achieve their consumers' satisfaction. They should focus on improving their work and training their staff to be able to deal with their stakeholders' need.

Table: 5.13 Level of practice of IT – performance indicators –customer satisfaction

No	Statement	N	Mean
1	Information systems provided by the IT department meet user/customer expectations.	82	3.6463
2	Services provided by the IT department staff meet user/customer expectations.	82	3.8780
3	User/customer rarely makes complaints about IT department product and services.	82	3.0854

5.4.4 Organisational performance

Table 6.14 indicates that the organisational performance fell in the high level. The mean ranges between 3.89 and 4.15, and this can reflect the effort of the organisation to improve their performance. In fact, these figures should help hospital's management to point out the main issues that can affect the IT performance which maybe cause problems to the whole organisation.

Table: 5.14 Level of practice of IT – performance indicators – organisational performance

No	Statement	N	Mean
1	IT department products/services improve employees' productivity.	82	3.8902
2	IT department products/services improve hospital operational efficiency.	82	4.1341
3	IT department products/services improve management effectiveness.	82	4.0854
4	IT department products/services improve hospital business performance.	82	4.1585

5.5 Effect of the hospital variables

The results illustrated that respondents' hospitals vary in their practice levels. This section is designed to examine the respondents' variables (nationality, age, educational level, field of study, position, years of experience, respondents' size of hospital, respondents' IT department size and respondents' information system development) that affect the organisational factors and IT performance indicators using independent-samples t-test and one-way ANOVA test. An independent-samples t-test is used when you want to compare the mean score, on some continuous variable, for two different groups of subjects. One-way between – groups analysis of variance is used when the case has one independent (grouping) variable with three or more levels (groups) and one dependent continuous variable.

5.5.1 Respondent nationality

An independent-samples t-test was conducted to compare scores for Saudi and Non-Saudi. There was no significant difference in scores for Saudi (M=8.98, SD=1.85) and Non-Saudi [M=9.79, SD=1.45; t (80) =-2.17, p=15]. The magnitude of the difference in the means was

very small (eta squared=015). Table 5.15 shows no significant difference between Saudi and Non-Saudi workers in IT departments. This is because the 'Sig' value is larger than .05 for all IT performance indicators and organisational factors.

The results suggest that the independent variable 'respondent nationality' has no statistically effect on the IT performance indicators and organisational factors.

Table: 5.15: Nationality with IT performance indicators and organisational factors

	Nationality	
	F-test	**Significant**
IT Service Quality	2.70	.104
IT product quality	3.55	.063
Customer satisfaction	1.41	.238
Organisational performance	1.28	.260
Top management responsibility	2.40	.125
Recruitment and retention	1.69	.196
Employee participation	1.62	.206
Reward and recognition	.546	.462
Training and education	.281	.598
Supplier management	.436	.511
Process management	1.78	.185
Measurement	.683	.411
Continuous improvement	3.18	.078
Customer focus	1.11	.294

5.5.2 Respondent age

The one-way ANOVA test was carried out to examine whether the mean of respondent age and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of age on performance indicators and organisational factors. Subjects were divided into five groups according to their age (Group 1: less than 26; Group 2: 26 to 30; Group 3: 31 to 35; Group 4: 36 to 40; Group 5: 40 and above). There was a statistically significant difference at the $p<.05$ level in scores for the IT service quality indicator [$F (4, 77) =2.8$, $p=.02$], and reward and recognition factor [$F (4, 77) =2.4$, $p=.05$]. It can be noted that there were some younger workers in IT departments and that they still needed more support to help them improve their skills. The result shows that reward is important to encourage these younger workers and this can reflect on IT service quality. The results suggest that the independent variable 'respondent age' has a statistical affect on the IT service quality indicator and reward and recognition factors.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was.04. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M=3.66, SD=.587) was significantly different from Group 5(M=4.29, SD=.496); Group 2 (M=4.01, SD=.578) Group 3 (M=4.04, SD=.633) and Group 4 (M=4.10, SD=.590) did not differ significantly from either Group 1 or 5.

The results suggest that the independent variable 'respondent age' has quite a small statistically effect on the IT performance indicators and organisational factors.

Table: 5.16: Age with IT performance indicators and organisational factors

	Age	
	F-test	**Significant**
IT Service Quality	2.848	.029
IT product quality	2.036	.098

Customer satisfaction	.544	.704
Organisational performance	2.115	.087
Top management responsibility	.885	.477
Recruitment and retention	.165	.955
Employee participation	1.409	.239
Reward and recognition	2.496	.050
Training and education	1.696	.160
Supplier management	1.151	.339
Process management	.541	.706
Measurement	.643	.634
Continuous improvement	.704	.591
Customer focus	.793	.533

The mean difference is significant at the .05 level.

5.5.3 Respondent educational level

The one-way ANOVA test was carried out to examine whether the mean of respondent educational level and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of educational level on IT performance indicators and organisational factors. Subjects were divided into five groups according to their educational level (Group 1: below Bachelor; Group 2: Bachelor; Group 3: Higher Diploma; Group 4: Master; Group 5: PhD). There was a statistically significant difference at the $p<.05$ level in scores for the IT service quality indicator [$F(3, 78) = 3.2$, $p=.02$], supplier management factor [$F(3, 78) = 3.4$, $p=.02$], and customer focus factor [$F(3, 78) = 2.8$, $p=.04$]. As can be seen, the result suggests that the educational level has an impact on the IT service quality, supplier management and customer focus, and this maybe because of a lack of knowledge among these workers. Furthermore, IT is a very quickly changing area, so specialists should keep improving their knowledge in this

field. The results suggest that the independent variable ‘respondent educational level’ has a statistical affect on the IT service quality indicator, supplier management factor and customer focus factor.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was .04. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M=3.62, SD=.423) was significantly different from Group 4(M=4.38, SD=.443); Group 2 (M=3.97, SD=.618) and Group 3 (M=4.09, SD=.597) did not differ significantly from either Group 1 or 4.

The results suggest that the independent variable ‘respondent educational level’ has quite a small statistical affect on the IT performance indicators and organisational factors.

Table: 5.17: Educational level with IT performance indicators and organisational factors

	Educational level	
	F-test	**Significant**
IT Service Quality	3.264	.026
IT product quality	.714	.547
Customer satisfaction	.552	.648
Organisational performance	1.329	.271
Top management responsibility	2.202	.094
Recruitment and retention	1.309	.277
Employee participation	1.812	.152
Reward and recognition	.041	.989
Training and education	.445	.721
Supplier management	3.432	.021
Process management	2.274	.086

Measurement	2.037	.116
Continuous improvement	1.337	.268
Customer focus	2.823	.044

The mean difference is significant at the .05 level.

5.5.4 Respondent field of study

The one-way ANOVA test was carried out to examine whether the mean of the respondent field of study variable and the means of IT performance indicators and organisational factors are statistically significantly different.

One-way ANOVA analysis results, as shown in Table 5.18, show that there was no statistical difference between the respondent field of study variable and the performance indicators and organisational factors. This is because the 'Sig' value is larger than .05 for all performance indicators and organisational factors.

The results suggest that the independent variable 'respondent field of study' has no statistical affect on the IT performance indicators and organisational factors.

Table: 5.18: field of study with IT performance indicators and organisational factors

	Field of study	
	F-test	**Significant**
IT Service Quality	1.689	.176
IT product quality	.698	.556
Customer satisfaction	.387	.762
Organisational performance	.564	.641
Top management responsibility	.306	.821
Recruitment and retention	.461	.711
Employee participation	.586	.626
Reward and recognition	.799	.498

Training and education	.452	.717
Supplier management	2.384	.076
Process management	1.009	.393
Measurement	1.070	.367
Continuous improvement	.737	.533
Customer focus	2.128	.103

5.5.5 Respondent position

The one-way ANOVA test was carried out to examine whether the mean of respondent position and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of position on IT performance indicators and organisational factors. Subjects were divided into four groups according to their position (Group 1: IT supervisor; Group 2: Programmer; Group 3: Manager; Group 4: Others). There was a statistically significant difference at the $p<.05$ level in scores for the customer focus factor [$F(3, 78) = 2.7$, $p=.04$]. It can be noted that there were two managerial positions, namely, IT supervisor and manager. The result shows that the remaining two categories appear to have no significant statistical associations with customer focus factor. The results suggest that the independent variable 'respondent position' has a statistical affect on the customer focus factor.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was .03. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 3 (M=4.09, SD=.628) was significantly different from Group 4(M=3.51, SD=.751); Group 1 (M=3.58, SD=1.00) and Group 2 (M=3.73, SD=.609) did not differ significantly from either Group 3 or 4.

The results suggest that the independent variable 'respondent position' has quite a small statistical affect on the customer focus factor.

Table: 5.19: Position with IT performance indicators and organisational factors

	Position	
	F-test	**Significant**
IT Service Quality	1.433	.239
IT product quality	.519	.670
Customer satisfaction	.292	.831
Organisational performance	2.149	.101
Top management responsibility	1.668	.181
Recruitment and retention	1.639	.187
Employee participation	.651	.585
Reward and recognition	1.044	.378
Training and education	.893	.449
Supplier management	1.471	.229
Process management	.261	.853
Measurement	.063	.979
Continuous improvement	.948	.422
Customer focus	2.748	.048

The mean difference is significant at the .05 level.

5.5.6 Respondent years of experience

The one-way ANOVA test was carried out to examine whether the mean of respondent years of experience and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of years of experience on IT performance indicators and organisational factors. Subjects were divided into five groups dependent on their years of experience (Group 1: less than 6; Group 2: 6 to

10; Group 3: 11 to 15; Group 4: 16 to 20; Group 5: above 20). There was a statistically significant difference at the p<.05 level in scores for the training and education factor [F (4, 77) =2.7, p=.03]. The results suggest that the independent variable 'respondent years of experience' has a statistical affect on the training and education factor.

The result showed that as the years of experience increase, the more IT managers appreciate the importance of training and education.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was .04. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 5 (M=2.29, SD=.561) was significantly different from Group 1(M=1.16, SD=.611) and Group 2 (M=1.57, SD=.692); Group 3 (M=1.74, SD=.646) and Group 4 (M=1.67, SD=.546) did not differ significantly from either Group 1, 2 or 5.

The results suggest that the independent variable 'respondent years of experience' has quite a small statistical affect on the training and education factor.

Table: 5.20: Years of experience with IT performance indicators and organisational factors

	Years of experience	
	F-test	**Significant**
IT Service Quality	2.133	.085
IT product quality	1.422	.235
Customer satisfaction	.659	.622
Organisational performance	1.266	.291
Top management responsibility	1.508	.208
Recruitment and retention	.616	.653
Employee participation	.932	.450
Reward and recognition	1.799	.138
Training and education	2.731	.035

Supplier management	.803	.527
Process management	.671	.614
Measurement	.643	.633
Continuous improvement	.563	.690
Customer focus	.956	.437

The mean difference is significant at the .05 level.

5.5.7 Respondent size of hospital

The one-way ANOVA test was carried out to examine whether the mean of respondent size of hospital and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of hospital size on IT performance indicators and organisational factors. Subjects were divided into four groups based on their hospital size (Group 1: 60 or less; Group 2: 60 to 100; Group 3: 101 to 200; Group 4: above 200). There was a statistically significant difference at the $p<.05$ level in scores for the IT product quality indicator [$F(3,78)=2.8$, $p=.04$] ; customer satisfaction indicator [$F(3,78)=3.2$, $p=.02$]; and supplier management factor [$F(3,78)=4.0$, $p=.01$]. As can be seen from Table 5.21 the size of hospital can affect the top management concentration to improve the IT product quality; dealing with clients needs and developing the relationship with outsource firms.

The results suggest that the independent variable ‘respondent size of hospital’ has a statistical affect on the IT product quality indicator, customer satisfaction indicator and supplier management factor.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was.03. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M=7.06, SD=.028) was significantly different from Group 2(M=10.0, SD=2.00) Group 3 (M=9.00, SD=.509) and Group 4 (M=9.40, SD=1.73) did not differ significantly from either Group 1and 2.

Table: 5.21: Size of hospital with IT performance indicators and organisational factors

	Size of hospital	
	F-test	**Significant**
IT Service Quality	1.156	.332
IT product quality	2.898	.040
Customer satisfaction	3.209	.028
Organisational performance	.712	.548
Top management responsibility	1.765	.161
Recruitment and retention	.179	.911
Employee participation	.184	.907
Reward and recognition	1.587	.199
Training and education	1.214	.310
Supplier management	4.017	.010
Process management	.045	.987
Measurement	1.757	.162
Continuous improvement	2.144	.101
Customer focus	.139	.936

The mean difference is significant at the .05 level.

5.5.8 Respondent of IT department size

The one-way ANOVA test was carried out to examine whether the mean of respondent nationality and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of IT department size on IT performance indicators and organisational factors. Subjects were divided into five groups dependent on their IT department size (Group 1: 10 or less; Group 2:

11 to 20; Group 3: 21 to 30; Group 4: 31 to 40; Group 5: above 40). There was a statistically significant difference at the p<.05 level in scores for the IT service quality indicator [F (4, 77) =2.8, p=.02]; and organisational performance indicator [F (4, 77) =2.4, p=.05]. It is interesting to note that the number of employees in an IT department can affect the service that is provided to the stakeholders and in the end that this can reflect on the hospital performance. The results suggest that the independent variable 'respondent IT department size' has a statistical affect on the IT service quality and organisational performance indicators.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was .03. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 1 (M=7.86, SD=1.66) was significantly different from Group 5 (M=9.60, SD=1.62) Group 2 (M=9.05, SD=3.28); Group 3 (M=9.26, SD=1.69) and Group 4 (M=9.06, SD=1.60) did not differ significantly from either Group 1and 5.

Table: 5.22: IT department size with IT performance indicators and organisational factors

	IT department size	
	F-test	**Significant**
IT Service Quality	2.984	.024
IT product quality	1.547	.197
Customer satisfaction	.786	.538
Organisational performance	2.613	.042
Top management responsibility	.498	.737
Recruitment and retention	1.482	.216
Employee participation	1.853	.127
Reward and recognition	1.468	.220
Training and education	1.584	.187
Supplier management	1.881	.122

Process management	1.592	.185
Measurement	.781	.541
Continuous improvement	.606	.660
Customer focus	1.610	.180

The mean difference is significant at the .05 level.

5.5.9 Respondent of information system development

The one-way ANOVA test was carried out to examine whether the mean of respondent nationality and the means of IT performance indicators and organisational factors are statistically significantly different.

A one-way between-groups analysis of variance was conducted to explore the impact of information system development on performance indicators and organisational factors. Subjects were divided into three groups according to their information system development (Group 1: In-house team; Group 2: Professional company; Group 3: Others). There was a statistically significant difference at the $p<.05$ level in scores for the IT service quality indicator [$F(2, 79) = 4.4$, $p=.01$]. As can be seen from Table 5.23, IT service that is provided to customers may be affected by a lack of professionals in this area. So, top management should encourage and train their employees to be professionals in their field. The results suggest that the independent variable 'respondent information system development' has a statistical affect on the IT service quality indicator.

Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small. The effect size, calculated using eta squared, was .03. Post-hoc comparisons using the Tukey HSD test indicated that the mean score for Group 2 (M=9.06, SD=1.67) was significantly different from Group 1(M=9.83, SD=1.74) Group 3 (M=9.35, SD=1.76) did not differ significantly from either Group 1or 2.

Table: 5.23: Information system development with IT performance indicators and organisational factors

	Information system development	
	F-test	**Significant**
IT Service Quality	4.446	.015

IT product quality	1.792	.173
Customer satisfaction	.854	.430
Organisational performance	1.188	.310
Top management responsibility	1.251	.292
Recruitment and retention	2.152	.123
Employee participation	1.220	.301
Reward and recognition	.835	.438
Training and education	1.914	.154
Supplier management	1.771	.177
Process management	1.494	.231
Measurement	.414	.662
Continuous improvement	.490	.615
Customer focus	2.502	.088

5.6 Level of practice of IT - organisational factors implementation

This study identifies the IT department practice of organisational factors implementation. Frequency analysis was used to recognize the practicing level. Organisational factors implementation is classified in terms of its level of practice. The researcher suggested three categories: high level practice, middle level practice and low level practice. The items of the organisational factors implementation will be classified as, for example, high level practice, if the mean of those items falls in the range of the high practice category. The researcher calculated the overall mean of each item of the organisational factors implementation, the result of the calculation showing that the high average is 4.08 and the low average is 2.50. Thus, to identify the category range of organisational factors implementation of each level of practice the researcher will follow the following equation to obtain the category range of the practice level;

$$(\text{HighScoreMean} - \text{LowScoreMean})/3 = (4.08 - 2.50)/3 = 0.53$$

New ranges have been identified for each level of practice by adding the category range 0.53 to the minimum average 2.50 and so on. So, the new category ranges are as follows:

High level practice range = 3.58 – 4.11

Middle level practice range = 3.04 -3.57

Low level practice range = 2.50 – 3.03

Thus, considering the level of practice of each item is based on its average and through comparing it with the practice level range.

5.6.1 Top management responsibility

The IT manager has to responsibility for establishing an IT department of purpose. They should direct their department by creating and maintaining an environment where IT professionals can be involved in the whole process, such as setting plans and objectives for both department and hospital. As can be seen in Table (5.24), results show that all respondents are highly practiced with 'IT top management responsibility'. All elements fall in high level practice categories and the mean of 'IT top management responsibility' elements range from 3.64 to 3.91.

The results show that the IT top management responsibility elements relating to responsibility for department performance, supporting long-term improvement processes, participating in improvement activities, encouraging employees participation in improvement activities, having clear objectives for department performance, developing comprehensive IT improvement plan and using quality as a major criterion in developing IT plans are at a high level.

Table: 5.24 Level of practice in relation to top management responsibility

No	Statement	Mean
1	IT top management assumes responsibility for department performance.	3.91
2	IT top management support long-term improvement process.	3.78
3	IT to management actively participates in improvement activities.	3.78

4	IT top management encourages employee participation in improvement activities.	3.64
5	IT top management has clear objectives for department performance.	3.71
6	There is a comprehensive IT/IS improvement plan in our department.	3.69
7	Quality used as the major criterion in developing IT/IS plans.	3.70

5.6.2 Recruitment and retention

Results showed that respondents vary in practicing 'recruitment and retention'. As can be seen from Table (5.25), the mean of 'recruitment and retention' elements range from 2.97 to 3.41.

The results illustrate that recruitment and retention elements relating to job description is clearly specified for IT department employees and working conditions in the IT department are comfortable for all employees are in the middle practice. The result suggests that providing decent salaries that can attract IT/IS professionals is in the low practice range. In reality, as in other fields hospitals have problems in to attracting professionals in IT because of the shortage of skilled IT/IS professionals.

Table: 5.25 Level of practice in relation to recruitment and retention

No	**Statement**	**Mean**
1	Our hospital provides decent salaries that can attract IT/IS professionals.	2.97
2	Job description for IT department employees is clearly specified.	3.32
3	The working condition in our IT department is comfortable	3.34

	for all employees.	

5.6.3 Employee participation

Table (5.26), shows that most of the respondents are in the high practice range in terms of 'employee participation'. All elements fall in high and middle level practice categories. The mean of 'employee participation' elements ranges from 3.52 to 3.82.

The results suggested that the elements relating to commitment of IT employees to the success of their IT department, the use of functional teams in their IT department, participation in IT department activities, empowering IT employees to resolve problems and providing IT departments' employees with their performance feedback are highly practiced. Elements relating to the participation of the IT department in developing the department plan is middle practiced. The reason behind that maybe some of IT managers think that employees should follow the instruction that is provided to them and that they have to do it, while, ignoring those workers, some of whom are qualified persons, and they could benefit from their experience. Another reason is that some IT departments do not provide their employees with training to help them participate in the departments' activities.

Table: 5.26 Level of practice in relation to employee participation

No	Statement	Mean
1	IT departments' employees are very committed to the success of the IT department.	3.82
2	Functional teams are frequently used in our IT department.	3.64
3	IT departments' employees actively participate in related activities.	3.62
4	IT department employees participate in developing the department plans.	3.52
5	IT department employees are empowered to resolve problems.	3.62

6	IT department employees are provided with their performance feedback.	3.59

5.6.4 Reward and recognition

The results show that most of the reward and recognition elements fall in the low practice category. As can be seen from Table (5.27) the mean of 'reward and recognition' elements ranges from 2.50 to 3.26.

The results illustrated that the reward and recognition elements relating to a salary promotion scheme to encourage employee participation in IT department activities, work effort as a criterion for position promotion, financial reward for excellent suggestions and communicating rewards and penalties to all employees fall into the low level practice. The reason behind that is that the IT manager may not have the right to reward the employees because in many organisations the higher administration controls the financial matters. Also results show that the element relating to the improvement of working conditions as one of the recognition schemes falls into the middle level practice, and that may be because legislations in some organisations are not clear on specific issues.

Table: 5.27 Level of practice in relation to reward and recognition

No	Statement	Mean
1	Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.	3.26
2	Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.	2.67
3	Position promotion is based on work effort and service quality in our hospital.	2.87
4	Excellent suggestions are financially rewarded.	2.50
5	Employees' rewards and penalties are clear.	2.78

5.6.5 Training and education

As can be seen from Table (5.28), all 'training and education' elements fall in middle and low level practice categories. The mean of 'training and education' elements ranges from 2.81 to 3.02.

The results show that the training and education elements relating to providing specific IT/IS skills training to IT department employees is a middle level practice. The reason behind that maybe because IT management sign contracts with a professional company to develop their systems and they think there is no need to spend more money on training while, there is someone who is responsible for doing this work. Furthermore, the results suggest that providing general management technique training and resources for IT department employees are in the low level practice range. That may be because IT managers want their employees to focus on their job, whereas the manager and supervisor can do this task. Moreover, managers may think that the availability of resources for training during work time can waste time and effort.

Table: 5.28 Level of practice in relation to training and education

No	Statement	Mean
1	Specific IT/IS skills training is given to IT department employees.	3.02
2	General management technique training is given to IT department employees.	2.82
3	Resources are made available for IT department employee's education and training.	2.81

5.6.6 Supplier management

The results show that all 'supplier management' elements fall in the middle level practice categories. It can be seen from Table (5.29) that the mean of 'supplier management' elements ranges from 3.46 to 3.54.

Building good relationships with suppliers is very important in terms of enhancing the ability to create value. The results suggest that the long term cooperative relations with suppliers is a high priority for the IT department with a mean of 3.54, while IT department product /service

quality is regarded as the most important factor in selecting suppliers with a mean of 3.52. Detailed information regarding suppliers' performance comes last in priority for the IT department. The reason behind that may be that the IT manager wants to improve trust with their suppliers and that this will enhance the product quality.

Table: 5.29 Level of practice in relation to supplier management

No	Statement	Mean
1	IT department product/service quality is regarded as the most important factor in selecting suppliers.	3.52
2	Long-term cooperative relations with suppliers are established in our IT department.	3.54
3	Detailed information regarding suppliers' performance is maintained in our IT department.	3.46

5.6.7 Process management

The results show that all 'process management' elements fall in the high and middle level practice ranges. It can be seen from Table (5.30) that the mean of 'process management' elements ranges from 3.26 to 3.69.

The results show that the process management elements relating to critical IT/IS processes are regularly monitored, measured and improved, IT department processes are standardised and systematically documented and IT/IS equipment are well maintained according to the maintenance plan and are high level practice. While, IT department processes are designed to be "foolproof" in order to minimise the chance of employee errors and the IT department implements a programme to reduce new product or service development and implementation cycle times are in the middle level practice. The reason behind that may be that the IT department in Saudi hospitals still suffers from fewer professional workers which can enhance the ability of their departments to deal with these kinds of issues.

Table: 5.30 Level of practice in relation to process management

No	Statement	Mean
1	Critical IT/IS processes are regularly monitored, measured and improved.	3.69
2	Our processes are standardised and systematically documented.	3.67
3	Our processes are designed to be "foolproof" in order to minimise the chance of employee errors.	3.40
4	IT/IS equipment are well maintained according to the maintenance plan.	3.78
5	Our department implements a programme to reduce new product or service development and implementation cycle times.	3.26

5.6.8 Measurement

Gathering and analysing of data and information about department performance can make a difference. The results show that most respondents vary in practicing 'measurement'. It can be seen from Table (5.31) that the mean of 'measurement' elements ranges from 3.08 to 3.48.

The results show that all measurement elements fall in the middle level practice. The reason behind that may be because of the measurement practice in organisations, and specifically in health organisation, is still quite new and there may be fewer professional workers in this field who would be able to do it in a right way.

The results suggest that the IT department has detailed related data such as customer complaints and the defect rates element has more priority than other elements.

