دراسة بحثية عن العوامل المؤثرة في عملية تطبيق أنظمة تقنية المعلومات في المنظمات الخاصة بالمملكة العربية السعودية

AN EMPIRICAL EXAMINATION OF THE FACTORS INFLUENCING THE IMPLEMENTATION OF INFORMATION TECHNOLOGY SYSTEMS IN THE SAUDI PRIVATE ORGANISATIONS

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DECLARATION

No portion of the work referred to in this thesis, which is submitted to the University of Leicester for Ph.D in planning and management of Computer and Management Information Systems, has been submitted in support of an application for another degree or qualification in this university or any other institution of learning.

تأكيد

أؤكد بأن محتويات هذه الرسالة المقدمة للحصول على درجة الدكتوراه في مجال التخطيط و إدارة أنظمة الحاسب الآلي و المعلومات الإدارية من جامعة لستر لم تقدم للحصول على أي درجة علمية أخرى سواء من هذه الجامعة أو من أي جامعة أخرى.

An Empirical Examination Of The Factors Influencing The Implementation Of Information Technology Systems In The Saudi Private Organisations

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ABSTRACT

This study was conducted in Saudi Arabia (SA) to identify and examine the main factors that entice private organisations in SA to implement Information Technology (IT) Systems. The study started by conducting an exploratory study using interviews, focus groups meetings to meet some IT academics and professionals in SA to find out about their opinions about the current IT environment in SA. Two mini-case studies were used to discuss the experience of two Saudi private organizations with implementation. The findings of this study were used to guide the direction and contents of the research. It was decided after the exploratory study that the research focus on the experience of Saudi private organizations with IT.

Questionnaires were distributed to 500 private organisations in the Saudi private sector in the Eastern Province in SA. 170 organisations completed and returned the instrument making the response rate to reach 34%. An analysis of the received data revealed that 89.4% of the respondents organisations are using IT systems with differing degrees of success as proposed by this study. This leaves 10.6% of the responding organisations being classified as unsuccessful (did not adopt IT systems at all); however 77% of these organisations stated that they will adopt IT systems in the near future.

The sample organisations were drawn from the databases of the Chamber of Commerce in the Eastern province of SA. To facilitate the analysis and data presentation the sample organisations were categorised, as suggested and used by other IS researchers, into the two main types of industries: manufacturing and services. The organisation was the unit of analysis and the owners and top-managers were the key informants who supplied information about their organisations' experience with IT systems.

The main reasons that entice Saudi private organisations to implement IT systems as revealed by this study include: to replace manual operations, to improve and facilitate decision-making, to improve the quality of the products and services, to overcome competition, to improve communication between the organisation and its clients/suppliers. Organisations which did not implement IT systems stated the main reasons to include high costs, current way of doing business is sufficient, business is too small, lack of qualified IT staff. In addition, the study found significant relationship between IT implementation and senior manager age, his nationality, his education level and his IT knowledge.

In addition, the study suggested and tested implementation guidelines to help organisations succeed in their implementation efforts. These guidelines include 1) determining organisational needs, 2) assessing total costs, 3) involving systems users, 4) practicing IT planning, 5) providing IT training, 6) securing technical/vendor support, 7) securing top-management support, and 8) adapting IT systems to local culture.

خلاصة الدراسة

دراسة بحثية عن العوامل المؤثرة في عملية تطبيق أنظمة تقنية المعلومات في المنظمات الخاصة بالمملكة العربية السعودية

قام بها : صالح محمد التركي

المحاضر بقسم الحاسب الآلي و نظم المعلومات الإدارية بجامعة الملك فيصل بالأحساء - السعودية

تمت هذه الدراسة في المملكة العربية السعودية للتعرف على و اختبار العوامل الرئيسية التي تحفز المنظمات السعودية الخاصة إلى اقتناء أنظمة تقنية المعلومات. تم توزيع الاستبانات على ٥٠٠ منظمة في القطاع الخاص السعودي بالمنطقة الشرقية من المملكة. ١٧٠ منظمة خاصة أكملت و أرجعت الأستبانة مما جعل نسبة الرد في هذه الدراسة تصل إلى ٣٤%. بعد تحليل الردود تبين أن ٨٩% من المنظمات التي شاركت في الدراسة تستخدم أنظمة تقنية المعلومات بدرجات متفاوتة من النجاح حسب التصنيف المقترح في هذه الدراسة؛ هذا يترك ١١% من المنظمات غير ناجحة في تطبيق أنظمة تقنية المعلومات بمعنى إنها لم تستخدم أنظمة تقنية المعلومات بتاتاً لكن ٧٧% من هذه المنظمات أوضحت أنها سوف تقتني هذه الأنظمة في المستقبل القريب.

تم اختيار عينة الدراسة من قائمة المؤسسات و الشركات المنتسبين في غرفة تجارة و صناعة المنطقة الشرقية في الدرجات الممتازة، الأولى و الثانية. لتسهيل عملية التحليل و عرضها تم توزيع المنظمات التي شاركت في الدراسة إلى القطاعين الرئيسين في القطاع الخاص حسب اقتراح بعض الباحثين في مجال نظم المعلومات وهما: القطاع الصناعي و قطاع الخدمات. المنظمة نفسها كانت محور الدراسة و ليس المستخدم النهائي. أفراد الإدارة العليا (المدير العام، المالك، أو مدير خدمات تقنية المعلومات) في المنظمات المشاركة كانوا المصدر الرئيسي للمعلومات في هذه الدراسة.

أظهرت الدراسة أن العوامل الرئيسة التي تحفز المنظمات الخاصة بالمملكة لاقتناء أنظمة تقنية المعلومات تشمل:حوسبة الوظائف اليدوية التي تقوم بها المنظمة، الرغبة في زيادة الكفاءة و الإنتاجية، الرغبة في التغلب على المنافسين، و الرغبة في تحسين عملية الاتصال بين المنظمة و عملائها و مورديها. أظهرت الدراسة كذلك أن هناك عوامل تؤثر سلباً في نجاح عملية تطبيق أنظمة تقنية المعلومات في المنظمات الخاصة بالمملكة مثل عدم توفر أنظمة تقنية المعلومات باللغة العربية، عدم توفر بنية تحتية (عمالة ماهرة، برامج، أجهزة) للمنظمة و ضعف المعرفة بأنظمة تقنية المعلومات.

العوامل الأخرى التي أظهرتها الدراسة كعوامل مؤثرة سلباً تشمل عدم توفر مساندة فنية من موردي تقنية المعلومات، ارتفاع تكلفة أنظمة تقنية المعلومات، عدم توفر تدريب كافي للمستخدمين و عدم التخطيط لاستخدام تقنية المعلومات. كذلك و جدت الدراسة علاقة إيجابية كبيرة بين عمر المدير، جنسيته، مستواه التعليمي و معرفته بتقنية المعلومات و بين قرار المنظمة لاقتناء أنظمة تقنية المعلومات و نجاحها في استخدام هذه الأنظمة.

قام الباحث كذلك باقتراح مجموعة من الإرشادات التي يجب أن تأخذها إدارة المنظمات عند تطبيق أنظمة الحاسب الآلي في أعمالها. من هذه الإرشادات: ١-تحديد احتياجات المنظمة من تقنية المعلومات، ٢-ضمان مساندة الإدارة العليا، ٣- تحديد التكاليف الكلية للتطبيق، ٤- الحصول على المساندة الفنية، ٥- تقديم برامج تدريب، ٦- القيام بالتخطيط لعملية التطبيق، ٧- إشراك المستخدمين في تصميم و تطبيق الأنظمة، و أخيراً ٨- تكييف الأنظمة لاحتياجات البيئة التي تعمل فيها المنظمة مثل أن تكون الأنظمة باللغة العربية.

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DEDICATION

I dedicate this work to many people who cared and prayed to ALLAH to help me finish this work successfully. They provided me with positive and great emotional and material support and encouragement that I will not forget. I, particularly, dedicate the work to my beloved:

Wives:

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Fatima

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CHAPTER ONE
THE RESEARCH OVERVIEW

This chapter has several objectives. It starts by giving a brief introduction about IT systems and their importance to business organisations in general and to Saudi private organisations in particular. Then, it explains the research problem, objectives and methodology. Finally, it explains the research management plan and its organisation.

1.1 INTRODUCTION & BACKGROUND

In today's dynamic world economy, Information Technology (IT) systems have become necessary rather than complementary tools. Organisations all over the world are investing enormous resources in their implementation in order to build, or simply maintain, their market share and competitive position (Applegate, McFaralan, McKenney, 1996; Laudon and Laudon, 1997; Fitzgerald and Michell, 1997; Irani, Love, and Li, 1999). Information technology as Walton (1989) stated is becoming the single most powerful force shaping the structure and functions of modern business organisations.

However, not all organisations adopt IT systems. For example, among almost four million UK small and medium-sized companies, the Federation of Small Businesses (FSB) estimates that an astonishing 65 percent do not even own a PC (Personal Computer World, April, 1999). The picture in Saudi Arabia (SA) is even grimmer (AL-Assaf, 1997).

The distinction between organisations that adopt IT systems and those that do not has been attributed to several factors in Information Systems (IS) literature. It is argued that there is an identifiable cluster of factors and issues that promote or hinder organisations from implementing IT systems (Abdul-Gader and Alangari, 1995; AL-Assaf, 1997; Eder, 1998; Doherty and King, 1998; Khalifa, Irani and Baldwin, 1999).

Implementation of IT systems is often expensive and risky. Systems may fail entirely to provide the expected services, or they may commit an organisation to a particular long-term solution that turns out to be inappropriate and which can be expensive to change. It is therefore essential for the top-managers to understand the impact of IT on their organisations and the process of implementing it.

With reference to SA in particular, the importance of IT systems can further be seen within the context of the Kingdom's development plans which continuously and repeatedly emphasise and encourage public and private organisations to adopt modern technologies, managerial skills and business practices to reduce the country's dependence on expatriates and foreign technical assistance (Ministry of Planning, 1996, 1997).

The critical role of up-to-date and integrated business and industrial information and databases, which can only be created through IT systems, is confirmed in the Kingdom's latest development plans which envisage them as an important part of the next stage of development (Ministry OF Planning, 1997). The Government encourages private companies to establish their own integrated information systems which, at the same time, can be linked within a national industrial information network.

In the wider context of the Kingdom's overall economic development, IT systems can offer the private sector a fresh approach to the management of its productive capacities and an efficient means of ensuring that it achieves its business and organisational objectives. In this sense, there is much to investigate, discuss and recommend with regard to the implementation of IT systems in the Saudi private business environment.

Against this background, IT systems can be viewed as an important aspect of management know-how, and a potentially critical factor in the ability of Saudi private organisations in particular, to adapt to the increasingly changing business environment and to develop and grow using their own resources.

Given the importance of the topic, it is surprising that little research has been done in this area in SA. Little research has been carried out both to identify what factors entice Saudi private organisations to implement IT systems and to find out their experience with them. Literature directly relevant to the implementation appears to be non-existent in SA with the exception of a tiny number of studies conducted by some Saudi and foreign academics (for example see Abdul-Gader, 1991; Yavas, Luqmani, and Qurashi, 1992; Abdul-Gader and Alangari, 1995; AL-Assaf, 1997; Malek and Alshoaibi, 1998). As a result there is a pressing need for empirical research to investigate this area of research further and fill the existing gap.

The Saudi environment with its variables may have similar, but not exactly the same, influence on the implementation of IT systems to that in other countries. This similarity or difference will be described as this research progresses. Consequently, issues relating to IT systems implementation from a developing country perspective will be presented in the appropriate chapters.

For these reasons, attention to the implementation of IT systems in the Saudi private sector has become a necessity which can no longer be ignored. The need to address the issue of IT systems and their degree of adoption and assimilation in the Saudi business environment is all the more pressing. This is clearer when we consider that, while every encouragement is given to the promotion of private investment in the different areas of the private sector, there are virtually no official studies or guidelines that help private organisations to apply IT systems in a way that ensures their success.

The motive behind this study is the author's growing interest to find out the causes of the low diffusion, and in some cases failure, of IT systems in Saudi private organisations. This interest has grown over the past several years as the author has came cross several cases where different private organisations in various sectors have either under-utilised or failed to implement IT systems successfully. This assertion is supported by findings from the related literature such as Yavas and Yasin (1994), Abdul-Gader (1997) and Shash and Amir (1997).

The study also draws from the IS implementation literature (for example Kown and Zmud, 1987; Earl, 1989; Cooper and Zmud, 1990, Delone and Mclean, 1992; Zmud and Apple, 1992; Cragg and King, 1993; Doherty and King, 1994; Thong, Yap, and Raman, 1994; Abdul-Gader and Alangari, 1995; Whyte and Bytheway, 1995; Thong and Yap, 1995; Laudon and Laudon, 1997; Malek and AL-Shoaibi, 1998; Doherty, King and Marples, 1998).

Due to time and financial limitations, this research is based on a study which has focused on a large number (500) of private organisations in the Saudi non-oil private sector; the sample organisations for this study were drawn from the membership database of the Chamber of Commerce and Industry in the Eastern Province of SA. A brief description of the Eastern Province of SA is presented in chapter two. Also, a detailed explanation of this research's sampling technique is presented in Chapter seven.

1.2 DEFINITIONS

The purpose of this section is to clarify the meanings of the main terms associated with the implementation process of IT systems. This is necessary because the IT field involves many different disciplines, ideas and terms which can have different meanings to different researchers.

1.2.1 Information Technology

The term Information Technology (IT) lends itself to many definitions and different authors use different meanings for IT; this is because IT encompasses many systems and tools and can perform many organisational functions. Information technology involves automation, computing, telecommunication techniques and technologies such as databases, software, hardware and networks components through which a user could access the desired information, regardless of where this information is, how big it is, and in what format (Checkland and Hollwell, 1998).

The Department of Trade and Industry (DTI) defines IT as:

> ***"The acquisition, processing, storage and dissemination of vocal, pictorial, textual and numeric information by a micro-electronics based combination of computing and telecommunications ".***

However, the recent developments in the IT field have made possible the integration of different systems to develop a network of systems. These systems can be used as either Intranet systems on the organisation level or as part of bigger networked systems that connect the organisation to anywhere in the world. These developments add new dimensions to the definition of IT and make it more comprehensive.

From the definitions found in the IS literature, the term IT may be used as a broader concept that describes a collection of several information systems, users, and management practices used by the organisation. Hence, in this study, the author will use the broader definition of IT to refer to any computer-based information system of any size and type used by organisations in their business. This definition extends to computing and telecommunication hardware, software, and the necessary human resources that design, develop, adopt, implement and maintain these systems to collect, generate, process, store, disseminate, rearrange and exploit information for business and organisational usage.

Based on this definition, IT systems can be as small as a stand-alone computer system that simply runs a word processing, spreadsheet and/or accounting system; a networked system that allows a personal computer to access and run different applications hosted in a mainframe within the organisation building; or as big as a huge Intranet and/or Internet system that connects the organisation to globe-spanning computer networks and databases.

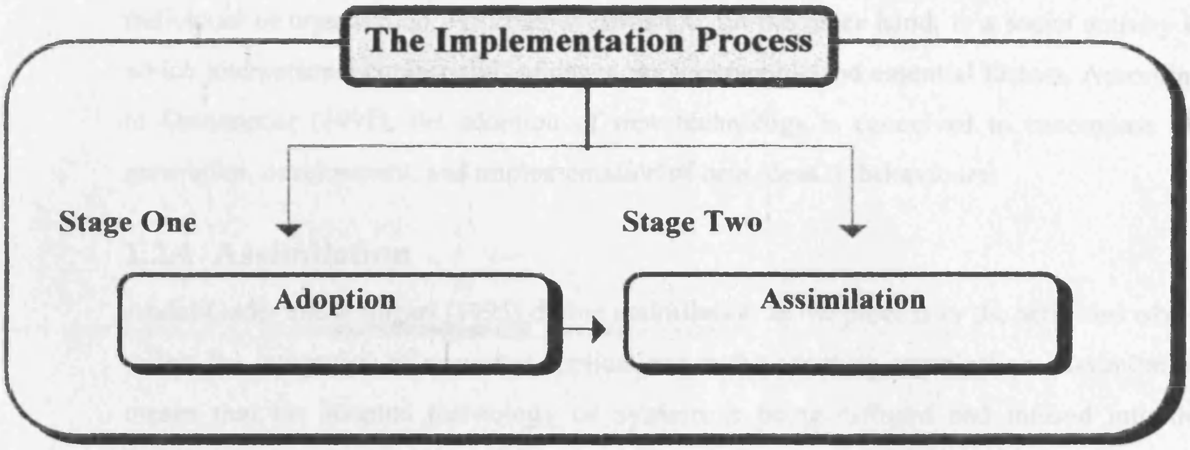
1.2.2 IT Implementation

Implementation has more than one connotation in the IS literature. Many authors refer to the final stage of the system development life cycle as the implementation stage. Kown and Zmud (1987) define implementation as the process of development, installation, and maintenance. According to Kown and Zmud the implementation of an IT systems go through six stages: initiation, adoption, adaptation, acceptance, use, and incorporation.

O'Brien (1993), asserts that implementation involves a range of acquisition, testing, documentation, installation and conversion activities. It also involves the training of end-users in the operation and use of the adopted systems. From the perspective of technological diffusion, Cooper and Zmud (1990) define IT implementation as an organisational effort directed toward the adoption and diffusion of a particular technology into a user community.

Many IS researchers claim that IT implementation may be broken into stages (see for example, Cooper and Zmud, 1990; Spence, 1994; Palvia and Chervany, 1995; Abdul-Gader and Alangari, 1995; Thong and Yap, 1995; Eder, 1998). Similarly, this research defines **implementation** as a process divided into two main stages: **Adoption** as stage one and **Assimilation** as stage two. This research covers not only why an organisation adopts IT systems but also what factors influence the implementation process as depicted in Figure 1.1.

Figure 1.1

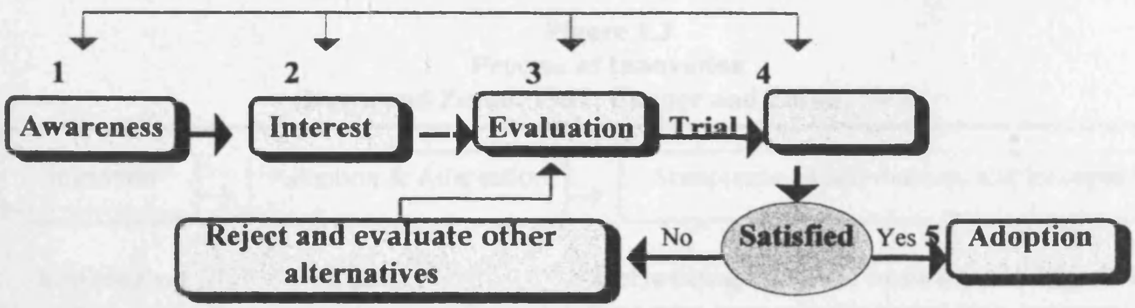


1.2.3 Adoption

Adoption refers to the organisational decision to purchase and make use of IT systems to support the organisation's functions, decision-making and management of the business (Thong and Yap, 1995) as opposed to other related alternatives. Adoption involves both the acquisition and the subsequent utilisation of the selected systems.

In order to facilitate its assimilation in the organisation, Spence (1994) pointed out the importance of assessing the selected technology before making the final decision to adopt it. The adoption process as suggested by Spence (1994) goes through five sequential steps or segments as illustrated in Figure 1.2.

Figure 1.2 The Adoption Process



The adoption process as suggested by Spence (1994) adopted and adapted by the present researcher

Spence (1994) differentiates between adoption and diffusion. He defines adoption of a new technology as the result of a personal mental process which is internal to the adopting individual or organisation. His idea of diffusion, on the other hand, is a social activity in which interpersonal contact and influence are inescapable and essential factors. According to Damanpour (1991), the adoption of new technology is conceived to encompass the generation, development, and implementation of new ideas or behaviours.