Table: 5.31 Level of practice in relation to measurement

No	Statement	Mean
1	IT/IS quality performance standards have been established and communicated to all stakeholders.	3.15

2	Our department regularly conducts IT/IS quality audits.	3.15
3	Self-assessment of IT department performance is a strong practice in our department.	3.36
4	Our department has detailed of related data such as customer complaints and defect rates.	3.48
5	The related data are used to evaluate overall IT department performance.	3.30
6	The related data are used to evaluate the performance of IT department employees.	3.21
7	IT department performance measurement findings are evaluated to identify problem causes.	3.36
8	IT department performance measurement findings are available to all stakeholders.	3.08

5.6.9 Continuous improvement

One of the permanent objectives for many organisations is to continually improve their IT department performance. The results show that all 'continuous improvement' elements fall in the high and middle level practice categories. It can be seen from Table (5.32) that the mean of 'continuous improvement' elements ranges from 3.50 to 3.60.

The results show that the continuous improvement elements relating to performance measurement findings are used for improvement and specific committee/teams which are used regularly to support improvement in IT department activities are in the high level practice. The results suggest that the continuous improvement element relating to customer feedback which is used for improvement is in the middle level practice range. The reason behind that may be the misunderstanding of the needs of stakeholders and that may be because there is no effective communication channel with customers.

Table: 5.32 Level of practice in relation to continuous improvement

No	Statement	Mean
1	Customer feedback is used for improvement.	3.50
2	Performance measurement findings are used for improvement.	3.60
3	A specific committee/team is used regularly to support improvement in IT department activities.	3.59

5.6.10 Customer focus

Meeting customer satisfaction is very important for any organisation, therefore understanding current and future customer requirements, meeting their needs and aiming to exceed their expectations is essential. It can be seen from Table (5.33) that the mean of 'customer focus' elements ranges from 3.14 to 4.08.

The results show that the customer focus elements relating to IT department provides service after IT/IS project completion and product delivery, the user/customer participates in various stages of IT department projects, customer complaints are treated with top priority, and the IT department collects extensive complaint information such as help desk calls from customers which are in the high level practice. The results suggest that the customer focus element relating to the IT department regularly conducts a customer satisfaction survey is a middle level practice. The reason behind that may be because of the awareness of the customer participation in the department plan and objectives. In fact, during the data collection process, research noticed that, encouraging stakeholders to participate in developing services in the IT department through such means as a survey is not a priority for the IT department.

Table: 5.33 Level of practice in relation to customer focus

No	Statement	Mean
1	Our department collects extensive complaint information such as help desk calls from customers.	3.78
2	Customer complaints are treated with top priority.	3.98

3	Our department regularly conducts a customer satisfaction survey.	3.14
4	User/customer participates in various stages of the IT department projects.	3.60
5	Our department provides service after IT/IS project completion and product delivery.	4.08

6.1 Introduction

The previous chapter explored the level of practice of IT – organisational factors in IT departments in Saudi Arabian hospitals. The results show that there was a lack of such IT organisational practices, such as recruitment, reward, training and education. The results suggested that there were significant relationships between some respondent variables (respondent age, respondent educational level, respondent position, respondent years of experience, respondent size of hospital, respondent of IT department size and respondent of information system development) and the IT performance indicators and organisational factors. However, to obtain more detailed knowledge about how these IT departments worked, it was necessary for the researcher get closer to these environments. This was done through fourteen semi-structured interviews with managers in many departments inside hospitals. The aim of these interviews was to examine the factors that affect the performance of IT departments in Saudi Arabian hospitals.

To discover the factors that affect the performance of IT departments, it is important to understand the environment in which these factors are implemented. This chapter will explore this environment through examining IT department stakeholders in the Saudi Arabian hospitals. From the literature, it was found that a number of organisational factors affect IT performance in all types of organisations. Table 6.1 shows that the factors that affecting the IT performance.

Table: 6.1 the factors affecting IT performance

1	Lack of management commitment
2	Lack of planning for department
3	Lack of employee involvement
4	Lack of training and education amongst IT department
5	An inappropriate performance measurement
6	Lack of customer focus
7	Lack of IT/IS expertise

8	Lack of time
9	High employee turnover
10	Lack of management expertise
11	No reward for achievement job amongst IT department
12	Inadequate knowledge about business

Section 6.2 describes the semi-structured interviews process. Section 6.3 presents profiles for the hospitals participating in the semi-structured interviews. Section 6.4 highlights the factors affecting IT performance in the IT departments in the Saudi Arabian hospitals.

6.2 Semi-structured interview process

Exploring the lack of performance in IT departments in Saudi Arabian hospitals was launched during this study. Semi-structured interviews through open-ended questions were used to enrich the research findings. The researcher chose the hospitals that were used to participate in the questionnaire survey. A number of stakeholder positions inside the hospitals were chosen to participate in this study. The reason behind this was to identify and examine the hospitals that had significant levels of practical experience. Of the 16 hospitals that completed the questionnaire, only 10 hospitals agreed to participate in the interview phase. The researcher conducted interviews with fourteen managers in many areas between January and March 2011. The interviewee was briefed on the information concerning the aims of the study and the purpose of the interviews. The interview was on a one-to-one basis and of 25-45 minutes duration. These interviews were conducted in the Arabic language and in the working hours. The researcher was interrupted during these interviews because of urgent situations relating to their work. All interviews were tape-recorded.

After the interview process with these managers in the Saudi Arabian hospitals had finished, the researcher started to analyse the interviewees' answers. A table was prepared to transcribe the results and has been called the 'influential factors' table. This table includes rows and columns; the columns present the factors that affect IT performance in IT departments as in Table 6.1 and the rows list the managers by number "M_1", etc.

During data processing, the researcher marked (√) when the manager (M) mentioned one of the factors that were listed in the 'influential factors' table. If, however, the interviewee

mentioned a new factor, the researcher added this to the table. After this, the data analysis process started and the most influential factors on IT performance in Saudi hospitals was identified.

6.3 Hospitals' profile

Fourteen interviews were carried out with managers in 10 Saudi hospitals. Table 6.2 illustrates the breakdown of the interviewed hospitals. All hospitals were large with more than 200 employees.

The strategic plan in these hospitals is dependent on the IT performance. IT is used in terms of increasing efficiency, reducing costs of their operation, accuracy and improving performance. For the IT/IS infrastructure in those hospitals, all have Local Area Networks (LAN), and up to date servers and operating systems.

Manager Number	Manager (M)		Hospital Size (Employee)	Department Size (Employee)
	Position	Experience (Years)		
M1	Director of Pharmacy	10	>200	18
M2	Director of Laboratories	13	>200	24
M3	Director of the Blood Laboratory	11	>200	15
M4	Director General of Quality	18	>200	21
M5	Director of Patient Services	22	>200	30
M6	Director of Patient Services	25	>200	34
M7	Director of Pharmacy	23	>200	27
M8	Director, Centre for Heart Disease	30	>200	52
M9	Director, Centre for Diabetes	32	>200	48
M10	Director of Outpatient Clinic	35	>200	89
M11	Director of Pharmacy	18	>200	17
M12	Director of Pharmacy	15	>200	27
M13	Director of Blood Bank	24	>200	31
M14	Director, Centre for Prosthetic limbs	11	>200	32

Table: 6.2 Breakdown of interviewed Hospitals

6.4 Factors affecting IT performance in the IT stakeholder's departments

The interviews with the stakeholder's managers in Saudi Arabian hospitals suggested that the following factors may affect the performance of IT in the IT departments in these hospitals:

6.4.1 Supporting the IT department has middle priority

The researcher asked managers in the interviewed hospitals, to what extent top management in your hospital supported the IT department function. The question tried to determine the level of priority that was assigned to IT performance. Two managers said that top management in their hospital paid high attention to IT performance and they believed that the IT department improvement had a high priority. While, ten Ms said that their hospitals top management had given the IT department middle priority. However, two Ms believed that top management in some hospitals came with a medical background and this may be prevented them from understanding the nature of the IT department.

To understand the factors that caused this, the researcher asked the respondents about the reasons for this attitude. Most of the respondents agreed that the top management had to balance their government's funding and that they pay high priority for medical equipment, spending money to train staff and letting specialists in the medical field improve their knowledge by attending conferences.

As one M said government should encourage hospitals to improve their IT performance by providing them with more financial support. One M commented on this, because software cannot be seen the same as other products, so it has less priority compared to, for example, an X Ray machine. Also, this type of software costs a lot of money and that makes top management struggle with a limited budget.

The result of the semi-structured interviews suggested that paying low priority for IT performance may be because of problems to the services these hospitals found which may affect the whole society.

6.4.2 Lack of training and knowledge amongst IT department

Researchers mentioned the importance of training and sharing knowledge in many fields, such as technology, because technology is growing very fast. However, IT management should be aware of their customer needs. The researcher asked managers to what extent do you get training in IT issues and/or participate in conferences in this regard. The reason

behind this question was to discover the consumer's satisfaction about training which is provided by the IT department. Also, because the IT departments had responsibility to supply this training to other departments in the hospital. Furthermore, the IT department should make their plan to train people in the hospital before providing these systems to stakeholders. One M commented as follows "we *find it difficult to deal with this issue because we have to wait a long time to schedule this training with the IT department and they need some time to bring someone in from outside to give this training"*. Another manager said that top management had promised to support the IT department to give us training to assist us using the new system. Unfortunately, they had been told that the IT department was not able to provide this training in that time. Therefore, personally I believe that the IT department has to improve their employee skills and knowledge, and only after that can they help other departments. One M noticed that *"when we have a problem in the system, sometimes an IT employee comes and writes down the problem and then disappears. When she/he comes back again she/he needs to ask questions and make some calls to their department. I believe that these people still need to improve their skills in this field"*. In order to understand this issue, the researcher asked the respondent about the reason for this attitude. Most of the respondents agreed that the IT management in their hospital assigns only a low priority in their agenda to train IT employees. The reason behind that maybe because of the allocation of training funds.

6.4.3 Lack of IT improvement

The researcher asked managers to what extent do you participate in the improvement meetings/committees in your hospital. The question tried to determine the importance of paying attention to the stakeholders within the hospital and establishing a relationship with them to share knowledge about how to improve the IT services. In fact, most of the managers mentioned that they used to participate in some activities relating to their job, but in the case of the IT department, they sometimes find it difficult to deliver their massage to the IT manager in terms of their observations on the services or products. The reason behind that is that sometimes cultural issues play an important role in preventing people advising someone on their job (M5). In addition, some managers mentioned that lack of an improvement plan caused many problems to the departments and divisions in the hospital. Changing of top management in the hospital that meant change in some departments can destroy any improvement plan that was set by the previous management.

Furthermore, as one M9 mentioned, sometimes it is really difficult to find the specific person who is responsible for to solving IT problems to help us doing our task. In reality, it is a complicated issue because everyone thinks it is not his job. As one M4 said it is affecting many IT projects and wasting time and effort. He said the IT department should put their emphasis on their real job, which is helping other departments to achieve their aims.

6.4.4 Lack of IT planning

The researcher asked managers are there any specific plans that you follow in respect to the implementation of technology in your department. This was to investigate their views about the importance of working on a plan to help them deliver their demands to the top management. It was also to discover the managers' knowledge about their IT needs, and to find out the participation of IT employees in developing this plan. Most of the managers said they already have their IT plan. These plans, as they mentioned, are short term plans because they are related to the regulations they have to do annually. However, some managers struggle to know their needs and that maybe because of less communication with professional people in the IT department. For example, one manager mentioned that *"in our department we know precisely what is our job, but in terms of IT and how to transfer our policies to an automated service, in fact, we find difficult because the IT department do not support us on this issue and to set our IT plan is really hard "*. Lack of job detail between managers and their employees may cause this problem, such as employee participation in developing these plans. M1 pointed out that in his experience in his department they set the plan which is then approved from the top management and by this way they could continue work on it even in the case of management change.

6.4.5 Unclear of IT department objectives

Objectives are very important for any organisations to achieve their goals. So, the researcher asked managers do you have any idea about the objectives of IT department. The reason behind that is to investigate the actuality of the communication between the IT departments and their stakeholders, and to explore the customers' perspective towards IT objectives. Most of the managers mentioned that they had a little bit of knowledge about the IT department objectives. M3 said he did not have any idea about the IT department objectives. Also, he blamed the IT department for letting other departments know about their plans and projects. It can be seen that there was a miscommunication between the IT department and their customers and that may be because of unclear policies within the hospital. M7 said that in his

hospital they are not responsible for letting other departments know about their objectives, but in the case of the IT department he said I believed that they should be close to their customer to help each other achieving the aim of the hospital. Top management in the hospitals should be aware of the importance of building good relationships with their stakeholders which will reflect on the whole work in hospital (M10). However, some hospitals have good policy and relationship between their departments.

6.4.6 Customer's less satisfaction

Researcher asked managers about what factors are important in improving the IT department performance. There was an agreement on to the importance of the customer satisfaction factor on IT performance. Others mentioned a variety of factors which may affect IT performance such as routine procedure, financial support and letting unqualified outsourced firms work with their IT department. As one manager said the IT department is still not aware of consumer's needs. In some cases, as he mentioned, the IT department buy some software to help us in the job. Unfortunately, the system did not work for them because they misunderstood their need. Almost all of the managers insisted on the significance of stakeholder's satisfaction because that assists the improvement of the output of services and products. Example mentioned by M14 about the important of this issue was *"as a customer I will be happy to find good customer services to help me choose my right product or services, and in our case, the IT department should be aware of this and they should deal with us as a customer in store and be willing to find his needs".* In fact, the IT department in his hospital employed very educated people and they had good knowledge in their field but they still missed the point, because knowledge is not everything. They should discover their consumer's needs and we willing to corporate with them in terms of helping them to improve their job (M12).

6.4.7 Shortage of expertise

With an acute shortage of IT/IS professionals, Saudi Arabian hospitals have resorted to hiring semi-skilled and unskilled workers and then training them. Many hospitals have resorted to hiring IT/IS professionals from foreign countries such as India and the Philippines. This was observed by the researcher while visiting these hospitals. As one manager commented *"The IT department suffers from a lack of expertise in this field, experienced guys are not available"*. Another manager said professionals in IT demand a lot of money and the hospital cannot afford what they ask and so the salary is not competitive. Another manager

commented *"the shortage of IT people is because the market is booming right now"*. Moreover, managers agreed about the importance of attracting expertise in IT to the health sector, but as M13 said, salaries in the medical field, particularly in public hospitals, cannot be attractive anymore because the increase of the number of established hospitals in the private sector, which increases their opportunity to get a good job in the health sector. Nowadays, hospitals avoid paying high salaries to experts by making contracts with professional firms. That can be a solution for the short term, but hospitals should build his team by employee experience and young people (M2).

6.4.8 IT professionals' turnover

Another factor that compounds the shortage of expertise is the IT professionals' turnover. Turnover of the employees disturbs any organisational routine [72]. This matter can cause problems to the hospitals. Interviewees in this research agreed that the IT professionals' turnover rate was high. They leave their jobs to search for a better salary and better working conditions. One manager commented *"I noticed that the IT department employee's turnover is high and that is because they find good pay outside the hospital"*. Another manager comments *"it is really difficult for the IT department to keep their professionals, there is a competitive market and IT firms attract them and they can get good pay, training and comfortable working conditions"*. As one manager commented, the real problem with the IT department is that when they have trained their employees and given them the skills they need to do their job, if they find a job with better pay they leave without completing their tasks. In addition, hospitals should have an agreement with IT professionals to always complete their tasks before leaving the job. Confidence is one of the key for keeping this people, in case of this hospital he noticed that numbers of professionals used to work for the IT department, and sometimes every few months they were working with another guy because he believed that these persons find it difficult to deal with lots of pressure from the IT top management (M7).

6.4.9 Lack of ambition amongst IT employees

The interviewers mentioned that IT employees' ambitions are very low. That may be because some of them believe that they deserve more benefits such as a good salary similar to other IT workers in other organisations. One manager said *"IT employees should have a fair salary and benefits, here in this hospital; management have obtained a very high salary, while IT professionals are treated in a very basic way (e.g. low salary compared to other fields, and*

very basic benefits)". Another manager mentioned that, during his experience in his hospital, he met many people in the IT department and they spent some times until they find a good place to work, and then they left the hospital to go somewhere else. The IT top management should be aware of this problem because these people are working without hope. Moreover, life is becoming very expensive and the ambitions between workers in some fields such as IT expertise in the health sector is really low because they can see how other professionals in this area, particularly those who are working in private hospitals, obtain lots of benefits (M5). To get good results you should invest in your resources and human resources in particular (M8).

6.4.10 Lack of sharing knowledge

The researcher asked managers to what extent you can participate in IT department activities. The reason behind this question was to discover the awareness of IT department management about the importance of sharing knowledge with their consumers. One manager commented on this *"I cannot accept that anyone asked me about my job, so I am not going to ask anyone about his job"*. Most of the interviewees agreed to the importance of sharing knowledge between departments, specifically, the IT departments and their stakeholders. Another manager said that IT is a backbone for any hospital and because of that IT can affect human lives. Therefore, the IT department can help their customers by sharing knowledge and discuss matters that can affect them. In addition, knowledge is power, so lack of legislation that forces people to do their job can cause problems in a hospital. In other words, sharing knowledge becomes very important for any job and it is imaginable for any employee work without any support from his/her colleague (M11).

6.5 Summary

The statistical results (see chapter 5) illustrated that respondent age, respondent educational level, respondent position, respondent years of experience, respondent size of hospital, respondent of IT department size and respondent of information system development have an impact on IT performance indicators and organisational factors.

This chapter has examined the factors that affect the IT department performance through conducting interviews with fourteen managers in Saudi Arabian hospitals. This research suggests a number of factors that influence the IT performance in the IT departments in Saudi Arabian hospitals. These are: supporting the IT department has a middle priority, lack of training and knowledge amongst IT department staff, lack of IT improvement, lack of IT planning, unclear IT department objectives, customer's lower satisfaction, shortage of expertise, IT professionals turnover, lack of ambition amongst IT employees, lack of sharing knowledge.

7.1 Introduction

The main purpose of this chapter is to explore possible relationships between organisation factors and the IT performance indicators and to explore which organisation factor has significant effects on the IT indicators. The reason behind this is that the researcher will use the Correlation coefficients (r) for all the organisation factors as well as the IT performance indicators and the Multiple Regression coefficient between organisation factors and IT performance indicators to assign weights for the each organisation factors. Section 7.2 illustrates the Pearson Correlation analysis to examine the relationships between the organisation factors and the IT performance indicators. Section 7.3 presents the Multiple Regression analysis to examine the effects of organisation factors.

7.2 The relationships between organisation factors and IT performance indicators

In this section the Pearson Correlation test will be used to examine the relationships between the organisation factors and the IT performance indicators. This study will begin with the null hypothesis that 'there are no statistically significant relationships between the organisation factors (top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement and customer focus) and the IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance). The following subsections illustrate the result of the Pearson Correlation analysis. The correlation coefficient (r) will be classified as small, medium and large. This can range from -1.00 to 1.00. This value will indicate the strength of the relationship between the two variables. A correlation of 0 indicates no relationship at all, a correlation of 1.0 indicates a perfect positive correlation, and a value of -1.0 indicates a perfect negative correlation.

[308] suggests the following guidelines:

r= .10 to .29 or r= -.10 to -.29 small

r= .30 to .49 or r= -.30 to -.49 medium

r= .50 to 1.0 or r= -.50 to -1.0 large

7.2.1 Top management responsibility and IT performance indicators

The Pearson Correlation was carried out to examine the relationships between top management responsibility and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between top management responsibility and IT service quality.
- There is a statistically significant relationship between top management responsibility and IT product quality.
- There is a statistically significant relationship between top management responsibility and customer satisfaction.
- There is a statistically significant relationship between top management responsibility and organisational performance.

Table 7.1 shows that there was a large statistically significant positive correlation found between top management and IT service quality (r=.697, p=.000), IT product quality (r=.690, p=.000), customer satisfaction (r=.628, p=.000), and organisational performance (r=.613, p=.000).

Table 7.1: Top management responsibility and IT performance indicators

	IT Service quality	IT product quality	Customer satisfaction	Organisational performance
Top management responsibility	.697**	.690**	.628**	.613**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the top management responsibility item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.2 Recruitment and IT performance indicators

The Pearson Correlation was carried out to examine the relationships between recruitment and IT performance indicators. The aim of this was to test the following null hypothesis:

- There is a statistically significant relationship between recruitment and IT service quality.
- There is a statistically significant relationship between recruitment and IT product quality.
- There is a statistically significant relationship between recruitment and customer satisfaction.
- There is a statistically significant relationship between recruitment and organisational performance.

Table 7.2 shows that there was a large statistically significant positive correlation found between recruitment and IT service quality (r=.529, p=.000) and IT product quality (r=.526, p=.000). There was a medium statistically significant positive correlation found between recruitment and customer satisfaction (r=.429, p=.000), and organisational performance (r=.315, p=.004).

Table 7.2: Recruitment and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Recruitment	.529**	.526**	.429**	.315**
Sig. (2-tailed)	.000	.000	.000	.004

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

The results show that of those IT departments that practiced the recruitment item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.3 Employee participation and IT performance indicators

The Pearson Correlation was carried out to examine the relationships between employee participation and IT performance indicators. The aim of this was to test the following null hypothesis:

- There is a statistically significant relationship between employee participation and IT service quality.
- There is a statistically significant relationship between employee participation and IT product quality.
- There is a statistically significant relationship between employee participation and customer satisfaction.
- There is a statistically significant relationship between employee participation and organisational performance.

Table 7.3 shows that there was a large statistically significant positive correlation found between employee participation and IT service quality (r=.622, p=.000), IT product quality (r=.554, p=.000), customer satisfaction (r=.526, p=.000) and organisational performance (r=.524, p=.000).

Table 7.3: Employee participation and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Employee participation	.622**	.554**	.526**	.524**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the employee participation item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.4 Reward and recognition

The Pearson Correlation was carried out to examine the relationships between reward and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between reward and IT service quality.
- There is a statistically significant relationship between reward and IT product quality.
- There is a statistically significant relationship between reward and customer satisfaction.
- There is a statistically significant relationship between reward and organisational performance.

Table 7.4 shows that there was a large statistically significant positive correlation found between reward and IT product quality (r=.614, p=.000) and customer satisfaction (r=.506, p=.000). There was a medium statistically significant positive correlation found between reward and IT service quality (r=.494, p=.000) and organisational performance (r=.437, p=.000).

Table 7.4: Reward and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Reward	.494**	.614**	.506**	.437**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the reward and recognition item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended

to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.5 Training and education

The Pearson Correlation was carried out to examine the relationships between training and education and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between training and education and IT service quality.
- There is a statistically significant relationship between training and education and IT product quality.
- There is a statistically significant relationship between training and education and customer satisfaction.
- There is a statistically significant relationship between training and education and organisational performance.

Table 7.5 shows that there was a medium statistically significant positive correlation found between training and education and IT service quality (r=.421, p=.000), IT product quality (r=.495, p=.000), customer satisfaction (r=.324, p=.003) and organisational performance (r=.346, p=.001).

Table 7.5: Training and education and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Training and education	.421**	.495**	.324**	.346**
Sig. (2-tailed)	.000	.000	.003	.001

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

The results show that of those IT departments that practiced the training and education item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended

to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.6 Supplier management

The Pearson Correlation was carried out to examine the relationships between supplier management and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between supplier management and IT service quality.
- There is a statistically significant relationship between supplier management and IT product quality.
- There is a statistically significant relationship between supplier management and customer satisfaction.
- There is a statistically significant relationship between supplier management and organisational performance.

Table 7.6 shows that there was a large statistically significant positive correlation found between supplier management and IT service quality (r=.566, p=.000), IT product quality (r=.626, p=.000), customer satisfaction (r=.576, p=.000) and organisational performance (r=.581, p=.000).

Table 7.6: Supplier management and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Supplier management	.566**	.626**	.576**	.581**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the supplier management item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended

to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.7 Process management

The Pearson Correlation was carried out to examine the relationships between process management and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between process management and IT service quality.
- There is a statistically significant relationship between process management and IT product quality.
- There is a statistically significant relationship between process management and customer satisfaction.
- There is a statistically significant relationship between process management and organisational performance.

Table 7.7 shows that there was a large statistically significant positive correlation found between process management and IT service quality (r=.641, p=.000), IT product quality (r=.507, p=.000), and organisational performance (r=.569, p=.000). There was a medium statistically significant correlation found between process management and customer satisfaction (r=.483, p=.000).

Table 7.7: Process Management and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Process management	.641**	.507**	.483**	.569**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the process management item, most tended to have high IT service quality, high IT product quality, high customer

satisfaction and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.8 Measurement

The Pearson Correlation was carried out to examine the relationships between measurement and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between measurement and IT service quality.
- There is a statistically significant relationship between measurement and IT product quality.
- There is a statistically significant relationship between measurement and customer satisfaction.
- There is a statistically significant relationship between measurement and organisational performance.

Table 7.8 shows that there was a large statistically significant positive correlation found between measurement and IT service quality (r=.608, p=.000), IT product quality (r=.676, p=.000), customer satisfaction (r=.688, p=.000) and organisational performance (r=.535, p=.000).