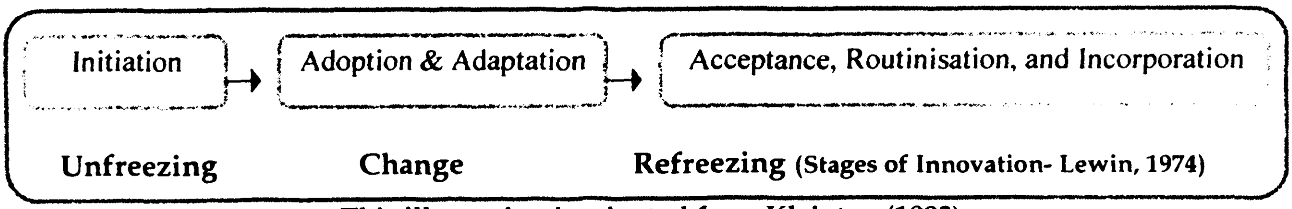
1.2.4 Assimilation

Abdul-Gader and Alangari (1995) define assimilation as the process or the activities which reflect the integration of computer applications in the adopting organisation. Assimilation means that the adopted technology or system is being diffused and infused into the organisation's departments and functions. IS literature suggest several measures of IT assimilation success which will be discussed in chapter two.

Some researchers (for example Rogers, 1983,1995; Cooper and Zmud, 1990, McFarlan and McKenney, 1982) use the terms diffusion and infusion to refer to assimilation. As specified by Cooper and Zmud (1990), assimilation involves accepting the adopted system by the users inside the organisation. In Cooper and Zmud work, acceptance is the first step in refreezing the organisation after a change caused by the adoption of a new technology. Acceptance is necessary before the adopted IT system can be assimilated in an organisation's routine and for its full pctential to be achieved (Kown and Zmud, 1987).

Acceptance follows adoption and adaptation of the organisation to the new technology and precedes the diffusion and infusion of the adopted system. In a later version of their implementation model, (Figure 1.3), Cooper and Zmud (1990) specify that acceptance is followed by routinisation (diffusion) and incorporation of the innovation into the adopting organisation (infusion).

Figure 1.3
Process of Innovation
(Kown and Zmud, 1987; Cooper and Zmud, 1990)



This illustration is adopted from Kleintop (1993)

There is not single measure for assimilation. An example of a practical model for IT systems assimilation was developed by McFarlan and McKenney (1982). The purpose of the model was to provide organisations with a framework to manage the assimilation of new technologies by understanding defined stages of implementation. They constructed a model that foresees technology assimilation as a four stages process summarised as:

(1) Technology Identification and Investment- where the emphasis is on learning the technology and implementing it in pilot studies;

(2) Experimentation, Learning, and Adoption- where organisational users' awareness of the technology rises and there is an increase in the requests to use the technology;

(3) Rationalisation and Management- where management and operational controls become necessary as the technology continues to become more widely used;

(4) Widespread Technology Transfer- the benefits of the technology have been disseminated throughout the organisation and the technology is used throughout the organisation.

Within the organisational context, research on IT systems assimilation has been also measured as the spread use of a new technology (Cooper and Zmud, 1990). Cooper and Zmud measured diffusion as the percentage of all possible users of the technology who were actually using it. While the percentage of users is a simpler measure of assimilation, it also provides adequate information about the spread of information technology systems within an organisation.

While McFarlan and McKenney's (1982) definition of assimilation reflects the 'levels' of diffusion, Cooper and Zmud's (1990) definition of assimilation represents the degree of usage spread throughout an organisation. To measure the assimilation or spread of use of IT systems among all departments, functions and staff of an organisation that has adopted these systems, using a percentage would appear to be the clearest measurement of diffusion for this study.

Assimilation occurs when the adopted technology is used in all levels of functions and operations and used by all different levels of management in the adopting organisation. A study by Zmud and Apple (1992) measured the infusion of electronic scanners in supermarkets chains. The major finding from this study was the determination that infusion was indeed a measurable construct and that it could be categorised into levels of use, or levels of infusion.

The idea of assimilation has been examined in the IS literature from two directions. First, it is seen as the result of adoption in which a new technology is introduced and used within an organisation. This approach largely sees the organisation as the unit of analysis, rather than the individual user. The second approach looks at assimilation as a broadly based concept characterised by outcomes of IT used by individual users.

Since the focus in this research is the organisational implementation of IT systems, the first approach which uses organisation as the unit of analysis is the one adopted in this study.

1.3 THE RESEARCH PROBLEM

Information technology is used as a tool in many management and administrative functions in. In using this technology, however, both public and private organisations are beset with problems and constraints which require urgent solutions if IT is to be effective. Most of these problems and constraints result from human, socio-cultural, organisational, and technical factors (Doherty and King, 1994; AL-Sudairy, 1994; Abdul-Gader and Alangari, 1995; McBride, 1996; Remenyi, 1996; Malek and Alshoaibi, 1998).

The Saudi Sixth National Development Plan, (1995-2000), has highlighted a number of key issues that need to be addressed to improve the Kingdom's status in the field of science and technology. These include: the technology gap, manpower shortages in science and technology, and the inadequate utilisation of IT systems in both public and private organisations in SA (Ministry of Planning, 1996, 1997).

The technology gap refers to the level of technology used in the Kingdom and that which SA can adopt, adapt and produce. The Sixth National Development Plan (1996, P293) stated that:

> *Many sectors of the economy have introduced and applied the most advanced technologies quite successfully. However, the capability to develop such technologies falls far behind both that of the industrial countries and of the rapidly advancing countries of South East Asia. Although it will not be possible to close this gap within a short period, further efforts must be made to reduce it as much as possible.*

The IS literature suggests that there is a variety of factors which affects the success or failure of IT systems. These include organisational , technical, and human factors, and attitudes and style of management (Whyte and Bytheway, 1995; Malek and AL-Shoaibi, 1998).

In SA, IT system implementation problems are more apparent due to many factors some of which were investigated by IS researchers such as Sindi (1991), Al-Tayyeb and Wrenn (1992), Yavas, Lugmani, and Qurashi (1992), AL-Sudairi (1994), Abdul-Gader and Alangari (1995), AL-Assaf (1997), and AL-Turki and Tang (1998). These researchers identified the following factors as obstacles to IT implementation in SA:

(1) lack of Saudi manpower with technical knowledge and experience to use and maintain IT systems;

(2) lack of current and updated policies;

(3) lack of organisational and national IT infrastructure;

(4) lack of hardware and software that support Arabic language;

(5) different intellectual property laws, customs and traditions among supplying nations;

(6) the communications between two different societies, Western and Arab, in terms of culture and religion;

(7) Heavy dependence on imported systems and expertise;

(8) Lack of modern management skills and business practices;

(9) Lack of business and IT planning;

(10) Lack of quality training programmes;

(11) The absence of an implementation guiding mechanism;

(12) Lack of IT national plan.

In addition, many Saudi organisations have pointed out that they have encountered difficulties during their implementation of IT systems. These difficulties have not been analysed to find out exactly what defects exist and how these defects hinder the implementation process. Also, relatively little attention has been paid to the assessment of factors that influence the implementation of IT systems in the Saudi private business context.

Because the use of IT systems is fairly new to many organisations in the Saudi private sector (Hamade, 1995), there is little, if any, empirical research to date that examines the the success of their deployment once they are adopted. Most of the available literature about Saudi organisations' experience with IT systems either focused on the government sector (Abdul-Salam, AL-Khateeb, and Mubark, 1987; AL-Malg, 1988; Abdul-Gader and Alangari, 1995), a specific sector of the Saudi private economy (Hamade, 1995; Shash and AL-Amir, 1997), or investigated specific organisation (AL-Tayyeb and AL-Ali, 1997).

The experience of Saudi private organisations with IT is particularly salient to the general issue of IT systems implementation because, despite the rapid expansion of computer usage in several sectors of the Saudi economy over the past two decades, such experience remains unshared among the other sectors and has been rarely documented in the literature.

Consequently, an opportunity exists to study the implementation process of IT systems in the Saudi private sector that has, until recently, seen very few computers in business activities. Such study may provide good insights into the implementation of IT within the Saudi private sector. This study is a pioneering attempt to measure the success level of IT and to empirically investigate the factors that influence its implementation in the Saudi private business context.

If Saudi private organisations, as a result of the above and other implementation issues, use different strategies, and/or have different incentives for acquiring IT systems, then these differences should be recognised. Not only they do raise separate issues, but they may, of themselves, account for given outcomes.

1.4 THE RESEARCH OBJECTIVES

Based on the notion that the experience of Saudi private organisations with IT systems may differ from those of other organisations around the world due to the unique political, cultural, economic, and managerial environment in which they conduct their business (see chapters two and three), it was decided to conduct this study in order to achieve the following objectives:

1- To identify and empirically investigate the main factors that entice Saudi private organisations to adopt IT systems.

2- To identify the characteristics that distinguish private organisations in SA that adopt IT systems and investigate how these characteristics facilitate or hinder the implementation process.

3- To identify the characteristics that distinguish top-managers of private organisations in SA and investigate how these characteristics facilitate or hinder the implementation process.

4- To document the general aspects of the Saudi IT environment such as the historical development of IT in SA, IT market size and its impact on the Saudi economy.

5- To suggest managerial guidelines to help organisations wishing to implement IT systems.

6- To make a contribution to the management and information systems literature on the experience of private organisations with IT in the developing countries.

To achieve the research objectives, two studies were carried out. They will be referred to in this research as the preliminary exploratory (qualitative) study and the primary questionnaire (quantitative) study. These two studies will be discussed in more details in chapter two and chapter seven. The results of the preliminary exploratory study document and discuss the initial findings about the Saudi business and IT environment. This discussion is found in chapters two and three.

For the purpose of assessing IT implementation success in this study, success will be based on whether the sample organisations are adopting IT systems or not and on top-management reported rate of IT systems assimilation into their organisations' departments and functions. This assessment will be done by interpreting the responses from the respondents and by dividing organisations into three groups based on their experience with IT:

1- **successful** (if the organisation is adopting IT systems and assimilating them into up to 50% of its departments and functions);

2- **more successful** (if the organisation is adopting IT systems and assimilating them into more than 50% of its departments and functions); or

3- **unsuccessful** representing those organisations which failed to adopt IT systems.

This method is valid and has been used by other researchers in the IS field; for example by Park, Jih, and Roy (1994) in their investigation of Management Information Systems (MIS) success in 300 companies in the USA. These authors based MIS success on the user's evaluation of the firm's MIS efforts, and on organisational and MIS characteristics; and how theses characteristics impacted MIS success. Park et al. used three different measures to categorise MIS success in their sample organisations. These measures included level of system use, level of user satisfaction and level of MIS contribution.

Many of the studies cited in Delone and Mclean (1992) used such measures to test IT systems success in organisations. Also, this method was used and validated in a recent study conducted by Eder (1998) who studied the level of IT systems implementation success in 1000 business organisations in the USA. Eder used the rate of diffusion and infusion of Intranet systems in her sample organisations.

1.5 THE RESEARCH QUESTIONS

Due to the limited available literature regarding the Saudi private organisations' experience with IT, and in order to achieve the research objectives declared earlier, it was necessary to investigate issues relating to the following questions:

1- What are the main factors that entice Saudi private organisations to adopt IT systems?

2- What are the distinguishing characteristics of Saudi private organisations that adopt IT systems?

3- What are the distinguishing characteristics of top-managers whose organisations adopt IT systems in Saudi private organisations?

4- What are the main factors that influence IT implementation in Saudi private organisations?

These questions are broad and their answers require fundamental investigation in a differing range of disciplines. The problem of IT implementation, however, is real and significant, both in practical terms and in terms of IS research. There is also a reasonable concern that limiting the research questions would limit the applicability of the outcome of the research.

1.6 THE RESEARCH METHODOLOGY

Research methodologies and data collection techniques identified in the IS literature were reviewed and appropriate ones were adopted for this research. During the preliminary phase of this study, data was collected from a wide variety of public and private organisations and IT academics and professionals in SA. Data collection techniques used in this research include sites visits, semi-structured face-to-face and telephone interviews and focus group meetings. Content analysis and statistical analysis were used as data analysis techniques (details are in chapters two, seven and eight).

For the main empirical research, a survey-based methodology was carried out with the administration of a questionnaire to business owners and senior executives in the sample organisations in the Saudi private sector. Before the final administration of the survey, the questionnaire was refined through:

⇒ extensive discussions with Dr. Nelson Tang- the research supervisor at the Management Centre of University of Leicester about the contents of the questionnaire;

⇒ several meetings with Mr. John Beckett- a statistician at the computer Centre at the University of Leicester to check the suitability of the questions to check the research hypotheses.

⇒ piloting and interviews with IT academics at the College of Management Sciences and Planning, with IT professionals at the Information Centre of King Faisal University and with private organisations including IT vendors in the Eastern province of SA. Besides, at the later stage of questionnaire development the focus group technique was used to increase the validity and reliability of the instrument.

The survey instrument captured information from both adopting and non-adopting organisations. The validity and reliability of the empirical data were enhanced through the use of a research design emphasising methodological research based on qualitative and quantitative methods. Two specific mini-cases were identified for analysis and discussion and are presented in chapter three. More detailed discussions of the various research methods employed in the IS research are presented in chapter six.

1.7 CONTRIBUTION

The results of this research will be of interest not only to researchers but also will have important practical implications. In terms of its contribution to IS research, the current work supplements previous studies by providing new insights on organisational implementation of IT systems in the Saudi environment. IT companies interested in gaining a larger share of the biggest IT market in the Middle East (the Saudi market) can use the research findings to understand this market and the factors that entice Saudi organisations to adopt IT systems. Consequently, they can direct their marketing and sales efforts to appeal to and to convince these organisations to buy their products. Also, based on the findings of this study, Saudi government agencies responsible for promoting IT, can design and direct their promotion programmes to help private organisations that need guidance and assistance when they decide to implement IT systems.

1.8 LIMITATION

This research focused on examining the experience of Saudi private organisations with IT systems and the degree of their success in implementing these systems. The sample organisations for this study consisted of 500 private organisations representing businesses from different sectors within the Saudi private sector. There are, however, other organisations in SA which were not surveyed because of access, cost and time limitations.

The information solicited from the owners and top managers of the sample organisations was limited to that collected via questionnaire distributed to the sample organisations in the Eastern province in SA. Information about non-respondents is unknown. To facilitate the analysis and presentation of data received from the respondents, the researcher, based on suggestions found in the management literature (Damanapour, 1991), categorised the respondent organisations into two main industries: manufacturing and services. (see chapter two).

In addition, this research examined IT implementation from general perspective and did not concentrate on the implementation of a specific system or application. Therefore, the researcher recommends future studies to examine specific IT applications (for example, Electronic Data Interchange- EDI or Electronic Commerce- EC) or to focus on specific sector of the Saudi economy (for example, the private health, education, or hotels and lodging) to identify and examine problems which may be associated with such systems or business.

1.9 GUIDE TO THE THESIS

This thesis consists of ten chapters. Chapter one presents a brief introduction about IT and its importance to business organisations and defines the subject of the study. It then presents the research problem, objectives, questions, methodology and the research management plan.

Chapter Two discusses and documents background information about SA and its IT environment. It presents the initial findings from the early literature review and the exploratory survey which was carried out in SA and sets the scene and the direction of the research project after the initial findings about IT research in SA.

Chapter Three discusses the activities carried out by the researcher in the first phase of this study. Chapter Three also gives detailed information about the Saudi private sector and discuss the role of the Saudi government in creating and supporting the private sector.

Chapters Two and Three were written as a result of the preliminary exploratory study, which was carried out at the beginning of the research period.

Chapter Four presents a review of the published literature relevant to IT implementation. It focuses on the implementation perspective. Several issues, related to the implementation of IT systems, are discussed using recent literature.

Chapter Five presents and discusses some previously developed IT implementation frameworks and models in order to develop a research framework for this study. Chapter six then discusses the adopted research model and its components (dependent and independent variables). Chapter Five concludes by outlining the research hypotheses.

Chapter Six discusses the different research methods in the IS field. It also describes the research design and methodology adopted in this thesis. Several methodological issues such as the data collection methods, the instrument design and the sampling technique adopted in this research are discussed.

Chapters Seven and Eight are devoted to data analysis, presentation and discussion. They present the main results and compare them with other findings from other studies. These two chapters then move on to answer the research questions through analysing the received data.

Chapter Nine presents and tests the proposed organisational/managerial guidelines which can be used by organisations when they wish to implement IT systems.

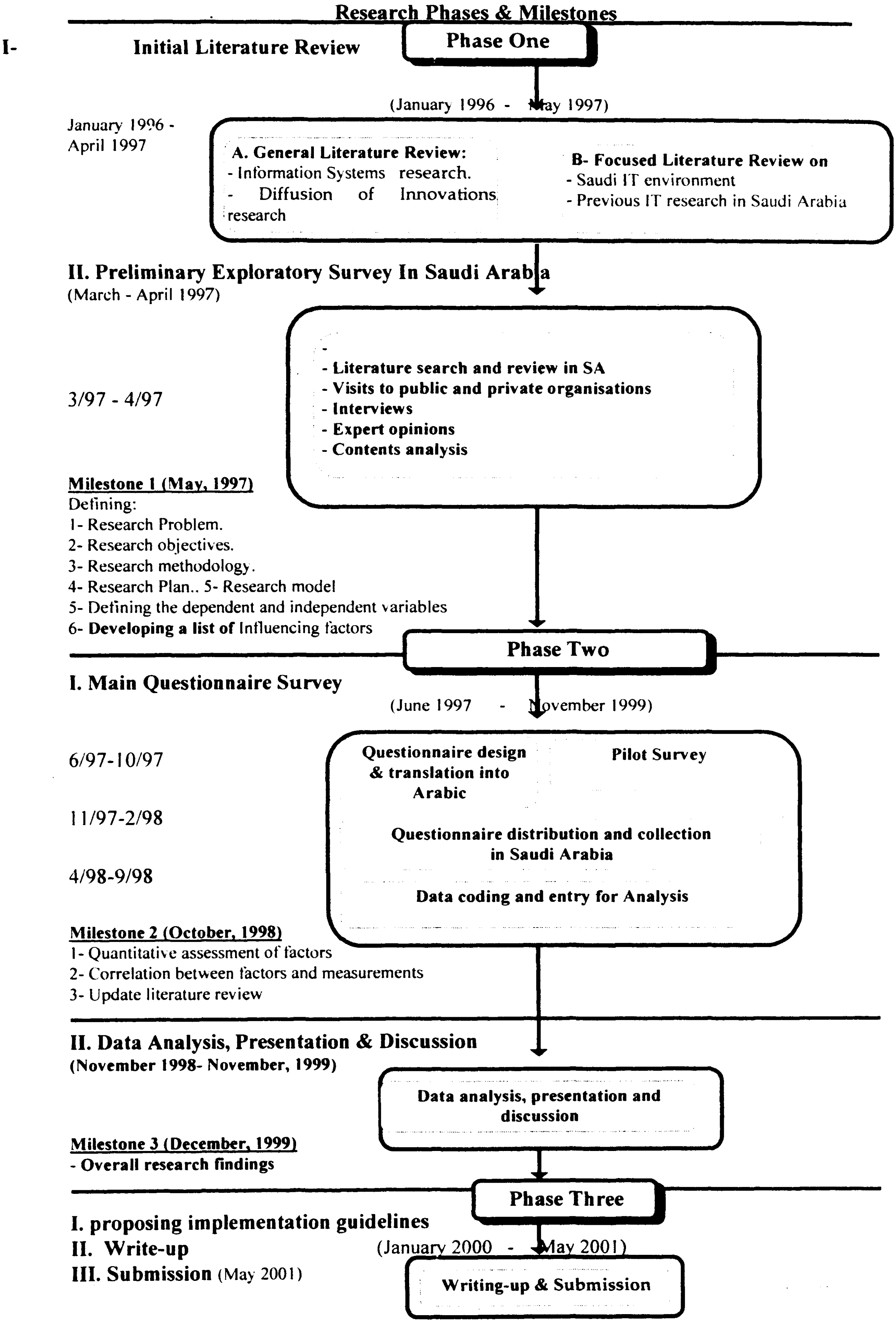
Chapter Ten concludes this thesis by given a short review of the work. It also highlights the research main implications, contribution, limitations, recommendations and suggestions for future work.

1.10 THE RESEARCH MANAGEMENT PLAN

The researcher has followed a systematic approach by dividing the research work into three main phases and 18 activities as shown in Table 1.2. The research management plan was developed to help the researcher and to facilitate the management of the research work.

Table 1.2 The Research Management Plan

	Phases	Activities	Outcome	Chapters
ONE	**1. Initial Literature Review & Research Project Definition**	1. Literature review - General - Focused	1- Understanding the importance of IT to Saudi Arabia. 2- Definition of the research problem. 3- Identifying the research objectives. 4- Identifying the research methodology 5- Developing the research management plan.	Activities in this stage influenced the contents of all chapters from Chapter two to chapter Five
	II- Qualitative Survey (Preliminary study)	2- Literature review 3- Conducting the exploratory study in Saudi Arabia -Interviews -Presentations -Expert opinions -Visits to organisations -Mini-case studies	1- Identifying and documenting the Saudi cultural, political, economic, and IT environment. 2- Identifying and categorising factors that influence the implementation process. 3- Identifying IT success measures. 4- Deciding on the research direction. 5- Updating the literature review. 6- Developing the research model and identifying the dependent and independent variables.	Working paper Conference paper 98 Chapter Two, Chapter Three Chapter Four, Chapter Five Chapter Six
TWO	**I. Quantitative survey (Main empirical study)**	5- Preparing for the major field study in SA. 6- Questionnaire development. 7-Translating the questionnaire into Arabic. 8- Conducting pilot studies. 9- Identifying the sample organisations. 10- Administering questionnaire.	1- Distribution of the questionnaire. 2- Receiving responses from the sample organisations	
	II. Data presentation, analysis, and discussion	11- Entering the data for analysis 12- Statistical analysis 13- Testing hypotheses 14- Interpretation of the results 15- Findings' presentation	1- Testing the implementation success factors. 2- Categorising the responding organisations according to their success levels. 3- Supporting or rejecting the research hypotheses.	Chapter Seven Chapter Eight
THREE	**I. Write up** **II. Submission**	16- Updating the literature 17- Developing the proposed organisational guidelines for IT implementation 18- Writing up the thesis	1- The proposed IT implementation guidelines 2- First draft of the thesis 3- The final draft of the thesis	Chapter Nine and Ten



Research Phases & Milestones
I- Initial Literature Review
Phase One
(January 1996 - May 1997)
January 1996 - April 1997
A. General Literature Review:
- Information Systems research.
- Diffusion of Innovations research
B- Focused Literature Review on
- Saudi IT environment
- Previous IT research in Saudi Arabia
II. Preliminary Exploratory Survey In Saudi Arabia
(March - April 1997)
3/97 - 4/97
- Literature search and review in SA
- Visits to public and private organisations
- Interviews
- Expert opinions
- Contents analysis
Milestone 1 (May, 1997)
Defining:
1- Research Problem.
2- Research objectives.
3- Research methodology.
4- Research Plan.. 5- Research model
5- Defining the dependent and independent variables
6- Developing a list of Influencing factors
Phase Two
I. Main Questionnaire Survey
(June 1997 - November 1999)
6/97-10/97
11/97-2/98
4/98-9/98
Questionnaire design & translation into Arabic
Pilot Survey
Questionnaire distribution and collection in Saudi Arabia
Data coding and entry for Analysis
Milestone 2 (October, 1998)
1- Quantitative assessment of factors
2- Correlation between factors and measurements
3- Update literature review
II. Data Analysis, Presentation & Discussion
(November 1998- November, 1999)
Data analysis, presentation and discussion
Milestone 3 (December, 1999)
- Overall research findings
Phase Three
I. proposing implementation guidelines
II. Write-up
III. Submission (May 2001)
(January 2000 - May 2001)
Writing-up & Submission

بسم الله الرحمن الرحيم

CHAPTER TWO
INITIAL LITERATURE REVIEW
&
THE SAUDI IT ENVIRONMENT

Initially this research was intended to investigate and make a comparative study on how IT is adopted and assimilated in a sample of organisations from both private and public sectors in Saudi Arabia (SA). Another objective was to identify and investigate the factors that influence the implementation process in both of these two organisation types. However, after carrying out the initial literature review and the preliminary exploratory study, it was decided that it would be more appropriate to focus only on the private organisations. This decision was made due to an abundance of studies investigating IT implementation in the Saudi public organisations and a paucity in Saudi private organisations.

Phase One of the Research

1. Initial Literature Review

A- General on:
- IS research, models, and frameworks
- Diffusion of innovations research
- Implementation of IT systems success & failure
- IT adoption in the developing countries.

B- Focused on:
- Saudi cultural, economic and managerial characteristics
- Saudi IT Environment
- Previous IT research in Saudi Arabia

2. Preliminary Exploratory Study

- Literature search in Saudi Arabia
- Visits to public and private organisations
- Interviews
- Expert opinions
- Content analysis
- Identifying possible case studies

2.1 THE INITIAL LITERATURE REVIEW
2.1.1 THE LITERATURE RELATING TO IT IMPLEMENTATION

Literature directly relevant to IT systems implementation and related topics in the developed countries was abundant but was limited with regard to SA. Many potentially relevant references were studied with only a few from adjacent fields proving to be of direct value for our intended study. It was therefore apparent that this research could be conducted on the basis of filling the gap.

In light of the adopted research framework, the literature review was continuously updated during the research period. The relevant literature covered the following issues:

1. Information systems implementation research;
2. Information systems research methodologies;
3. IT Systems implementation success and problems;
4. IT environment in SA.

The review of the IS literature indicated that the implementation of IT systems have received wide attention from researchers and academics. The work of many researchers such as Kown and Zmud (1987) Lyytinen (1987), Galliers (1987), Abdul-Gader (1990), Farrel (1990), Bhatngar (1990), Robey, Gupta, and Rodriguz-Diaz (1990), Nabali (1991), Goodman and Green (1992), Madon (1992), AL-Sudairi (1994),Yavas and Yasin (1994), Tye and Chau (1995), Abdul Gader and Alangari (1995). Thong and Yap (1995), Whyte and Bytheway (1995), Cox and Ghoneim (1996), Montazemi, Cameron, and Gupta, (1996), AL-Assaf (1997), Chau and Tam (1997), Shash and AL-Amir (1997) are among those who have been concerned with issues relating to the implementation of IT systems in the developed and developing countries were examined.

The majority of their work was either related to qualitative interpretative case studies, application specific, or related to end-user computing. The literature highlighted the factors and processes that must be adopted for successful implementation (Doherty and King, 1994,1998). Other studies identified and adopted different success measures to evaluate IT implementation success (Delon and Mclean, 1992).

After examining this literature, it was found that researchers identified many factors that might entice organisations to adopt IT systems. Table 2.1 lists the main factors identified. The initial literature review also revealed that little research has been conducted to examine the Saudi private organisations' experience with IT (Namla, 1982; Abdul-Gader, 1990, Yavas and Yasin, 1994). The early IT research in SA gives little guidance relevant to IT implementation in the Saudi context. This led to the researcher to consider the matter of IT implementation and the factors that facilitate or hinder its success in the Saudi private business environment. It is hoped that this study will close the gap by providing up-to-date information about IT in SA in general and about the experience of the Saudi private sector with IT on particular.

Table 2.1
The Main Factors that Entice Organisations To Adopt IT Systems

	Factors
1	To reduce costs of running business
2	To increase efficiency
3	To increase productivity
4	To improve communication
5	To improve inter-organisational relations
6	To improve information handling and retrieval
7	To facilitate decision making
8	To overcome competition
9	To gain customer loyalty
10	To increase client switching costs
11	To build barriers against entry by competitors
12	To pull down market entry barriers built by competitors
13	To produce and offer new services
14	To build global presence

The search for the literature included a library search covering IT implementation and related topics. Search was also carried out in Saudi libraries and information centres covering IT environment in Saudi Arabia (SA) and some of the issues surrounding or influencing IT implementation in Saudi private and public organisations. The result of this literature review concerning the Saudi environment is presented in the following sections.

A detailed report (about 45 pages long) was produced at the end of the first phase of the research documenting the IT environment in SA. This was later summarised and published as a research working paper by the Management Centre of Leicester University. The same paper was updated and presented in the First Saudi Conference on Administrative Sciences: New Horizons and Roles in Development which was held in March 16-18, 1998 at King Fahd University for Petroleum & Minerals, Dhahran, SA.

The main literature review of this thesis is presented in Chapter Four. However, the following comments can be made concerning previous work on IT implementation:

- The concept of stages is adopted in many other different fields of research beside IS such as economies (supply and demand), organisational buying behaviour and marketing. However, not all of these fields investigate the factors that influence IT implementation process or how to measure its success.

- Most of the previous IS research focused on some specific stages (adoption, diffusion, and/or utilisation) of the implementation process; and most did not consider post-implementation stages (Whyte and Bytheway, 1995).

The following sections will concentrate on discussing the different issues affecting IT implementation in the Saudi environment.

2.1.2 LITERATURE RELATING TO SAUDI ARABIA

During the past thirty years Saudi Arabia (SA) has witnessed a thrilling development in all aspects of its economic, industrial and social life. From the early years of its development plans, the Saudi government has spent billions of pounds to build and improve its national infrastructure in the fields of computing and telecommunication. The Saudi official policies and development plans were designed and implemented to facilitate and promote the adoption and application of knowledge, skills and information technology (Ministry Of Planning, 1996).

In addition, the Saudi government has encouraged public and private organisations to utilise Information Technology (IT) systems to facilitate and improve the efficiency and effectiveness of their functions. The government's encouragement was accompanied by huge investments to build national computer and information centres and to send abroad thousands of Saudi youths to study and obtain IT knowledge from the USA, the UK and other advanced countries. This encouragement was also evident in the government's own spending and credits to organisations using the latest industrial and IT products (Ministry Of Planning, 1997).

The Kingdom possesses the world's largest known resources of oil. Its growth rate and per capita income are among the highest in the world (Ministry of Planning, 1996). In the 1970s and 1980s, the Kingdom embarked on massive development plans. Over 600 billion dollars were spent on industrial and economic development during the last three decades. Traditionally, the economy has been dominated by the oil and public sectors; however, the Government has encouraged the growth and the role of the private sector in the economy. As a result, the number of private sector establishments more than doubled during the same period (Ministry of Planning, 1996).

Saudi Arabia possesses abundant capital resources but is short in skilled indigenous workforce. This has resulted in a heavy dependence on expatriate workers, to the extent that two-thirds of the labour force consists of foreign nationals. This has also led to a situation where capital intensive processes are encouraged. Advanced technology, particularly computers, is therefore adopted wherever possible.

Saudi Arabia, with its rapidly expanding economy and shortage of skilled human resources, as well as the increasing competition from international companies directed to Saudi organisations, offers excellent opportunities for expanding IT systems usage. The importance of IT for SA is undoubted because, besides its contribution to the efficiency and productivity of the national economy, its applications can be used to reduce the number of unskilled and semi-skilled expatriates.

The following sections will discuss and present the situation of IT environment in SA and some of the issues which affect this environment such as:

- the historical development of IT in SA,
- previous studies about IT in SA
- the Saudi government role and efforts to increase IT usage in SA,
- the barriers and problems facing Saudi organisations when they implement IT systems.

2.2 INFORMATION TECHNOLOGY ENVIRONMENT IN SAUDI ARABIA

The Organisation for Economic Co-operation and Development (OECD) estimates that the world will spend more than $600 billion on IT in 1998 (AL-Assaf, 1997). The benefits of adopting IT systems in the economy of any country are numerous. IT imports or exports in today's technological and information age can equalise or devastate the balance of payments of any country. IT systems can improve the efficiency, productivity and the economic well-being of the society (Mandurah and Mandurah, 1990).

Indeed, IT can positively or negatively contribute to the independence, influence, and balance of power among today's nations. Those countries that have more advanced and make more effective use of IT systems are the ones which will have the real independence, power and a positive balance of payments.

The Saudi IT market is considered to be the biggest in the Middle East. Its share was around 40% from the early 1980s up to the present. Hundreds of computer sites mainly in the Eastern province, Central province and Jeddah city are now scattered all over Saudi

Arabia; (Okaz, 22 April, 1998). The expected introduction of Internet services in SA, the expected price drops and new products are expected to boost the market still further.

According to a report issued in 1995 by the British Embassy in SA, in 1992 the market for computers and peripherals in SA was estimated to be worth around SR1.6 billion a year with software accounting for a further SR2.4 billion and computer services a further SR1.2 billion. The Saudi IT sector is experiencing a high rate of growth as more businesses and organisations introduce computerised systems and as those which already possess such systems upgrade their technology. There is also an expanding market for educational and training products in schools and colleges. The recent announcement of Prince Abdullah's (the Crown Prince) computerisation project directed towards public schools is expected to increase the PC market by at least 15-20%.

Mainframes have dominated the Saudi market during the 1970s and 1980s, but for the last seven years there has been an increase in the demand for micro, Personal Computers (PCs) and multimedia products. The International Data Committee (IDC) - Middle East which is based in Cairo-Egypt has estimated an annual increase of 16-25% in the PC demand in SA until the turn of the century (Byte-Middle East, 1995). Generally, the Saudi public sector has been mainframe oriented, while the private sector has been mini and microcomputer oriented. It is estimated that private organisations own only 20-30% of the total installed mainframe computers, but 60% of the total installed mini and microcomputers. The growth in the private sector has thus resulted in higher growth rate in mini and microcomputer sales. Annual computer imports rose from about $250 million in 1982 to more than $600

Almost all international computer brands are available in SA and host of less famous brands are also available. Okaz (22 April, 1998) describes the Saudi home computer market as fast growing and estimates that more than 200,000 machines are used domestically. This number represents about 25% of the personal computers in SA, most of which are bought for their low prices from local companies which assemble them locally.

All the major international computer companies have branches or agents in SA. The major competitors in the Saudi computer market are the Americans, Japanese, British, Taiwanese as well as the Koreans. Currently, the Taiwanese and the Korean brands have the major sales volume (about 60-75%). Their customers are the medium and small firms as well as the individuals who do not wish to pay the mark-up associated with buying a big brand name system (Byte-Middle East, 1995).

A report from the Dubai World Trade Centre estimated Middle East PC sales for 1996 to be 337,000 units, compared to 270,000 for 1995 an increase of 25%. The report also estimates that 20-25% of the personal computers sold in this region are bought by small organisations and home users (Computer News, Sept., 1997). The following are some statistics of 1996 and 2000 personal computer imports to SA compared to other Arab countries:

	1996	**2000**
Saudi Arabia	**104,000**	**340,000**
Egypt	100,000	287,000
United Arab Emirates	41,000	103,000
Kuwait	28,000	75,000
Lebanon	25,000	95,000
Bahrain	10,000	29,000
Oman	10,000	42,000
Qatar	7,000	29,000
Jordan	7,000	49,000
Yamen	5,000	n/a

From the literature review, the present author found that, per capita, the number of computers sold in SA exceeded that in most developing countries like Brazil, India, Indonesia and Mexico, and, in fact, exceeded that in some developed countries like Russia and China. Now, it is estimated that between 950,000 and 1,500,000 micro-computer units have been sold so far in the Saudi market with an annual growth rate of 15-25% (Byte Middle East, 1995, Computer News, 1997). The number of mainframe computers increased 30 fold to reach 1,500; and the Government's information centres operation and maintenance budgets run to SR500-700 million annually. Table 2.2 and Table 2.3 give the number of imported computer units and spending details on IT systems in SA from the 1980 to the 2000.

The Saudi IT market is directly influenced by PC prices in the large markets of the USA, Europe and Asia. As prices in these markets continue to decline, SA will also witness PC price reduction. The Saudi IT market like other IT markets in the Middle East, is looked at as an attractive dumping site for older processor technology.

The numbers in these tables are not precise indicators of the IT expenditure in SA. They reflect only the estimated values because it is not known exactly how much is spent on all of the IT related products, services, operation and maintenance.

Table 2.2 Personal Computer Imports to Saudi Arabia (1980-1999)

Year	No. of Units (estimated)
1980	15,508
1981	17,446
1982	19,626
1983	20,079
1984	20,839
1985	21,000
1986	21,437
1987	21,366
1988	22,550
1989	25,368
1990	15,147*
1991	19,691
1992	45,000
1993	50,625
1994	56,953
1995	104,072
1996	124,800
1997	138,280
1998	1817000
1999	236,000
2000	340,000
Totals	**1,531,487**

Source: Saudi General Statistics Agency 1989; Sindi 1991; NCC&E 1990, Byte-Middle East Aug. 1995, Computer New- Middle East Sept. 1997; ALAM ATTIJARAT Aug./Sept. 1997; Computer Reseller News Oct. 1997, Asharq AL-Awsat (16,9,1999). www..alriyadh-np.com/rnet//03-12-2000/market.html * Reflects the slow and unsTable economy during and after the Gulf war.

Table 2.3 Estimated Expenditure on IT in Saudi Arabia 1980-1998
(Millions Saudi Riyals)*

Year	Hardware	Software	Services	Staff	Totals
1980	372	149	93	558	**1,172**
1981	590	236	148	885	**1,859**
1982	1,210	484	302	1,210	**3,206**
1983	1,612	645	403	1,712	**4,372**
1984	1,333	533	333	1,066	**3,265**
1985	1,025	410	256	717	**2,408**
1986	1,179	472	295	825	**2,771**
1987	1,356	543	339	949	**3,187**
1988	1,559	625	390	1,091	**3,665**
1989	1,793	719	449	1,255	**4,216**
1990	2,062	827	516	1,443	**4,848**
1991**	1,237	496	310	866	**2,909**
1992	1,855	744	496	1,386	**4,481**
1993	2,782	1,190	790	2,218	**6,980**
1994	3,338	1,666	1,106	3,105	**9,215**
1995	4,006	1,999	1,327	3726	**11,058**
1996	4,607	2,299	1,526	4,285	**12,717**
1997	5,067	2,528	1,678	4,137	**13,419**
1998	5,574	2,781	1,846	4,550	**14,751**
Totals	***42,566***	***19,346***	***12,603***	***35,984***	***110,499***

Source: Governmental Ministries & Agencies' special studies record - The 12th National Computer Conference & Exhibition 1990-Riyadh, Saudi Arabia p,161,.
* Include an updated information based on data obtained from different publications and reports related to IT infrastructure (computing and telecommunication facilities) in Saudi Arabia.
** This reflects a sharp decrease in imports and expenditure due to the Gulf War in 1990 which affected the Saudi budget in the early 1990s.

2.2.1 The Historical Development of IT in Saudi Arabia

Saudi Arabia was an early user of computing in the Middle East, with a few mainframes in the late 1960s and early 1970s (NCC&E, 1990). One was installed in 1969 for the College of Petroleum and Minerals (now called King Fahd University for Petroleum & Minerals or KFUPM). Another was established for the Ministry of Finance & National Economy (MFNE) in 1972 and a third for the Ministry of Interior in 1977. Indeed the 1980s was a period when tens of mainframes and computer centres were set up all over SA.

Batma (1982), Abdul-Salam, AL-Khateeb, and Mubark (1987) and Sindi (1991) investigated IT utilisation in the government sector and pointed out that in 1972 the Ministry of Finance & National Economy (MFNE) was the first government agency to install an IBM mainframe computer.

These studies indicated that, in the early 1980s, computers in SA were mostly used for structured and routine administrative functions such as data processing, accounting & finance records, personnel, inventory and warehouse control and reports generation (Batma, 1982).

Most of the early computerisation efforts in Saudi Arabia were led by the public sector which represented, and still represents, about 50-60 percent of the market for IT products and services (Ghani and AL-Sakran, 1988; Abdul-Gader and Alangari, 1995). By 1982, there were about 40 governmental computer centres, 20% of which did not have their own computers. They were outsourcing their data processing functions. A list of some early mainframes installed in Saudi Arabia can be referred to in Table 2.4.

Nevertheless, Saudi Arabia's first introduction to IT can be traced back to the mid 1940s. The Arabian American Oil Company (now called Saudi Aramco), a private company in its early years, was the first organisation in the Kingdom to utilise computers for its oil exploration and information handling services (Yavas, Lugmani, and Qurashi, 1992).

The adoption of computers in the public sector has been paralleled by the surge in the purchases of computers and other IT systems by private organisations. It is estimated that the private sector owns about 20-30% of mainframes and about 50% of the mini and personal computers in SA (Ghani and AL-Sakran, 1988).