Table 7.8: Measurement and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Measurement	.608**	.676**	.688**	.535**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the measurement item, most tended to have high IT service quality, high IT product quality, high customer satisfaction

and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.9 Continuous improvement

The Pearson Correlation was carried out to examine the relationships between continuous improvement and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between continuous improvement and IT service quality.
- There is a statistically significant relationship between continuous improvement and IT product quality.
- There is a statistically significant relationship between continuous improvement and customer satisfaction.
- There is a statistically significant relationship between continuous improvement and organisational performance.

Table 7.9 shows that there was a large statistically significant positive correlation found between continuous improvement and IT service quality (r=.519, p=.000), IT product quality (r=.544, p=.000), customer satisfaction (r=.543, p=.000) and organisational performance (r=.571, p=.000).

Table 7.9: Continuous improvement and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Continuous improvement	.519**	.544**	.543**	.571**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the continuous improvement item, most tended to have high IT service quality, high IT product quality, high customer satisfaction and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.2.10 Customer focus

The Pearson Correlation was carried out to examine the relationships between customer focus and IT performance indicators. The test was applied to the following hypothesis:

- There is a statistically significant relationship between customer focus and IT service quality.
- There is a statistically significant relationship between customer focus and IT product quality.
- There is a statistically significant relationship between customer focus and customer satisfaction.
- There is a statistically significant relationship between customer focus and organisational performance.

Table 7.10 shows that there was a large statistically significant positive correlation found between customer focus and IT service quality (r=.653, p=.000), IT product quality (r=.560, p=.000), customer satisfaction (r=.545, p=.000) and organisational performance (r=.556, p=.000).

Table 7.10: Customer focus and IT performance indicators

	IT service quality	IT product quality	Customer satisfaction	Organisational performance
Customer focus	.653**	.560**	.545**	.556**
Sig. (2-tailed)	.000	.000	.000	.000

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

The results show that of those IT departments that practiced the customer focus item, most tended to have high IT service quality, high IT product quality, high customer satisfaction

and high organisational performance, and those which practiced the least tended to have the lowest IT service quality, lowest IT product quality, lowest customer satisfaction and lowest organisational performance.

7.3 The effects of organisation factors on IT performance indicators

This section is to examine which of the organisation factors (independent variables) had a significant effect on the four IT performance indicators (dependent variables). Using Multiple Regression, the IT performance indicators were regressed separately on the organisation factors. The results of Multiple Regression analysis will be presented in the following subsections.

7.3.1 The effects of organisation factors on IT service quality

Enter and Stepwise regression methods were regressed on the IT service quality as the independent variable. Table 7.11 illustrates the result of the Enter regression methods analysis. It shows that 62.2% of the variance in IT service quality was explained jointly by the independents variables. The ANOVA analysis shows that the regression is statistically significant (F=11.668 and p-value=.000).

Table 7.11: Enter Regression analysis result for IT service quality

Model	F	Sig.	R	R^2	Adjusted R^2
1	11.668	.000	.788	.622	.568

Table 7.12 presents the results of the Stepwise Regression method analysis. The Stepwise Regression model 1 contains one independent variable top management responsibility; this factor explained 48.6% of the variance in IT service quality (F=75.556 and p-value =.000). Model 2, contains an additional factor supplier management which explained the additional 5% of the variance in IT service quality (F=46.986 and p-value =.000), for model 2, R^2 change = .543. Model 3, contains an additional factor employee participation that explained the additional 3% of the variance in IT service quality (F=35.029 and p-value =.000), for model 3, R^2 change = .030. No further variables were entered, as they would not contribute significantly to the regression.

Table 7.12: Stepwise Regression analysis result for IT service quality

Model	Significant organisation factor(s)	F	Sig.	R	R^2	Adjusted R^2
1	Top management responsibility	75.556	.000	.697	.486	.479
2	Top management responsibility Supplier management	46.986	.000	.737	.543	.532
3	Top management responsibility Supplier management Employee participation	35.029	.000	.758	.574	.558

The results show that top management responsibility, supplier management and employee participation are the only organisation factors that have a statistically significant influence on IT service quality. They jointly explained 57.4% of the variance in IT service quality. The results suggest that of those IT departments that practiced the top management responsibility, supplier management and employee participation most tended to have the highest IT service quality and those practicing the least tended to have the lowest IT service quality.

7.3.2 The effects of organisation factors on IT product quality

Enter and Stepwise regression methods were regressed on the IT product quality as the independent variable. Table 7.13 illustrates the result of the Enter regression methods analysis. It shows that 63.5% of the variance in IT product quality was explained jointly by the independents variables. The ANOVA analysis shows that the regression is statistically significant (F=12.329 and p-value=.000).

Table 7.13: Enter Regression analysis result for IT product quality

Model	F	Sig.	R	R^2	Adjusted R^2
1	12.329	.000	.797	.635	.583

Table 7.12 presents the results of the Stepwise Regression method analysis. The Stepwise Regression model 1 contains one independent variable top management responsibility; this factor explained 47.6% of the variance in IT product quality (F=72.538 and p-value =.000). In model 2, the supplier management factor explained the additional 13% of the variance in IT product quality (F=53.396 and p-value =.000), for model 2, R^2 change = .135. In model 3, the reward factor explained the additional 5% of the variance in IT product quality (F=40.407

and p-value =.000), for model 3, R^2 change = .054. No further variables were entered, as they would not contribute significantly to the regression.

Table 7.14: Stepwise Regression analysis result for IT product quality

Model	Significant organisation factor(s)	F	Sig.	R	R^2	Adjusted R^2
1	Top management responsibility	72.538	.000	.690	.476	.469
2	Top management responsibility Supplier management	53.396	.000	.758	.575	.564
3	Top management responsibility Supplier management Reward	40.407	.000	.780	.608	.593

The results show that top management responsibility, supplier management and reward are the only organisation factors that have a statistically significant influence on the IT product quality. They jointly explained 60.8% of the variance in IT product quality. The result suggests that of those IT departments that practiced the top management, supplier management and reward, most tended to have the highest IT product quality and those practicing the least tended to have the lowest IT product quality.

7.3.3 The effects of organisation factors on customer satisfaction

Enter and Stepwise regression methods were regressed on the customer satisfaction as on the independent variable. Table 8.15 illustrates the result of the Enter regression methods analysis. It shows that 56.7% of the variance in customer satisfaction was explained jointly by the independents variables. The ANOVA analysis shows that the regression is statistically significant (F=9.293 and p-value=.000).

Table 7.15: Enter Regression analysis result for customer satisfaction

Model	F	Sig.	R	R^2	Adjusted R^2
1	9.293	.000	.753	.567	.506

Table 7.16 presents the results of the Stepwise Regression method analysis. The Stepwise Regression model 1 contained one independent variable measurement; the factors explained

47.4% of the variance in customer satisfaction (F=71.957 and p-value =.000). In model 2, supplier management factor explained the additional 4% of the variance in customer satisfaction (F=39.721 and p-value =.000), for model 2, R^2 change = .048. In model 3, top management responsibility factor explained the additional 5% of the variance in customer satisfaction (F=28.868 and p-value =.000), for model 3, R^2 change = .057. No further variables were entered, as they would not contribute significantly to the regression.

Table 7.16: Stepwise Regression analysis result for customer satisfaction

Model	**Significant organisation factor(s)**	**F**	**Sig.**	**R**	**R^2**	**Adjusted R^2**
1	Measurement	71.957	.000	.688	.474	.467
2	Measurement Supplier management	39.721	.000	.708	.501	.489
3	Measurement Supplier management Top management responsibility	28.868	.000	.725	.526	.508

The results show that measurement, supplier management and top management responsibility are the only organisation factors that have a statistically significant influence on customer satisfaction. They jointly explained 52.6% of the variance in customer satisfaction. The results suggest that of those IT departments that practiced the measurement, supplier management and top management responsibility, most tended to have the highest customer satisfaction and those practicing the least tended to have the lowest customer satisfaction.

7.3.4 The effects of organisation factors on organisation performance

Enter and Stepwise regression methods were regressed on the organisation performance as the independent variable. Table 8.17 illustrated the result of the Enter regression methods analysis. It shows that 55.0% of the variance in organisational performance was jointly explained by the independents variables. The ANOVA analysis shows that the regression is statistically significant (*F*=8.677 and *p*-value=.000).

Table 7.17: Enter Regression analysis result for organisation performance

Model	**F**	**Sig.**	**R**	**R^2**	**Adjusted R^2**
1	8.677	.000	.742	.550	.487

Table 7.18 presents the results of the Stepwise Regression method analysis. The Stepwise Regression model 1 contained one independent variable top management responsibility; the factor explained 37.6% of the variance in customer satisfaction (F=48.155 and p-value =.000). In model 2, supplier management factor explained the additional 13% of the variance in organisation performance (F=35.191 and p-value =.000), for model 2, R^2 change = .130.

Table 7.18: Stepwise Regression analysis result for organisation performance

Model	**Significant organisation factor(s)**	**F**	**Sig.**	**R**	**R^2**	**Adjusted R^2**
1	Top management responsibility	48.155	.000	.613	.376	.368
2	Top management responsibility Supplier management	35.191	.000	.686	.471	.458

The results show that top management responsibility and supplier management are the only organisation factors that have a statistically significant influence on organisation performance. They jointly explained 47.1% of the variance in organisation performance. The results suggest that of those IT departments that practiced the top management responsibility and supplier management, most tended to have the highest organisation performance and those practicing the least tended to have the lowest organisation performance.

7.4 Summary

The data analysis results suggested that not all of the organisation factors were of high importance; they varied in respect to their effects and relationships with IT performance indicators. Section 7.2 showed that there were significant positive relationships between organisation factors and IT performance indicators. Section 7.3 explored which of the organisation factors had a significant effect on IT performance indicators.

8.1 Introduction

In this study, chapter 4 evaluated the validity and reliability of the instruments. Chapter 5 investigated the level of IT performance in IT departments in the Saudi Arabian hospitals. The following chapter, number 6, examined the factors affecting IT department's performance. In addition, chapter 7 explored the relationships between organisational factors implementation and IT performance indicators and explored which of the organisational factors implementation had significant and direct effects on IT performance indicators. It can be seen that organisational factors are different in their relationships and effects with IT performance indicators. From the knowledge that the researcher obtained during this study, which included a literature review, semi-structured interviews and questionnaire survey, what needs to be done to assist in implementing the organisational factors in IT departments in Saudi hospitals has been identified. The researcher, with support from his supervisor, developed an assessment tool to help in evaluating the organisational factors implementation in IT departments. In this chapter, the assessment tool will be discussed in terms of a scoring system and their ratings.

8.2 The assessment tool construction

The assessment tool for organisational factors implementation in IT departments in Saudi hospitals was prepared after collecting the data via the questionnaire survey and semi-structured interviews (see chapters 4, 5, 6 and 7). The assessment tool has been enhanced and consolidated by semi-structured interviews. To help evaluate the strength and weaknesses of organisational factors implementation in IT departments, the assessment tool was used as a reference for the participant. It can be used to improve the areas of weakness and to assist with vital information to those hospitals that are willing to implement the organisational factors in their IT departments. From the data analysis, it shows that organisational factors were different in their relationships and effects to the IT performance indicators. As a result, organisational factors implementation should be identified. However, to weight the organisational factors implementation, a variety of methods have been used such as beta weights in Multiple Regression. [230] suggested that loading in Multiple Regression are *"the validities (the correlation of each predictor with the criterion) divided by R, the multiple regression coefficient"*.

There are four IT performance indicators used in this study namely; IT service quality, IT product quality, customer satisfaction and organisational performance. To compute a weight for each IT performance indicator and organisational factor implementation, the multiple regression coefficient will be used as follows: the multiple regression coefficient between organisational factor implementation and IT service quality is *.788* (see table 7.11); the multiple regression coefficient between organisational factor implementation and IT product quality is *.797* (see table 7.13); the multiple regression coefficient between organisational factor implementation and customer satisfaction is *.753* (see table 7.15); and the multiple regression coefficient between organisational factor implementation and organisational performance is *.742* (see table 7.17). In the following example, the computing of a weight for each organisational factors implementation will be explained. Computing a weight, for example for 'employee participation' is as follows (Where *L* means loading and *3* refers to the number of employee participation factor). The correlation coefficient (r) between employee participation and IT service quality (0.642) has been divided by the multiple regression coefficient between organisational factors implementation and IT service quality (.788). The loading score for the employee participation (L_3_1) is 0.814720 (see Table 8.1). Every organisational factors implementation and IT service quality was repeated.

Table 8.1: Factors' loading with respect to the IT service quality

I	**Factor**	**Correlation with IT service quality (r)**	**Loading (L_i_1)** **(ri/ .788)**
1	Top management responsibility	0.736	0.934010
2	Recruitment and Retention	0.531	0.673857
3	**Employee participation**	**0.642**	**0.642/.788 = 0.814720**
4	Reward and Recognition	0.512	0.649746
5	Training and Education	0.421	0.534263
6	Supplier management	0.568	0.720812
7	Process management	0.667	0.846446
8	Measurement	0.626	0.794416

9	Continuous improvement	0.544	0.690355
10	Customer focus	0.663	0.841370

Then, the correlation coefficient (r) between employee participation and IT product quality (0.583) has been divided by the multiple regression coefficient between organisational factors implementation and IT product quality (.797). The loading score for the employee participation (L_3_2) is 0.731493 (see Table 8.2).

Table 8.2: Factors' loading with respect to the IT product quality

I	**Factor**	**Correlation with IT product quality (r)**	**Loading (L_i_2) (ri/ .797)**
1	Top management responsibility	0.725	0.909661
2	Recruitment and Retention	0.546	0.685069
3	**Employee participation**	**0.583**	**0.583/.797 = 0.731493**
4	Reward and Recognition	0.598	0.750313
5	Training and Education	0.479	0.601003
6	Supplier management	0.610	0.765370
7	Process management	0.553	0.693851
8	Measurement	0.679	0.851944
9	Continuous improvement	0.548	0.687578
10	Customer focus	0.596	0.747804

After that, the correlation coefficient (r) between employee participation and customer satisfaction (0.557) has been divided by the multiple regression coefficient between organisational factors implementation and customer satisfaction (.753). The loading score for the employee participation (L_3_3) is 0.739707 (see Table 8.3). This process was also repeated for every organisational factors implementation.

Table 8.3: Factors' loading with respect to the customer satisfaction

I	Factor	Correlation with customer satisfaction (r)	Loading (L_i_3) (ri/ .753)
1	Top management responsibility	0.665	0.883134
2	Recruitment and Retention	0.457	0.606905
3	**Employee participation**	**0.557**	**0.557/.753 = 0.739707**
4	Reward and Recognition	0.494	0.656042
5	Training and Education	0.315	0.418326
6	Supplier management	0.579	0.768924
7	Process management	0.549	0.729083
8	Measurement	0.711	0.944223
9	Continuous improvement	0.565	0.750332
10	Customer focus	0.590	0.783532

Following that, the correlation coefficient (r) between employee participation and organisational performance (0.517) has been divided by the multiple regression coefficient between organisational factors implementation and organisational performance (.742). The loading score for the employee participation (L_3_4) is 0.696765 (see Table 8.4). This process was also repeated for every organisational factors implementation.

Table 8.4: Factors' loading with respect to the organisational performance

I	Factor	Correlation with organisational performance (r)	Loading (L_i_3) (ri/ .742)
1	Top management responsibility	0.596	0.803234
2	Recruitment and Retention	0.298	0.401617

3	**Employee participation**	**0.517**	**0.517/.742 = 0.696765**
4	Reward and Recognition	0.443	0.597035
5	Training and Education	0.329	0.443396
6	Supplier management	0.569	0.766846
7	Process management	0.560	0.754716
8	Measurement	0.532	0.716981
9	Continuous improvement	0.555	0.747978
10	Customer focus	0.543	0.731805

Then, to figure the IT performance indicators the loading numbers have been added together for the employee participation factor and called (L_3). The total of employee participation's loading (L_3) = (L_3_1) + (L_3_2) + (L_3_3) + (L_3_4) = 0.814720 + 0.731493 + 0.739707 + 0.696765 = 2.982 (see table 8.5). All organisational factors implementation has been repeated in a similar process. After that, the loading for all organisational factors implementation has been added together and called (L). The total loading (L) = 22.934 (see table 8.5). Finally, the computed weight for the employee participation factor is (W_3) by dividing (L_3) by (L). (W_3) = (2.982/ 22.934)* 100 = 13.00 (see table 8.5). All organisational factors implementation has been repeated in similar process.

Table 8.5: The organisational factors implementations' total loading

I	**Factor**	**Total Loading (L*i*) =** **(L_*i*_1) + (L_*i*_2) + (L_*i*_3) +** **(L_*i*_4)**	**Weight (W*i*) =** **(L*i* / 16.147)*100**
1	Top management responsibility	2.722	11.86
2	Recruitment and Retention	1.832	7.988
3	**Employee participation**	**2.982**	**W_3 = 13.00**

4	Reward and Recognition	2.047	8.925
5	Training and Education	1.544	6.732
6	Supplier management	2.326	10.14
7	Process management	2.329	10.15
8	Measurement	2.548	11.11
9	Continuous improvement	2.212	9.645
10	Customer focus	2.392	10.42
	Total	**22.934**	**100**

According to these weights in table 8.5, the assessment tool was reconstructed to help in assessing organisational factors implementation in IT departments in Saudi Arabian hospitals. Table 8.6 provides a sample of the assessment tool which considered organisational factors implementation weights. Appendix (D) provides full details about the assessment tool. Forty-eight organisational factors implementation elements/practices are included in the assessment tool. In fact, these elements can assist in the achievement of successful organisational factors implementation. Practice of these elements can help IT departments to focus on the organisational factors implementation and their criteria/area (see appendix E).

Table 8.6: A version of the assessment tool

No	Statement
1.	**Top management responsibility (21 points)**
1.1.	IT top management assumes responsibility for department performance.
2.	**Recruitment and retention (9 points)**
2.1.	Our hospital provides decent salaries that can attract IT professionals.
3.	**Employee participation (18 points)**
3.1.	IT departments' employees actively participate in related activities.
4.	**Reward and recognition (15 points)**
4.1.	Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.

5. Training and education (9 points) 5.1. Specific IT/IS skills training is given to IT department employees.
6. Supplier management (9 points) 6.1. Long-term cooperative relations with suppliers are established in our IT department.
7. Process management (15 points) 7.1. Critical IT/IS processes are regularly monitored, measured and improved.
8. Measurement (24 points) 8.1. Self-assessment of IT department performance is a strong practice in our department.
9. Continuous improvement (9 points) 9.1. The related data are used to evaluate overall IT department performance.
10. Customer focus (15 points) 10.1. Customer complaints are treated with top priority.

Effectiveness and efficiency can be provided by this assessment tool, and it can also identify areas for improvement and help in evaluating the organisational factors implementation in an IT department. The IT department can have their quick results by using this assessment tool to explore the areas needing improvement. However, the scores that are produced by the assessment tool can help to provide the IT department with a reference to prepare the improvement plan, but that cannot be the only way to select the improvement possibilities.

8.3 Scoring system

[329] and [330] provide a base of developed guidelines to help IT managers rating each organisational factor elements/practices (see table 8.7). The strength and weakness of the organisational factors should be pointed out. So, the more attention should go to the lower score. The lower score can be used to formulate an improvement plan. However, the evidence should be used instead of conjecture during the rating of each organisational factor practice. This rating system is quick, descriptive and easy to administer.

Each organisational factor implementation will have a set of practices after the interviews are completed, which indicate the values (0, 1, 2, or 3) of these elements. The score for each organisational factor is (the sum of all its elements' scores divided by the factor's total score)

and multiplied by its weight. Then, the total score for the hospitals are obtained by adding up all organisational factor implementation scores.

The total score of each hospital will be highlighted in one of the three ranges:

Strong - Score falls between 67% - 100%.

Moderate - Score falls between 35% - 66%, more improvement is needed.

Weak - Score falls between 0% - 34%, much improvement is needed.

Table 8.7: Scoring guidelines for organisational factors implementation

Scores	Criterion
0	No evidence is available. This means that the IT department is characterised as ***ad hoc*** and occasionally even chaotic (reactive and inconsistently implemented).
1	Little required evidence is available. This means that the IT department is ***weak*** in this practice.
2	Much required evidence is available. This means that the IT department is ***moderate*** in this practice.
3	All required evidence sound and systematic approach is available. This means that the IT department is ***strong*** in this practice.

8.4 Summary

The IT performance indicators can have the chance to be measured after implementing organisational factors in an IT department, by using the assessment tool. In fact, this can be seen as an important part of the research aims and objectives. The next chapter aims to test the usefulness and practicality of the assessment tool. Two hospitals were supplied with the assessment tool to guide them to evaluate the organisational factors implementation in their IT department. The findings of this are discussed in the following chapter.

9.1 Introduction

The results in previous chapters (5, 6 and 8) assist in building the assessment tool, and these results were produced from the questionnaire survey. In addition, chapter (7) provided fourteen semi-structured interviews as well as a literature review that in fact helped the researcher to evaluate the organisational factors implementation in IT departments in two hospitals using the assessment tool. Furthermore, testing and validation of the assessment tool can identify to what extent the organisational factors implementation practices/elements can reflect the level of practice of organisational factors implementation in IT departments of two selected hospitals and also demonstrates that an IT department with a high score reflects the strong IT performance indicators.

9.2 Evaluation process

In terms of the assessment tool, the researcher decided to choose hospitals that were used to participate in the questionnaire survey and semi-structured interviews and were willing to take part in this phase. Stakeholders in this stage were chosen from the top management in their department. Only, two hospitals showed interest in this stage. In order to respect their privacy, during this study the hospitals are presented as hospital A and hospital B.

The problem that faced the researcher was that the IT managers who took part in this evaluation process had no experience of organisational factors implementation in their departments, so the researcher decided to do it by himself. Details of the assessment tool and its measurement criteria are given in appendix D and E. During the data collection trip, the researcher benefited by building a relationship with the people in these hospitals, that helped him to ask them to participate in this evaluation, so enabling open-ended semi-structured interviews to be used in terms of helping these managers to give their views and personal experiences. In hospital A, one IT manager showed his interest in participating in this evaluation, while one director manager of technology in hospital B agreed to take part in this stage. The brief of this study and its aim and objectives were provided to the interviewee and that the answers to their questions would be used only in this study and evaluation phase. One hour and thirty minutes was the duration of the interview with each hospital. Arabic and English language were used in these interviews. The difficulties that faced the researcher were interruptions during the interview time because these interviews were undertaken during

the working hours. Because of the complicated issues which related to permission from the director managers of these hospitals, interviewees were not happy with these interviews being recorded. When the interviews had finished, the analysis of these answers started.

Table 9.1: Breakdown of the participated hospitals

	Hospital	
	A	**B**
Position	IT manager	Director Manager of the Information Technology
Experience (years)	11	20
Hospital's size (No of employees)	More than 200	More than 200
IT size (No of employees)	More than 40	More than 40

The following sections will present the results of organisational factors evaluation of hospital A and B.

9.3 Hospital A

9.3.1 Brief Background

Hospital A is in a large medical city which included many hospitals such as a women's specialised hospital and children's hospital with 1095 beds in total. Their mission is *"provides optimum healthcare to SANG personnel, their dependants and other eligible patients. Also provides excellent academic opportunities, conducts research and participates in industry and community service programs in the health field"*.

Their vision is to be *"recognized as internationally acclaimed centres of excellence to enhance individual and public health status"*.

In addition, they mentioned their core values which cover many aspects:

- *"Respect religious and social values*
- *Patient safety and satisfaction*

- *Quality performance*
- *Respect and dignity*
- *Transparency*
- *Teamwork*
- *Productive work environment*
- *Accountability*
- *Behaviour and work ethic*
- *Excellence and innovation”.*

It can be seen from the information that was provided by hospital A, their willingness to provide specialist services to their patients and that they were enthusiastic in assisting their employees to be professionals in their field. The IT department in hospital A was responsible for providing IT infrastructures, solutions, security and managing applications. To help the medical city achieve their goals and objectives the IT department was keen to improve their business and provide high IT/IS services and products.

9.3.2 Evaluation Results

9.3.2.1 IT Top Management Responsibility

The results of the IT top management responsibility assessment can be seen in table 9.2. There was moderate evidence that IT top management in hospital A had responsibility for the performance, improvement and evaluation of the IT/IS in the IT department. IT top management spent time and effort during this work to enhance the performance in the IT department. This responsibility helps them to practice and improve their knowledge by participating in many workshops, conferences and training. Consulting experts, visiting other hospitals and improving relationships with IT professionals can be seen as a responsibility for IT performance. There was moderate evidence that the IT top management supported long-term improvement processes. Their support can enhance the quality of improvement by recruiting experienced people and setting a long-term plan for improvement which considers many aspects, (e.g. implementing the organisational factors). Moderate evidence showed that the IT top management actively participated in improvement activities. They were interested in serving on the IT committee, participating in developing a comprehensive vision, mission and policy, celebrating successful IT achievements, helping staff to communicate the vision and mission, and reviewing the main issues to management meetings. There was moderate evidence that IT top management encourages employee participation in improvement

activities. Employees are very important in developing and enhancing any activities in the IT department, so trusting them and belief in their ability to do better can make a difference. There was weak evidence that the IT top management had clear objectives for department performance. That maybe because of misunderstanding the long-term vision statement and there being no plan for the overall performance. Moderate evidence shows that the IT top management had a comprehensive IT/IS improvement plan in the department. Their ability to implement the improvement plan in practice and to divide this plan into targets which can help to cover major problems areas was shown. Weak evidence showed that the IT top management used quality as the major criterion in developing IT/IS plans. That may be because of looking for a very quick solution and ignoring the plan including quality which needs more concentration on the vision, mission and department targets.

Table 9.2: Hospital A's IT top management responsibility assessment

Statement	Strength & weakness	Score
1. IT top management assumes responsibility for department performance.	Moderate	2
2. IT top management support long-term improvement process.	Moderate	2
3. IT top management actively participates in improvement activities.	Moderate	2
4. IT top management encourages employee participation in improvement activities.	Moderate	2
5. IT top management has clear objectives for department performance.	Weak	1
6. There is a comprehensive IT/IS improvement plan in our department.	Moderate	2
7. Quality used as the major criterion in developing IT/IS plans.	Weak	1
Total score (F1)	12/21 = 0.571428	

9.3.2.2 Recruitment and Retention

Table 9.3 shows the results for recruitment and retention. There was no evidence to show that hospital A provides decent salaries that can attract IT/IS professionals. Satisfaction rate is a very important issue that can affect the employee's focus on their work, so if they believe that their hospital does not provide them with the decent salary that they feel they deserve this can

influence their concentration and force them to search for a new job. Moderate evidence shows that IT top management provided employees in the IT department with a clear job description. Their responsibility is to make sure the job description is set for every position and to provide employees with job policies and procedures. There was weak evidence to show that the working conditions in the IT department were comfortable for all employees. Working environment can influence the output of any job, so the employee's condition should be improved which would then increase their productivity, and something such as devices, suitable equipment, air conditioning and lighting maybe help in this matter.

Table 9.3: Hospital A's recruitment and retention assessment

Statement	Strength & weakness	Score
1. Our hospital provides decent salaries that can attract IT/IS professionals.	No evidence	0
2. Job description for IT department employees is clearly specified.	Moderate	2
3. The working conditions in our IT department are comfortable for all employees.	Weak	1
Total score (F2)	3 / 9 = 0.333333	

9.3.2.3 Employee Participation

Table 9.4 shows the results for the employee participation. There was moderate evidence to show that the IT departments' employees were committed to the success of the IT department. The satisfaction rate of the employees can help the department to be successful, in other words, a high turnover rate of professionals would cause problems to the department, but if the IT top management were able to control this matter to a minimum level, this could enhance the success of the department. Moderate evidence showed that the IT top management were using functional teams in the IT department. Choosing the functional team members should consider the individual's potential contributions they should have training in team building, and their successes should not be ignored. The employees actively participating in related activities showed moderate evidence. It concentrated on involving the IT department's employees in the improvement teams. This was because every member in the department should be aware of the improvement process and the IT top management should encourage them to take part in this development. Weak evidence showed that the IT

department employees participated in developing the department plans. Employees in the IT department should have the opportunity to participate in the illustration of the department's plans, or at least the plans that affect their work. Moderate evidence showed that the IT department employees are empowered to resolve problems. In some cases, the IT top management could empower their employees to solve IT/IS problems and empowered them to make some urgent decisions. Strong evidence showed that the IT department employees were provided with their performance feedback. Employees should be monitored in terms of their productivity and the completion of their tasks, and that can help in improving the ability of the workers and in enhancing the transparency between them.

Table 9.4: Hospital A's employee participation assessment

Statement	Strength & weakness	Score
1. IT departments' employees are very committed to the success of the IT department.	Moderate	2
2. Functional teams are frequently used in our IT department.	Moderate	2
3. IT departments' employees actively participate in related activities.	Moderate	2
4. IT department employees participate in developing the department plans.	Weak	1
5. IT department employees are empowered to resolve problems.	Moderate	2
6. IT department employees are provided with their performance feedback.	Strong	3
Total score (F3)	12 / 18 = 0.666666	

9.3.2.4 Reward and Recognition

Table 9.5 shows the results for the reward and recognition. Moderate evidence showed that the improvement of working conditions is one of the recognition schemes in hospital A in order to recognise employee effort. Working conditions should be suitable for employees to assist them with their job. IT top management should pay attention to employee's well-being, safety, morale and growth. In addition, they should be provided with suitable equipment and devices. The salary promotion scheme to encourage employee participate in the IT department activities showed weak evidence. The differences between employees in terms of

their skills, ability and contributions should be recognised and their salary must be widened dependent on this. Position promotions are based on work effort and quality in hospital A showed moderate evidence. Promotion of employees must be based on their capabilities, performance, skills and contributions to the hospital. Moderate evidence showed that excellent suggestions are financially rewarded. Good suggestions can influence the performance in any business, so establishing employee suggestion systems could encourage them to submit their suggestions. These suggestions should be evaluated in terms of reward for the best suggestion. Weak evidence showed that the employees' rewards and penalties are clear. However, rewards and penalties should be communicated to all employees.

Table 9.5: Hospital A's reward and recognition assessment

Statement	Strength & weakness	Score
1. Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.	Moderate	2
2. Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.	Weak	1
3. Position promotions are based on work effort and quality in our hospital.	Moderate	2
4. Excellent suggestions are financially rewarded.	Moderate	2
5. Employees' rewards and penalties are clear.	Weak	1
Total score (F4)	8 / 15 = 0.533333	

9.3.2.5 Training and Education

Table 9.6 shows the results for the training and education. No evidence showed that the specific IT/IS skills training was given to IT department employees. IT top management need to introduce the IT department employees to their job and provide them with training to help them perform their job better. General management technique training given to IT department employees showed weak evidence. Training that can assist employees in their job should include some option courses, for example, time management and team building. There was weak evidence showing that the resources were available for IT department employee's education and training. In fact, businesses are changing quickly, so management should be

aware of these changes which would help them to provide sufficient resources for implementing the education and training plan.

Table 9.6: Hospital A's training and education assessment

Statement	Strength & weakness	Score
1. Specific IT/IS skills training is given to IT department employees.	No evidence	0
2. General management technique training is given to IT department employees.	Weak	1
3. Resources are made available for IT department employee's education and training.	weak	1
Total score (F5)	2 / 9 = 0.222222	

9.3.2.6 Supplier Management

Table 9.7 shows the results for supplier management. Moderate evidence showed that the selection of suppliers in the IT department is dependent on the quality of product/service. The price of product/service is not the issue in some circumstances, so the selection of suppliers should follow a process that can protect the rights of hospital and to make sure that every product/service is to the required standard. There was weak evidence to show that long-term cooperative relations with suppliers had been established in the IT department. The cooperation of suppliers can create benefits to the IT department, such as delivering the product/service in a good condition and on time, and can make sure the required product/service comes with the best price. The detailed information about supplier performance which is maintained in the IT department showed moderate evidence. The evaluation of a supplier's performance is a very important step in terms of creating the evaluation system which can measure supplier's performance, so that suppliers can be rated regarding their product/service performance.

Table 9.7: Hospital A's supplier management assessment

Statement	Strength & weakness	Score
1. IT department product/service quality is regarded as the most	Moderate	2

important factor in selecting suppliers.		
2. Long-term cooperative relations with suppliers are established in our IT department.	Weak	1
3. Detailed information regarding suppliers' performance is maintained in our IT department.	Moderate	2
Total score (F6)	5 / 9 = 0.555555	

9.3.2.7 Process Management

Table 9.8 shows the results for the process management. There was moderate evidence showing that the regular critical IT/IS processes were monitored, measured and improved. Monitoring, measuring and improving the IT/IS product/service can help to avoid any damage in the future, therefore the IT department can plan their budget, and training provided to make sure that everything can be managed within the required time. Moderate evidence showed that the processes in the IT department were standardised and systematically documented. These involved identifying and defining business processes in the areas of: IT/IS service management, measurement, IT/IS application development, IT/IS planning, customer focus, supplier management, software and hardware maintenance, and project management. There was a moderate evidence to show that the process in the IT department was designed to be "foolproof" in order to minimise the chance of employee errors. The processes can be explained to the employees, and they can be trained to follow them. Strong evidence showed that IT/IS equipment's was well maintained according to the maintenance plan. In the technology era, businesses really should keep the IT equipment's well maintained in order to save their business; therefore the equipment maintenance plan schedule should be set and also allowing employees and a professional firm to be responsible for daily equipment maintenance. Moderate evidence showed that the IT department use a cycle time to reduce new product or service development. That can be by using, for example, change management.

Table 9.8: Hospital A's process management assessment

Statement	Strength & weakness	Score
1. Critical IT/IS processes are regularly monitored, measured and improved.	Moderate	2

2. Our processes are standardised and systematically documented.	Moderate	2
3. Our processes are designed to be "foolproof" in order to minimise the chance of employee errors.	Moderate	2
4. IT/IS equipment's are well maintained according to the maintenance plan.	Strong	3
5. Our department implements a programme to reduce new product or service development and implementation of cycle times.	Moderate	2
Total score (F7)	11 / 15 = 0.733333	

9.3.2.8 Measurement

Table 9.9 shows the results for measurement. There was moderate evidence showing that the IT/IS performance standards had been established and communicated to all stakeholders. Identifying the success factors can help to define performance measures for every success factor. However, a plan which could assist in achieving the target performance should be set. Moderate evidence showed that the IT department conducted IT/IS audits. That could be within a regular conduct audits. Weak evidence showed that self-assessment of IT department performance is a strong practice. Self-assessment is a helpful source for improvement. There was moderate evidence to show that the IT department had details of related data such as customer complaints and defect rates. The relationship with customers is a really valuable source that can enhance the business, so the IT department could improve that by establishing a system to deal with client complaints. Weak evidence showed that related data was used to evaluate overall IT department performance. Having data for IT/IS services/products performance to evaluate the stakeholder's satisfaction which can lead to hospital performance is important. There was moderate evidence to show that the related data was used to evaluate the performance of IT department employees. Set targets can help the IT top management to evaluate employee's performance. Moderate evidence showed that the IT department performance measurement findings were evaluated to identify problem causes. Employee's performance findings, stakeholder satisfaction findings, self-assessment findings can be used to identify problem causes. There was moderate evidence to show that the IT department performance measurement findings are available to stakeholders. The published findings of measurement can enhance the trust between the IT department and their stakeholders.

Table 9.9: Hospital A's measurement assessment

Statement	Strength & weakness	Score
1. IT/IS quality performance standards have been established and communicated to all stakeholders.	Moderate	2
2. Our department regularly conducts IT/IS quality audits.	Moderate	2
3. Self-assessment of IT department performance is a strong practice in our department.	Weak	1
4. Our department has detailed of related data such as customer complaints and defect rates.	Moderate	2
5. The related data are used to evaluate overall IT department performance.	Weak	1
6. The related data are used to evaluate the performance of IT department employees.	Moderate	2
7. IT department performance measurement findings are evaluated to identify problem causes.	Moderate	2
8. IT department performance measurement findings are available to all stakeholders.	Moderate	2
Total score (F8)	14 / 24 = 0.583333	

9.3.2.9 Continuous Improvement

Table 9.10 shows the results for continuous improvement. Weak evidence showed that customer feedback is used for improvement. The improvement should focus on the customer's needs, and customer complaints can help in this matter. There was moderate evidence showing that performance measurement findings are used for improvement. Stakeholder's satisfaction surveys, self-assessment, and organisational performance evaluation can help in identifying the improvement areas, updating performance targets and action plans. Moderate evidence showed that the IT department used regular committee/team meetings to support improvement. Enhancing the value of the team can guide the IT department to achievement of their goals, and in terms of improvement, it may be helpful to establish an improvement team and to provide employees with all important training.

Table 9.10: Hospital A's continuous improvement assessment

Statement	Strength & weakness	Score
1. Customer feedback is used for improvement.	Weak	1
2. Performance measurement findings are used for improvement.	Moderate	2
3. A specific committee/team is used regularly to support improvement in IT department activities.	Moderate	2
Total score (F9)	5 / 9 = 0.555555	

9.3.2.10 Customer Focus

Table 9.11 shows the results for customer focus. Moderate evidence showed that the IT department collected extensive complaints, such as help desk calls, from customers. To deal with customer's complaint, the IT department may need an established system that can collect these complaints. Strong evidence showed that customer complaints are treated with top priority. With close cooperation, the call centre may help in resolving customer's problems, which can receive the calls and pass them to problem management staff. There was moderate evidence showed that the IT department conducts a regular customer satisfaction survey. Measuring the customer satisfaction needed a close relationship with them and established channels that can help to measure their satisfaction level. Moderate evidence showed that the user/customer participated in various stages of the IT department projects. The participation of the customers can assist the IT department to choose the required service/product to make sure this service/product will meet the required standards. Strong evidence showed that the IT department provides services after IT/IS project completion and product delivery. Having service agreements with the departments in the hospital can help in achieving their goals.

Table 9.11: Hospital A's customer focus assessment

Statement	Strength & weakness	Score
1. Our department collects extensive complaint information such as help desk calls from customers.	Moderate	2

2. Customer complaints are treated with top priority.	Strong	3
3. Our department regularly conducts a customer satisfaction survey.	Moderate	2
4. User/customer participates in various stages of the IT department projects.	Moderate	2
5. Our department provides services after IT/IS project completion and product delivery.	Strong	3
Total score (F10)	12 / 15 = 0.8	

9.3.2.11 IT performance indicators

The researcher found it difficult to obtain any information about IT performance indicators in hospital A. The IT top management did not give any figures about the IT performance indicators. The reason behind that is because it needed time and effort to collect these figures. As mentioned, IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance) are improving from year to year. Assessment was used to collect data from customer/stakeholders to measure their satisfaction level. This assessment suggested that the IT performance indicators (IT service quality, IT product quality and customer satisfaction) were improving. The IT department measured hospital performance in terms of vision, mission and strategy.

9.3.3 Hospital A assessment summary

Table 9.12 shows hospital A's final assessment results. The results suggest that in general hospital A is moderate in practicing the organisational factors implementation elements. In addition, it is suggested that hospital A is moderate in almost all organisational factors implementation since they have a score above 35%, except in process management and customer focus which were strong, while recruitment and retention and training and education were weak. The results showed those six moderate areas, two strong areas and two weak areas. The results are surprising because of the high budget which was spent on the IT department.

Table 9.12: Hospital A's strengths and weaknesses

Factor	Factor score (FS)	Factor weight (FW)	Contribution (FS*FW)
1. Top management responsibility	0.571428	11.86	6.777136
2. Recruitment and retention	0.333333	7.988	2.662664
3. Employee participation	0.666666	13.00	8.666658
4. Reward and recognition	0.533333	8.925	4.759997
5. Training and education	0.222222	6.732	1.495998
6. Supplier management	0.555555	10.14	5.633327
7. Process management	0.733333	10.15	7.443329
8. Measurement	0.583333	11.11	6.480829
9. Continuous improvement	0.555555	9.645	5.358327
10. Customer focus	0.8	10.42	8.336
	Total points	**100**	**57.6142**

9.4 Hospital B

9.4.1 Brief Background

Hospital B is a major recognised hospital in the region, which contains hospitals in two cities, Riyadh and Jeddah. In addition, it has a research centre with a good reputation in the medical field. Hospital B's mission is to provide *"the highest level of specialized healthcare in integrated educational and research setting"*. Furthermore, its vision is formulated as: *"to be a world-leading institution of excellence and innovation in healthcare"*.

Their values:

- ***"Patient Focus:** We put the needs of our patients first*
- ***Integrity:** We adhere to high ethical principles to be truthful, transparent, equitable and trustworthy*
- ***Quality:** We strive for excellence and high quality through creativity and innovation*

- ***Compassion:*** *We treat patients, families, and team members with dignity and kindness*
- ***Teamwork:*** *We work well together to ensure that knowledge and wisdom are shared for the benefit of all".*

9.4.2 Evaluation Results

9.4.2.1 IT Top Management Responsibility

The results of the IT top management responsibility assessment can be seen in table 9.13. There was moderate evidence that IT top management in hospital B had responsibility for the performance, improvement and evaluation of the IT/IS in the IT department. The IT top management spent time and effort during their work to improve themselves. This responsibility helped them to practice and improve their knowledge by participating in many workshops, conferences and training. Their responsibility involved consulting experts, visiting other hospitals and improving relationships with IT professionals. There was moderate evidence that the IT top management supported long-term improvement processes. Their support could enhance the quality of improvement by recruiting experienced people and setting a long-term plan for improvement which considers many aspects, (e.g. implementing the organisational factors). Moderate evidence showed that the IT top management actively participated in improvement activities. They showed interested in serving on the IT committee, participating in developing a comprehensive vision, mission and policy, celebrating IT successful achievements, helping staff to communicate to the vision and mission, and reviewing the main issues at the management meeting. There was moderate evidence that IT top management encouraged employee participation in improvement activities. The trust between employees and their IT top management and belief in their ability to do better can make a differences. There was moderate evidence that the IT top management had clear objectives for department performance. Misunderstanding of the long-term vision statement, and work without any plan for the overall performance could cause problems in the IT department. Moderate evidence showed that the IT top management had a comprehensive IT/IS improvement plan in the department. Their ability to implement the improvement plan in practice and divide this plan into targets which can help to cover major problems area was shown. Moderate evidence showed that the IT top management used quality as the major criterion in developing IT/IS plans. It is very important that the IT top management were aware of the quality of their products and services.

Table 9.13: Hospital B's IT top management responsibility assessment

Statement	Strength & weakness	Score
1. IT top management assumes responsibility for department performance.	Moderate	2
2. IT top management support long-term improvement process.	Moderate	2
3. IT top management actively participates in improvement activities.	Moderate	2
4. IT top management encourages employee participation in improvement activities.	Moderate	2
5. IT top management has clear objectives for department performance.	Moderate	2
6. There is a comprehensive IT/IS improvement plan in our department.	Moderate	2
7. Quality used as the major criterion in developing IT/IS plans.	Moderate	2
Total score (F1)	14 / 21 = 0.666666	

9.4.2.2 Recruitment and Retention

Table 9.14 shows the results for recruitment and retention. There was no evidence to showing that hospital B provided decent salaries that could attract IT/IS professionals. Satisfaction rate is a very important issue that can affect the employee's focus on their work, so if they believe that their hospital does not provide them with the decent salary they deserve that can influence their concentration and force them to search for a new job. Weak evidence showed that the IT top management provided employees with a clear job description. Their responsibility was to make sure the job description was set for every position and to provide employees with job policies and procedures. There was no evidence to show that the working conditions in the IT department were comfortable for all employees. Work conditions can influence the output of any job, so the environment should be improved which could increase their productivity, such as devices, suitable equipment, air conditioning and lighting may help in this matter.

Table 9.14: Hospital B's recruitment and retention assessment

Statement	Strength & weakness	Score
1. Our hospital provides decent salaries that can attract IT/IS professionals.	No evidence	0
2. Job description for IT department employees is clearly specified.	Weak	1
3. The working conditions in our IT department are comfortable for all employees.	No evidence	0
Total score (F2)	1 / 9 = 0.111111	

9.4.2.3 Employee Participation

Table 9.15 shows the results for employee participation. There was moderate evidence to show that the IT departments' employees were committed to the success of the IT department. The satisfaction rate of the employees can help the department to be successful, in other words a high turnover rate of professionals would cause problems to the department, but if the IT top management were able to control this issue to a minimum level, this would enhance the success of the department. Moderate evidence showed that the IT department was using functional teams. When choosing the functional team members they should consider the individual potential contributions, they should have training in team building, and their success should not be ignored. The employees actively participating in related activities showed moderate evidence. It concentrated on involvement of the IT department's employees in the improvement teams. That was because every member in the department should be aware of the improvement process and the IT top management should encourage them to take part in this development. Moderate evidence showed that the IT department employees participated in developing the department plans. Employees in the IT department should have the opportunity to participate in an illustration of the department's plans, or at least the plan that would affect their work. Moderate evidence showed that the IT department employees are empowered to resolve problems. In some cases, the IT top management can empower their employees to solve IT/IS problems and empower them to make some urgent decisions. Moderate evidence showed that the IT department employees are provided with their performance feedback. Employees should be monitored in terms of their productivity

and achievement of their tasks, and that can help in improving the ability of the workers and enhance the transparency between them.

Table 9.15: Hospital B's employee participation assessment

Statement	Strength & weakness	Score
1. IT departments' employees are very committed to the success of the IT department.	Moderate	2
2. Functional teams are frequently used in our IT department.	Moderate	2
3. IT departments' employees actively participate in related activities.	Moderate	2
4. IT department employees participate in developing the department plans.	Moderate	2
5. IT department employees are empowered to resolve problems.	Moderate	2
6. IT department employees are provided with their performance feedback.	Moderate	2
Total score (F3)	12 / 18 = 0.666666	

9.4.2.4 Reward and Recognition

Table 9.16 shows the results for reward and recognition. Weak evidence showed that working conditions improvement is one of the recognition schemes in the IT department in order to recognise employee effort. Working conditions should be suitable for employees to assist them with their job. IT top management should pay attention to employee's well-being, safety, morale and growth. In addition, they should be provided with suitable equipment and devices. The salary promotion scheme to encourage employee participation in the IT department activities showed weak evidence. The differences between employees in terms of their skills, ability and contributions should be recognised and their salary must be widened dependent on this. Position promotions based on work effort and quality in the IT department showed weak evidence. Promotion of the employees must be based on their capabilities, performance, skills and contributions to the department. Weak evidence showed that excellent suggestions are financially rewarded. Good suggestions can influence the performance in any business, so establishing an employee suggestion system can encourage

them to submit their suggestions. These suggestions should be evaluated in terms of a reward for the best suggestion. Weak evidence showed that the employees' rewards and penalties are clear. However, rewards and penalties should be communicated to all employees.

Table 9.16: Hospital B's reward and recognition assessment

Statement	Strength & weakness	Score
1. Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.	Weak	1
2. Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.	Weak	1
3. Position promotions are based on work effort and quality in our hospital.	Weak	1
4. Excellent suggestions are financially rewarded.	Weak	1
5. Employees' rewards and penalties are clear.	Weak	1
Total score (F4)	5 / 15 = 0.333333	

9.4.2.5 Training and Education

Table 9.17 shows the results for training and education. Weak evidence showed that the specific IT/IS skills training was given to IT department employees. IT top management need to introduce the IT department employees to their job and provide them with training to help them perform their job better. General management technique training that was given to IT department employees showed weak evidence. Training that can assist employees in their job should include some option courses, for example time management and team building. There was weak evidence showing the resources available for IT department employee's education and training. In fact, businesses are changing quickly, so management should be aware of this change which could help them to provide sufficient resources for implementing the education and training plan.

Table 9.17: Hospital B's training and education assessment

Statement	Strength & weakness	Score
1. Specific IT/IS skills training is given to IT department employees.	Weak	1

2. General management technique training is given to IT department employees.	Weak	1
3. Resources are made available for IT department employee's education and training.	Weak	1
Total score (F5)	3 / 9 = 0.333333	

9.4.2.6 Supplier Management

Table 9.18 shows the results for supplier management. Moderate evidence showed that the selection of the suppliers in the IT department was dependent on the quality of the product/service. The price of the product/service was not the issue in some circumstances, so the selection of the suppliers should follow a process that can protect the rights of the IT department and make sure that every product/service is the required standard. There was moderate evidence showing that long-term cooperative relations with suppliers had been established in the IT department. The cooperation with suppliers could create benefits to the IT department, such as delivery of the product/service in a good condition and on time, and can make sure that the required product/service came at the best price. The detailed information about supplier performance maintained in the IT department showed moderate evidence. The evaluation of the supplier's performance is a very important step in terms of creating the evaluation system which can measure supplier's performance, so that suppliers can be rated regarding their product/service performance.

Table 9.18: Hospital B's supplier management assessment

Statement	**Strength & weakness**	**Score**
1. IT department product/service quality is regarded as the most important factor in selecting suppliers.	Moderate	2
2. Long-term cooperative relations with suppliers are established in our IT department.	Moderate	2
3. Detailed information regarding suppliers' performance is maintained in our IT department.	Moderate	2
Total score (F6)	6 / 9 = 0.666666	

9.4.2.7 Process Management

Table 9.19 shows the results for process management. There was moderate evidence showing that regular critical IT/IS processes were monitored, measured and improved. Monitoring, measuring and improving the IT/IS product/service can help to avoid any damage in the future, therefore the IT department can plan their budget, and apply training to make sure that everything can be managed by the required time. Moderate evidence showed that the processes in the IT department are standardised and systematically documented. Business processes in the areas of IT/IS service management, measurement, IT/IS application development, IT/IS planning, customer focus, supplier management, software and hardware maintenance, and project management were identified and defined. There was moderate evidence to show that the process in IT department was designed to be "foolproof" in order to minimise the chance of employee errors. The processes can be explained to the employees, and they can be trained to follow them. Weak evidence showed that IT/IS equipment's are well maintained according to the maintenance plan. In the technology era, businesses really should keep the IT equipment's well maintained in order to save their business; therefore an equipment maintenance plan schedule should be set should also allow employee and a professional firm to be responsible for daily equipment maintenance. Weak evidence showed that the IT department use cycle time to reduce new product or service development. That can be by using, for example, change management.