Table 2.4
Some Early Mainframe Computers Installed In Saudi Arabia

Location	Year	Type
Arab American Oil Company (ARAMCO)	1946 1957 1989	IBM Sorter Machine IBM 370/155 Cray-2
Ministry of Finance & National Economy (MFNE)	1962 1972/1974 1993	IBM Sorter Machine IBM 370/135 IBM and Amdahl machines
King Fahd University for Petroleum and Minerals (KFUPM)	1969 1995	IBM 370 IBM 3090 and Amdahl 5850
King Abdul-Aziz City for Science and Technology (KACST)	1978 by 1995	IBM 4361 Spark Centre 2000+ HP 9000/130+ Sun machines
Saudi Arabian Airlines (SAUDIA)	1967 by 1993	United Records Machines IBM 9021-640 HDS-EX90
Ministry of Defence	1968	IBM 370/138
Ministry of Education	1972	IBM 370
Ministry of Interior	1977 1996	Univac IBM 3090
Ministry of Municipal and Rural Affairs	1982 1993	Comparex 8/83 + IBM4361 Micro vax II + IBM 9221/200
Ministry of Post, Telegraph, and Telephone	1978	IBM 2250/2280
Ministry of Industry and Electricity	1980 1991	Data General machines Unisys 5095
Saudi Arabian Monetary Agency (SAMA)	1977	DIGITAL PDP-11
Saudi Basic Industries Company (SABIC)	1978	ICL machines
Royal Commission for Jubail and Yanbu	1978 1981 By 1995	ICL 2903/35 machines WANG & PRIME UNIX BASED RISK MACHINES
Institute of Public Administration	1980	IBM 4341
King Abdul-Aziz University	1976 by 1993	PDP-11/70 IBM 3031-> 3083 -> 4381
King Saud University	1978 1993	IBM IBM 3083-JX, Amdahl 5880
Saudi American Bank (SAMBA)	1980	Concurrent 3280
Public Administration Institute	1979 1988	Texas Instruments TX990 IBM 3033 > Amdahl 15-5890
King Faisal University	1984 by 1997	IBM 4341 HP9000/200K + SUN machines

Sources: AL-Saloom, 1981;Basheer, Khalifa, and AL-Askar, 1981; Batma, 1982; NCC&E, 1990; Yavas et al. 1992; Al-Iktissad Wal-Aamal, 1993; KFUPM's ITC 1996; and telephone interviews.

2.2.2 Earlier Studies on IT in Saudi Arabia

There have been a limited research about IT in the Saudi private sector; most of IT literature in SA was investigating public organisations' experience with IT. Also, little research was done to investigate IT barriers and problems in SA. However, Saudi researchers conducted various studies attempting to describe the computerisation environment in SA. Some of these studies documented IT in the service and manufacturing (Ghani and AL-Sakran, 1988), (Yavas and Yasin, 1994); Saudi managers utilisation of computers (Sindi, 1991); information systems strategies in Gulf companies (Abdul-Gader, 1992). There are other IT studies like: end-user computing success (Abdul-Gader, 1990); Knowledge workers' use of support software (Rahman & Abdul-Gader, 1993; and IT in contractor's firms (Shash and AL-Amir, 1997).

A survey conducted by Ghani and AL-Sakran (1988) investigated 208 private companies in the Eastern Province of SA and found that 34% of them were not using IT systems, 14% were using mainframes, 36% were using personal computers (PC) and 16% were using both mainframes and PCs. The study also found that companies using microcomputers were smaller, younger, and more likely to be in the trade/service sector. The majority of companies in this user segment lacked a formal computer department. They generally did not employ computer professionals and depended on ready-made packages.

Abdul-Gader (1990) attempted to measure and validate some individual and organisational factors thought to affect the success of end-user computing in SA. He surveyed 158 end-users from forty-five organisations. The study indicated that end-user computing success is closely associated, among other factors, with organisation's size, training, source of computer application, computer literacy, top-management involvement, and availability of native language software.

Sindi (1991) conducted a study to investigate the factors influencing personal computer utilisation by Saudi managers for supporting decision-making. He found that Saudi engineers are influenced to a great extent to either utilise or not utilise computers by the actions of their associates. Also Sindi found that Saudi managers will use computers if they feel that these tools will not take excessive time from their managerial duties and the manager's own perception was to whether computers jeopardise security.

Rahman and Abdul-Gader (1993) investigated the use of applications software by knowledge workers. Their results indicate that user productivity is positively related to satisfaction and negatively to alienation. Knowledge workers in SA generally use low-end applications software. Expert systems and 4 GLs are rarely used in a micro-computer environment. Computer periodicals are an important information source for successful users. Rahaman and Abdul-Gader also found that younger knowledge workers are more productive than the older ones. The study also found that knowledge workers used software packages like word-processing and spreadsheet for routine work.

The results of a study of Saudi manufacturing and service organiations by Yavas and Yasin (1994) revealed that service organisations put more emphasis of their computerisation on replacing manual operations with computerised systems and to increase service quality. Manufacturing organisations were found to use computers to increase their efficiency in routine operations and to consolidate their operations and integrate their processes. In addition, Yavas and Yasin indicated that manufacturing organisations tend to develop their own applications while service organisations mostly buy ready-developed software packages. Moreover, both types of organisations plan to increase their IT facilities and resources.

Shash and AL-Amir (1997) investigated the use of IT systems by contractors in the construction industry. They found that computers are not widely used among contractors. However, all large contractors, 62% of medium-sized contractors and 41% of small contractors use computes mainly for administrative operations, such as accounting and database management.

These studies have identified and investigated many variables that influence the adoption and usage of IT systems. Among these variables include:

- Manager's age, national, education, experience and support and commitment.
- Organisation's size, business type (such as manufacturing, trade, service, construction)
- Organisational processes and procedures like planning, training.
- Availability of organisational IT resources and facilities like skilled workforce and facilities (such as IT department).
- Reasons for adopting IT systems (for example to replace manual operation, to increase productivity...etc.).

In addition, these studies pointed out the importance and influence of these variables on IT implementation in Saudi organisations. The variables found as important factors for IT implementation in the above studies will be discussed in the interviews and focus meetings which are planed to be conducted in a later stage of this study. If these variables are agreed upon as important by IT people who will participate in the interviews and meetings then these variables will be tested in the questionnaire survey which also will be conducted at the second phase of this study. Table 2.5 shows the variables discussed in the Saudi IT studies and their references.

Table 2.5 Variables influencing IT implementation in previous Saudi IT research

Variable	Reference
Organisation size	Ghani & AL-Sakran, 1988, Abdul-Gader, 1990, Sindi, 1991, Yavas & Yasin, 1994, Shash & AL-Amir, 1997
Organization business type	Ghani & AL-Sakran, 1988, Abdul-Gader, 1990, Yavas & Yasin, 1994, Shash & AL-Amir, 1997
Manager's age	Abdul-Gader, 1990
Manager's nationality	Dahlawi, 1989, Abdul-Gader, 1990, Sindi, 1991
Availability of IT resources (skilled workforce, IT department)	Namlah, 1982, Ghani & AL-Sakran, 1988, Abdul-Gader, 1990, Shash & AL-Amir, 1997
Development of IT systems (internal / external)	Ghani & AL-Sakran, 1988, Abdul-Gader, 1990, Shash & AL-Amir, 1997
IT training	Abdul-Gader, 1990, AL-Tayyeb and Wrenn; 1992; AL-Sudairy, 1994; Abdul-Gader and Alangari, 1995; AL-Assaf, 1997, Yavas & Yasin, 1994
IT planning	Abdul-Gader, 1990, AL-Sudairy, 1994, Shash & AL-Amir, 1997, Abdul-Gader & Alangari, 1995
Application development	Ghani & AL-Sakran, 1988, Abdul-Gader, 1990, Rahman & Abdul-Gader, 1993
IT knowledge / literacy	Abdul-Gader, 1990, Sindi, 1991, Rahman & Abdul-Gader, 1993
Top-management support & commitment	Abdul-Gader, 1990, Sindi, 1991; Yavas & Yasin, 1994, AL-Sudairy, 1994; Abdul-Gader and Alangari, 1995, AL-Assaf, 1997
Availability of IT systems in Arabic	Abdul-Gader, 1990, Sindi, 1991, AL-Tayyeb and Wrenn; 1992
Reasons to adopt IT systems	Ghani & AL-Sakran, 1988, Rahman & Abdul-Gader, 1993, Yavas & Yasin, 1994, Shash & AL-Amir, 1997

2.2.3 The Saudi Government Efforts And Policies

From the early years of its development plans, the Saudi government has encouraged its public and private organisations to utilise IT systems to facilitate and improve their efficiency. The Saudi official policies and development plans were designed and implemented to ease and promote the adoption and application of knowledge, skills and IT systems (Ministry of Planning, 1997).

According to the Saudi Sixth Development Plans' guidelines, Saudi Arabia's long term objectives in the field of science and technology are clear and precise:

⇒ to encourage the deployment of advance technologies in all economic sectors;

⇒ to expand the national scientific research and technology base and contribute towards the development of national, scientific and technological manpower;

⇒ to enhance the quality of locally produced goods and services;

⇒ to promote investment in the development and utilisation of technologies that increase the productivity of Saudi organisations in the private and public sectors.

Accordingly, many computing facilities, costing billions of Saudi Riyals, were established by the Saudi government. Examples for these establishments include King Abdul-Aziz City for Science and Technology (KACST) and other IT related public agencies. In the following sub-sections we will highlight some of the Saudi government efforts to create modern IT infrastructure in the Kingdom.

- King AbdulAziz City for Science and Technology (KACST)

KACST was established by a Royal Decree in 1977 to be the main Saudi national body for research, science, and technology. KACST's main responsibilities are to support, encourage, implement scientific research, and to co-ordinate the various activities of other Saudi scientific research centres; it is also responsible for defining priorities and IT national policies (Ministry of Planning, 1997).

One of KACST's main tasks, as part of the national development plans, is to propose a national policy for the development of science and technology in the Kingdom, and to prepare the strategy necessary for its implementation. In carrying out this task, KACST, in collaboration and co-ordination with the Ministry of Planning, began to prepare a comprehensive strategic national plan for science and technology including the establishment of IT infrastructure. KACST co-operates with many national, Arabic, Islamic and international scientific institutions to promote the adoption and diffusion of science and technology in SA.

Since its establishment, KACST has provided very important academic and research services to the academic community in SA; it has also hosted many conferences, seminars, and workshops to stimulate interest in IT systems adoption. In addition, KACST runs and maintains many Saudi national scientific and IT facilities that provide vital services to the local IT academics and research professionals. Currently KACST is preparing to connect to the Internet through a set-up of UNIX servers and will to act as the centre and the gateway for Internet connections to and from SA.

KACST academic and computer services are offered through the following divisions:

A- The Database Division: this division develops systems for collecting, sorting, processing, storing and publishing the scientific information relating to the Kingdom; this division support the national scientific research activities through the following databases:

* Arabic Databases
* Foreign Databases
* Saudi Bank for Terminology (BASM)
* Manpower Database
* Other databases

B- Information Services Division: This division attempts to obtain the scientific information by means of direct contact with the national and international databases; and offer them to researchers all over the Kingdom.

C- Computer Division: This division is the basis of all activities of the General Directorate of Information. It develops the automated programs for the operation and maintenance of the information systems within KACST, designs and implements the systems used by the KACST Directorates and institutes, and renders support services in the field of computing.

D- National Net: It connects KACST with governmental and non governmental institutions so as to make use of the databases available within KACST. It also connects to certain countries and international institutions via GULFNET which will be replaced with Internet connection (KACST, 1994; AL-Zooman, 1997).

In addition, KACST has developed KACSTNET as a national data communication network to provide scientific and technical information for researchers and the academic community in the Kingdom. KACSTNET is a dial-up service which connects many research institutions and libraries in SA with the KACST computer which is linked to the computers at the National Computer Centre (NCC) in Riyadh through a leased line.

KACST has developed its own communication and information systems through Sun Spark 2000 using the UNIX operating system. According to KACST officials, a PASSTHRU software allows users of the KACST computer to communicate with the NCC computers as if they were locally connected to that system (KACST, 1994). In addition, KACST has established Electronic and Computer Research Institute, which conducts and sponsors researches and studies relating to IT application and development. This institute includes the following units: Programming unit, Electronic equipment unit and Communication unit.

KACST is the host site for GULFNET and BITNET and the most recently adopted Internet services in SA. Internet services in SA will be discussed in a later section in this chapter. GULFNET is a store-and-forward network and not a distributed processing facility; it was used during the 1980s and 1990s by many universities in Saudi Arabia, Kuwait and other countries in the region to transfer files, text, data, and programs (KACST, 1994). GULFNET's main purpose was to provide an academic and research facilities as well as services to stimulate research co-operation between Saudi academics and their counterparts in the region and around the world (KACST, 1989).

- The National Computer Centre (NCC)

In 1974, the Saudi government established the National Computer Centre (NCC) as part of the Ministry of Finance and National Economy (MFNE) to perform the following functions:

- to run the ministry's cheques & payroll system (MFNE was among the first Saudi organisations to use such a facility in SA)
- to automate the national budget preparation.
- to support other governmental agencies connected to the system.
- to monitor and maintain the government expenditure, accounts and properties.
- to approve other governmental information centres.
- to train government employees from different agencies.

In 1976, the NCC installed very advanced new mainframes from IBM and Amdahl to serve the increasing demand from over 40 government and semi-government agencies connected to its system. In addition, in 1977, MFNE established the National Centre for Financial and Economic Information (NCFEI). The purpose of this centre was to take on the following functions:

- to supply MFNE with comprehensive, up-to-date accurate reports about local and international economic developments;
- to provide MFNE with continuos information about different local and international economic issues;
- to analyse Saudi Arabia's international economic role;
- to develop mathematical and statistical models for the national economy; and
- to monitor local and international financial and currency markets.

NCFEI has a very well developed and specialised computerised library and information system. This system covers a comprehensive range of economic and financial periodicals, computer printouts, books, reports and active files with more than 3.000 titles. It is connected to nine direct information retrieval systems and more than 500 databases. An automated indexing system is being used to categorise the ever-increasing number of research-oriented Arabic and English subjects (AL-Turki and Tang, 1998).

In addition, NCFEI has established an economic database to provide a mechanism for economic analysis. Specialists and interested researchers can use the abundant PCs and suitable software packages to load economic data for analysis and printouts. The centre also publishes printouts, video programs, slides and TV reports related to important economic events. NCFEI also participates in the production of printed and visual material for several governmental organisations.

To perform these functions the NCFEI is equipped with eight CRTs connected to powerful HP 1000 machines. The centre is connected via telephone lines to the Data Research Inc. (DRI) data banks in Massachusetts-USA (AL-Sudairy 1994). DRI is an international economic and statistical database provider for many international agencies. NCFEI employs a lot of Saudi and expatriate IT specialists. The current system was planned to be upgraded at the time of writing this material.

Today, we find that most Saudi public organisations have computerised many of their functions and are equipped with the latest hardware and software systems available for their type of business. This is why we see that about 70% of the mainframes and about 40-50% of the microcomputer installations are in the public organisations. Furthermore, many

IT scientific and professional societies were created in the 1980s in SA: the Saudi Computer Society (SCS), the American Computing Machinery (ACM) Chapter in Saudi Aramco, the Saudi Engineers Society as well as others. These societies have organised and hosted IT scientific and professional events since their creation. For example, the SCS organises the Saudi national computer conference every two years which is considered as one of the best computer and information systems conferences in the region.

2.2.4 Education and Training Facilities

From analysis of the available literature and from observation, it can be seen that the Saudi government has given more emphasis and efforts to developing physical IT infrastructure and human resources capable of working in the IT field without creating local IT industry. The Saudi government has established many universities, colleges and institutes to educate and prepare Saudi nationals to operate and maintain its national IT resources.

During the mid 1980s and early 1990s, some of these universities began graduate and postgraduate programs in the computer and information systems fields (Ministry Of Planning, 1997). Some of these programs were 'majors' within some other university programs like at the College of Science at King Abdul-Aziz University-Jeddah, and the College of Management Sciences & Planning at King Faisal University-Hufof. Other programs were completely new leading to undergraduate degrees in Computer Science or Computer Information Systems as the case of King Fahd University in Dhahran and King Saud University in Riyadh.

Increased funding has been also granted to these institutes to enable them to adopt and utilise the latest in IT systems. The Saudi government has also sent abroad hundreds of students, civilian and military employees to study IT (Ministry of Planning, 1997; Civilian Service Bureau, 1996). As a result, these technical colleges and universities have influenced the Saudi IT environment in three ways: education and preparation of Saudi youths in the IT field, Arabisation research, and technology transfer. Similar programmes are also offered by the newly established technical colleges, which are scattered all over the country. Most of these technical colleges run 2-years programs and give associate degrees. However, there are plans to turn them to 4-years programs. The total number of male and female graduates from Saudi universities with a major in computer related studies was about 2000 in 1994 (AL-Turki and Tang, 1998). This number is expected to jump to about

4000 by the year 2000. In addition, in an effort to promote and guide the computerisation process of the governmental ministries and agencies, the Saudi government has created committees in most of these public agencies to oversee the acquisition processes of hardware and software (AL-Assaf, 1997).

According to a special report issued in 1997 for the author by the Civil Service Bureau (CSB) in SA, it is estimated that about 2,703 IT civil professionals work in governmental agencies; and about twice as many work in the military and private sector. Jobs performed by these professionals cover many functions and positions such as: programming, systems analysis, IT managers, data entry and computer operations. These categories are shown in Table 2.6.

Table 2.6 IT Civilian Professionals Working For The Government In SA (1996)

Job Title	Saudis		Non-Saudis		Total	
	M	F	M	F	M	F
Section Supervisor	3	0	0	0	3	0
Chief Programmer	29	0	0	0	0	0
Chief Systems Analyst	6	0	0	0	6	0
Chief Systems Designer	50	0	0	0	50	0
Computer Programmer	378	20	28	0	406	20
Systems Analyst	281	3	4	0	285	3
Assistant Systems Analyst	10	0	0	0	10	0
Systems Analyst & Designer	7	0	1	0	8	0
Data Entry Dept. Manager	1	0	0	0	1	0
Computer Dept. Manager	19	0	0	0	19	0
Information Dept. Manager	3	0	0	0	3	0
Computer Section Manager	7	0	1	0	8	0
Computer Services General. Manager (G.M)	5	0	0	0	5	0
Information Services G.M	1	0	0	0	1	0
Assistant Programmer	198	3	12	1	210	4
Data Entry Specialist	1126	113	37	7	1163	120
Data Entry Supervisor	2	1	0	0	2	1
Computer Operator	296	10	35	4	231	14
Computer Operator Supervisor	1	0	0	0	1	0
Totals	2423	170	118	12	2541	182

Source: The Saudi Civil Service Bureau(CSB) - Riyadh, Saudi Arabia, 1996.

However, Saudi Arabia's reliance on foreign manpower, especially for IT related jobs, is likely to continue for the next few years. One reason for this is that the Saudi computer education system is not meeting the increased demand for computer professionals in the country (Abdul-Gader, 1997). This has been a persisting problem ever since the establishment of computer education programs in SA in the mid 1980s. Mandurah and AL-

Orani (1991) discussed this problem in their report to the Saudi-Japanese joint seminar and pointed that, in 1993. They pointed out that the total number of Saudi students studying computer-related subjects in SA was only 2538 students (1 for every 5,000 citizens). It was in some other countries much higher such as in Taiwan where they had about 57,942 IS students or about 14 for every 5000 citizens (Abdul-Gader, 1997).

2.2.5 IT Barriers and Problems In Saudi Arabia

Implementing IT systems is subject to failure because of several social, economic and technical factors. Abdul-Gader and Alangari (1995) point out that implementation problems are more evident in the context of developing countries because of their circumstances. Indeed, these problems are often more severe in the developing countries in terms of factors such as the lack of sufficient and suitable infrastructure, lack of financial resources, shortages of trained and experienced personnel and constraints imposed by the social and political forces (Namlah, 1982; Walsham et al., 1990, McBride, 1996).

Abdul-Gader and Alangari (1995) assert that some of the factors constraining implementation in these countries are funding, resistance to change, organisational policy, training, hardware and software availability and individual characteristics.

With reference to Saudi Arabia (SA), the introduction and development of information technology were accompanied by many challenges to Saudi individuals and organisations for a variety of reasons. In the early years of their introduction in SA, IT systems were very expensive to purchase and maintain and Arabised systems were rarely available, and skilful workers were scarce. In SA, IT systems are used mainly for management and administrative tasks. In using these systems, however, both Saudi public and private organisations are plagued with problems and constraints which require urgent solutions if IT is to be effective (AL-Assaf, 1997).

Saudi researchers attribute most of these problems to socio-cultural and technical factors such as the lack of IT skilled Saudi manpower, the lack of a national IT infrastructure, the lack of national IT policies and laws, insufficient government support, a lack of systems that support the Arabic language, customs and traditions of the supplying nations and the communications between two different societies, Western and Arab, in terms of culture and religion (AL-Tayyeb and Wrenn; 1992; AL-Sudairy, 1994; Abdul-Gader and Alangari, 1995; AL-Assaf, 1997).

AL-Sudairy (1994) conducted a research to find out the obstacles that hinder the development of the IT industry in SA and proposed a strategic plan that can be used to guide this development. In his study AL-Sudairy identified and classified the problems which he found hindering the development of IT in SA. Abdul-Gader and Alangari (1995) carried out a study to investigate the problems that have been identified in the literature as barriers to IT implementation. Their objective was to assess the relevance and applicability of these barriers in the Saudi public sector. They found that lack of IT planning and lack of skilled human resources were the main factors hindering the development of IT in SA.

Likewise, this exploratory study is conducted during the first phase of this research to document IT environment in SA and to investigate if there is any similarity findings to those above. It was found that the lack of Arabised systems is one major problem to implementation in early days of computerisation in SA especially in the private sector. Another problem found from the literature about IT in SA, which can also be described as unique to SA, is the challenge to strike balance between achieving the modernisation needed to support the national economic and industrial development and the desire to retain the country's distinctly Islamic culture and traditions.

Many religious people argue against adopting IT systems that will change the conservative and religious nature of the Saudi society. This is one of the main reasons behind the late official introduction of Internet service in SA. However, there are some problems that, as AL-Assaf describes, are unique to SA are: lack of Arabised systems, IT transfer limitations, lack of professional IT training centres, insufficient manpower development programmes and lack of IT research and development centres.

Many Saudi academics and researchers assert that most of the problems found in the Saudi environment can be overcome by developing good national IT plans and policies. Also, encouraging and supporting local IT industry, and, more importantly, improving the national IT infrastructure (human, technical, and hardware/software) (Mandurah and Bakri, 1990; Abdul-Gader and Alangari, 1995; AL-Sudairy, 1994; AL-Assaf, 1997). Indeed, the solutions to these problems, as AL-Assaf (1997) asserts, can be found by looking at the experience of other countries and by adapting IT systems to fit Saudi society and culture.

The review of the literature on IT in SA identified several factors that hinder IT implementation (Ghani and AL-Sakran, 1988; Mandurah and Bakri, 1990; Abdul-Gader, 1990; Yavas and Yasin, 1993; AL-Sudairy, 1994; Abdul-Gader and AL-angari, 1995) . These factors include:

- Lack of top-management support
- Lack of IT planning
- Lack of IT training
- Lack of technical support
- Lack of national policies
- Shortage of skilled IT workforce
- Lack of national IT infrastructure
- Insufficient user involvement
- Absence of formal system analysis and design procedures
- Lack of Arabic IT systems

These factors hindered IT implementation in Saudi organisations. The following sub-sections will discuss some of these barriers; for example lack of skilled workforce, lack of qualified IT vendors, lack of training programs and lack of IT infrastructure.

2.2.5.1 Lack of Skilled workforce

The availability of computer skills is basic requirement for successful implementation of IT systems (Rahman and Abdul-Gader, 1993). These skills can be improved by developing either local workforce or by importing qualified expatriates. Due to limited means of such development, Saudi organisations resort to contracting foreign workforce to overcome the shortage in this field. Empirical evidence has been provided on the critical role skilled manpower play in the success in the implementation of IT systems. Saudi researchers reported that among the reasons for IT failure in SA is the lack of skilled workforce (Ghani and AL-Sakran, 1988; Abdul-Gader and Alangari, 1995).

This is consistent with the recent findings of a study by (AL-Sudairi and Tang, 1998). They studied the experience of Saudi supermarkets with IT and found that most supermarkets have only one IT staff who has a good knowledge about computers and carries all IT responsibilities; the other staff in the IT department do not have enough knowledge to allow them to manage the huge volume of data in these supermarkets. They are neither IT educated nor they have any IT diploma which qualifies them to run the IT facilities. The management of these supermarkets employs low wage workforce. All these factors combine to hinder IT implementation in Saudi supermarkets. It was recommended that

Saudi organisations must employ staff with sufficient IT knowledge in order to have full advantage of the adopted systems. The management needs to understand the role that IT plays in today's business and it needs to build IT departments with qualified staff who can develop and run the organisation's IT systems.

In addition, SA still continues to lack a good local supply of computer specialists (Mandurah and Bakri, 1990). It still depends heavily on imported technology and foreign lavour to fulfil the needed technical infrastructure and to adjust for the lack of skilled IT staff. Saudi compute and IT education system is not coping with the increasing demand for computer professionals (Madurah and Bakri, 1990, Abdul-Gader, 1997).

2.2.5.2 Lack of qualified IT vendors

The shortage of skilled IT workforce and the novelty of IT in SA mean that organisations rarely posses the in-house expertise necessary to develop or modify computer systems. Hence, it is necessary for them to outsource their IT needs to IT vendors. These vendors often handle many activities together such as systems development, sales and maintenance. In addition, IT users are staffed mostly by non-professionals. This has an impact on IT vendors who will be dealing increasingly with customers who have little or no IT knowledge. These customers will be depending completely on the vendors to study the organisation's needs and requirements, to recommend the best solutions, to develop, set up and manage and maintain the needed systems.

Moreover, the hardware and software suppliers do not yet possess expertise in understanding, supporting and knowing the products they sell. This is in contrast with the expertise of the suppliers in the USA and Europe. In these countries IT suppliers undergo intensive training on how their products work and how to set up and run them before selling them. In SA, most many IT suppliers sell products that they don't understand and therefore their after-sale service is neglected. Many IT systems users have to use manuals or discover their systems by trial-and error. These factors build uncertainty and sometimes conflicts between the adopting organisations and the suppliers.

2.2.5.3 Lack of sufficient Training

Due to the inadequate training support from the vendor, managers and employees of Saudi organisations have had to spend hours learning and training themselves in the use of different software applications. The complexity of these applications means that some managers have to develop their own IT knowledge.. systems providers are themselves not well trained in the use of the systems, so they cannot support orrganisations that purchase from them. The management needs to understand and educate itself and its staff in the use of the adopted systems. With lack of in-house IT expertise, mistakes will happen, systems will fail and this will cause organisations to lose faith in the adopted systems and will question their investment in the technology.

Many managers in Saudi organisations in do not think training is important enough to affect their organisation's planning and success (Sindi, 1991, Abdul-Gader and AL-angari, 1995). Indeed, most IT failures in these organisations are due to inadequate taining programmes. IT researchers have noted that the use of IT is accompanied by a number of problems. They found significant relationship between IT failure and the availability of training programs. Key amongst these problems was the lack of training in computer use by both employees in the adopting organisations and by systems providers (Yavas and Yasin, 1994, Abdul-Gader and AL-angari, 1995).

2.2.5.4 Lack of IT infrastructure

Organisations need to send and receive information in order to conduct business in modern business environment. Organisations can adopt different and more advanced IT systems if modern and advanced telecommunication infrastructure is available in the country. Systems such as Internet and intranet systems can not be implemented if the national telecommunication is old, slow or doesn't support advanced systems.

The diffusion of IT systems requires the existence of an adequate telecommunication infrastructure. Most developing countries suffer from the lack of modern telecommunication infrastructure. Control remains in the hands of monopolies, poor on reliability and quality of service and inadequate in service delivery.

The telephone service in SA provides two information networks called ALWASEET and ALTAREEQ using X.25 and X.28 technology for information delivery. The existing telecommunication infrastructure in SA is unreliable and the quality of service is inadequate for business organisations. This cause delay in implementing many IT services in SA such as electronic data interchange (EDI) and Internet and intranet applications. This inadequacy in the Saudi telecommunication services forced many Saudi organisations and individuals to access Internet services through the neighboring countries (Bahrain, Kuwait and the United Arab Emirates).

The privatisation of the telecommunication services in SA is expected to enhance the capacity and capability of these services to enable Saudi organisations to adopt more advance IT systems. However, there are many Saudi organisations complain about the services provided by the newly established Saudi Telecommunication Company (STC). They complain about problems such as slow transfer of information, line interruption and busy lines. This has hindered the diffusion of IT systems in SA.

2.2.6 IT Planning in Saudi Arabia

Planning is defined by Alangari (1992) as the process of determining in advance the optimum direction of organisational efforts by establishing strategic or operational goals, budgeting for achievement and analysing the actions taken. Planning for IT, however, is more complex than traditional planning for four reasons: (1) the fast rate of growth and advancement in the IT field; (2) the scarcity of qualified human resources; (3) the mixed experience with IT among organisations; and (4) the high investments required in IT projects.

Many studies indicate that planning is one of the most important factors for successful IT implemenation (Galliers, 1987; Delone, 1988; Barki and Hartwick, 1994; AL-Sudairi, 1994; Abdul-Gader, 1997). A study conducted in SA about IT systems assimilation in the public sector indicates that IT implementation is endangered in Saudi organisations which lack or have weak IT planning (Abdul-Gader and Alangari, 1995).

Even though it is the official body for the planning of the national development, the Ministry of Planning (MOP) in SA does not look at IT development in the Kingdom as one of its direct responsibilities. When preparing and applying the national development plans, the MOP does not have clear IT procedures or operational structures. AL-Sudairi (1994) comments on the Saudi government's role in the development of IT in SA and describe it as "unclear and indirect".

For its planning and decision making duties, MOP has used a gradual step-by-step approach to identify the data and information needed for the national development. MOP has studied the possibility of using IT to capture and process such data for the benefit of the Saudi society. It was encouraged by a number of developments in the country such as:

- The widespread use of computers in many sectors of the Saudi society;
- The changing role of the government in the development process;

- The recommendation by many studies to have proper and expanded use of IT in both the Saudi public and private sectors.

In an effort to understand the IT phenomenon in the early 1980s, the Saudi Consulting House (SCH, 1985) and MOP supported studies on IT usage in the Kingdom. The purpose was to improve their planning capability and make recommendations to public and private organisations in the field of IT adoption and implementation. The results of these studies helped these two organisations in identifying three main goals for the Saudi government to achieve in its development plans in general and in the IT field in particular; these goals were:

⇒ The government must encourage efforts designed to improve IT and its utilisation in the Saudi society;

⇒ The government must find a form of monitoring, direction and control in planning and developing the government information centres and their services;

⇒ There must be more efforts towards IT self-sufficiency and usage and increased reliance on the Saudi managers and technicians (SCH, 1985; AL-Sudairi, 1994).

The main recommendations given by these studies were that SA must concentrate on exploiting the opportunities provided by the latest of IT systems and should avoid buying old systems. These studies also explained that if the government wished to be able to monitor and control the use of IT in SA, it must develop the necessary standards, specifications, laws and policies. In addition, these studies emphasised the importance of preparing and training Saudi nationals to operate and maintain national IT centres and advised that these centres should not be run by foreign workers due to the sensitivity of information held by these centres (SCH, 1985; AL-Sudairi, 1994).

These studies indicated that the Saudi government, with proper planning and more investment in IT, can make the Kingdom and its organisations more independent. Through proper IT planning and successful implementation, SA can solve many of its human resources problems that have appeared during the implementation of the development plans.

Many Saudi researchers emphasise that planning for the development and spreading the use of modern technologies at the national level requires special attention from both Saudi public and private organisatons; and that assimilation of IT systems is a process that must not be left to chance. Saudi researchers proposed several plans and strategies for IT development in SA and appealed to the government to adopt and implement such strategies (Mandurah and Bakri, 1990; Khayat, 1990; AL-Sudairi, 1994; Abdul-Gader and Alangari, 1995). These academics and researchers suggest that IT development must be part of national development planning.

2.3 SUMMARY

The purpose of this chapter was to familiarise the reader with the Saudi IT environment.

Information presented in this chapter has revealed that Saudi Arabia's first introduction to IT can be traced back to the mid 1940s. This is when the Arabian American Oil Company (now called Saudi ARAMCO), a private company in its early years, was the first organisation in the Kingdom to use computers for its oil exploration and information handling services (Yavas, Ugur, Mushtaq Lugmani, and Zahir Qurashi, 1992). Moreover the information presented in this chapter has revealed that Saudi organisations are not homogeneous in their use of IT systems. Saudi Aramco and other public and some large private organisations may now be found to be using IT to the highest international standards.

Mainframes dominated the Saudi market for twenty years, but for the last seven years there has been an increase in the demand for microcomputers (PCs), network, telecommunication and multimedia products. Use of IT in the banking, oil, petrochemical and military sectors is considered to be among the most advanced in the world (Abdul-Gader, 1990). This is due to the huge budgets that these sectors have set aside and received from the government.

The abundance of financial resources available to public and large/medium private organisations has enabled them to purchase the latest and the most advanced IT systems. They have also been able to attract and contract the best personnel and consultants in the IT field from all-over the world as well as from Saudi nationals.

The findings of the initial literature review were not sufficient to decide on conducting the main study using mixture of public and private organizations. The literature found at this stage concerning Saudi experience with IT was limited to public sector organizations. Therefore, it was decided after discussion between the researcher and the research supervisor to follow the initial literature review with an exploratory study to find out more about the experience of both types before continuing with the main study.

The importance of the exploratory study stems from the fact that conducting such a study and its results will either support the researcher's desire to have a mixed sample of both public and private organizations or will help the researcher focus on either of them.

The next chapter will present a detailed discussion about the exploratory study which was conducted in SA in the first phase of this study after completing the initial literature review. The exploratory study involved interviews and focus group meetings with many IT academics and professionals in SA. Also mini-case studies will be presented to highlight some of the procedures followed by Saudi organisations when they decide to adopt IT systems; also, these mini-case studies will highlight some of the IT implementation problems encountered in these organisations.

بسم الله الرحمن الرحيم

CHAPTER THREE
THE EXPLORATORY QUALITATIVE STUDY

3.1 INTRODUCTION

Researchers use different methods to collect data for their research. Among the many methods available for researchers are interviews, focus groups meetings and/or case studies and each method has its advantages and disadvantages. These methods were used by the researcher in this study for their potential contribution as data collection techniques. This chapter discusses and presents the exploratory qualitative study, which was conducted in the first phase of this research.

The results of initial literature review and this exploratory study were used to guide the researcher in selecting the material for the main literature review, in developing the research hypotheses and in designing and developing the questionnaire. The questionnaire was used in the second phase of the research as the main data collection instrument. In addition, the results of both the exploratory study and initial review helped the researcher in deciding the direction of the research and highlighted the need to focus the research on studying the IT experiences of the Saudi private organisations. Therefore, the research here will concentrate on the private organisations instead of having a mixed sample from both private and public organisations as was initially intended.

The following sections present detailed explanation of how the exploratory study was conducted and what issues were discussed and the main results.

3.2 THE EXPLORATORY STUDY

3.2.1 The Purpose

The reason why this study is carried out is because the initial literature review reported in chapter two did not result in enough information about the experience of Saudi organisations with IT. Therefore, this exploratory survey was carried out to complement the information gathered from the initial review. It was done in SA between March 1st and April 30th 1997. In it the views of a wide sample of IT academics and professionals in SA were sought to:

1. Highlight the issues needed to be addressed in this research;

2. Find out the important variables in studying IT implementation;

3. Confirm the need for such a research in SA.

3.2.2 The Methods

The exploratory study involved the following:

- Visits to some 30 public and private organisations;
- Semi-structured face-to-face and telephone interviews with about 30 Saudi and foreign IT academics and professionals;
- Focus group meetings which were arranged by the administration office of AL-Ahssa and Dammam Industrial Cities;
- Mini-case studies.

The exploratory study attempt to investigate the issues which are thought affect IT environment in SA and their impact on IT implementation. The following sections will present and discuss the different methods used to collect the necessary information during the first phase of the research and the results obtained.

3.2.2.1 The Sites Visits

As mentioned above the researcher carried out many visits to Saudi private and public organisations in order to understand the status of IT implementation in their organisations. Site visits are a good way to obtain first hand and correct information about the research subject and gives the researcher the opportunity to meet the people involved in making the decisions about IT implementation in their organisation. The researcher also can meet systems users and obtain direct information about the problems they encounter when using IT systems. In our case, the site visits allowed the researcher obtain and look at documents and literature about the IT experiences and resources of the visited organistions. They also enabled the researcher to meet and build good personal relationships with many IT professionals within these organisations. This will, of course, be of benefit to future research work.

Most of the visits were arranged a few days before the actual visits dates. Others took the form of drop-in visits to ex-colleagues or friends within some organisations. In total about 30 organisations private and public establishments were visited, some of them were visited more than once. During these visits, the researcher conducted interviews with members of the top-management as will be discussed below. The contents of the literature provided by the management about IT implementation in their organisations and about the available IT facilities and resources were reviewed and analysed. These visits provided a good understanding and a clear picture about the IT environment in SA. They also reflected the visited organisations' experiences with IT. These organisations are listed in the appendix section at the end of this thesis. Some of the interviews which were conducted with IT professional in Saudi organizations took place during some of these visits.

3.2.2.2 The Interviews

As mentioned earlier personal interviews were used to collect primary data for this research. These interviews were conducted between March 1- April 30, 1997 both to collect data about IT environment in SA and to identify and assess the problems that face Saudi organisations when they decide to implement IT systems. Even with the difficulties of carrying out interviews in SA, the researcher decided to meet as many IT academics and professionals in SA as possible. In total the researcher managed to meet more than 30 IT officers most of those professionals are working for organisations located in the Eastern Province of SA. (Map of SA will be printed in the appendix section)

An interview is a face-to-face or telephone meeting between interviewee and interviewer where the latter asks questions of the former and records the responses. Interviews are often used in marketing and opinion polls to gather quantitative data (Easterby-Smith and Thorpe, and Lowe, 1996). Easterby-Smith et al. assert that to obtain the most out of interviews, they must be legitimised and arranged in advance. The interview may range from the most informal chat to highly structured sets of questions and answers.

Structured or semi-structured interviews allow detailed evidence to be elicited from individual informants who are encouraged to raise and suggest issues and problems which they themselves regard as important to the issue being researched (Remenyi and Williams, 1995). Among the advantages associated with this technique are a higher rate of response compared to the mailed questionnaire, flexibility and an applicability to people with different literacy levels.

Despite their advantage in allowing the researcher to collect detailed information and to create research contacts within organisations, interviews can be time consuming and costly. This is clear if the study sample is large or is intended to cover different regions in a large country such as SA. In this case the researcher may have to travel considerable distances to meet enough representatives for a study population or to obtain enough information about a particular topic.

Moreover, interviewing top-management executives is difficult to arrange for the time factor will always act as a restraint on busy executives. In addition, and more importantly, the interviewer must gain the interviewee's trust otherwise little information will be gained (Easterby et. al., 1996).

To determine the state of IT in SA, the researcher conducted semi-structured face-to-face and telephone interviews with 30 IT academics and professionals in SA (see the list in the appendix section at the end of this thesis). This technique was used at this stage because the idea was to let the interviewees feel at ease and talk freely about their organisations' experience with IT and to identify the facilitating and inhibiting factors that are thought to influence the implementation of IT systems in the Saudi context.

The interviews were deliberately semi-structured and wide ranging since the overall aim at this stage of the research was to get a broad understanding of the level of IT in SA in general and in the private sector in specific.

In the interviews the aim was to discuss with IT academics and professionals, who are actively involved in IT implementation in Saudi organisations, not only topics defined by the researcher, but also to allow discussion of any other topics which the participants felt were relevant. The interview format was devised to elicit views about IT in those organisations of which the participants had direct experience either through actual involvement, consultancy services or research.

The interviews were personal and confidential. They were mostly conducted in Arabic but English was used with some interviewees who do not speak Arabic. The researcher made an advance arrangement by telephoning to set up interview appointments with those who were willing to participate in the interviews. However, some of these interviews took the form of drop-in personal interviews at organisations with which the researcher had contacts. Other participants were interviewed during their attendance at various IT events (conferences, seminars and symposiums) which the researcher attended.

The interviewees were given an on the spot briefing about the interview agenda which included but was not restricted to:

1. Defining the research topic;
2. Identifying and discussing IT problems faced by Saudi organisation when they adopt IT;
3. Identifying factors that influence IT implementation in the Saudi environment;
4. Discussing the Saudi IT environment in general; and
5. Discussing issues on the subject raised by the participants themselves.

3.2.2.2.1 Interview Script Design

In order to be organized and elicit the needed data and information from the interviews, the research developed a list of questions that he, after consultation with the research advisor thought, necessary to obtain such information. The interview elements were printed on an A4 size paper and were split in two sections. The first section contained spaces to be filled about the demographic characteristics of the interviewees. The second section contained the interview main questions which were listed in one column of a table with a second column lift empty to be filled by the researcher with the answers and comments taken from the interviewees. The following page presents the interview questions format.