Table 9.19: Hospital B's process management assessment

Statement	Strength & weakness	Score
1. Critical IT/IS processes are regularly monitored, measured and improved.	Moderate	2
2. Our processes are standardised and systematically documented.	Moderate	2
3. Our processes are designed to be "foolproof" in order to minimise the chance of employee errors.	Moderate	2
4. IT/IS equipment's are well maintained according to the maintenance plan.	Weak	1
5. Our department implements a programme to reduce new product or service development and implementation cycle times.	Weak	1
Total score (F7)	8 / 15 = 0.533333	

9.4.2.8 Measurement

Table 9.20 shows the results for measurement. There was weak evidence to show that the IT/IS performance standards have been established and communicated to all stakeholders. Identifying the success factors can help in defining performance measures for every success factor. However, a plan which can assist in achieving the target performance should be set. Moderate evidence showed that the IT department conducts IT/IS audits. That can be within regular conduct audits. Weak evidence showed that self-assessment of the IT department performance is a strong practice. Self-assessment is a helpful source for improvement. There was moderate evidence to show that the IT department had details of related data such as customer complaints and defect rates. The relationship with customers is a really valuable source that can enhance the business, so the IT department can improve that by establishing a system to deal with client complaint. Moderate evidence showed that related data was used to evaluate overall IT department performance. Having data for IT/IS services/product performance to evaluate the stakeholder's satisfaction can lead to improved hospital performance. There was moderate evidence showing that the related data was used to evaluate the performance of IT department employees. Setting targets can help the IT top management to evaluate employee's performance. Moderate evidence showed that the IT department performance measurement findings were evaluated to identify problem causes. Employee's performance findings, stakeholder satisfaction findings, self-assessment findings can be used to identify problem causes. There was weak evidence to show that the IT department performance measurement findings were available to stakeholders. The published findings of measurement could enhance the trust between the IT department and their stakeholders.

Table 9.20: Hospital B's measurement assessment

Statement	Strength & weakness	Score
1. IT/IS quality performance standards have been established and communicated to all stakeholders.	Weak	1
2. Our department regularly conducts IT/IS quality audits.	Moderate	2
3. Self-assessment of IT department performance is a strong practice in our department.	Weak	1
4. Our department has detailed of related data such as customer complaints and defect rates.	Moderate	2

5. The related data are used to evaluate overall IT department performance.	Moderate	2
6. The related data are used to evaluate the performance of IT department employees.	Moderate	2
7. IT department performance measurement findings are evaluated to identify problem causes.	Moderate	2
8. IT department performance measurement findings are available to all stakeholders.	Weak	1
Total score (F8)	13 / 24 = 0.541666	

9.4.2.9 Continuous Improvement

Table 9.21 shows the results for continuous improvement. Weak evidence showed that customer feedback is used for improvement. The improvement should focus on the customer's needs, so customer complaints can help in this matter. There was moderate evidence showing that performance measurement findings were used for improvement. Stakeholder's satisfaction surveys, self-assessment, and organisational performance evaluation can help in identifying the improvement areas, updating performance targets and action plans. Moderate evidence showed that the IT department used regular committee/team meetings to support improvement. Enhancing the value of the team can guide the IT department to achieve their goals, and in terms of improvement, it may be helpful to establish an improvement team and provided employees with all important training.

Table 9.21: Hospital B's continuous improvement assessment

Statement	**Strength & weakness**	**Score**
1. Customer feedback is used for improvement.	Weak	1
2. Performance measurement findings are used for improvement.	Moderate	2
3. A specific committee/team is used regularly to support improvement in IT department activities.	Moderate	2
Total score (F9)	5 / 9 = 0.555555	

9.4.2.10 Customer Focus

Table 9.22 shows the results for customer focus. Strong evidence showed that the IT department collect extensive complaints, such as help desk calls, from customers. To deal with a customer's complaint, the IT department may need an established system that can collect these complaints. Moderate evidence showed that customer complaints are treated with top priority. With close cooperation, call centre staff may help in resolving customer's problems by passing it onto the problem management staff. There was moderate evidence showing that the IT department conducts a regular customer satisfaction survey. Measuring the customer satisfaction needs a close relationship with them and established channels that can help to measure their satisfaction level. Moderate evidence showed that user/customer participates in various stages of the IT department projects. The participation of the customers can assist the IT department to choose the required service/product to make sure that this service/product will meet the required standards. Moderate evidence showed that the IT department provides services after IT/IS project completion and product delivery. The IT department may have a service agreement with the departments in the hospital which can help in achieving their goals.

Table 9.22: Hospital B's customer focus assessment

Statement	Strength & weakness	Score
1. Our department collects extensive complaint information such as help desk calls from customers.	Strong	3
2. Customer complaints are treated with top priority.	Moderate	2
3. Our department regularly conducts a customer satisfaction survey.	Moderate	2
4. User/customer participates in various stages of the IT department projects.	Moderate	2
5. Our department provides services after IT/IS project completion and product delivery.	Moderate	2
Total score (F10)	11 / 15 = 0.733333	

9.4.2.11 IT performance indicators

IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance) in hospital B needs improvement according to director manager of the information technology.

9.4.3 Hospital B Assessment Summary

Table 9.23 shows the hospital B's final assessment results. The results suggest that in general hospital B is moderate in practicing the organisational factors implementation elements. In addition, it is suggested that hospital B is moderate in almost all organisational factors implementation since they have a score above 35%, except customer focus which is strong, while recruitment and retention, reward and recognition and training and education are weak. The results show those six moderate areas, one strong area and three weak areas. The results are surprising, because of the high budget which was spent on the IT department. The assessment can help in identifying the weak areas which need more focus to be improved.

Table 9.23: Hospital B's strengths and weaknesses

Factor	Factor score (FS)	Factor weight (FW)	Contribution (FS*FW)
1. Top management responsibility	0.666666	11.86	7.906658
2. Recruitment and retention	0.111111	7.988	0.887554
3. Employee participation	0.666666	13.00	8.666658
4. Reward and recognition	0.333333	8.925	2.974997
5. Training and education	0.333333	6.732	2.243997
6. Supplier management	0.666666	10.14	6.759993
7. Process management	0.533333	10.15	5.413329
8. Measurement	0.541666	11.11	6.017909
9. Continuous improvement	0.555555	9.645	5.358327
10. Customer focus	0.733333	10.42	7.641329
	Total points	**100**	**53.87075**

9.5 Comparisons between the hospitals

The evaluations identified the strengths and weakness of the organisational factors implementation. These results show that almost all of the organisational factors implementation in both hospitals were moderate, while hospital A was strong in process management and customer focus. Hospital B was strong in one organisational factor which is customer focus; in fact hospital B had more weak organisational factors than hospital A, which are recruitment and retention, training and education, reward and recognition. Furthermore, there were five moderate organisational factors in both hospitals; these factors are top management responsibility, employee participation, supplier management, measurement, and continuous improvement, and also with reward and recognition in hospital A, and process management in hospital B.

9.6 Discussion and Summary

The evaluations showed that the assessment tool can help in identifying the strengths and weakness of practicing organisational factors. In fact, the researcher considered the available frameworks that were used to improve the IT/IS performance, such as information technology infrastructure library (ITIL) which is strong in the IT/IS services side and weak in the software development side. Therefore, the researcher decided to establish an assessment tool to help the IT department in these hospitals to measure their organisational factors implementation practice. This tool assists the IT top management to implement ten different elements, top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement, and customer focus. It was clear that the evaluations were useful and valuable for the IT departments, and there was agreement in some evaluation results. The IT managers maybe benefit from this evaluation to improve the moderate organisational factors implementation elements, and more concentration should go on the weak organisational factors implementation elements.

10.1 Introduction

To answer the five research questions, the previous chapters presented data collection, findings and results and their data analysis. This chapter highlights the contributions that have been made by this research. Summary of this research and the findings that have been obtained are covered in section 10.2. The contributions in this study are covered in section 10.3. Then, section 10.4 presents limitations of the study. Finally, section 10.5 presents recommendations for further research.

10.2 Brief summary

In business fields, information technology (IT) and information system (IS) have become the strongest elements which could make it impossible for any organisation to function without them. In fact, public and private organisations invested a sum of money in this field, on things such as computer software/hardware [1]. The dependence and investment on the technology have increased the concern about the performance of these technologies. So, poor performance of IT could lead to business losses [1]. After the literature related to organisational factors implementation in Saudi Arabia hospitals was studied, it become clear that there had been no empirical study dealing with the effects of organisational factors implementation in hospitals their overall performance in general and on IT performance indicators in particular. Therefore, the main aim of this research was to develop an assessment tool for organisational factors implementation in IT departments in Saudi Arabian hospitals. Five research questions were proposed to achieve the research aim:

1. What is the level of practice of IT/IS implementation in IT departments in Saudi Arabian hospitals?
2. What are the main organisational factors that affect performance of IT in Saudi Arabian hospitals?
3. What are the factors that affecting IT/IS performance in Saudi Arabian hospitals?
4. What are the relationships between organisational factors and IT performance indicators in IT departments in Saudi Arabian hospitals?
5. How can the organisational factors implementation assessment tool be implemented in practice?

The study started with a review of organisational factors implementation literature from a variety of researchers (e.g. 15, 22, 25 and 169). As a result, the concept of organisational factors in this research was defined based on top management responsibility, recruitment and retention, employee satisfaction, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement, and customer focus to enhance IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance). This research consists of ten organisational factors.

Organisational factors implementation and IT performance indicators framework was formulated in this study. The positive impact of organisational factors implementation on IT performance indicators is assumed by the framework. It could be that organisational factors implementation is able to enhance IT performance indicators. Organisational factors implementation are the independent variables, while the IT performance indicators are the dependent variables. In addition, 48 items were developed to measure organisational factors implementation and 18 items were developed to measure IT performance indicators.

After that, the research methodology was developed to help answer the research questions and to achieve the main aim a questionnaire survey and semi-structured interviews were used in this study. The researcher distributed 114 questionnaire forms to 114 IT managers, supervisors and IT division managers. The number of returned completed forms was 82 with a response rate of 71.9%. The data obtained during this process was used to examine the level of practice of organisational factors implementation in IT departments in Saudi Arabia hospitals and to examine the relationships between organisational factors implementation and IT performance indicators.

The two instruments to measure organisational factors implementation and IT performance indicators were evaluated in terms of their reliability and validity. These instruments were empirically evaluated using the collected data from Saudi Arabian hospitals. Construct validity, content validity, criterion-related validity, reliability analysis and item analysis were used for instrument evaluation. It was concluded that the organisational factors implementation instrument and the IT performance indicators instrument are reliable and valid.

To examine the level of practice of organisational factors implementation in IT departments in Saudi Arabian hospitals and to examine the relationships between organisational factors

implementation and IT performance indicators, data from 16 Saudi Arabian hospitals was collected. A frequency analysis technique was used to identify the level of practice of the organisational factors implementation in IT departments in Saudi Arabia. Lack of some organisational factors implementation was shown in the results. One-way ANOVA was used to examine the variance between means of hospital characteristics and IT department characteristics variables in response to organisational factors implementation and IT performance indicators. The independent variables have a significant relationship with the dependent variables which can be identified as factors affecting the organisational factors implementation in IT departments in Saudi Arabian hospitals. To explore possible relationships between organisational factors implementation and IT performance indicators, and to explore which organisational factors implementation has a significant effect on IT performance indicators, the researcher used Pearson Correlation and Multiple Regression. Correlation coefficients (r) were used for all organisational factors implementation and IT performance indicators, while a Multiple Regression coefficient between organisational factors implementation and IT performance indicators was used to assign weights for each organisational factors implementation.

Fourteen interviews were carried out with managers in 10 Saudi hospitals. Data obtained from these interviews was used in examining the factors affecting organisational factors implementation in IT departments in Saudi Arabian hospitals, and also this data was used to develop the assessment tool for organisational factors implementation in IT departments in Saudi Arabian hospitals. The results from the questionnaire survey and fourteen semi-structured interviews were used to develop the organisational factors implementation assessment tool for IT departments in Saudi Arabian hospitals. The principles and practices presented in this tool can be used as a reference in other countries hospitals. In fact, the philosophy of organisational factors implementation is applicable to any type of hospital. Also, this tool was developed for public hospitals in Saudi Arabia; however, it can be used for private hospitals in Saudi Arabia.

The evaluations were carried out in two different hospitals to evaluate their organisational factors implementation in order to identify the strengths and weaknesses and then the suggested improvement possibilities. The applicability of this tool was shown in these results. In addition, hospitals that are planning to implement organisational factors in the future can benefit from this detailed information about the elements and practices.

10.3 Research results

First, it can be said that the two instruments for measuring organisational factors implementation and IT performance indicators are reliable and valid. The instrument for organisational factors implementation had 10 scales which included 48 measurement items. Whereas, the IT performance indicators instrument had 4 scales which included 18 measurement items. Secondly, the study showed that there was some lack of organisational factors implementation practices in IT departments in Saudi Arabia hospitals. The results suggested that almost all of the organisational factors practice in both hospitals were in a moderate level category, in fact, hospital A had 2 elements practices in the weak category while, hospital B had 3 elements practices in the weak category. Both hospitals had a strong element practice in process management and customer focus for hospital A and customer focus for hospital B. Thirdly, the statistical results showed that there was an impact within the IT department dependant on the respondent age, respondent educational level, respondent position, respondent years of experience, respondent size of hospital, respondent IT department size and information system development on organisational factors implementation in IT departments in Saudi Arabia. The interview results showed that supporting the IT department has a middle priority, showing a lack of training and knowledge amongst the IT department, lack of IT improvement, lack of IT planning, lack of clarity of IT department objectives, less customer satisfaction, shortage of expertise, IT professionals' turnover, lack of ambition amongst IT employees and a lack of sharing knowledge. Fourthly, there were positive significant relationships between the organisational factors implementation and IT performance indicators showed in this research. It can be seen that:

- There were significant relationships between top management responsibility and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between recruitment and retention and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between employee participation and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between reward and recognition and IT service quality, IT product quality, customer satisfaction and organisational performance;

- There were significant relationships between training and education and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between supplier management and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between process management and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between measurement and IT service quality, IT product quality, customer satisfaction and organisational performance;
- There were significant relationships between continuous improvement and IT service quality, IT product quality, customer satisfaction and organisational performance; and
- There were significant relationships between customer focus and IT service quality, IT product quality, customer satisfaction and organisational performance.

Fifthly, there were the impacts of the organisational factors implementation on the IT performance indicators (IT service quality, IT product quality, customer satisfaction and organisational performance) showed in this study. It showed that 62.2% of the variance in IT service quality was explained jointly by the independents variables; the 63.5% of the variance in IT product quality was explained jointly by the independents variables; the 56.7% of the variance in customer satisfaction was explained jointly by the independents variables; and the 55.0% of the variance in organisational performance was jointly explained by the independents variables. These results helped in developing the assessment tool.

Finally, it can be seen from this research, that the organisational factors implementation assessment tool which was used to evaluate the two hospitals is applicable in practice. The strengths and weakness of the organisational factors implementation in two hospitals was identified using this assessment tool to suggest improvement possibilities.

10.4 Research contributions

Both contributions on academic and practice will follow:

10.4.1 Academic contributions

Firstly, to the researcher's knowledge, this is the first research studying organisational factors implementation and IT performance indicators in Saudi Arabian hospitals. This research assisted in reducing the gap in this field and helps other researchers to investigate the organisational factor implementation in different countries. The second contribution is the

identification of critical factors for the implementation of organisational factors in IT departments in Saudi Arabian hospitals and also their relationships with the IT performance indicators. The third contribution is the development and validation of an assessment tool for organisational factors implementation in IT departments in Saudi Arabian hospitals. The knowledge in the field of IT about an organisational factors implementation assessment tool will increase. Construct validity, content validity, criterion-related validity, internal consistency and items analysis were used to verify the reliability and validity in the assessment tool.

10.4.2 Practical contributions

First, the assessment tool can help the IT top management to measure and improve their IT department. Also, this assessment tool can assist IT top management to implement the ten different elements, top management responsibility, recruitment and retention, employee participation, reward and recognition, training and education, supplier management, process management, measurement, continuous improvement, customer focus. The second contribution is the impact of age, educational level, position, years of experience, size of hospital, IT department size and information system development which can be seen as new factors that may affect the performance in the IT departments in Saudi Arabian hospitals.

10.5 Limitations and future research

As with other research, this study is not the best. So, some limitations are raised, this study has several limitations as given in the following subsection:

10.5.1 Sample population

In this research, the sample population that has been used may not represent all hospitals in Saudi Arabia. The sample was drawn from hospitals in many regions with concentration on the biggest hospitals and medical cities. The research result's is dependent on the surveys (questionnaire and interviews), which were collected between January 2011 and March 2011. The sample size that had been collected were 82 for the questionnaire and 14 interviews, a larger sample which covered all public hospitals would be great and would increase confidence in the results. However, that could only be available for this study if there was any additional resources and financial support.

10.5.2 Research methodology

A variety of methods were used in this study questionnaire, semi-structured interviews and evaluation method to collect data from Saudi Arabian hospitals. The questionnaire helped to provide a measurement and proved effects of variables. During the survey processes, it was proved that the organisational factors influenced the implementation of organisational factors

and IT performance indicators and how organisational factors implementation influenced IT performance indicators. Factors that were affected by the organisational factors implementation in IT departments were identified during the interviews processes. An assessment tool was tested and validated.

10.6 Conclusion

Chapters 9 and 10 provided construct and evaluation of the assessment tool. This chapter provided a summary for this study which included the contributions of this study and limitations of the study. In fact, this study tried to help IT departments in Saudi Arabian hospitals to avoid the affect of organisational factors which can stop them improving their service/product. This research suggested some helpful steps for performance improvement, and developed an assessment tool to assist hospitals to evaluate their organisational factors implementation and identifying improvement possibilities. Finally, this research identified the factors affecting the organisational factors implementation in IT departments. The IT managers will benefit from this by directing their attention to the weak areas which could affect their performance.

References

[1] Seddon, P. B. and Graeser, V. et al. (2002) Measuring Organizational IS Effectiveness: An Overview and Update of Senior Management Perspectives. *The DATA BASE for Advances in Information Systems*, 33(2), pp. 11-28.

[2] Dalcher, D. and Genus, A. (2003) Introduction: Avoiding IS/IT Implementation Failure. *Technology Analysis & Strategic Management*, 15(4), pp. 403-407.

[3] Edington, B and Shin, N. (2006) An integrative framework for contextual factors affecting IT implementation. *In: Proceedings of the 39th Hawaii International Conference on System Sciences*.

[4] Gunes, F. Basoglu, A, N. and Kimiloglu, H. (2003) Business and information technology strategies and their impact on organizational performance.

[5] Gragg, P. King, M. and Hussin, H. (2002) IT Alignment and Firm Performance in Small Manufacturing Firms. *Journal of Strategic Information Systems*, 11, pp. 109-132.

[6] Gottschalk, P. (1999) Implementation of Formal Plans: the Case of Information Technology Strategy. *Elsevier, Long Range Planning*, 32, (3), pp. 362-372.

[7] Kaplan, B. Kimberly, D. and Harris-Salamone. (2009) Health IT Success and Failure: Recommendations from Literature and An AMIA Workshop. *Journal of the American Medical Informatics Association*, 16 (3), pp. 291-299.

[8] Chowdhury, B. D'Souza, C and Sultana, N. (2009). The use of emerging technology to improve the performance of health service delivery.

[9] Gershon, S. P. (2004). Releasing resources to the front line independent review of public sector efficiency. Available from: http://webarchive.nationalarchives.gov.uk/+/http://www.hmtreasury.gov.uk/media/C/A/efficiency_review120704.pdf, (Accessed on05/07/2011).

[10]Central Department of Statistics & Information. Available from http://www.cdsi.gov.sa/english/index.php [Accessed 05/01/2013].

[11] Al-Gahtani, S. S. (2003) Computer Technology Adoption in Saudi Arabia: Correlates of Perceived Innovation Attributes. *Information Technology for Development*, 10, pp. 57-69.

[12] Saudi National e-Government Portal. Available from http://www.saudi.gov.sa/wps/portal/yesserRoot/aboutEgovernment [Accessed 05/01/2013].

[13] Menadue, J. (2003) Health Reform: Possible Ways Forward. *The Medical Journal of Australia (MJA)*, 179 (7), pp. 367-369.

[14] Duckett, S.J. (2007). The Australian health care system. 3ed. Melbourne. Oxford University Press.

[15] Del Aguila-Obra, Ana, R. and Padilla-Meléndez. (2006) Organizational Factors Affecting Internet Technology Adoption. *Internet Research Journal*, 16 (1), pp. 94-110.

[16] Iskandar, B.Y. Kurokawa, S. and Leblanc, L.J. (2001) Adoption of Electronic Data Interchange: the Role of Buyer-Supplier Relationships. *IEEE Transaction of Engineering Management*, 48 (4), pp. 505-517.

[17] Cooper, R.B. and Zmud, R.W. (1990) Information Technology Implementation Research: A Technological Diffusion Approach. *Management Science*, 36 (2), pp. 123-139.

[18] Tronatzky, L.G. and Fleischer, M. (1990) The processes of technological innovation. Lexington, MA: Lexington Books.

[19] Teo, T. Tan, M. and Buk, K. (1997) A Contingency Model of Internet Adoption in Singapore. *International Journal of Electronic Commerce*, 2 (2), pp. 57-69.

[20] Teo, T. and Tan, M. (1998) An Empirical Study of Adopters and Non-Adopters of the Internet in Singapore. *Information & Management*, 34, pp. 339-345.

[21] Flynn, B. B. Schroederb, R. G. et al. (1994) A Framework for Quality Management Research and An Associated Measurement Instrument. *Journal of Operations Management*, 11 (4), pp. 339-366.

[22] Igbaria, M. Zinatelli, N. and Covaye, A.L.M. (1998) Analysis of Information Technology Success in Small Firms in New Zealand. *International Journal of Information Management*, 18 (2), pp. 103-119.

[23] Saraph, J. V., Benson, P. G. et al. (1989) An Instrument for Measuring the Critical Factors of Quality Management. *Decision Sciences*, 20 (4), pp. 810-829.

[24] Ahire, S. L. Golhar, D. Y. et al. (1996) Development and Validation of TQM Implementation Constructs. *Decision Sciences*, 27 (1), pp. 23-56.

[25] Premkumar, G. and Roberts, M. (1999) Adoption of New Information Technologies in Rural Small Businesses. *Omega, International Journal of Management Science*, 27, pp. 467-484.

[26] Mehrtens, J. Cragg, P.B. and Mills, A.M. (2001) A Model of Internet Adoption by SMEs. *Information & Management*, 38, pp. 165-176.

[27] Vidgen, R. Wood-Harper, T. et al. (1993) A Soft System Approach to Information Systems Quality. *Scandinavian Journal of Information Systems*, 5, pp. 97-112.

[28] Braa, K. (1995) Beyond Formal Quality in Information Systems Design – A Framework for Information Systems Design from a Quality Perspective. *In: Proceedings of the 18th IRIS Conference, Gjern, Denmark.*

[29] Dahlberg, T. and Jarvinen, J. (1997) Challenges to IS Quality. *Information and Software Technology*, 39 (12), pp. 809-818.

[30] Stylianou, A. C. and Kumar, R. L. (2000) An Integrative Framework For IS Quality Management. *Communications of The ACM*, 43(9), pp.99-104.

[31] Ewusi-Mensah, K. and Przasnyski, Z. H. (1991) On Information Systems Project Abandonment: An Exploratory Study of Organizational Practices. *MIS Quarterly*, 15 (1), pp. 67-86.

[32] Ewusi-Mensah, K. and Przasnyski, Z. H. (1994) Factors Contributing to the Abandonment of Information Systems Development Projects. *Journal of Information Technology*, 9, pp. 185-201.

[33] Ewusi-Mensah, K. (1997) Critical Issues in Abandoned Information Systems Development Projects. *Communication of ACM*, 40 (9), pp. 74-80.

[34] Doherty, N. F. and King, M. (1998a) The Importance of Organizational Issues in Systems Development. *Information Technology & People*, 11 (2), pp. 104-123.

[35] Doherty, N. F. and King, M. (1998b) The Consideration of Organizational Issues During the Systems Development Process: an Empirical Analysis. *Behaviour & Information Technology*, 17 (1), pp. 41-51.

[36] Martinsons, M. G. and Chong, P. K. C. (1999) The Influence of Human Factors and Specialist Involvement on Information Systems Success. *Human Relations*, 52 (1), pp. 123-152.

[37] Doherty, N. F. King, M. et al. (2003) The Impact of Inadequacies in the Treatment of Organizational Issues on Information Systems Development Projects. *Information*

& Management, 41 (1), pp. 49-62.

[38] Al-Sudairy, T. (1994) A strategic approach to developing information systems in the Kingdom of Saudi Arabia. Unpublished thesis (PhD), London School of Economics.

[39] Abdul-Gader, A. H. and K. Al-Angari (1996). Enhancing IT assimilation in Saudi public organizations: human resources issues. The Human Side of Information Technology Management Edited by Edward Szewczak and Mehdi Khosrowpour, London: Idea Group Publishing: 111-141.

[40] Abdul-Gader, A. H. (1999) Managing Computer Based Information in Developing Countries: A Cultural Perspective. Hershey, USA, Idea group Publishing.

[41] Alghobiri, M. A. (2003) IS Implementation and the Role of Senior Executives in its Processes in Saudi Arabian Organisations. Unpublished thesis (PhD), School of Computing Sciences. Norwich, University of East Anglia.

[42] Al-Maliki, S. G. A.-K. (2005). IS/IT Evaluation in Private Organisations in Kingdom of Saudi Arabia. School of Computing Sciences. Unpublished thesis (PhD), Norwich, University of East Anglia.

[43] Punch, K. F. (2005) Introduction to Social Research: Quantitative and Qualitative Approaches. London, SAGE Publications Ltd.

[44] Galliers, R. D. (1992) Information Systems Research, Issues, Methods and Practical Guidelines. Oxford, Blackwell Scientific Publications.

[45] Pinsonneault, A. and Kraemer, K. L. (1993) Survey Research Methodology in Management Information Systems: An Assessment. *Journal of Management Information Systems*, 10 (2), pp. 75-105.

[46] Duckett, S.J. (2007) The Australian health care system. 3ed. Melbourne. Oxford University Press.

[47] Infante, A, de la Mata S, and Lopez-Acuňa, D. (2000) Health sector reform in Latin America and the Caribbean: situations and trends. *Pan American Journal of public Health*, July-August: 13.

[48] Ministry of Health. Available from: http://www.moh.gov.sa/EN/Pages/Default.aspx, [Accessed 10/12/2012].

[49] Weill, P. (Cited in) Edington, B and Shin, N. (2006) An integrative framework for contextual factors affecting IT implementation. *In: Proceedings of the 39th Hawaii International Conference on System Sciences*.

[50] Al-Adaileh, R. and Al-Makhadmeh, A. (2008) An Investigation of Fundamental Organizational Factors Influencing IT/IS Projects in Jordanian Banking Sector. *Jordan Journal of Business Administration*, 4 (3), pp. 366-374.

[51] McKone and Schroeder. (Cited in) Edington, B and Shin, N. (2006) An integrative framework for contextual factors affecting IT implementation. *In: Proceedings of the 39th Hawaii International Conference on System Sciences*.

[52] Gragg, P. King, M. Hussin, H. (2002) IT Alignment and Firm Performance in Small Manufacturing Firms. *Journal of Strategic Information Systems*, 11, pp. 109-132.

[53] Gottschalk, P. (1999) Implementation of Formal Plans: the Case of Information Technology Strategy. *Elsevier, Long Range Planning*, 32, (3), pp. 362-372.

[54] Atiyyah, H. S. (1989) Determinants of Computer System Effectiveness in Saudi Arabian Public Organizations. *Int. Studies of Mge & Org*, 19 (2), pp.85-103.

[55] Cash, R.B. McFarlan, F.W. McKenny, J.L. and Applegate, L.M. (1992) Corporate information systems management. 3rd ed. Homewwod. Irwin.

[56] Hirschheim, R. (1986) The Effect of A Priori Views on the Social Implications of Computing: the Case of Office Automation. *ACM Computing Surveys*, 18 (12), pp. 165-195.

[57] Nickerson, R.S. (1981) Why Interactive Computer Systems are Sometimes Not Used by People Who Might Benefit from them. *Int. J. Of Man-Machine studies*, 15 pp. 469-483.

[58] Nelson, D.L. (1990) Individual Adjustment to Information-Driven Technologies: A Critical Review. *MIS Quarterly*, 14 (1), pp. 78-98.

[59] Abdul-Gader, A.H. and Al-Angari, K.H. (1995) Information technology assimilation in the government sector: an empirical study. KACST, project AR-11-025.

[60] Al-Khaldi, M.A. and Wallace, R.S. (1999) The Influence of Attitudes on Personal Computer Utilization Among Knowledge Workers: the Case of Saudi Arabia. *Information & Management*, 36 pp.185-204.

[61] Diebold, J. (1969) Based Decisions on Computer Use. *Harvard Business Review*, 47 (1), pp.14-16.

[62] Ein-Dor, P. and Segev, E. (1977) Information System Responsibility. *MSU Business Topics*, 25 (4), pp.33-40.

[63] Cheney, P.H. and Dickson, G.W. (1982). Organizational Characteristics and Information Systems: An Exploratory Investigation. *Academy of Management Journal*, 25 pp. 170-184.

[64] Cron, W.L. and Sobol, M.G. (1983) The Relationship Between Computerization and Performance: A Strategy for Maximizing the Economic Benefits of Computerization. *Information and Management*, 6 pp. 171-181.

[65] Chaya, A. (1996) Exploring the relationships between IT investments and organizational performance: preliminary empirical evidence. *In: Proceedings of the 29th Annual Hawaii International Conference on System Sciences*.

[66] Harris, S.E and Katz, J.L. (1991) Firm Size and the Information Technology Investment Intensity of Life Insurers. *MIS Q*, 15.

[67] Banker, R.D. Kauffman, R.J and Morey, R.C. (1990) Measuring Gains in Efficiency from Information Technology: A Study of the Positron Deployment at Hardee's Inc. *Journal of Management Information Systems*, 7 (2).

[68] Bender, D.H. (1986) Financial impact of information processing. *Journal of Information Systems*.

[69] Weill, P. (2004) Don't Just Lead, Govern: How Best Performing Organizations Govern IT. *MIS Quarterly Executive*, 8.

[70] Brynjolfsson, E and Hitt, L.M (1996) Paradox Lost? Firm-Level Evidence on the Returns to Information Systems Spending. *Management Science*, 42 (4), pp. 541-558.

[71] Kim, J.K, Xiang, J.Y and Lee, S. (2009) The Impact of IT Investment on Firm Performance in China: An Empirical Investigation of the Chinese Electronics Industry. *Technological Forecasting and Social Change*, 76 (5), pp.678-687.

[72] Porter, M.E and Millar, V.E. (1985) How Information Gives you Competitive Advantages. *Harvard Business Review*, 63 (4), pp.149-160.

[73] Xiang, J.Y *et al.* (2009) The impact of IT investment on firm performance in Korean insurance industry. In: *Proceedings of the 1st International Conference on Information Science and Engineering*. IEEE Computer Society.

[74] Bianchi, A.J. (2001) Management indicators model to evaluate performance of IT organizations. In*: Proceedings of the Portland International Conference. IEEE Computer Society.*

[75] Laudon, K.C. and Laudon, J.P. (2003) Essentials of management information systems. 5th ed. Prentice Hall.

[76] Beaumaster, S. (2002) Local government IT implementation issues: a challenge for public administration. In: *Proceedings of the 35th Hawaii International Conference on System Sciences*.

[77] Byrd, L.W et al. (2011) Investigating the mediating effect of the accuracy of information in the relationship between IT and the quality of healthcare in hospitals. In: *Proceedings of the 44th Hawaii International Conference on System Sciences*.

[78] Kossman, S.P and Scheidenhelm, S.L. (2008) Nurses' Perceptions of the Impact of Electronic Health Records on Work and Patient Outcomes. *Computers, Informatics, Nursing*, 26 (2), pp. 69-77.

[79] Tanriverdi, H. (2006) Performance Effects of Information Technology Synergies in Multibusiness Firms. *MIS Quarterly*, 30 (1), pp. 57-77.

[80] Byrd, T.A. Thrasher, E.H. Lang, T and Davidson, N.W. (2006) A Process-Oriented Perspective of its Success: Examining the Impact of is on Operational Cost. *Omega*, 34 (6), pp. 448-460.

[81] Banker, R.D. Bardham, I.R. Chang, H. and Lin, S. (2006) Plant Information Systems, Manufacturing Capabilities, and Plant Performance. *MIS Quarterly*, 30 (2), pp. 315-337.

[82] Mukhopadhyay, T. and Cooper, R.B. (1992) Impact of Management-Information-Systems on Decisions. *Omega-International Journal of Management Science*, 20 (1), pp. 37-49.

[83] Brandyberry, A. Rai, A. and White, G.P. (1999) Intermediate Performance Impacts of Advanced Manufacturing Technology Systems: An Empirical Investigation. *Decision Sciences*, 30 (4), pp. 993-1020.

[84] Rai, A. Robinson, J.M. Patnayakuni, R. and Seth, N. (2006) Firm Performance Impacts of Digitally Enabled Supply Chain Integration Capabilities. *MIS Quarterly*, 30 (2), pp.225-246.

[85] Tsai, J. and Bond, G. (2008) A Comparison of Electronic Records to Paper Records in Mental Health Centres. *International Journal for Quality in Health Care*, 20 (2), pp. 136-143.

[86] Damberg, C.L. et al. (2009) Adopting information technology to drive improvements in patient safety: lessons from the agency for healthcare research and quality health information technology grantees. Health Research and Educational Trust.

[87] Shekelle, P.G. Morton, S.C. and Keeler, E.B. (2006) Costs and benefits of health information technology, evidence report/technology assessment No. 132. (Prepared by Southern California Evidence-Based Practice centre/RAND under Contract No. 290-97-0001.) AHRQ Publication. Rockville, MD: Agency for Healthcare Research and Quality.

[88] Tomasi, E. Facchini, L.A. and Maia, M.F.S. (2004) Health Information Technology in Primary Health Care in Developing Countries: A Literature Review. *Bulletin of the World Health Organization*, 82 (11).

[89] Jaana, M et al. (2011) Key IT management issues in Canadian hospitals: a Delphi study. In: *Proceedings of the 44th Hawaii International Conference on System Sciences*.

[90] Bates, D. W. (2000) Using Information Technology to Reduce Rates of Medication Errors in Hospitals. *The British Medical Journal*, 320, pp. 788-791.

[91] Bates, D. W. Evans, R. S. Murff, H. Stetson, P. Pizziferri, L. and Hirpcsak, G. (2003) Detecting Adverse Events Using Information Technology. *Journal of the American Medical Informatics Association*, 10 (2), pp. 115-128.

[92] Lepanto, L. Paré, G. Aubry, D. Robillard, P and Lesage, J. (2006) Impact of PACS on Dictation Turnaround Time and Productivity. *Journal of Digital Imaging*, 19 (1), pp. 92-97.

[93] Paré, G. Sicotte, C. Chekli, M. Jaana, C. De Blois and Bouchard, M. (2009) A Pre-Post Evaluation of A Telehomecare Program in Oncology and Palliative Care. *Telemedicine and e-Health*, 15 (2), pp. 154-159.

[94] Jaana, M and Paré, G. (2006) Home Telemonitoring of Patients With Diabetes: A Systematic Assessment of Observed Effects. *Journal of Evaluation in Clinical Practice*, 13 (2), pp. 242-253.

[95] Jaana, M. Paré, G and Sicotte, C. (2007) Hypertension Home Telemonitoring: Current Evidence and Recommendations for Future Studies. *Disease Management and Health Outcomes*, 15 (1), pp.19-31.

[96] Paré, G. Jaana, M and Sicotte, C. (2007) Systematic Review of Home Telemonitoring for Chronic Diseases: the Evidence Base. *Journal of the American Medical Informatics Association*, 14 (3), pp. 269-277.

[97] The Standish Group CHAOS report, 1995. Available from: http://net.educause.edu/ir/library/pdf/NCP08083B.pdf, (Accessed 28/06/2011).

[98] Kaplan, B. (1987) The Medical Computing "lag": Perceptions of Barriers to the Application of Computers to Medicine. *Int J Technol Assess Health Care*, 3 (1), pp. 123-136.

[99] Lewis, B., The 70-percent failure. InfoWorld. Online < http://www.infoworld.com/articles/op/xml/01/10/29/011029/opsurvival.xml>, (Cited in) Kaplan, B. Kimberly, D. and Harris-Salamone. (2009) Health IT Success and Failure: Recommendations from Literature and An AMIA Workshop. *Journal of the American Medical Informatics Association*, 16 (3), pp. 291-299.

[100] McManus, J. and Wood-Harper, T. (2007) Understanding the Sources of Information Systems Project Failure. *Manag Serv*, pp. 38-43.

[101] Rubinstein D Standish Group. Report: there's less development CHAOS Today. Vol1. March: SDTimes, 2007. Available from: http://www.sdtimes.com/link/30247 , (Accessed 28/06/2011).

[102] Tichy, L. and Bascom, T. The business end of IT project failure. Mortgage Banking. Available from: http://findarticles.com/p/articles/mi_hb5246/is_6_68/ai_n29421069?tag=content;col1, (Accessed 28/06/2011).

[103] Wears, RL. and Berg, M. (2005) Computer Technology and Clinical Work: Still Waiting for Godot. *J Am Med Assoc*, 293 (10), pp. 1261-1263.

[104] Heeks, R. (2006) Health Information Systems: Failure, Success and Improvisation. *Int J Med Inf*, 75 pp. 125-137.

[105] Jones, C. (1995) Patterns of software systems failure and success. London: International Thompson Computer Press.

[106] Lundsgaarde, HP. Fischer, PJ. and Steele, DJ. (1981) Human problems in computerized medicine, Lwrence, KS: University of Kansas.

[107] Massaro, TA. (1993b) Introducing Physician Order Entry at A Major Academic Medical Center. 2: Impact on Medical Education. *Acad Med*, 1 pp. 25-30.

[108] Dowling, AF. (1980) Do Hospital Staff Interfere With Computer System Implementation? *Health Care Manage Rev*, 5 pp. 23-32.

[109] Brown, AD. and Jones, MR. (1998) Doomed to Failure: Narratives of Inevitability and Conspiracy in A Failed IS Project. *Organ Stud*, 19 (1), pp.73-88.

[110] Sicotte, C. Denis, JL. and Lehoux, P. (1998a) The Computer Based Patient Record: A Strategic Issue in Process Innovation. *J Med Syst*, 22 (6), pp. 431-443.

[111] Sicotte, C. Denis, JL. and Lehoux, P. (1998b) The Computer Based Patient Record: Challenges Towards Timeless and Spaceless Medical Practice. *J Med Syst*, 22 (4), pp. 237-256.

[112] Timpka, T. (1999) Professional Ethics for System Developers in Health Care. *Methods Inf Med*, 38 (2), pp. 144-147.

[113] Scott, JT. Rundall, TG. Vogt, TM and Hsu, J. (2005) Kaiser Permanente's Experience of Implementing An Electronic Medical Record: A Qualitative Study. *BMJ*, 331 pp.1313-1316.

[114] Costello, D. (2006).Head of Kaiser's digital project quits. Los Angeles Times. Available from: http: //doctorandpatient.blogspot.com/2006/11/head-of-kaiser-digital-project-quits.html, (Accessed 02/10/2010).

[115] Southon, F. Sauer, C. and Dampney, C. (1997) Information Technology in Complex Health Services: Organizational Impediments to Successful Technology Transfer and Diffusion. *J Am Med Inform Assoc*, 4 pp. 112-124.

[116] Wells, S. Bullen, C. (2008) A Near Miss: the Importance of Context in A Public Health Informatics Project in A New Zealand Case Study. *J Am Med Inform Assoc*, 15 (5), pp. 701-704.

[117] Beynon-Davies, P. and Lloyd-Williams, M. (1999) When Health Information Systems Fail. *Top Health Inf Manage*, 19 (4), pp. 66-79.

[118] Hagland, M. (2007) From struggles to success. Part technology, part cooperation and part good old fashioned trial and error are what it take to build or break- A RHIO. Available from: http://www.healthcare-informatics.com, (Accessed 06/07/2011).

[119] DerGurahian, J. (2007) Patient Safety Institute folds due to lack of funding. Mod Health. Available from:

http://www.modernhealthcare.com/apps/pbcs.dll/search?Category=Search , (Accessed 29/06/2011).

[120] Adler-Milstein, J. McAfee, AP. Bates, DW and Jha, AK. (2008) The State of Regional Health Information Organizations: Current Activities and Financing. *Health Aff Millwood*, 27 (1), pp. w60-9.

[121] Bloxham, A., (2008) £13 Billion NHS computer system failures affecting patient care. Telegraph. Retrieved from http://www.telegraph.co.uk. (Accessed 29/06/2011).

[122] Telegraph. (2008) Another government IT scheme in trouble. Retrieved from http://www.telegraph.co.uk/comment/telegraph-view/3563090/another-Government-IT-scheme-in-trouble.html. (Accessed 29/06/2011).

[123] Massaro, TA. (1993a) Introducing Physician Order Entry at A Major Academic Medical Center. 1: Impact on Organizational Culture and Behaviour. *Acad Med*, 68 (1), pp. 20-25.

[124]Williams, LS. (1992) Microchips Versus Stethoscopes; Calgary Hospital, MDs Face Off Over Controversial Computer System. *Can Med Assoc J*, 147 (10), pp. 1534-1547.

[125] Chin, T. (2003) Doctors Pull plug on paperless system. Available from: http://www.ama-assn.org/amednews/2003/02/17/bil20217.htm >. (Accessed 29/06/2011).

[126] Aarts, J. Doorewaard, H. and Berg, M. (2004) Understanding Implementation: the Case of Computerized Physician Order Entry Systems in A Large Dutch University Medical Center. *J Am Med Inform Assoc*, 11 (3), pp. 207-216.

[127] Aarts, J. Berg, M. (2006) Same System, Different Outcomes. *Methods Inf Med*, 45 pp. 53-61.

[128] Ornstein, C. (2003) Hospital heeds doctors, suspends use of software. Los Angeles Times. Available from: http://articles.latimes.com/2003/jan/22/local/me-cedars22, (Accessed 29/06/2011).

[129] Beynon-Davies, P. (1995) Information Systems "Failure": the Case of the London Ambulance Service's Computer Aided Despatch Project. *Eur J Inf Syst*, 4 pp. 171-184.

[130] Van't Riet, A. Berg, M. Hiddema, F and Kees, S. (2001) Meeting Patients' Needs With Patient Information Systems: Potential Benefits from Qualitative Research Methods. *Int J Med Inf*, 64 pp. 1-14.

[131]Ash, J. Berg, M and Coiera, EW. (2004) Some Unintended Consequences of Information Technology in Health Care: the Nature of Patient Care Information System-Related Errors. *J Am Med Inform Assoc*, 11 (2), pp. 104-112.

[132]Koppel, R. Metlay, JP. Cohen, A. et al. (2005) Role of Computerized Physician Order Entry Systems in Facilitating Medication Errors. *J Am Med Assoc*, 293 (10), pp. 1197-1203.

[133] Campbell, E. Sittig, D. Ash, J. Guappone, K and Dykstra, R. (2006) Types of Unintended Consequences Related to Computerized Provider Order Entry. *J Am Med Inform Assoc*, 13 (5), pp. 547-556.

[134] Wetter, T. (2007) To Decay is System: the Challenges of Keeping A Health Information System Alive. *Int J Med Inf*, 76 pp.S252-S60.

[135] Harrison, MI. Koppel, R. Bar-Lev, S. (2007) Unintended Consequences of Information Technologies in Health Care-An Interactive Socio-Technical Analysis. *J Am Med Inform Assoc*, 14 (5), pp. 542-549.

[136] Silverstein, S. sociotechnologic issues in clinical computing: common examples of health IT difficulties. Available from: http://www.ischool.drexel.edu/faculty/ssilverstein/failurecases/?1oc=home, (Accessed 15/10/2010).

[137] Vogelsmeier, AA. Halbersleben, JRB and Scott-Cawiezell, JR. (2008) Technology Implementation and Workarounds in the Nursing Home. *J Am Med Inform Assoc*, 15 (1), pp. 114-119.

[138] Koppel, R. Wetterneck, T. Telles JL and Karsh, B-T. (2008) Workarounds to Barcode Medication Administration Systems: Their Occurrences, Causes, and Threats to Patient Safety. *J Am Med Inform Assoc*, 15 (4).

[139] Prescott, M. and Conger, S. (1995) Information Technology Innovations: A Classification by IT Locus of Impact Research Approach. *The Database for Advance in Information Systems*, 26 (2/3), pp. 20-41.

[140] Daniel, E. Wilson, H. And Myers, A. (2002) Adoption of E-commerce by SMEs in the UK: Towards A Stage Model. *International Small Business Journal*, 20 (3), pp. 253-270.

[141] Rogers, E. (1983) Diffusion of Innovations. The Free Press. New York, NY. (Cited in) Del Aguila-Obra, Ana R and Padilla-Meléndez. (2006) Organizational Factors Affecting Internet Technology Adoption. *Internet Research Journal*, 16 (1), pp. 94-110.

[142] Damanpour, F. (1991) Organizational Innovation: A Meta-Analysis of Effects of Determinants and Moderators. *Academy of Management Journal*, 34 (3), pp.555-590.

[143] Sudhakar, G, P. Farooq, A and Patnaik, S. (2011) Soft Factors Affecting the Performance of Software Development Teams. *Team Performance Management*, 17 (3/4), pp.187-205.

[144] Crosby, p. B. (1996) Quality is still free: making quality certain in uncertain times. New York, McGraw-Hill.

[145] Feigenbaum, A. V. (1991) Total quality control. New York; London, McGraw-Hill.

[146] Kim, C. And Galliers, R.D. (2004) Toward A Diffusion Model for Internet Systems. *Internet Research*, 14 (2), pp. 155-166.

[147] Poon, S. and Swatman, P. (1999) An Exploratory Study of Small Business Internet Commerce Issues. *Information & Management*, 35 (1), pp. 9-18.

[148]Vadapalli, A. And Ramamurthy, K. (1997) Business Use of the Internet: An Analytical Framework and Exploratory Case Study. *International Journal of Electronic Commerce*, 2 (2), pp. 57-69.

[149] Mehrtens, J. Cragg, P.B. and Mills, A.M. (2001) A Model of Internet Adoption by SMEs. *Information & Management*, 38 pp. 165-176.

[150] Grandon, E.E. and Pearson, J.M. (2004) Electronic Commerce Adoption: An Empirical Study of Small and Medium US Business. *Information & Management*, 42 pp. 197-216.

[151] Dholakia, R.R. and Kshetri, N. (2004) Factors Affecting the Adoption of the Internet Among SMEs. *Small Business Review*, 23 pp. 311-322.

[152] Sumner, M. (1985) Organization and Management of the Information Center. *Journal of Systems Management*, 36 (11), pp. 10-15.

[153] Teo, T.S.H, Ang, J.S.K, (1999) Critical Success Factors in the Alignment of IS Plans With Business Plans. *International Journal of Information Management*, 19 pp. 173-185.

[154] Dahlberg, T. and J. Jarvinen (1997) Challenges to IS Quality. *Information and Software Technology*, 39 (12), pp. 809-818.

[155] Stylianou, A. C. and Kumar, R. L. (2000) An Integrative Framework For IS Quality Management. *Communications of The ACM*, 43(9), pp. 99-104.

[156] Ewusi-Mensah, K. and Przasnyski, Z. H. (1994) Factors Contributing to the Abandonment of Information Systems Development Projects. *Journal of Information Technology*, 9 pp. 185-201.

[157] Ewusi-Mensah, K. (1997) Critical Issues in Abandoned Information Systems Development Projects. *Communication of ACM*, 40 (9), pp. 74-80.

[158] Martinsons, M. G. and P. K. C. Chong (1999) The Influence of Human Factors and Specialist Involvement on Information Systems Success. *Human Relations*, 52 (1), pp. 123-152.

[159] AlShitri, K. (2008) Quality management implementation in IS/IT departments in Saudi Arabian private organizations. Unpublished thesis (PhD), School of Computing Sciences. Norwich, University of East Anglia.

[160] Ong, A. Tan, G.W. and Kankanhalli, A. (2005) Team expertise and performance in information systems development projects. In: *Proceedings of the 9th Asia Pacific Conference on Information Systems.* Bangkok, Thailand, July 7-10.

[161] Rapidsoft (2009) Managing offshore development teams, White Paper of Rapidsoft Systems Trenton, NJ, available from: http\\:www.rapidsoftsystems.com (Accessed 11/10/2011).

[162] Blasi, L. Fiore, S.M. Hedberg, J. And Schmid, R.F. (2008) The social consequences of design and development teams, in Spector, J.M. Merrill, M.D. Merrienboer, J. and Driscoll, M.P. (Eds), Handbook of Research on Educational Communications and Technology, Lawrence Erlbaum, Hillsdale, NJ, pp. 647-58.

[163] Ramasubbu, N. and Balan, R.K. (2007) Globally distribute software development project performance: an empirical analysis. In: *Proceedings of the ESEC-FSE'07, Cavtat near Dubrovnik, Croatia*, September 3-7.