3.2.2.2.2 How the interviews were conducted?

Each interview lasted about 30-45 minutes. The interviewees expressed their views freely in response to the questions. The same questions were asked of each of the interviewees. The questions covered various issues related to IT implementation and IT facilities and resources. The researcher asked the interviewees to explain how each issue in the above questions was treated by the management. For example, after the interviewees answered the question related to top-management support, they were asked to elaborate and to point out whether this support was high, moderate or low and what form of support was provided. For example, some of the interviewees mentioned that their top-management regularly attended the meetings in which IT implementation was discussed and encouraged department heads to attend these meetings. Others mentioned that top-management took the initiatives to suggest new ideas or new applications.

Each issue was discussed thoroughly for several minutes before moving to the next question. The researcher was able to develop a greater understanding of the IT environment in SA from these interviews. Consequently, factors thought to influence IT implementation were identified (see chapter five). All interviews were conducted in Arabic and either recorded whenever possible or written Notes taken.

The interviewees were selected on the bases of their official appointment as IT officers in their respective organisations or based on their knowledge and involvement in installing, running and managing IT resources in their organizations. This technique ensured that all of the interviewees have the needed knowledge about their organizations experience with IT systems. Table 3.1 presents some specific information about these interviewees and Table 3.2 displays the responses of the interviews.

Background Information & Questions used for the interviews

Name:______________________________ (optional)

Name of organisation:____________________(optional)

Management Position:__________________ (Business owner, GM, IT director, other)

Nationality:______________________________ (Saudi, Non-Saudi)

Age:________ _________________________(30 years or less, 31-45, more than 45)

Education level:________(High-school or less, university level, Master or Ph.D, other)

Computer experience in years:___________

Business sector:________________________(Public or private:___________________)

Organisation size:______________________(small 1-100, medium 101-500, large over 500)

Ownership type:_______________________(Saudi 100%, joint-venture, foreign)

Types of computers used: (Mainframe, Minicomputers, Personal computers)________

	Question Statements	Possible Answers
Q1	Does your organisation use IT systems?	Yes/No
Q2	When did your organisation start using IT systems?	Date of adoption
Q3	Does your organisation have an implementation strategy/guidelines?	Yes/No/Don't know
Q4	Does your organisation have an IT department/unit?	Yes/No
Q5	Does your organisation develop its applications internally or externally?	Externally, internally
Q6	Who provides the technical support for the users in your organisation?	IT department, vendors, Not available
Q7	Does your organisation outsource its IT services?	Yes/No/Don't know
Q8	Does your organisation provide IT training?	Yes/No/Don't know
Q9	How much support does top-management give to IT implementation in your organisation?	high, moderate, low
Q10	Why did your organisation adopt IT systems?	To replace manual operations, to improve decisions, to improve quality,to overcome competition, to have better control.
Q11	What barriers or factors may cause resistance to use IT systems in your organisation?	Lack of Arabic systems, lack of IT skills, lack of technical support, lack of training, lack of management support
Q12	What types of problems, if there is any, does your organisation face when it decides to implement IT systems?	Human, technical, infrastructure, financial

Table 3.1 Some specific information about the interviewees

Interview NO	Job Title	Organisation Size	Organisation Sector
1	Owner	Small	Trade
2	IT director	Medium	Manufacturing
3	General manager	Medium	Services
4	General manager	Medium	Trade
5	IT manager	Large	Public
6	IT officer	Medium	Manufacturing
7	Owner	Small	Services
8	CIO	Large	Manufacturing
9	IT manager	Large	public
10	Owner	Medium	Agriculture
11	General manager	Medium	Trade
12	Owner	Small	Trade
13	General manager	Medium	Services
14	IT manager	Large	Manufacturing
15	IT manager	Medium	public
16	General manager	Medium	Trade
17	Owner	Small	Manufacturing
18	Owner	Medium	Services
19	IT manager	Large	Public
20	General manager	Medium	Trade
21	Programmer	Small	Manufacturing
22	IT manager	Large	Public
23	General manager	Small	Public
24	IT manager	Medium	Manufacturing
25	IT officer	Small	Public
26	IT manager	Large	Public
27	General manager	Large	Manufacturing
28	System analyst	Large	Public
29	IT manager	Small	Manufacturing
30	General manager	Large	Public

3.2.2.2.3 Data capture and analysis

For each interview, the researcher prepared an answer sheet on which interviewees ticked the appropriate answer. Then the interviewee was encouraged to elaborate further on his answers. In analysing the data collected from these focus groups the researcher took into consideration the recommendations presented by Morgan (1998) and Krueger (1994) such as:

1- the words used by the participants and their meaning;

2- the context in which the meeting is taking place;

3- the internal consistency and the change of opinions among the participants;

4- the extensiveness and frequency of certain words or ideas during the meeting;

5- the way participants give emphasis (intensity) to their ideas; this can be done by noticing the voice tone, talking speed and consistency in ideas;

6- the basis on which the participants base their comments and ideas. The moderator should give issues supported by real experiences more weight than mere personal comments.

Table 3.2 presents the short responses to the interviews. However, these short responses have led to rich discussions between the researcher and the interviewees. This kind of technique was used here to make the interviewees feel that the meeting would be short and undemanding. The data was analysed through listing and recording the main issues and points as they were mentioned or emphasized by the interviewees.

Table 3.3 shows the descriptive statistics for the interviewees. Frequencies and percentages are presented. As can be seen, twenty (67%) of the interviewees were between the age of thirty and forty years old. Only three (10%) were under thirty years old and seven (23%) were over forty-five years old. Twenty-five (83%) of the people interviewed during the exploratory study were Saudis and the rest (17%) were expatriates the majority of whom are from Arab countries.

Table 3.3 also shows that the interviewees have different levels of education and different management positions. The table shows that they have a good educational background. The interviewees, as shown in the table, worked for organisations from different business sectors and their organisations were of different sizes and different ownership type.

Table 3.2 The Responses from the Interviews

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Intrv1	Yes	1985	Yes	Yes	Intr	ITD	No	Yes	High	rpm	lckmgs	Humn
Intrv2	Yes	1990	Yes	No	Extr	Vndr	No	Yes	Mod	Impd	lckmgs	Techn
Intrv3	No	--	No	No	--	N/a	--	--	--	--	lckITsk	Financi
Intrv4	Yes	1995	No	No	Extr	Vndr	Yes	Yes	Mod	impc	lckmgs	Financi
Intrv5	Yes	1993	No	Yes	Intr	ITD	No	Yes	High	ovrco	lcktrn	Techn
Intrv6	No	--	No	No	--	N/a	--	--	--	--	--	Financi
Intrv7	Yes	1988	No	No	Extr	Vndr	Yes	No	Mod	rpm	lcktrn	Techn
Intrv8	Yes	1985	Yes	Yes	Intr	ITD	Yes	Yes	High	Impd	lckITsk	Humn
Intrv9	Yes	1988	No	No	Extr	Vndr	No	Yes	Mod	Impd	lckmgs	Techn
Intrv10	Yes	1987	No	No	Extr	Vndr	No	No	Low	impc	Dntk	Financi
Intrv11	Yes	1993	Yes	Yes	Intr	ITD	Yes	Yes	Mod	Impd	lckITsk	Techn
Intrv12	Yes	1990	Yes	Yes	Intr	Vndr	No	Yes	Mod	impc	lckmgs	Financi
Intrv13	Yes	1983	No	No	Extr	Vndr	Yes	Yes	Low	rpm	lckmgs	Financi
Intrv14	Yes	1986	Yes	Yes	Intr	ITD	No	Yes	Mod	impc	lckITsk	Techn
Intrv15	Yes	1985	No	No	Extr	Vndr	No	No	High	rpm	lcktrn	infrast
Intrv16	Yes	1984	No	No	Extr	Vndr	No	Yes	Mod	ovrco	lcktrn	Humn
Intrv17	Yes	1992	No	No	Extr	Vndr	No	Yes	High	impc	lckmgs	Financi
Intrv18	Yes	1997	No	No	Extr	N/a	Yes	Yes	Low	rpm	lcktrn	Financi
Intrv19	No	--	No	No	--	N/a	--	--	--	--	lckITsk	Financi
Intrv20	Yes	1991	Yes	Yes	Intr	ITD	No	Yes	High	ovrco	lckmgs	Financi
Intrv21	Yes	1985	No	Yes	Extr	Vndr	Yes	Yes	Mod	rpm	lcktech	Techn
Intrv22	Yes	1987	No	No	Extr	Vndr	No	No	Low	impc	lckarbs	Techn
Intrv23	Yes	1991	No	No	Extr	Vndr	Yes	Yes	Mod	rpm	lckmgs	Laktr
Intrv24	Yes	1990	No	No	Extr	Vndr	Yes	Yes	Low	Impd	lcktrn	Humn
Intrv25	Yes	1988	Yes	Yes	Intr	ITD	No	Yes	High	ovrco	lckmgs	Techn
Intrv26	Yes	1990	Yes	Yes	Intr	ITD	Yes	Yes	High	rpm	lcktrn	infrast
Intrv27	Yes	1986	No	Yes	Extr	Vndr	No	No	High	Impd	lckmgs	Humn
Intrv28	Yes	1988	Yes	Yes	Extr	Vndr	No	Yes	High	rpm	lcktech	Techn
Intrv29	Yes	1990	No	No	Extr	N/a	Yes	Yes	Low	ovrco	lckmgs	Financi
Intrv30	Yes	1995	Yes	No	Extr	N/a	No	Yes	Low	rpm	lckITsk	infrast

Extr=External, Intr=Internal; ITD=IT department, n/a=Not available, Vndr=Vendor; rpm=replace manual operations, ovrco=overcome competition, impc=improve communications, impd=improve decision making; lckarbs= lack of Arabic systems, lckITsk= lack of IT skills, lcktech = lack of technical support, lckmgs =lack of management support, lcktrn=lack of training; humn=human, finance=financial techn=technical, infrast=infrastructure.

Table 3.3 The Interviewees Descriptive Statistics

	Frequencies	**Percentage**
Age:		
Less than 30 years	3	10%
- Between 31-45	20	67%
More than 45	7	23%
Nationality:		
Saudi	25	83%
Non-Saudi	5	17%
Education Level:		
High-school or less	5	17%
Bachelor degree	20	66%
Master or higher degree	3	10%
Other	2	7%
Management Position:		
Business owner	6	20%
General manager	9	30%
IT service director/officer	13	43%
Other position	2	7%
Business Sector:		
Private	20	67%
Public	10	33%
Ownership Type:		
Saudi 100%	22	73%
Joint venture	8	27%
Foreign 100%	0	- - -
Organisation Size:		
-Small (1-100 employee)	8	27%
-Medium (101-500)	12	40%
-Large (over 500)	10	33%
IT Adoption		
Yes	27	90%
No	3	10%
Types of Computers used		
- Mainframe	4	13%
Minicomputers	6	20%
Personal Computers	27	90%

3.2.2.2.4 Findings from the interviews

It should be made clear that some of the topics discussed in the interviews were not included on the questionnaire but were raised by the participants themselves. Therefore, some of the findings of the interviews were the results of the open discussions of these topics. In the following paragraphs brief discussions are presented about some of the issues discussed with the interviewees.

A- Rate and dates of IT Adoption

Table 3.2 reveals that 27 (90%) of the interviewees indicated that their organisations are using IT systems in their functions compared to only 3 organisations which have failed to adopt IT. This shows that a high percentage of the organisations visited are using computers and data processing tools. As far as the number of years since an organisation adopted IT systems, we see from Table 3.2 that most organisations have adopted IT systems during the 1980s and early 1990s. This means that computers uses in many Saudi organisations for a quite some time. The more the organisation is using IT the more experience it gets and the more it can assimilate IT in its functions. From the table we also can see that IT departments or units are more common in organisations which have been using IT for longer periods of time; especially those which have used IT since the 1980s.

The high percentage of adoption may be attributable to the size of the organisation because all of the public organisations visited are ministries or large academic institutes and many of the private organisations visited are medium to large ones. It is also possible that the type of business influences whether the organisation adopts IT or not. These issues will be tested in the main research survey in which the researcher will use a questionnaire to reach a much larger sample size.

B- IT environment (types of computers used, availability of IT department)

In an attempt to find out an organisation's computing environment, the researcher sought information about the types of computing facilities in these organisations and whether they have an IT department or not.

The interview questions:

Q: What types of computers are used in your organisation:

Q: Does your organisation have an IT department/unit?

Responses showed that different types of computers are in use. All of the twenty-seven adopting organisations (90%) were using stand-alone PCs. Mainframe computers were used by only four organisations representing (13%) and minicomputers were used by six organisations representing 20% of the participating organisations. It should be noted that all of the organisations, which use mainframes and minis, are using PC too to connect their branches and/or departments. The researcher has noted that those organisations which use mainframes and minis have more IT skilled employees, an IT department and, consequently, more internal IT expertise. These organisations develop their own applications internally and depend more on their internal IT resources for technical support.

One IT manager explained why his organisation decided to use minicomputer systems by saying:
" the management decided to purchase five minicomputers and install one in each of the five different branches we have. This way we use them as servers and install a local area network to connect the different departments in each branch because we thought it is less costly and a less complicated process. This is done because all branch accounts are separate and there is no need to share information between branches ". (interview 14)

With regards to the existence of IT departments within the participating organisations it was found that few organisations have one. Only twelve organisations in Table 3.2 have IT departments; this represents only 44% of the adopting organisations or 40% of the total number of the organisations visited. This shows that most Saudi organisations lack internal IT expertise.

The absence of an IT department indicates that either IT systems are not used extensively in the adopting organisation or that the organisation itself is small to the point that it does not need one. It also shows that the organisation has only a small IT workforce and little internal IT expertise. This in turn may force the organisation to depend heavily on external IT expertise for developing, installing, running and maintaining its systems. This assertion is clearly supported by the information in Table 3.2 where we can see that those organisations, which have no IT department turn to external expertise for system development and technical support.

C- Availability of IT strategy or guidelines

Top-management commitment to IT implementation is considered one of the most important factors influencing the successful implementation. The researcher discussed this issue with the interviewees to check how they evaluated their management's support to the use of IT systems in their organisations. The interviewees were asked:

Q: How much support does your top-management gives to IT implementation in your organisations?

Most of the interviewees indicated that their organisations' top-management gave positive (37% moderate to 37% high) support while those who indicated low support were only 26%. The following are quotes from some of the interviews concerning top-management support. IT manager in medium size organisation in Dammam commented on the level of top-management support in his organisation:

" *Top-executives attended most of the meetings with the chosen IT supplier and participated in setting the requirements and specifications for the new patients' records system*". (interview 6)

A less enthusiastic manager in small manufacturing organisation in Dammam said:

" *The business owner is Not aware of the value and importance of implementing IT systems and this is reflected by his frequent delaying of the purchase of IT systems.*". (interview 29)

D- System development and technical support provision

Organisations depend heavily on IT expertise available internally or externally to develop the applications they need or to solve the technical problems they face. In an attempt to know how Saudi organisations act when they need to develop or modify their systems, the researcher directed the following questions:

Q: Does your organisation develop its applications internally or externally?

Q: Who provides the technical support for the users in your organisation?

From Table 3.2 we see that most organisations seek outside help to develop their applications and systems. Eighteen (67%) of the adopting organisations depend on IT vendors when they decide to adopt new systems or when they need upgrades or technical advice. Some of those organisations which have an IT department turn to outside help when developing their systems. Worth mentioning is that the existence of an IT department influences the organisation's decision to develop its systems internally and influence where it obtains the technical support. Most of the organisations which have IT departments or units develop their systems internally and gets technical support from IT department. However, from the table we can see that there are three organisations (No. 21, 27 and 28) which, despite having IT departments, develop their systems with external assistance.

One IT director emphasized the importance of organisations developing their own IT systems and resources. He explained that:

"having your own IT staff and resources helps the organisation to be independent and saves time in upgrading or enhancing systems because most vendors are usually busy working for many other organisations...... they are not working for you only.... If the organisation cannot develop and maintain its systems, it will be under the mercy of the overcharging vendors.". (interview 2)

E- Top-management support and commitment

Top-management commitment to IT implementation is considered one of the most important factors influencing the successful implementation. The researcher discussed this issue with the interviewees to check how they evaluated their management's support to the use of IT systems in their organisations. The interviewees were asked:

Q: How much support does your top-management gives to IT implementation in your organisations?

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" Top-executives attended most of the meetings with the chosen IT supplier and participated in setting the requirements and specifications for the new patients' records system". (interview 6)

A less enthusiastic manager in small manufacturing organisation in Dammam said:

" The business owner is Not aware of the value and importance of implementing IT systems and this is reflected by his frequent delaying of the purchase of IT systems.". (interview 29)

F- Barriers and problems to adopting IT systems

Organisations in any business environment face different kinds of problems when they decide to adopt IT systems. This exploratory study attempted to identify the main barriers that hinder implementation Saudi organisations. The interview questions were:

Q: What barriers or factors may cause resistance to use IT systems in your organisation?

Q: What types of problems, if there is any, does your organisation face when it decides to implement IT systems?

Previous studies about IT in SA (Abdul-Gader, 1990,1997; Yavas and Yasin, 1994; Shash and AL-Amir, 1997) revealed that there are a number of factors, which have hindered Saudi organisations from adopting IT systems. Primarily these factors include the lack of Arabic systems, the lack of an IT skilled workforce, the lack of management awareness and a lack of leadership. In addition, insufficient training programs caused many organisations to report problems. This exploratory study found similar results.

- **IT skills and technical support problems**

One of the biggest barriers to successful IT implementation in SA mentioned by many participants in the interviews was the lack of an IT skilled workforce and insufficient training programs. Only one participant mentioned that lack of Arabic systems as a barrier; this may be due to the fact that many IT companies and software houses like Microsoft and IBM are now Arabising their systems for the Arab countries.

The lack of both technical expertise by vendors and skilled workforces in the Saudi organisations hinder IT implementation or limit its use in the adopting organisations. From Table 3.2 we see that six interviewees (22%) indicated that lack of IT skilled forces can cause major problems in implementation in SA. Two interviewees (7.4%) asserted that the lack of technical support may hinders implementation. For example, implementing EDI systems in SA is hindered by the limited number of EDI specialised vendors who provide these systems and make them very expensive to adopt. Lack of competition allows vendors with a good technical knowledge of these systems to overcharge their clients and consequently turn away organisations with limited financial resources. Three interviewees (11%) pointed out that the lack of a national telecommunication infrastructure is hindering organisations in SA from adopting some types of IT systems such as Internet systems.

- **Infrastructure problems**

Because there is only one telecommunication service provider in SA, there is a lack of competition and consequently this kind of service becomes very expensive. It makes many organisations unable to afford installation of Internet and Intranet systems. These types of systems require very advanced and fast telecommunication lines. Only large organisations can afford and justify the costs. Moreover, most telecommunication technology provided by the Saudi Ministry of Telecommunication needs to be upgraded and updated to systems that support Internet and intranet applications. A general manager in a medium service company mentioned that lack of fast and sufficient IT infrastructure in SA is hindering the company plans to connect their intranet systems to the internet. His exact words were:

" lack of modern and fast internet services in SA is causing us to delay implementing EDI and internet applications". (interview 3)

- **Financial problems**

On his visits the researcher found that many Saudi organisations, especially the small ones, are hesitant to adopt IT systems due to the high cost of implementation. Thirteen or about 43% of the interviewees indicated that their organisations face financial problems when they decide to adopt or upgrade their IT systems. The three organisations (10%) which did not adopt IT systems indicated that the cause was the costs. One of the IT professionals interviewed whose organisation adopted IT systems despite its weak financial position said:

" Adopting IT systems represented a challenge to our organisation because we had to implement IT systems to overcome competition despite the hard financial situation we were facing. ". (interview 21)

A business owner commented about his refusal to adopt IT systems by saying:

" *I will not approve buying computers in my business because I am satisfied with the current way we are doing business without computers which will cost us a lot of money if we decide to adopt them.* ". (interview 17)

More detailed discussion of implementation problems that face Saudi organisations when they implement IT systems was presented in section 2.2.5 of chapter two.

3.2.2.3 Focus groups

A focus group interview is a qualitative research technique that brings several persons together in one place to respond to questions and to discuss a topic of particular interest to a sponsor or client. It is also used to collect qualitative data by generating concentrated discussion on topics of interest to the researcher. The interview is led by a moderator who keeps the respondents focused on a particular topic (Morgan, 1998).

The focus group technique has been adopted as a major data-gathering instrument by market researchers to find out about consumer preferences and to design advertising strategies. It has also been used by social scientists as an aid to questionnaire development. Most recently, this technique has been used by IS researcher (Morgan, 1998. Krueger (1994) suggested that the focus group method consist of four phases: planning, developing the questions, piloting and analysing the responses. The planning phase is concerned with determining the purpose; determining the study subjects; and determining the size of the group, the duration of each meeting, the number of the participants in each groups and the resources needed.

The questions used in the focus group meetings must be short, direct, clear and focused. Before conducting the meetings, the questions should be given to one or two experts who have knowledge of the subject to check and review the clarity and focus of the questions. This is an important procedure because it gives the moderator the opportunity to remove and/or add questions thought important by the experts.

According to Greenbaum (1998) there are two types of focus groups: - full groups and mini groups. A full group, as suggested by Greenbaum, consists of eight to twelve people while the mini is limited to four to six people. Some researchers prefer to use smaller sized focus groups to allow more time to each participant and consequently to have more in-depth discussion of the topic.

This technique has been found to be effective in enhancing the understanding of researchers about their topic (Alamari, 1998). Other researchers suggest that the use of the focus group technique is an excellent measure to establish ordinary descriptions of reality by informants (AL-Shoaibi, 1991). For the focus group technique to be successful, the researcher must create a friendly atmosphere where the participants feel free and at ease and welcomed to express their feelings and opinions.

The focus group technique was used in this research simply to enhance the researcher's understanding and knowledge about the IT environment in SA and to obtain a direct and precise feedback about private organisations' experiences with IT. The researcher thought that by adopting this method many benefits could be gained such as:

- better insights about different aspects of the research subject from the perspective of interested and knowledgeable people (top-management executives and IT professionals);
- identification of factors that facilitate or hinder IT implementation in the Saudi environment;
- the development of relevant hypotheses;
- the collection of valuable information that could be used to design and develop the questionnaire, which was to be used in the main quantitative survey.

3.2.2.3.1 Conducting the focus groups

Two full focus group meetings were held. One on Monday the 6th of October, 1997 in the administration building of AL-Ahssa Industrial City complex and the second on Wednesday the 8th of October, 1997 at the administration building of Dammam First Industrial City. Each of these meetings lasted about two hours. Four business owners and six IT directors participated in the first meeting and eight individuals, mostly IT directors, participated in the second. These meetings were arranged by the administrations of the two industrial cities.

Invitations to these meetings were extended to owners, executives and IT managers in some of the private organisations that have sites in these cities. All of the participants were knowledgeable and involved in the decisions to implement IT in their organisations. Representatives from the administrations of these industrial cities were present during these meetings and contributed positively by encouraging the attendants to talk frankly and openly about their organisations' experiences and problems with IT (invitation letters in Arabic are printed in the appendix section at the end of this thesis).

In these meetings the researcher started by talking about the role and importance of IT systems for business organisations. This was followed by open discussions about the factors that entice or prevent Saudi organisations from adopting IT systems. These discussions also allowed coverage of a range of problems raised by the participants themselves that affect Saudi organisations when they decide to adopt IT systems.

- Issues and questions raised during the focus group meetings

Most of the discussions in the focus group meetings focused on the following four main issues:

- identifying and discussing the main factors that entice Saudi organisations to adopt IT;
- identifying and discussing the main problems facing private organisations in SA when they decide to adopt IT systems;
- identifying and discussing the main factors associated with IT implementation (organisation factors, management factors and systems factors);
- describing the IT environment in Saudi organizations.

Some of the questions used in the interviews were used by the researcher in the focus group meetings. For example, in an attempt to find out an organisation's computing environment, the researcher sought information about the types of computing facilities in these organisations and whether they have an IT department or not. For example:

Q: What types of computers are used in your organisation:

Q: Does your organisation have an IT department/unit?

Responses showed that different types of computers are in use. Most of the adopting organisations were using stand-alone PCs as was reflected in the interviews. Mainframe computers as well as minicomputers were used by two and three organisations respectively. It should be noted that all of the organisations, which use mainframes and minis, are using

PC to connect their branches and/or departments. In addition, the researcher has noted that those organisations which use mainframes and minis have more IT skilled employees, an IT department and, consequently, more internal IT expertise. These organisations develop their own applications internally and depend more on their internal IT resources for technical support. Most of the findings of the focus group meetings were similar to the findings from the interviews.

Top-management commitment to IT implementation was among the issues discussed in the focus group meentings. The researcher discussed this issue with the participants to check how they evaluated their management's support to the use of IT systems in their organisations. The question was:

Q: How much support does your top-management gives to IT implementation in your organisations?

Most of the participants indicated that their organisations' top-management gave positive support while those who indicated low support were the minority. As far as the problems which face organisations when they implement IT systems. Also, the issues were discussed in the focus group meetings and the questions used to check these were:

Q: What barriers or factors may cause resistance to use IT systems in your organisation?

Q: What types of problems, if there is any, does your organisation face when it decides to implement IT systems?

Previous studies about IT in SA (Abdul-Gader, 1990,1997; Yavas and Yasin, 1994; Shash and AL-Amir, 1997) revealed that there are a number of factors, which have hindered Saudi organisations from adopting IT systems. Primarily these factors include lack of Arabic systems, lack of IT skilled human resources, lack of management awareness and lack of leadership. In addition, insufficient training programs caused many organisations to report problems.

Another issue discussed in the meetings was whether the organisation has a strategy or guidelines to implement IT systems and how these are helping the organisation. The interview questions:

Q: Does your organisation have an implementation strategy/guidelines?

Based on the finding from the focus group meetings and the interviews, the researcher suggests that there is lack of IT planning in many Saudi organisations especially in private organisations. Public organisations, due to their huge financial budgets, use external IT consultancy agencies and vendors to study the organisation's requirements and to provide an implementation plan. This is a very expensive choice for private organisations; and this explains why many of the visited organisations have no IT strategy compared to their counterparts in the public sector.

In an attempt to know how Saudi organisations act when they need to develop or modify their systems, the researcher directed the following questions:

Q: Does your organisation develop its applications internally or externally?

Q: Who provides the technical support for the users in your organisation?

Information received from the focus meetings indicate that most organisations seek outside help to develop their applications and systems. Some of those organisations which have an IT department turn to outside help when developing their systems. Worth mentioning is that the existence of an IT department influences the organisation's decision to develop its systems internally and influence where it obtains the technical support. Most of the organisations which have IT departments or units develop their systems internally and gets technical support from IT department. The findings of the focus group meetings will be presented in the following sections.

3.2.2.3.2 How the information was recorded and analysed

Both of the focus group meetings were cassette tape recorded after taking permission from the participants. This made retrieving the information easy for the researcher. It helped him play back the recording of the meetings later and listen several times to the discussions at the two meetings. In analysing the data collected from these focus groups the researcher took into consideration the recommendations presented by Morgan (1998) and Krueger (1994) such as:

1- the words used by the participants and their meaning;

2- the context in which the meeting is taking place;

3- the internal consistency and the change of opinions among the participants;

4- the extensiveness and frequency of certain words or ideas during the meeting;

5- the way participants give emphasis (intensity) to their ideas; this can be done by noticing the voice tone, talking speed and consistency in ideas;

6- the basis on which the participants base their comments and ideas. The moderator should give issues supported by real experiences more weight than mere personal comments.

3.2.2.3.3 Findings from the focus group meetings

In total there were 18 participants in both meetings. All of the organisations in the focus groups meetings were using IT systems. Eight of them were using minicomputers as servers to connect PCs in their different departments and branches while the rest were mostly using stand-alone PCs. None was using mainframes. Seven of the organisations are medium size and the rest are small. Fourteen of them are from the manufacturing sector and the other four operate in the service sector.

The discussions in the focus group meetings concentrated on identifying and discussing the main factors that entice Saudi organisations to adopt IT systems and the problems they face when they implement these systems. Sixteen (89%) of the participants indicated positive management support for implementation. Training programs on how to use IT systems were available in ten organisations while the rest did not provide training. While resistance towards the use of IT systems is existing among employees of two organisations as stated by their representatives, the rest did not report any resistance. Resistance was attributed to a lack of IT skills.

Nine of the eighteen participants in the two meetings indicated that their organisations have strategies for IT implementation. IT managers of those nine organisations stated that they had spent considerable time in planning and managing the introduction of IT systems in their organisations. Three participants stated that their organisations are outsourcing their IT activities.

A- Factors enticing Saudi organisations to adopt IT systems

The participants in the focus group were invited to state the motives behind their organisations' decisions to adopt IT systems. They were given a list of motives and asked to rank order them from one to eight with one being the most important motive and eight the least important.

Sixteen (89%) of the participants ranked the statement "to replace manual operations" as the number one motive for computerisation. Table 3.4 lists how suggested motives were ranked by the participants at the focus group meetings. From Table 3.4 we can see how Saudi organisations give emphasis to practical reasons for their computerisation decisions. The participants indicated that their organisations give little importance to a reduction of the workforce at their organisation; they put more emphasis on reducing the burden of manual work and on improving the quality of their products and service. These are very reasonable reasons for adopting IT systems because these systems can help achieve many organisational objectives if they are installed and run correctly.

Table 3.4 Motives to implement IT systems

Motive	Frequency	Percentage	Rank
To replace manual operations	16	89%	1
To improve decision-making process	15	83%	2
To improve product and service quality	13	72%	3
To improve communication	11	61%	4
To overcome competition	10	55%	5
To increase productivity	8	44%	6
To do like competitors	7	39%	7
To reduce the number of workers	2	11%	8

In the main questionnaire survey, which will be carried out in the second phase of this research, these motives will be checked again to see how a bigger sample of organisations rank their importance.

One of the participants in the focus group meetings listed verbally the main factors he thought are pushing Saudi organisations to implementing IT systems; he mentioned:

> *" there are 4 main factors that force Saudi organisations to turn to computers to run their business: 1- to reduce work load; 2- to reduce transactions time; 3- to reach and serve more customers with better services and products; 4- to enhance communications within and outside organisation ".*

B- Problems facing organisations:

In an attempt to find out what kind of problems face Saudi organisations when they implement IT systems, the researcher directed a question to the interviewees about the difficulties their organisation face.

While successful implementation is taking place in many of the visited organisations, there were some organisations are having major problems. Those organisations are the ones which do not have IT strategies. Also technical and human problems clearly existed at these organisations. For example, the researcher found that some organisations have different IT systems (IBM personal computers and Apple Mackintosh). This leads to incompatibility between the systems and caused technical problems some of which the organisation's staff could not solve.

Most of the participants in the meetings indicated that financial difficulty is a major problem for many Saudi organisations when they decide to implement IT systems while the same difficulty prevented other organisations from upgrading or enhancing their systems. Human problems (lack of skilled workforce) and technical problems came next. One general manager explained how the financial difficulties have put pressure on his organisation:

" *Implementing IT systems now means that we have to set aside at least 100,000 Saudi Riyals which we urgently need to move to our new location. This means we have to choose between investing in IT systems or using the money to move to the more strategic location. We can postpone buying computers but we cannot postpone relocating because we will lose that site if we wait.* ".

In another organisation, the lack of an IT strategy explained why the organisation's different departments are having different hardware and software systems both of which have caused many problems when trying to share information within the organisation.

One system analyst working for one of the organisations stated that:

" *one of the main problems I face as a system analyst and programmer is that the users don't know how to specify their requirements .... they give vague ideas about their needs. This makes my job hard and I have to spend a lot of time working on defining exactly what is needed.* ".

The issue of users' involvement and the level of this involvement was raised by most of the participants in both the individual and the focus group meetings. These participants emphasised the importance of involving the users in the implementation decisions from the early stages. They mentioned that many of the implementation problems relating to workforce can be remedied by involving and training the user. Also several IT researchers pointed out to the importance of involving system users during the implementation process (AL-Alawi, 1991; AL-Sudairy, 2000).

Another problem is that not all business partners use IT systems; this makes installing advanced IT systems not feasible for some Saudi organisations because their suppliers or clients do not use computers. These are the exact words of one of the participants in the focus group meetings:

" *I was successful to convince the management to install some kind of decision support system that facilitates taking orders from our clients and make decisions on when and what quantity we should increase our inventory with. After making a survey to know who among our client use computers, we found that only 30% of our clients* *use computers and this set off the management decision to buy this system.".* He continues *"The management asserted that there is no need to use this system if our clients are not using computers".* Most of the participants indicated that Saudi telecommunication facilities need to be enhanced and expanded to allow organisations in SA to adopt and upgrade to faster and more advanced IT systems.

The researcher, also, obtained information from two IT directors who wanted neither themselves nor their organisations identified. We will refer to them as Director 1 and Director II. When asked about their organisations' experience with IT and about which area is most affected by IT, both directors indicated that they believed that IT has very positive impact on the work and workers in their organisations. Director I indicated that the use of those systems expedited and made " the job more efficient in relation to getting the work done." He also indicated that communication is the area improved by the use of IT systems. He added, however, that in order to be efficient, the organisation has to have properly trained people, a proper business and office layout, and a functioning implementation plan before getting involved with IT.

On the other hand, Director II indicated that productivity is the area most improved by the use of IT systems. He indicated that, without the use of IT systems, he would be unable to get the reports he needs in the timely fashion that he is currently getting, thus allowing him to go higher in the corporation to justify his budget and manpower requirements. He added that the use of IT systems also provides him with the necessary information he needs to make sound resource allocation decisions.

In response to a question regarding resistance to use of IT systems in their organizations, both directors indicated that they had not encountered any significant resistance. However, Director I indicated that one problem that they do have is where implementing IT may be something new and represents a change that some managers really do not believe is necessary. Commenting on the same point, Director II indicated that the issue of resistance stems from the fear of some managers and workers that the use of IT systems is something new that they have to learn.

Addressing the issue of training, both directors, as was the case for many of the interviewees, believe that training is important for all levels of management and workers. But more emphasis should be placed on lower management and actual users. However, director II indicated that in his organisation, and because of the heavy workload requirements, he cannot afford to send his staff out to attend training programs. Therefore, they have an in-house section dedicated to providing computer support and his managers and workers can learn on the job. Other interviewees, commented on the issue of training and its importance to succeeding in using IT systems.

Based on the responses received from the interviews and from the focus group meetings, it became evident that IT implementation in Saudi organisations is influenced negatively or positively by many factors some of which are related to the adopting organisation itself or to the attitudes of top-management in charge of the business.

Table 3.5 shows a summary of the relationship between the research objectives, the questions and the key findings of the focus group meetings.

Table 3.5 The Relationships between the research objectives, questions and the key findings of the focus group method

Research Objectives	Questions / Statements	Key Findings
1. To identify the main factors that entice Saudi private organisations to adopt IT systems.	Does your organisation use IT systems in its functions? What are the main factors that enticed your organisation to adopt IT systems? What are the main problems your organisation face when it decides to implement IT systems?	All of the participants came from organisations which are using IT systems. To overcome competition. To provide better quality services and products. To enhance decision-makings. To have better communication with suppliers and clients. To overcome financial, IT skill shortage, and technical support problems. Organisation's size, type of business and ownership influence IT adoption.
2. To identify the main characteristics that distinguish Saudi private organisation that adopt IT systems and how these characteristics influence the implementation process	Please fill in the background information about you and your organisation in the paper presented.	All large and a majority of medium sized organisation are using IT systems. Organisations in the manufacturing sector are using IT system more than organisations in the other sectors. Organisations which have branches in other cities are adopting IT systems more than locally based organisations.
3. To identify the characteristics that distinguish top-managers of Saudi private organisations and how these characteristics influence the implementation process	Please fill in the background information about you and your organisation in the paper presented.	Organisations which are run by younger managers are adopting IT more than other organisations whose managers are older. Organisations which are run by more educated managers are adopting IT more than other organisations whose managers are less educated..
4. To document the general aspects of the Saudi IT environment in SA such as the historical development of IT in SA	When did your organisation adopt IT? Do you develop your IT systems and application internally or externally? Does your organisation use Internet and Intranet systemss? What are the nationalities of your IT staff. Does your organisation use Arabic systems?	Most of the participants came from organisations which started using IT systems in the late 1980s and early 1990s. Majority of the organisations use stand-alone or locally networked systems. Most of the IT staff working for Saudi private organisations are expatriates. Big and medium organisations use both Arabic and English IT systems while small ones use Arabic systems only. Majority of Saudi organisations were Not using Internet because it was Not available at the time. Availability of IT systems in Arabic helped greatly in spreading the use of IT systems in the Saudi society.
5. To suggest managerial guidelines to help organisations wishing to implement IT in their businesses.	What procedures does your organisation follow when it decides to adopt IT systems?	There is a lack of IT planning. Many Saudi organisations seek external advice when buying IT systems. Lack of clear procedures for implementing IT

3.2.2.4 Mini-case studies

Case study is a method used in field-based survey research to collect evidence in relation to a particular set of circumstances from multiple sources which may be quantitative or qualitative in nature (Remenyi and Williams, 1995). This method allows observations of social interaction and investigation of the perceptions and attitudes of people playing interdependent roles (Klientop, 1993). Case studies usually concentrate either on a single or on a very limited number of organisations and seek an in-depth understanding of a phenomenon including an understanding of the context in which it occurs (Gill and Johnson, 1997).

The case study approach seeks to understand the problem being investigated. It provides the opportunity to ask penetrating questions and to capture the richness of organisational behavior. But the conclusions drawn may be specific to the particular organisations studied and not generalisable. The case study approach, therefore, emphasizes qualitative analysis (Gable, 1994). Moreover, case study technique is suitable more to the generation of hypotheses than to their testing (AL-Shoaibi, 1991).

Case studies, however, are not entirely qualitative and can in fact employ embedded quantitative survey techniques such as questionnaires, observations, in-depth interviews and longitudinal studies. Benbassat et al. (1987) identify three strengths of case study research in the IS/IT field: (1) the researcher can study IT systems in a natural setting, learn about the latest developments in the field, and generate theories from practice; (2) the method allows the researcher to understand the nature and complexity of the process taking place; and (3) valuable insights can be gained into new topics emerging in the IT field.

In this research two mini-case studies were conducted as part of the research methodology to take advantage of the strength that such a technique provides in terms of realism, significance and investigative quality. The case study approach was used as a supportive investigative element to provide a more-in-depth look at the experience of two organisations in the Saudi private sector. The purpose was to highlight IT practices and procedures followed by private organisations in SA. The cases were developed into mini-case studies and the details of these cases are presented in the following section.

3.2.2.4.1 Conducting the Mini Case Studies

The implementation of IT systems in two private organisations was studied and developed into mini case studies, both of which are presented here. Data was gathered from these two organisations which had been identified as users of IT systems. Both of them are businesses in the service sector. The IT manager in each organisation was interviewed and asked to identify and talk about a recent adoption or upgrade of IT system in their organisations.

Semi-structured interviews were conducted with each of the officers to determine their part in the decision, how the implementation process progressed and whether the final outcome was successful or not. The primary unit of analysis here was the implementation process and the factors influencing it. These cases were analysed but some details have been omitted or changed to preserve anonymity.

Mini-case Study I

Implementation of a Computer-based Personnel Administrative and Payroll System

This case involves a large size organisation in the services sector. The organisation was running an old computerised personnel and pay system which had been giving problems in the last two years. This system was developed by two expatriate programmers working for the organisation. One of these programmers had gone back to his country and the other was threatening to leave. What added to the problem was that the system had not been adequately documented. Although the organisation had a small IT department staffed by experienced personnel, it did not have the in-house resources to develop a more comprehensive system. These circumstances induced top-management to look outside for a ready-made system and to contract a software house to develop a more updated replacement system.

The management decided to approach a number of software companies to gain some idea about what was available in the area of personnel administration and payroll systems. The director of the IT department invited representatives from several software companies in the Eastern region of SA. They were asked to come and demonstrate their systems to the top management and were asked to supply a list of clients who could be used as references. One of these representatives came from a fairly large software company which had sold accounting and administrative systems to a large number of private companies all-over SA.

The top-management was pleased with the system presented by this company and signed a contract with it to customise a system according to the general guidelines of its administrative and payroll requirements.