[164] Mohammadi, S. Zare-Hoseini, S and Jahanshahi, H. (2008) An assessment of related pararmeters affecting on success and failures of national IT projects: case study of Iran. In: *Proceedings of the IEEE ICMIT*.

[165] Fink, F. (1998) Guidelines for the successful adoption of information technology in small and medium enterprises. *International Journal of Information Management*, 18 (4), pp. 243-53.

[166] Sadowski, B.M. Maitland, C. and van Dongen, J. (2002) Strategic use of the Internet by small-and medium-sized companies: an exploratory study. *Information Economics and Policy*, 14, pp. 75-93.

[167] Santarelly, E. and D'Altri, S. (2003) The diffusion of e-commerce among SMEs: theoretical implications and empirical evidence. *Small Business Economics*, 21, pp. 273-83.
[168]Sekaran, U. (1992) Research methods for business: a skill-building approach. Chichester, John Wiley.
[169] Rosacker, K.M. Zuckweiler, K.M and Buelow, J.R. (2010) An Empirical Evaluation of Hospital Project Implementation Success. *Academy of Health Care Management Journal*, 6 (1), pp. 37-53

[170] ISO9000 (2000) ISO 9000: Quality Management Systems - Fundamental and Vocabulary. Geneva, Switzerland, International Organization for Standardization.
[171] ISO90003 (2004) Software engineering - Guidelines for the application of ISO 9001:2000 to computer software. Geneva, Switzerland, International Organization for Standardization.
[172] Yeomans, W. (1982) How to Get Top Management Support. *Training and Development Journal*, 36 (6), pp.38-40.
[173] Raghunathan, B and Raghunathan, T.S. (1988) Impact of top management support on IS planning. *Journal of Information System*.

[174] Belout, A and Gauvreau, C. (2004) Factors Influencing Project Success: the Impact of Human Resource Management. *International Journal of project Management*, 22 pp. 1-11.

[175]Belout, A. (1998) Effect of Human Resource Management on Project Effectiveness and Success: Toward A New Conceptual Framework. *International Journal of Project Management*, 16 (1), pp. 21-26.

[176] Curtis, B. Krasner, H. et al. (1988) A Field Study of the Software Design Process for Large Systems. *Communications of ACM*, 31(11), pp. 1268-1287.
[177] Baroudi, J. J. (1985) The Impact of Role Variables on IS Personnel Work Attitudes and Intentions. *MIS Quarterly*, 9(4), pp. 341-356.
[178] Lee, D. M. S. Trauth, E. M. et al. (1995) Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation. *MIS Quarterly*, 9(3), pp. 313-340.
[179] Krishnan, M. S. Kriebel, C. K. et al. (2000) An Empirical Analysis of Productivity and Quality in Software Products. *Management Science*, 46(6), pp. 745-759.

[180] Parzinger, M. J. and Nath, R. (2000). A Study of the Relationship Between Total Quality Management Implementation Factors and Software Quality. *Total Quality Management*, 11(3), pp. 353-371.

[181] Armstrong, M. (2006) A handbook of human resource management practice. 10th ed. London: Kogan Page.

[182] Abdulkadir, D.S. Isiaka, S.B and Adedoyin, S.I. (2012) Effects of Strategic Performance Appraisal, Career Planning and Employee Participation on Organizational Commitment: An Empirical Study. *International Business Research*, 5 (4), pp. 124-133.

[183] Pfeiffer, J. (1994) Competitive advantage through people. Boston: Harvard Business School Press.

[184] Verma, A. (1995) Employee involvement in the workplace. In M. Gunderson & A. Ponak (Eds.), Research in Personal and Human Resource Management. New Haven, CT:JAI Press.

[185] Marchington, M. Wilkinson, A. Ackers, P. and Dundon, A. (2001) Management choice and employee voice. London: CIPD.

[186] Carless, S. A. Wearing, A. J. et al. (2000) A Short Measure of Transformational Leadership. *Journal of Business and Psychology*, 14(3), pp. 389-405.

[187] Shrednick, H. R. Stutt, R. J. et al. (1992) Empowerment: Key to IS World-Class Quality. *MIS Quarterly*, 16(4), pp. 491-505.

[188] Ravichandran, T. and Rai, A. (1999). Total Quality Management in Information Systems Development: Key Constructs and Relationships. *Journal of Management Information Systems*, 16(3), pp. 119-155.

[189] Islam, R. and Ismail, A. Z. (2004) Ranking of Employees' Reward and Recognition Approaches: A Malaysian Perspective. *Journal of International Business and Entrepreneurship Development*, 2 (2), pp. 113-124.

[190] Urichuk, B. (1999) Employee Recognition and Praise. *The Canadian Manager*, 24 (2), pp. 27-29.

[191] Freed, D.H. (1999) Fifty-Two Effective, Inexpensive Ways to Reward and Recognize Hospital Employees. *Health Care Manager*, 18 (1), pp. 20-28.

[192] Evans, J.R. and Lindsay, W.M. (2003) The management and control of quality. 5th ed. Thomson: USA.

[193] Cacioppe, R. (1999) Using Team-Individual Reward and Recognition Strategies to Drive Organizational Success. *Leadership and Organizational Development Journal*, 20 (6), pp. 322-331.

[194] Nachmias, C. and D. Nachmias (1981) Research Methods in the Social Sciences. London, St. Martin's Press.

[195] Deming, W. E. (1986) Out of the Crisis. Cambridge, Massachusetts; London, MIT Press.

[196] Cortada, J. W. (1995) TQM for Information Systems Management: Quality Practices for Continuous Improvement. New York, McGraw-Hill, Inc.

[197] Crosby, P. B. (1996) Quality is still free: making quality certain in uncertain times. New York, McGraw-Hill.

[198] Thiagarajan, T. and Zairi, M. (1997) A Review of Total Quality Management in Practice: Understanding the Fundamentals Through Examples of Best Practice Applications - Part I. *The TQM Magazine*, 9(4), pp. 270-286.

[199] Issac, G. Rajendran, C. et al. (2004) A Conceptual Framework for Total Quality Management in Software Organizations. *Total Quality Management*, 15(3), pp. 307-344.

[200] Ward, J. and Wood, C. (2000) Education and Training of Healthcare Staff: the Barriers to its Success. *European Journal of Cancer Care*, 9 pp. 80-85.

[201] Pinto, J.K. and Slevin. D.P. (1987) Critical Factors in Successful Project Implementation. *IEEE Transaction on Engineering Management*, 34 (1), pp. 22-28.

[202] Ishikawa, K. (1985) What is total quality control? The Japanese way. London, Prentice-Hall International, Inc.

[203] Feigenbaum, A. V. (1991) Total quality control. New York; London, McGraw-Hill.

[204] Anderson, J. C. M. Rungtusanatham, et al. (1994) A Theory of Quality Management Underlying the Deming Management Method. *Academy of Management Review*, 19(3), pp. 472-509.

[205] Goetsch, D. L. and Davis, S. (1994) Introduction to Total Quality: Quality, Productivity, Competitiveness. New York, Macmillan College Publishing Company.

[206] Oakland, J. S. (1997) Total Quality Management: Text with Cases. Oxford, Butterworth-Heinemann

[207] Juran, J. M. and Godfrey, A. B. (1998) Juran's Quality Handbook. New York, McGraw-Hill.

[208] Porter, L. J. and Parker, A. J. (1993) Total Quality Management - the Critical Success Factors. *Total Quality Management*, 4(1), pp. 13-22.

[209] Parzinger, M. J. and Nath, R. (1998) TQM Implementation Factors for Software Development: An Empirical Study. *Software Quality Journal*, 7(3/4), pp. 239-260.

[210] Li, S. Ragu-Nathan, B. Ragu-Nathan, T.S and Subba Rao. (2006) The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance. *The International Journal of Management Science (Omega)*. 34 pp. 107-124.

[211] Powell, T. C. (1995) Total Quality Management As Competitive Advantage: A Review and Empirical Study. *Strategic Management Journal*, 16 pp.15-37.

[212] Black, S. A. and Porter (1996) Identification of the critical factors of TQM. *Decision Sciences*, 27 pp. 1-21.

[213] Li, E. Y. Chen, H.-G. et al. (2000) Total Quality Management in Software Development Process. *The Journal of Quality Assurance Institute*, 14(1), pp. 4-6 & 35- 41.

[214] Chow, W. S. and Lui, K. H. (2001) Discriminating Factors of Information Systems Function Performance in Hong Kong Firms Practicing TQM. *International Journal of Operations & Production Management*, 21(5/6), pp. 749-771.

[215]Kannan, V and Tan, K.C. (2002) Supplier Selection and Assessment: their Impact on Business Performance. *Journal of Supply Chain Management*. 38 (4), p.11.

[216] Choi, T.Y and Hartley, J.L. (1996) An Exploration of Supplier Selection Practices Across the Supply Chain. *Journal of Operations Management*, 14 (4), pp.333-343.

[217] Min, H. LaTour, M and Williams, A. (1994) Positioning Against Foreign Supply Sources in An International Purchasing Environment. *Industrial Marketing Management*, 23 (5), pp. 371-382.

[218] Deng, S and Wortzel, L.H. (1995) Importer Purchase Behaviour: Guidelines for Asian Exporters. *Journal of Business Research*, 32 (1), pp.41-47.

[219] Thorelli, H.B and Glowacka, A.E. (1995) Willingness of American Industrial Buyers to Source Internationally. *Journal of Business Research*, 23 (1), pp. 21-31.

[220] Katsikeas, C.S and Leonidou, L.C. (1996) International Supplier Selection: the Relevance of Import Dependence. *Journal of Global Marketing*, 9 (3), pp.23-45.

[221] Piercy, N.F. Katsikeas, C.S and Cravens, D.W. (1997) Examining the Role of Buyer-Seller Relationships in Export Performance. *Journal of World Business*, 32 (2), pp. 73-86.

[222] Lambert, D.M. Adams, R.J and Emmelhainz, M.A. (1997) Supplier Selection Criteria in the Healthcare Industry: A Comparison of Importance and Performance. *International Journal of Purchasing and Materials Management*, 33 (4), pp. 16-22.

[223] Gustin, C.M. Daugherty, P.J and Ellinger, A.E. (1997) Supplier Selection Decisions in System/Software Purchases. *International Journal of Purchasing and Materials Management*, 33 (3), pp. 41-46.

[224] Hirakubo, N and Kublin, M. (1998) The Relative Importance of Supplier Selection Criteria: the Case of Electronic Components Procurement in Japan. *International Journal of Purchasing and Materials Management*, 34 (2), pp.19-24.

[225] Hammer, M. (2003) The new agenda: what every business must do to dominate the decade. New York, NY. Three Rivers Press.

[226] Seethamraju, R. (2012) Business Process Management: A Missing Link in Business Education. *Business Process Management Journal*, 18 (3), pp. 532-547.

[227] Gartner Group (2005) Delivering IT's Contribution: The 2005 CIO Agenda. Stamford, Connecticut, Gartner, Inc. (Cited in) Bandara, W. et al. (2007) Major issues in business process management: an expert perspective, In: *Proceeding of the 15th European Conference on Information Systems*, University of St Gallen, St Gallen, pp. 1240-51).

[228] Bandara, W., et al. (2007). Major issues in business process management: an expert perspective. In: *Proceeding of the 15th European Conference on Information Systems*, University of St Gallen, St Gallen, pp. 1240-51).

[229] Meziani, R. and Saleh, I. (2011) Towards a collaborative business process management methodology. In: *Proceeding of the International Conference on Multimedia Computing and Systems (ICMCS)* pp.1-6. Available from: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5945621&isnumber=5945564. [Accessed 06/08/2012].

[230] Dyba, T. (2000) An Instrument for Measuring the Key factors of Success in Software Process Improvement. *Empirical Software Engineering*, 5(4), pp. 357-390.

[231] Harter, D. E. Krishnan, M. S. et al. (2000) Effects of Process Maturity on Quality, Cycle Time, and Effort in Software Product Development. *Management Science*, 46(4), pp. 451-466.

[232] Krishnan, M. S. Kriebel, C. K. et al. (2000) An Empirical Analysis of Productivity and Quality in Software Products. *Management Science*, 46(6), pp. 745-759.

[233] Ravichandran, T. and Rai, A. (2000) Quality Management in Systems Development: An Organizational System Perspective. *MIS Quarterly*, 24(3), pp. 381-415.

[234] Abrahamsson, P. (2001) Commitment Development in Software Process Improvement: Critical Misconceptions. In: *Proceeding of the 23rd International Conference on Software Engineering (ICSE'01)* pp. 71-80.

[235] Ashrafi, N. (2003) The Impact of Software Process Improvement on Quality: in the Theory and Practice. *Information & Management*, 40(7), pp. 677-690.

[236] Harter, D. E. and Slaughter, S. A. (2003) Quality Improvement and Infrastructure Activity Costs in Software Development: A Longitudinal Analysis. *Management Science*, 49(6), pp. 784-800.

[237] Green, G. C. Hevner, A. R. et al. (2005) The Impact of Quality and Productivity Perceptions on the Use of Software Process Improvement Innovations. *Information and Software Technology*, 47(8), pp. 543-553.

[238] Hood, C. (1995) The New Public Management in the 1980s: Variations on Theme. *Accounting, Organization and Society*, 20 (2/3), pp. 93-109.

[239] Lapsley, I. (1999) Accounting and the New Public Management: Instruments of Substantive Efficiency or A Rationalizing Modernity?. *Financial Accountability and Management*, 15 (3), pp. 201-207.

[240] Department of Health (2000) Department of Health the NHS plan: a plan for investment, a plan for reform. The Stationery Office, London.

[241] Department of Health (2001) Department of Health the NHS plan: implementing the performance improvement agenda, The Stationery Office, London.

[242] Neely, A and Micheli, P. (2005) Performance measurement in the UK's public sector. Searching for the golden thread, paper presented at the British Academy of Management Conference, Oxford, September.

[243] Oakland, J.S. (1997) Total quality management: text with cases. Oxford, Butterworth-Heinemann.

[244] NIST (2012) Baldrige National Quality Program. Gaithersburg, MD, USA, National Institute of Standards and technology. Available from: http://www.quality.nist.gov. [Accessed 09/08/2012].

[245] Walrad, C. and Moss, E. (1993) Measurement: The Key to Application Development Quality. *IBM Systems Journal*, 32(3), pp. 445-460.

[246] Chang, L. (2007) The NHS Performance Assessment Framework As A Balanced Scorecard Approach Limitations and Implications. International *Journal of Public Sector Management*, 20(2), pp.101-117.

[247] Kaplan, R and Norton, D. (1992) The balanced scorecard-measures that drive performance. Harvard Business Review.

[248] Conrath, D. W. and Mignen, O. P. (1990) What is Being Done to Measure User Satisfaction With EDP/MIS. *Information & Management*, 19(1), pp. 7-19.

[249] Jørgnsen, F, Boer, H and Gertsen, F. (2003) Jump-Starting Continuous Improvement Through Self-Assessment. *International Journal of Operations & Production Management*, 23 (10), pp. 1260-1278.

[250] Bessant, J and Francis, D. (1999) Developing Strategic Continuous Improvement Capability. *International Journal of Operations & Production Management*, 19 (11), pp. 1106-1119.

[251] Nonaka, I. (1991) The Knowledge Creating Company. *Harvard Business Review*, November-December, pp. 96-104.

[252] Garvin, D. (1993) Building A Learning Organization. *Harvard Business Review*, July/August, pp. 78-91.

[253] Leonard-Barton, D. (1995) Wellsprings of Knowledge: Building and Sustaining the Sources on Innovation. Harvard Business School Press, Boston, MA.

[254] Mehra, S and Ranganathan, S. (2008) Implementing Total Quality Management With A Focus on Enhancing Customer Satisfaction. *International Journal of Quality & Reliability Management*, 25 (9), pp. 913-927.

[255] Mehra, S. Hoffman, J.M. and Sirias, D. (2001) TQM As A Management Strategy for the Next Millennia. *International Journal of Operations and Production Management*, 21 (5/6), pp. 855-76.

[256] Baroudi, J. J. Olson, M. H et al. (1986) An Empirical Study of the Impact of User Involvement on System Usage and Information Satisfaction. *Communication of the ACM*, 29 (3), pp. 232-238.

[257] McKeen, J. D. Guimaraes, T. et al. (1994) The Relationship Between User Participation and User Satisfaction: An Investigation of Four Contingency Factors. *MIS Quarterly*, 18 (4), pp. 427-451.
[258] Barki, H. and Hartwick, J. (1989) Rethinking the Concept of User involvement. *MIS Quarterly*, 13 (1) pp.53-63.
[259] Wong-On-Wing, B. (1998) User Involvement in Systems Development: An Attribution Approach. *Journal of Information Systems*, 2 pp. 3-14.
[260] Saleem, N. (1996) An Empirical Test of the Contingency Approach to User Participation in Information Systems Development. *Journal of Management Information Systems*, 13(1), pp. 145-166.
[261] Lin, W. T. and Shao, B. B. M. (2000) The Relationship Between User Participation and System Success: A Simultaneous Contingency Approach. *Information & Management*, 37(6), pp. 283-295.
[262] DeLone, W. H. and McLean, E. R. (1992) Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research*, 3(1), pp. 60-95.
[263] Teo, T. S. and Wong, P. K. (1998) An Empirical Study of the Performance Impact of Computerization in the Retail Industry. *Omega - The international Journal of Management Science*, 26(5), pp. 611-621.

[264] Chang, P.K. and Chong, H. L. (2011) Customer satisfaction and loyalty on service provided by Malaysian Telecommunication companies. In: *Proceeding of the International Conference on Electrical Engineering and Informatics*. 17-19 July 2011, Bandung, Indonesia.

[265] Kettinger, W. J. and Lee, C. C. (1994) Perceived Service Quality and User Satisfaction With the Information Services Function. *Decision Sciences*, 25(5/6), pp. 737- 766.
[266] Pitt, L. F. Watson, R. T. et al. (1995) Service Quality: A Measure of Information Systems Effectiveness. *MIS Quarterly*, 19(2), pp. 173-188.
[267] Kahn, B. Strong, D and Wang, R. (2002) Information Quality Benchmarks: Product and Service Performance. *Communication of the ACM*, 45 (4), pp. 184-192.
[268] Knight, S. and Burn, J. (2005) Developing A Framework for Assessing Information Quality on the World Wide Web. *Informing Science Journal*, 8 pp.159-172.
[269] Lee, Y. Pipino, L. Funk, J. and Wang, R. (2006) Journey to data quality. The MIT Press. Cambridge, Massachusetts London, England. Available from: http://fs1.bib.tiera.ru, [Accessed 19/09/2012].

[270] Jiang, J. J. Klein, G. et al. (2002) Measuring Information System Service Quality: SERVQUAL From The Other side. *MIS Quarterly*, 26(2), pp.145-166.
[271] Saarinen, T. (1996) An Expanded Instrument for Evaluating Information Systems Success. *Information & Management*, 31(2), pp. 103-118.
[272] Seddon, P. B. (1997) A Respecification and Extension of the DeLone and McLean Model of IS Success. *Information Systems Research*, 8(3), pp. 240-253.
[273] Rai, A. S. Lang, S. et al. (2002) Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis. *Information Systems Research*, 13(1), pp. 50-69.
[274] Nelson, R. R. Todd, P. A. et al. (2005) Antecedents of Information and System Quality: An Empirical Examination Within the Context of Data Warehousing. *Journal of Management Information Systems*, 21(4), pp. 199-235.

[275] ISO 9126 (2003). Applying the ISO 9126 model to the evaluation of an e-learning system. Geneva, Switzerland, ISO (the International Organization for Standardization). Available from: http://www.ascilite.org.au/conferences/perth04/procs/chua.html [Accessed 24/09/2012].

[276] Crosby, Lawrence A. and Nancy Stephens (1987) The Effects of Relationship Marketing on Satisfaction, Retention, and Prices in the Life Insurance Industry. *Journal of Marketing Research*, 24 (November), pp. 404-11.
[277] Rust, Roland and Anthony Zahorik (1993) Customer Satisfaction, Customer Retention, and Market Share, *Journal of Retailing*, 69 (2), pp.193-216.
[278] Reicheld, Frederick F. (1996) Learning from Customer Defections. *Harvard Business Review*, March-April, pp. 56-69.
[279] Bolton, Ruth N. (1998) A Dynamic Model of the Duration of the Customer's Relationship with a Continuous Service Provider: The Role of Satisfaction, *Marketing Science*, 17 (1), pp. 45-65.
[280] Gronholdt, Lars, Anne Martensen and Kai Kristensen (2000) The Relationship Between Customer Satisfaction and Loyalty: Cross-Industry Differences. *Total Quality Management*, 11 (July), 4-6, pp. S509-S514.
[281] Shankar, V. Smith, A.K and Rangaswamy, A. (2003) Customer Satisfaction and Loyalty in Online and Offline Environments. *International Journal of Research in Marketing*, 20 (2), pp. 153-175.
[282] Berry, L. L. (1995) On Great Service. New York, United States: Free Press.

[283] Berry, L. L. and A. Parasuraman. (1991) Marketing Services: Competing through Quality. New York, United States: Free Press.

[284] Oakland, J. (2000) Total Quality Management. Oxford, United Kingdom: Butterworth-Heinemann.

[285] Bailey, J. E. and Pearson, S. W. (1983) Development of a Tool for Measuring and analyzing Computer User satisfaction. *Management Science*, 29(5), pp. 530-545.

[286] Baroudi, J. J. Olson, M. H. et al. (1983) The Measurement of User Information Satisfaction. *Communications of the ACM*, 26(10), pp. 785-793.

[287] Baroudi, J. J. and Orlikowski, W. J. (1988) A Short-Form Measure of User Information Satisfaction: A Psychometric Evaluation and Notes on Use. *Journal of Management Information Systems*, 4(4), pp. 44-59.

[288] Doll, W. J. and Torkzadeh, G. (1988) The Measurement of End-User Computing Satisfaction. *MIS Quarterly*, 12(2), pp. 258-274.

[289] Hubbard, G. (2009) Measuring Organizational Performance: Beyond the Triple Bottom Line. *Business, Strategy and Environment*, 19 pp. 177-191.

[290] March, J.G and Sutton, R.I. (1997) Organizational Performance As A Dependent Variable. *Organization Science*, 8 (6), pp.698-706.

[291] Ming-Huei Chen; Cangahuala, G., Corporate entrepreneurship environment and organizational performance in technology manufacturing sector, *Technology Management for Global Economic Growth (PICMET), 2010* In: *Proceeding of the PICMET '10.* Pp.1-9, 18-22 July 2010. Available from: http://ieeexplore.ieee.org. [Accessed 08/10/2012].

[292] Chun-Ming, Chen. Yan-Xiao, Li. Research on the relationship between organizational innovation atmosphere and organizational performance. In: *Proceeding of the Management Science and Engineering (ICMSE)*, pp.457-463, 2010. Available from: http://ieeexplore.ieee.org. [Accessed 08/10/2012].

[293] Drury, D. H. and Farhoomand, A. F. (1998) A Hierarchical Structural Model of Information Systems Success. *INFOR*, 36(1/2), pp. 25-40.

[294] Hongyan, Yu. Yu, Jin. Hua Li. Relationship between market orientation and organizational performance in public hospitals in China. In: *Proceeding of the 7th International Conference Service Systems and Service Management (ICSSSM), 2010* , pp.1-6, 28-30 Available from: http://ieeexplore.ieee.org. [Accessed 08/10/2012].

[295] Myers, M. D. (1997) Qualitative Research in Information Systems. *MIS Quarterly*, 21(2), pp. 241-242.

[296] Wilson, T. (2001) Structure in Research Methods. Available from: [http://informationr.net/tdw/publ/ppt/ResMethods/] [Accessed 22/10/2012].

[297] Chen, W. and Hirschheim, R. (2004) A Paradigmatic and Methodological Examination of Information Systems research from 1991 to 2001. *Information Systems Journal*, 14(3), pp. 197-235.

[298] Albadi (2005) A Framework for Designing Usable Localised Websites. Unpublished thesis (PhD). School of Computing Sciences, University of East Anglis, Norwich, UK.

[299] Denscombe, M. (2003) The Good Research Guide - For Small-Scale Social research Projects. Maidenhead. Philadelphia. Open University Press.

[300] Pinsonneault, A. and Kraemer, K. L. (1993) Survey Research Methodology in Management Information Systems: An Assessment. *Journal of Management Information Systems*, 10(2), pp. 75-105.

[301] Robson, C. (2002) Real world research : a resource for social scientists and practitioner-researchers. Oxford, Blackwell.

[302] Cohen, L. Manion, L. And Morrison K. (2000) Research Methods in Education. London. Routledge Falmer.

[303] Creswell, J. W. (2003) Research design, qualitative, quantitative, and mixed methods approaches. California, Sage. Thousand Oaks.

[304] Remenyi, D. Williams, B. Money, A. Swartz. E. (1998) Doing research in business and management: an introduction to process and method. London, SAGE.

[305] Bryman, A. (2001) Social Research Methods. Oxford, Oxford University Press.

[306] Benbasat, I. Goldstein, D. K. et al. (1987) The Case Research Strategy in Studies of Information Systems. *MIS Quarterly*, 11(3), pp. 368-386.

[307] Orlikowski, W. J. and Baroudi, J. J. (1991) Studying Information Technology in Organizations: Research Approaches and Assumptions, *Information Systems Research*, 2, pp. 1-28.

[308] Cohen, L. and Mannion, L. (1980) Research Methods in Education. London, Routledge.

[309] Walsham, G. (1993) Interpreting Information Systems in Organisations. Wiley.

[310] Antill, L. (1985) Selection of a research method, *In the proceeding of IFIP WG 8.2 Colloquium*, 203-215.Manchester Business School, 1-3 September 1984.

[311] Beynon-Davies, P. (2002) Information Systems: An Introduction to Informatics in Organisations. London. Palgrave.

[312] Palvia, P. Mao, E. et al. (2003) Management Information Systems Research: What's There in a Methodology? *Communication of the Association for Information Systems*, 11, 16.

[313] Ritchie, J. and J. Lewis (2004) Qualitative Research Practice: A Guide for Social Sciences Students and Researchers. London. SAGE Publications Ltd.

[314] Irani, Z. Love, P. et al. (2005) Evaluating e-government: learning from the experiences of two UK local authorities. *Information Systems Journal*, 15(1), pp. 61-82.

[315] Gilbert, N. (2004) Researching Social Life. London, SAGE Publications Ltd.

[316] Vaus, D. D. (2004) Surveys in Social Research. London, Routledge.

[317] Hair et al. (1995) (Cited in) Avison, D. and Pries-Heje, J. (2005) Research in information systems - A handbook for research supervisors and their students. Burlington, MA, Elsevier Butterworth-Heinnemann.

[318] Garson, D. (1998) Statnotes: Topics in Multivariate Analysis. Available from: http://www2.chass.ncsu.edu/garson/pa765/statnote.htm. [Accessed 11/12/2012].

[319] Patton, M. Q. (1997) Utilization-focused evaluation: the new century text. London. SAGE.

[320] Clarke, A. (1999) Evaluation Research: An Introduction to Principles, Methods and Practice. London. SAGE Publications.

[321] Patton, M. Q. (1987) How to Use Qualitative Methods in Evaluation. London. SAGE.

[322] Nunnally, J. C. (1967) Psychometric Theory. New York. McGraw-Hill.

[323] Straub, D. W. (1989) Validating Instruments in MIS Research. *MIS Quarterly*, 13(2) pp. 147-169.

[324] Cronbach, L. J. (1951) Coefficient Alpha and the Internal Structure of Tests. *Psychometrical*, 16(3), pp. 297-334.

[325] Hair, J. F. Anderson, R. E. et al. (1992) Multivariate Data Analysis. New York. Macmillan.

[326] Sekaran, U. (1992) Research methods for business: a skill-building approach. Chichester. John Wiley.

[327] Straub, D. W. Boudreau, M.-C. et al. (2004) Validation Guidelines For IS Positivist Research. *Communication of the Association for Information Systems*, 14 pp. 380-427.

[328] Dyba, T. (2000) An Instrument for Measuring the Key factors of Success in Software Process Improvement. *Empirical Software Engineering*, 5(4), pp. 357-390.

[329] NIST (2006) Baldrige National Quality Program. Gaithersburg, MD, USA, National Institute of Standards and Technology. Available from: http://www.quality.nist.gov. [accessed 26/12/2012].

[330] EFQM (2006) The EFQM Excellence Award. Brussels, Belgium, European Foundation for Quality Management. Available from: http://www.efqm.org. [accessed 26/12/2012].

Appendix A
The English Version of the Questionnaire

The IT department performance

Questionnaire Survey

Dear IT department Manager

I am carrying out a PhD study at the De Montfort University, UK, under the supervision of Dr. Amelia Platt. This research aims to investigate the IT department performance in Saudi's hospitals.

I should be grateful if you respond to the enclosed questions as frankly and thoughtfully as possible. The answers required will only take you a very short time to complete, but will have a significant value in terms of the completion and execution of the research as well as the achievement of its objectives. So, please fill in the questionnaire as completely as possible. The information you provide will be strictly confidential and will be used solely for the purpose of the research. Please send the completed questionnaire to the address provided below.

The questionnaire is divided into the following sections:

Section One: Respondent Background

Section Two: Hospital and IT Department Characteristics

Section Three: IT'S Department Success

Section Four: IT Department Practices

The following abbreviations have been used in this questionnaire:

- (IT) Information Technology
- (IS) Information Systems

I would like to take this opportunity to thank you in advance for spending your valuable time to answer the questions of this survey.

Abdullah A. Almarshad
P.O. Box 30561
Riyadh 11487
Saudi Arabia
Email: almarshad@dmu.ac.uk
OR almarshad55@yahoo.com

Name: Hospital Name:

Telephone/Mobil: Email:

Directions: Please answer the following questions by checking the boxes provided, or by writing the appropriate answer which best indicates the situation applicable in your hospital.

Section One: Respondent Background

1.Your nationality?
- □ Saudi
- □ Non-Saudi

2.Gender?
- □ Male
- □ Female

3.Your age (years)?
- □ <26
- □ 26-30
- □ 31-35
- □ 36-40
- □ >40

4.Your educational level?
- □ Below Bachelor
- □ Bachelor
- □ Higher Diploma
- □ Master
- □ PhD

5. Your field of study?
- □ Computing
- □ Management
- □ Accounting
- □ Others, specify

6. Your position?
- □ IT supervisor
- □ Programmer
- □ Manager
- □ Others, specify

7. Years of experience?
- □ <6
- □ 6-10
- □ 11-15
- □ 16-20
- □ >20

Section Two: Hospital and IT Department Characteristics

8. How many employees are there in your hospital?
- □ <60
- □ 61-100
- □ 101-200
- □ >200

9. How many IT/IS employees are there in your hospital?
- □ <10
- □ 11-20
- □ 21-30
- □ 31-40
- □ >40

10. Who develops your information systems?
- □ In-house team
- □ Professional company
- □ Others, specify

Section Three: IT'S Department Success

11. Please read the following statements and tick the boxes provided, that best indicates your level of agreement with the IT department and their services in your hospital.

No	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	IT department has up-to-date hardware and software.	☐	☐	☐	☐	☐
2	IT department is dependable and reliable.	☐	☐	☐	☐	☐
3	IT employees give prompt service to users/customers.	☐	☐	☐	☐	☐
4	IT employees have required skills and knowledge to do their job well.	☐	☐	☐	☐	☐
5	IT department has users' best interests at heart.	☐	☐	☐	☐	☐
6	IS are meeting functional requirements (the capability of the software product to provide functions which meet stated and implied needs).	☐	☐	☐	☐	☐
7	IS are reliable (the capability of the software product to maintain a specified level of performance).	☐	☐	☐	☐	☐
8	IS are usable (the capability of the software product to be understood, learned, used and attractive to the user).	☐	☐	☐	☐	☐
9	IS are efficient (the capability of the software product to provide appropriate performance, relative to the amount of resources used).	☐	☐	☐	☐	☐
10	IS are maintainable (the capability of the software product to be corrected and improved).	☐	☐	☐	☐	☐
11	IS are portable (the capability of the software product to be transfer from one environment to another).	☐	☐	☐	☐	☐
12	Information systems provided by the IT department meet user/customer expectations.	☐	☐	☐	☐	☐
13	Services provided by the IT department staff meet user/customer expectations.	☐	☐	☐	☐	☐
14	User/customer rarely makes complaints about IT department products and services.	☐	☐	☐	☐	☐
15	IT department products/services improve employees' productivity.	☐	☐	☐	☐	☐
16	IT department products/services improve hospital operational efficiency.	☐	☐	☐	☐	☐

17	IT department products/services improve management effectiveness.	☐	☐	☐	☐	☐
18	IT department products/services improve hospital business performance.	☐	☐	☐	☐	☐

Section Four: IT Department Practices

12. Please read the following statements and tick the boxes provided that best indicates your level of agreement with IT department practices in your hospital.

No	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	IT top management assumes responsibility for department performance.	☐	☐	☐	☐	☐
2	IT top management support long-term improvement process.	☐	☐	☐	☐	☐
3	IT top management actively participates in improvement activities.	☐	☐	☐	☐	☐
4	IT top management encourages employee participation in improvement activities.	☐	☐	☐	☐	☐
5	IT top management has clear objectives for department performance.	☐	☐	☐	☐	☐
6	There is a comprehensive IT/IS improvement plan in our department.	☐	☐	☐	☐	☐
7	Quality used as the major criterion in developing IT/IS plans.	☐	☐	☐	☐	☐
8	Our hospital provides decent salaries that can attract IT/IS professionals.	☐	☐	☐	☐	☐
9	Job description for IT department employees is clearly specified.	☐	☐	☐	☐	☐
10	The working conditions in our IT department are comfortable for all employees.	☐	☐	☐	☐	☐
11	IT departments' employees are very committed to the success of the IT department.	☐	☐	☐	☐	☐
12	Functional teams are frequently used in our IT department.	☐	☐	☐	☐	☐
13	IT departments' employees actively participate in related activities.	☐	☐	☐	☐	☐
14	IT department employees participate in developing the department plans.	☐	☐	☐	☐	☐
15	IT department employees are empowered to resolve problems.	☐	☐	☐	☐	☐
16	IT department employees are provided with their performance feedback.	☐	☐	☐	☐	☐

17	Working conditions improvement is one of the recognition schemes in our hospital in order to recognize employee effort.	☐	☐	☐	☐	☐
18	Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.	☐	☐	☐	☐	☐
19	Position promotions are based on work effort and quality in our hospital.	☐	☐	☐	☐	☐
20	Excellent suggestions are financially rewarded.	☐	☐	☐	☐	☐
21	Employees' rewards and penalties are clear.	☐	☐	☐	☐	☐
22	Specific IT/IS skills training is given to IT department employees.	☐	☐	☐	☐	☐
23	General management technique training is given to IT department employees.	☐	☐	☐	☐	☐
24	Resources are made available for IT department employee's education and training.	☐	☐	☐	☐	☐
25	IT department product/service quality is regarded as the most important factor in selecting suppliers.	☐	☐	☐	☐	☐
26	Long-term cooperative relations with suppliers are established in our IT department.	☐	☐	☐	☐	☐
27	Detailed information regarding suppliers' performance is maintained in our IT department.	☐	☐	☐	☐	☐
28	Critical IT/IS processes are regularly monitored, measured and improved.	☐	☐	☐	☐	☐
29	Our processes are standardized and systematically documented.	☐	☐	☐	☐	☐
30	Our processes are designed to be "foolproof" in order to minimize the chance of employee errors.	☐	☐	☐	☐	☐
31	IT/IS equipments are well maintained according to the maintenance plan.	☐	☐	☐	☐	☐
32	Our department implements a programme to reduce new product or service development and implementation cycle times.	☐	☐	☐	☐	☐
33	IT/IS quality performance standards have been established and communicated to all stakeholders.	☐	☐	☐	☐	☐
34	Our department regularly conducts IT/IS quality audits.	☐	☐	☐	☐	☐
35	Self-assessment of IT department performance is a strong practice in our department.	☐	☐	☐	☐	☐

36	Our department has detailed of related data such as customer complaints and defect rates.	☐	☐	☐	☐	☐
37	The related data are used to evaluate overall IT department performance.	☐	☐	☐	☐	☐
38	The related data are used to evaluate the performance of IT department employees.	☐	☐	☐	☐	☐
39	IT department performance measurement findings are evaluated to identify problem causes.	☐	☐	☐	☐	☐
40	IT department performance measurement findings are available to all stakeholders.	☐	☐	☐	☐	☐
41	Customer feedback is used for improvement.	☐	☐	☐	☐	☐
42	Performance measurement findings are used for improvement.	☐	☐	☐	☐	☐
43	A specific committee/team is used regularly to support improvement in IT department activities.	☐	☐	☐	☐	☐
44	Our department collects extensive complaint information such as help desk calls from customers.	☐	☐	☐	☐	☐
45	Customer complaints are treated with top priority.	☐	☐	☐	☐	☐
46	Our department regularly conducts a customer satisfaction survey.	☐	☐	☐	☐	☐
47	User/customer participates in various stages of the IT department projects.	☐	☐	☐	☐	☐
48	Our department provides services after IT/IS project completion and product delivery.	☐	☐	☐	☐	☐

Is it possible to give the researcher a chance to make an interview with you when it is necessary?

- ☐ Yes
- ☐ No

Please indicate whether you wish to receive a summary report of the findings of this study?

- ☐ Yes
- ☐ No

Appendix B
The Semi-Structured Interview Questions

The Semi-Structured Interview Questions

Q1 To what extent top management in your hospital support IT department function?

Q2 To what extent IT department is important to your hospital?

Q3 To what extent do you get training in IT management issues and/or participate in conferences in this regard?

Q4 To what extent do you participate in the improvement meetings/committees in your hospital?

Q5 Are there any specific plans that you follow in respect to the implementation of technology acceptance in your IT department?

Q6 Do you have clears objectives for your IT department?

Q7 What factors are important in improving the IT department performance? DO you measure them formally?

Q8 What factors are important in selecting IT/IS professional?

Q9 To what extent IT department employees are participated and encouraged?

Q10 To what extent stakeholders participate in IT department activities?

Q11 In your opinion, what are the main factors affecting the technology acceptance in your IT department and what are your suggestions to overcome these factors?

Appendix C

The assessment tool for organisational factors implementation in IT departments

The assessment tool for organisational factors implementation in IT departments

There are 48 statement below. For each statement, check the box that best matches how your hospital's level of practice according to the following scoring guidelines:

0 No evidence is available. This means that the IT department is characterised as ad hoc and occasionally even chaotic (reactive and inconsistently implemented).

1 Little required evidence is available. This means that the IT department is **weak** in this practice.

2 Much required evidence is available. This means that the IT department is **moderate** in this practice.

3 All required evidence sound and systematic approach is available. This means that the IT department is **strong** in this practice.

How you feel will help you decide where your IT hospital most need to improve. It should take you about 10 to 15 minutes to complete this questionnaire.

1. Top management responsibility

Statement	No Evidence	Weak	Moderate	Strong
8. IT top management assumes responsibility for department performance.				
9. IT top management support long-term improvement process.				
10. IT top management actively participates in improvement activities.				
11. IT top management encourages employee participation in improvement activities.				
12. IT top management has clear objectives for department performance.				
13. There is a comprehensive IT/IS improvement plan in our department.				
14. Quality used as the major criterion in developing IT/IS plans.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

2. Recruitment

Statement	No Evidence	Weak	Moderate	Strong
4. Our hospital provides decent salaries that can attract IT/IS professionals.				
5. Job description for IT department employees is clearly specified.				
6. The working conditions in our IT department are comfortable for all employees.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

3. Employee participation

Statement	No Evidence	Weak	Moderate	Strong
7. IT departments' employees are very committed to the success of the IT department.				
8. Functional teams are frequently used in our IT department.				
9. IT departments' employees actively participate in related activities.				
10. IT department employees participate in developing the department plans.				
11. IT department employees are empowered to resolve problems.				
12. IT department employees are provided with their performance feedback.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

4. Reward

Statement	No Evidence	Weak	Moderate	Strong
6. Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.				
7. Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.				
8. Position promotions are based on work effort and performance in our hospital.				
9. Excellent suggestions are financially rewarded.				
10. Employees' rewards and penalties are clear.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

5.Training and education

Statement	No Evidence	Weak	Moderate	Strong
4. Specific IT/IS skills training is given to IT department employees.				
5. General management technique training is given to IT department employees.				
6. Resources are made available for IT department employee's education and training.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

6.Supplier management

Statement	No Evidence	Weak	Moderate	Strong
4. IT department product/service quality is regarded as the most important factor in selecting suppliers.				
5. Long-term cooperative relations with suppliers are established in our IT department.				
6. Detailed information regarding suppliers' performance is maintained in our IT department.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

7. Process management

Statement	No Evidence	Weak	Moderate	Strong
6. Critical IT/IS processes are regularly monitored, measured and improved.				
7. Our processes are standardized and systematically documented.				
8. Our processes are designed to be "foolproof" in order to minimize the chance of employee errors.				
9. IT/IS equipments are well maintained according to the maintenance plan.				
10. Our department implements a programme to reduce new product or service development and implementation cycle times.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

8. Measurement

Statement	No Evidence	Weak	Moderate	Strong
9. IT/IS quality performance standards have been established and communicated to all stakeholders.				
10. Our department regularly conducts IT/IS quality audits.				
11. Self-assessment of IT department performance is a strong practice in our department.				
12. Our department has detailed of related data such as customer complaints and defect rates.				
13. The related data are used to evaluate overall IT department performance.				
14. The related data are used to evaluate the performance of IT department employees.				
15. IT department performance measurement findings are evaluated to identify problem causes.				
16. IT department performance measurement findings are available to all stakeholders.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

9. Continuous improvement

Statement	No Evidence	Weak	Moderate	Strong
4. Customer feedback is used for improvement.				
5. Performance measurement findings are used for improvement.				
6. A specific committee/team is used regularly to support improvement in IT department activities.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

10. Customer focus

Statement	No Evidence	Weak	Moderate	Strong
6. Our department collects extensive complaint information such as help desk calls from customers.				
7. Customer complaints are treated with top priority.				
8. Our department regularly conducts a customer satisfaction survey.				
9. User/customer participates in various stages of the IT department projects.				
10. Our department provides services after IT/IS project completion and product delivery.				
Sub-Total	0* [ ] +	1* [ ] +	2* [ ] +	3* [ ] +
Total Score (F1)				

Appendix D
The organisational factors Implementation Practices/Elements Measurement Criteria

The organisational factors Implementation Practices/Elements Measurement Criteria

1. Top management responsibility

Statement	Measurement criteria
IT top management assumes responsibility for department performance.	Develop a clear belief in the benefits that organisational factors implementation can bring in to the hospital. This requires investing time and effort learning about organisational factors implementation through: reading about organisational factors implementation; attending training courses; attending conferences; consulting experts, or Visiting other hospitals.
IT top management support long-term improvement process.	• Establish a team/committee/department. • Recruit a manager to provide support in the planning and implementation of organisational factors.
IT top management actively participates in improvement activities.	• Serving at team/committee. • Participating in developing a comprehensive vision, mission, and policies. • Participating in celebrating successful achievements. • Communicating the vision and mission to staff. • Reviewing organisational factors implementation issues at management meetings.
IT top management encourages employee participation in improvement activities.	• Attach great importance to employees' suggestions. • Trust employees and believe that they can do things better. • Encourage employees to list the IT department's shortcomings.
IT top management has clear objectives for department performance.	• Have a long-term vision statement. • Have a written policy. • Have a long-term overall IT performance plan.
There is a comprehensive IT/IS improvement plan in our department.	• Formulate an improvement plan to target major problem areas. • Implement the improvement plan in practice.
Quality used as the major criterion in developing IT/IS plans.	• Quality of service/product coming first.

2. Recruitment

Statement	Measurement criteria
Our hospital provides decent salaries that can attract IT/IS professionals.	• Employee satisfaction rate.
Job description for IT department employees is clearly specified.	• Having job description for every position. • Providing job policies and procedures.
The working conditions in our IT department are comfortable for all employees.	• Providing comfortable working conditions in terms of lights, air condition, suitable equipment, devices, etc.

3. Employee participation

Statement	Measurement criteria
IT departments' employees are very committed to the success of the IT department.	• Employee satisfaction rate. • Turnover rate.
Functional teams are frequently used in our IT department.	• Have some functional teams. • Choose team members according to their potential contributions. • Provide training in team building. • Rewarding and recognizing team successes.
IT departments' employees actively participate in related activities.	• Participate in the improvement teams.
IT department employees participate in developing the department plans.	• Participate at least in plans that affect their Work.
IT department employees are empowered to resolve problems.	• Empower employees to solve problems. • Empower employees to make some urgent decisions.
IT department employees are provided with their performance feedback.	• Employee performance appraisal results.

4. Reward

Statement	Measurement criteria
Working conditions improvement is one of the recognition schemes in our hospital in order to recognise employee effort.	• Pay sufficient attention to employee wellbeing, safety, morale, and growth; • Reduce employees' working strengths by providing suitable equipment, devices, or tools.
Our hospital has a salary promotion scheme to encourage employee participation in IT department activities.	• Increase employees' salaries fairly and rationally. • Widen salary differences between employees with different skill levels and different contributions.
Position promotions are based on work effort and performance in our hospital.	• Promote employees based on their capabilities, skills, performance, and contributions to the hospital.

Excellent suggestions are financially rewarded.	• Have effective employee suggestion systems. • Encourage employees to submit suggestions. • Evaluate employee suggestions promptly. • Provide recognition and reward for employee suggestions.
Employees' rewards and penalties are clear.	• Communicate reward and penalty schemes to all employees.

5. Training and education

Statement	Measurement criteria
Specific IT/IS skills training is given to IT department employees.	• Provide job training for employees to perform their jobs better.
General management technique training is given to IT department employees.	• Team building. • Time management.
Resources are made available for IT department employee's education and training.	• Provide sufficient resources for implementing the education and training plan.

6. Supplier management

Statement	Measurement criteria
IT department product/service quality is regarded as the most important factor in selecting suppliers.	• Select supplier based on the products/ services quality rather than price alone.
Long-term cooperative relations with suppliers are established in our IT department.	• Work together with suppliers for mutual benefits. • Establish long-term relationships with suppliers.
Detailed information regarding suppliers' performance is maintained in our IT department.	• Evaluate the performance of products and services from suppliers. • Rate suppliers in terms of service/product quality. • Have supplier performance evaluation system for measuring suppliers' performance.

7. Process management

Statement	Measurement criteria
Critical IT/IS processes are regularly monitored, measured and improved.	• Improvement teams established, budget Allocated and training provided.
Our processes are standardized and systematically documented.	• Identify and define business processes in these areas: IT service management, IT/IS application development, measurement, human resources management, human resources development, IT/IS planning, customer focus, supplier management, software and hardware maintenance, project management.
Our processes are designed to be "foolproof" in	• Provide training to employees to explain to

order to minimize the chance of employee errors.	them each process.
IT/IS equipments are well maintained according to the maintenance plan.	• Have equipment maintenance plan. • Conduct preventive equipment maintenance. • Assign employees / professional company the responsibility for daily equipment maintenance.
Our department implements a programme to reduce new product or service development and implementation cycle times.	• For example, change management

8. Measurement

Statement	Measurement criteria
IT/IS quality performance standards have been established and communicated to all stakeholders.	• Identify critical success factors. • Define performance measure for every critical success factor • Develop plan to achieve the target performance.
Our department regularly conducts IT/IS quality audits.	• Conduct service/product quality audits regularly.
Self-assessment of IT department performance is a strong practice in our department.	• Have relevant information by self-assessing IT performance.
Our department has detailed of related data such as customer complaints and defect rates.	• Establish customer complaint registration system. • Collect customer complaint information extensively.
The related data are used to evaluate overall IT department performance.	• Have data on IT service/product quality and evaluate IT service/product quality. • Have data on stakeholder satisfaction and evaluate stakeholder satisfaction. • Have data on hospital performance and evaluate hospital performance.
The related data are used to evaluate the performance of IT department employees.	• Have performance criteria for different employees. • Evaluate employee performance against set targets.
IT department performance measurement findings are evaluated to identify problem causes.	• Evaluate stakeholder satisfaction findings. • Evaluate audits finding. • Evaluate self-assessment findings. • Evaluate IT service/product quality, stakeholder satisfaction, and hospital performance findings. • Evaluate employee's performance findings.
IT department performance measurement findings are available to all stakeholders.	• Communicate information to all stakeholders.

9. Continuous improvement

Statement	Measurement criteria
Customer feedback is used for improvement.	• Analyse customer complaint information to

	formulate further improvement actions.
Performance measurement findings are used for improvement.	• Data collecting from customer satisfaction surveys, audits, self-assessment, IT service/product quality , and hospital performance evaluations, and employees' evaluation results: • to identify areas for improvement; • update action plans; • update performance targets; • redesign processes (where appropriate); • Manage the performance of teams and individuals (performance management and appraisal) and suppliers.
A specific committee/team is used regularly to support improvement in IT department activities.	• Establish improvement teams. • Allocate budget. • Provided needed training.

10. Customer focus

Statement	Measurement criteria
Our department collects extensive complaint information such as help desk calls from customers.	• Establish customer complaint registration system. • Collect customer complaint information extensively.
Customer complaints are treated with top priority.	• Knowledgeable and customer-oriented support staffs resolve problems in close cooperation with the problem management staff. • Customer complaints that cannot be resolved in a timely appropriate escalated.
Our department regularly conducts a customer satisfaction survey.	• Have effective stakeholder satisfaction measurements. • Have stakeholder satisfaction levels on the service/product quality.
User/customer participates in various stages of the IT department projects.	• Participate in analysis and design. • Participate in purchasing new product.
Our department provides services after IT/IS project completion and product delivery.	• Have service level agreement.