The top-management appointed one of the IT department's staff to act as project manager on the new system and work began on customising a system to the specific needs of the organisation. Initially, the work went well in documenting the system requirements, but problems were encountered when in trying to add new features for storing personnel photos with details and in adapting the system to allow for a wider range of pay scales than were provided for in the company's original system.

The initial problems were solved through close work between the organisation's representatives and the programmers from the software company. However, work on the project was delayed many times because both sides had to travel long distances when new requirements needed to be discussed or the system tested. The headquarters of the software company's was in Dammam and the client organisation was 160 km away in AL-Ahssa.

The IT department director left the whole follow-up task of the project to the project manager. The top-management was supportive but not involved in supervising the projects progress. It was busy securing new contracts that covered a wide range of services all-over SA. However, the top-management was assured by the IT director that things were progressing well while, in fact, they were behind schedule.

After five months the new system was ready for data to be entered. The software company did not consider the possibility of transferring data electronically from the old system. Therefore, data was entered manually by a team of data entry clerks from both the client organisation and the software company. This process lasted about one month, but the data entry team was entering old data without updates. This required the team to spend an extra month going back to check every record to make sure the new updates had been entered and stored.

Finally, after eight months, the system was ready for test with actual data. There were several tests and reports to be processed. Some errors were found in the reports concerning administrative functions such as producing different lists of personnel with near-to-expiry Iqamas (permissions to stay and work in SA) and near-to-expiry passports. These errors happened because the software company developed the system to recognise the Gregorian calendar while Iqamas were issued by the Saudi Immigration and Passports Authority using the Arabic/Islamic calendar. Moreover, the passports of the expatriates working for the client organisation had been issued in their home countries with dates based on the Gregorian calendar.

The original system used the Gregorian calendar because it was developed originally to be marketed to any company in the Middle East region and not just in SA, and most of the countries in this region use the Gregorgian calendar in their official business and administrative dealings. Saudi Arabia is the only country in the region, if not in the whole world, which uses the Arabic/Islamic calendar in its official business. This is something that companies doing business in SA have to be aware of and therefore must modify their systems accordingly. After work which lasted about three weeks to correct these problems, the system was ready for another test run. After the second run the reports were produced as required but new errors were found which needed correction before a third run could be scheduled.

After the final corrections, the CEO, the IT director, the project manager and two representatives from the software company were present to witness the last test run. The final trial was more successful and the organisation was ready to switch its data processing to use the new system. It was four months behind schedule and had cost the organisation 25% more than had been anticipated.

Table 3.6 presents a brief analysis of the factors influencing the implementation of IT systems in the above organisation.

Table 3.6 Factors influencing IT implementation in the first mini-case study

Issues mentioned in the case	Main findings
A- Main motives to implement IT systems	- to replace an old computerised system - to enhance decision making - to increase efficiency and productivity - to increase control over work
B- Problems during implementation	- low management involvement - lack of internal IT expertise - unclear organisational requirements - low users' involvement - increase in costs - delay in implementation

Mini-case Study II
Implementing Computer-Based Records System

This case involves a medium sized private organisation in travel services. This organisation has seven branches in different cities in Saudi Arabia. The enormous amount of paperwork involved in this type of business combined with the huge volume of business forced the top-management to automate the business in order to increase the productivity and efficiency of its staff and its operations.

The organisation's business covered a wide range of services including organised business and tourism travel packages, hotel and car bookings and reservations, travel insurance, shipping and transportation.

Although top-management had No clear idea of what was needed as far as the type of hardware and software was concerned, it felt that adopting an IT system would greatly reduce the workload and improve efficiency. As it had no IT experience and was Not sure how best to go about the task, it contacted two IT companies (A and B) who had been producing and selling software packages to travel agencies in the Kingdom. The organisation requested information from these two computer companies concerning the functions and specifications on which they based their "Travel Services" software packages. The top-management liked the specifications and functions built into company A's package and decided to purchase their system.

The cost was estimated to be around SR 250,000 (about £45,000). The system was to be customised to link all branches of the organisation to its headquarters in Dammam. The purchase included both the hardware and software components of the system as well as the training needed to prepare the organisation's staff to use the system.

Due to its lack of IT knowledge and the high cost associated with the computerisation project, the top-management decided to delay the purchase for four months till the next years' budget. The IT supplier informed the organisation that the price was valid for two months only, after which it might rise. This put pressure on the organisation to sign a contract to purchase and install the system after paying 25% of the cost. The rest of payments were to start at the beginning of the organisation's next financial year.

The supplier offered to start customising the system according to the organisation's requirements and requested that a representative from the organisation be assigned to start working with the company's designers and programmers. Because most of the organisation's staff did not have any computer background, two new employees with IT knowledge were appointed to work with the supplier's programmers to customise the package according to the organisations' requirements. The top-management had another purpose for employing these new staff. This was to establish an IT unit to operate and maintain the organisation's new and future systems. These new employees were given a one-week intensive presentation and training on the organization's operations.

After two months, the system was available for a trial period of one month. The supplier would then adapt the system according to the users experience and comments. The top-management requested that during the test period two people from each branch should come to the headquarters to attend two-days intensive training sessions followed by two days of testing the new system with actual data. This method presented an excellent opportunity for all employees who would be carrying out the actual work to acquire a comprehensive knowledge and use of the system before the actual run. The training sessions were successful and the employees benefited greatly.

After the one month "test" period, the supplier started adapting the system to accommodate the comments presented by the users. Among the organisation's demands was that receipts and some of the reports be printed in Arabic. The adaptation lasted for three weeks after which the system was ready for installation and actual use. The branches were connected to the main server through modems and normal telephone lines because this was cheaper.

The system was customised to allow each branch to perform its operations separately but to link with the headquarters at the end of every day to upload data about the daily transactions and store a backup copy of these transactions and data on the organisation's main server.

The top-management was involved in the implementation process from the beginning of the computerisation process. Top-management's involvement and support was instrumental in motivating the staff to use the new system and consequently succeeded in its computerisation efforts.

Table 3.7 Factors influencing IT implementation in the second mini-case study

Issues mentioned in the case	Main findings
A- Main motives to implement IT systems	- to computerise manual operations - to enhance decision making - to increase efficiency and productivity - to reduce work load
B- Problems during implementation	-lack of internal IT expertise - unclear organisational requirements - lack of financial resources - lack of IT implementation

2.3 SUMMARY OF THE MAIN FINDINGS

The findings of the initial literature review and the discussions during the exploratory study covered wide range of issues relating to IT implementation in SA; these included:

- The historical development of computerisation in SA;
- The computerisation efforts in both the private and public sectors in SA;
- The types and sizes of computing facilities in Saudi organisations (IT environment);
- The experience of some Saudi organisations with computers and IT systems;
- The factors that entice or hinder Saudi organisations when implementing IT systems;
- The national IT infrastructure (Internet provision, education and training facilities).

There is little research done concerning IT implementation in the Saudi private sector. The exploratory study ended by gathering general findings relating to the IT environment in SA in general. These findings are summarised as follows:

- **The Historical introduction of computers and IT environment in SA.**

It was found that computerisation efforts in SA can be dated back to mid 1940s. Aramco, an American private oil company working on an oil-exploration license at the time, was the first organisation to use information-handling machines to process oil exploration data.

Then, in the late 1960s and early 1970s, some public organisations installed their first computers; among these organisations were the Ministry of Finance and National Economy and the University of Petroleum and Minerals. During the last 25 years IT investment by the Saudi public sector is greater than the Saudi private sector. In the early days of computing in SA, mainframe and minicomputers were the most used machines. The public sector was the major user of computing facilities up to the early 1980s when the private sector started to use computers (Ghani and AL-Sakran, 1988). The Saudi public sector owns about 70-90% of the mainframe computing and buys around 50-60% of the personal computers sold in the Kingdom.

Until the present time, the Saudi IT market, constituting about 40%, is the biggest in the Middle East. Because of the language barrier many private organisations were hesitant to buy computers that doesn't input and output Arabic. Arabisation of IT systems helped in a big way in the growth of IT systems in SA; this became very clear in the mid 1980s when the Arabisation fever started in the Arab world. Hundreds of private organisations were rushing to buy computers especially in SA and the Gulf countries. From the visits and observations by the researcher it was evident that the majority of the IT workforce in the private sector are expatriates from different nationalities.

The conservative and religious nature of the Saudi society, however, has hindered the adoption of many technologies in the country. For example, the late introduction of Internet services in SA was caused, among other things, by the resistance of the religious establishment to new ideas or technologies that may change Saudi society (AL-Shehri, 1997).

Although, business owners and top managers in the Saudi public and public organisations are the most influential in IT decision-making, the final purchasing decisions however, (for example, the choice of IT vendor or external contractor), are made by the top officials of the ministry or agency concerned. Indeed, sometimes royal family members influence decisions for big IT contracts in many public organisations. In the private sector, one of the interviewees informed the researcher about his encounter with his business owner who openly said to his enthusiastic member of staff (the interviewee) who was trying to convince the owner about introducing computers to the business:

"This business is my business and I am the one who decides whether to buy computers and when to do it.".

- Motives to implement IT systems

From the interviews, the focus group and the mini-case studies it was found that many organisations are adopting IT systems mainly to achieve the following objectives:

- to computerise their manual operations.
- to have better control over the business.
- to improve communication with clients and suppliers.
- to improve the quality of the services and products.
- to improve the decision making process.

According to the findings of the initial literature review and the exploratory study, the top motive for IT investment in manufacturing organisations is consolidation of operations and integration of processes and systems. In the service organisations, the top motive is to meet the demand for high quality service from customers (Yavas and Yasin, 1994). Based on the findings from the focus group meetings, reducing the number of workers is not a priority for Saudi organisations when they adopt IT systems. However, many organisations implement IT systems to overcome competition and to keep up with their competitors.

- Problems facing Saudi organisations

◆ **Lack of IT awareness and expertise**

Information technology systems are not used to their full potential due to a lack of awareness of IT potential and expertise among Saudi top-management in both the private and public sectors (Abdul-Gader, 1990; Yavas and Yasin, 1994, Abdul-Gader and AL-angari, 1995. Besides, the findings from the interviews and group meetings indicate that many Saudi organisations complain about the difficulty of finding local IT skilled workers. In addition, There is a clear lack of IT planning; a high percentage of the participants in both the interviews and focus group meetings stated that their organisations do not have IT strategy or guidelines. This persuaded the researcher to suggest implementation guidelines as one of the objectives of this research.

◆ **Costs of IT implementation**

Many IT failures are due to a lack of knowledge about the total cost of ownership of IT systems. Many computerisation decisions are made on the basis of hardware and software costs only; other requirements such as staff training, system maintenance and costs associated with the adoption of IT systems are frequently not calculated.

- **Influence of top-management characteristics on IT implementation**

From both the initial literature review (Ghani and AL-Sakran, 1988; Abdul-Gader and Alangari, 1995) and the exploratory study it was found that IT implementation in Saudi organisation is influenced by the age of the top-manager, his nationality and his education level. Organisations which are run by younger and more educated managers are more likely to adopt IT systems. Also, it was found that most of the IT skilled workforce in the Saudi private sector are expatriates. This corresponds with the findings of previous studies which has pointed out that, due to the lack of a local IT skilled workers or their demand for higher salaries, many private organisations turn to importing a less expensive but skilled workforce from other Arab and Non-Arab countries.

- **Influence of organisational characteristics on IT implementation**

Many organisational factors can influence the decision to implement IT systems. From the literature (Yap, 1990; Yavas and Yasin, 1994, Yap and Thong, 1995; Shash and AL-Amir, 1997) and the exploratory study we found that large organisations, due to their greater financial resources are more likely to adopt and use more computing applications and resources. Also, it was found that organisations, which have many branches spread over different geographical locations or deal with national and international business, are more likely to use IT systems than local organisations. On his visits to many organisations at this stage of the research, the researcher found that all joint-venture companies were using computers and other IT systems.

- **Influence of system charaacteristics on IT implementation**

Ease of use, usefulness and cost of implementation can encourage or discourage organisations from adopting IT systems (Abdul-Gader and Alangari, 1995; Thong and Yap, 1995). Many organisations install IT systems because of their perception that these systems will be useful in automating their functions, in reducing manual workloads and in increasing the efficiency and productivity of their workforce.

In addition, Saudi organisations are more inclined to adopt IT systems if these systems are available in Arabic. This is necessary for two reasons:

1- the government requires that all official communications between the business establishments and the public agencies are in Arabic.

2- the language barrier caused by low percentage of Saudis who are literate the English or other languages.

In conclusion, Table 3.8 presents a comparison between AL-Sudairy's (1994), Abdul-Gader and Alangari (1995) and this exploratory study's findings of barriers and problems facing Saudi organisations when they attempt to implement IT systems. Some of these problems such as computer piracy, administration, centralisation and decentralisation, maintenance and support are common even in developed countries (AL-Assaf, 1997).

Table 3.9 summarizes the relationships between the general findings from the exploratory study and the research hypotheses and the questionnaire items.

Table 3.8 IT Barriers and Problems in the Saudi Environment

	Factors	Abdul-Gader & Alangari (1995)	AL-Sudairy (1994)	This exploratory study
1	Negative management / user attitudes to IT	√	√	
2	Lack of appropriate IT and strategic planning	√	√	√
3	Lack of skilled manpower	√	√	√
4	Lack of or insufficient funding	√	√	√
5	Lack of or insufficient training	√	√	√
6	Lack of Arabised systems		√	√
7	Software piracy			√
8	Operation and maintenance problems	√	√	√
9	Lack of systems integration	√	√	√
10	Lack of organisational structure		√	
11	Lack of IT specialised consulting organisations	√		
12	Lack of co-ordination between departments	√		√
13	Resistance to change	√		√
14	Lack of incentives and career development for IT professionals	√		√
15	Lack of national IT infrastructure	√	√	√
16	Lack of national IT plan, policy and laws	√	√	√
17	Insufficient IT knowledge and experience	√	√	√
18	Lack of scientific research and development		√	
19	Lack of top-management support	√	√	√
20	Lack of vendor's after-sale support	√		√
21	Centralisation	√		√
22	Inappropriate procedures to define user requirements	√	√	√
23	Negative organisational culture toward IT	√	√	√
24	Lack of user involvement	√	√	√
25	Weak IT department/manager	√		
26	Lack of standards and specifications	√	√	
27	Weak relations between top-management and IT management	√	√	
28	Perceived complexity of hardware/software	√	√	√
29	Lack of IT awareness	√		√
30	Conflicts between IT systems contents and local customs, traditions and religion		√	√

Table 3.9 The Relationships between the exploratory study's findings and the research hypotheses and questionnaire items

Issues and Findings	Related Hypotheses (general statements)	Questions
Organisations which are run by younger managers are dopting IT more than other organisations whose managers are older. Many organisations or their IT services are managed by xpatriates. Organisations which are run by more educated managers are dopting IT more than other organisations whose managers are less ducated. Management support was found to be a key factor for IT uccess	H1 IT Implementation in Saudi private organisations. is influenced by manager's age. H2 IT Implementation in Saudi private organisations. is influenced by manager's nationality. H3 IT Implementation in Saudi private organisations. is influenced by manager's education level. H4 IT Implementation in Saudi private organisations. is influenced by manager's IT kNowledge H5 IT Implementation in Saudi private organisations. is influenced by manager's support	Q2 Q3 Q4 Q6 Q9
Large organisations adopt IT systems more than smaller rganisations Manufacturing organisations use IT systems more than ervice organisations Foreign partners and doing business internationally requires ie use of IT. Organisations which have branches adopt IT systems. Many organisations complain about inadequate IT ifrastructure. IT planning is an important factor in implementing IT ystems. Training is essential for successful IT implementation. Saudi organisations use IT to overcome competition. Saudi organisations complain about lack of after sale vendor chnical support.	H6 IT implementation in Saudi private organisations is influenced by the size of the organisation H7 IT implementation in Saudi private organisations is influenced by the business type of the organisation. H8 IT implementation in Saudi private organisations is influenced by the ownership type of the organisation H9 IT implementation in Saudi private organisation is influenced by the geographical scope of the organisation H10 IT implementation in Saudi private organisations is influenced by the available IT infrastructure H11 IT implementation in Saudi private organisations is influenced by IT planning. H12 IT implementation in Saudi private organisations is influenced by provision of IT training. H13 IT implementation in Saudi private organisations is influenced by the level of competition in the Saudi business environment. H14 IT implementation in Saudi private organisations is influenced by the availability of vendor support.	Q10 Q11 Q12 Q13 Q19 Q20 & Q21 Q24 Q15 Q25
Saudi organisation use systems for routine applications. Organisations adopt IT to offer better quality services and roducts. Many organisations in SA do not adopt IT for financial easons. The widespread availability of IT systems in Arabic ncourages Saudi private organisations to adopt IT systems.	H15 IT implemenation in Saudi private organisations is influenced by the level of difficulty of using the systems. H16 IT implemenation in Saudi private organisations is influenced by the perception of their usefulness. H17 IT implemenation in Saudi private organisations is influenced by the costs of the systems. H18 IT implemenation in Saudi private organisations is influenced by the availability of IT systems in Arabic.	Q26 item1 Q26 item 2 Q26 item 3 Q26 item 4

3.4 HOW THE INFORMATION IS USED

The information gathered from the exploratory study influenced the development of both the research model and hypothesis at the later stages of the research. For example, hypotheses 1-4 concerning top-management characteristics, hypothesis 11 concerning IT planning and strategy, and hypothesis 18 concerning availability of Arabic IT systems are very much based on or related to the findings from the exploratory study.

This information also was used in designing the research main instrument, the questionnaire, and in deciding who would receive the questionnaires. As results of the site visits, possible case studies were identified at this stage. In addition, the results of the exploratory study highlighted the need to conduct a more focused empirical study to investigate IT implementation in private organisations in SA.

3.5 DECISION ON THE RESEARCH DIRECTION

As mentioned in the previous sections, the initial literature review and the exploratory survey gave little knowledge or guidance about IT implementation in the Saudi private sector. Most of the IS research on IT systems in SA focused on the public sector or on specific organisations in the private sector. With this in mind, it became clearly more appropriate to concentrate on investigating the experiences of the Saudi private sector with IT systems instead of on a mixed sample of public and private organisations as originally intended. The author's decision to conduct a study of this kind was intended to promote understanding of IT experience in the Saudi private sector and to enable a general description of this experience. The original focus of this research, therefore, was adjusted.

3.5.1 Why the Saudi Private Sector?

Most available data on SA relates to the Kingdom's role as an oil exporting country and to the associated problems of its situation as a single commodity economy. Since little research has been carried out to highlight the other emerging sectors of its economy, this study can be considered as a modest attempt to redress the balance by focusing on the private sector in SA and the problems its organisations face when they decide to implement IT systems.

The Saudi private sector was chosen as the focus of this research because of the important role it plays in the country's economic, industrial, and technological development (Ministry of Planning, 1997; Saudi Arabian Monetary Agency (SAMA), 1998). Yet little research has been carried out to study the experience of this sector with IT systems. Many organisations in this sector are either not adopting IT systems in their functions or, if they are, they are not utilising these systems to their potential due to a number of factors that need to be identified and investigated (Yavas and Yasin, 1994; Shash and AL-Amir, 1997).

The Saudi private sector is but one of many sectors that benefit from the oil wealth in SA. Private organisations in the Kingdom are encouraged and supported financially and legally by the government. This special treatment from the Saudi government to the private sector stems from the big role which the government is preparing for this sector to play in its attempts to diversify and strengthen the national economy. This is clearly stated in the various governmental development plans and annual reports. Development of management skills and IT systems to support management in the Saudi private sector is considered vital to such an undertaking.

In recent years, the Saudi private organisations have begun to take the lead and assume responsibility in providing many services in a range of different sectors of the Saudi economy that used to be provided by the government. This is due to the Saudi government's privatisation programme which was announced in 1994. Through this programme, the Government is planning to turn many governmental ministries and agencies from the public to the private sector (Ministry of Planning, 1996).

These new developments in the Saudi private business environment, coupled with the Saudi government's decisions to join the WTO, put more pressure on the Saudi private organisations to update their management practices. Saudi private organisations must become more technology oriented if they wish to withstand the expected severity of competition from the well-established multinationals from around the world. With this in mind we can see the big role that IT can play in this critical period for the Saudi private organisations.

Information technology is definitely important for the Saudi private organisations because as consequence of the Saudi government's plan to join the WTO and the frequent fluctuations of oil prices, the Kingdom's main source of income, the Saudi government will not be able to aid and protect them as it used to when it had the necessary wealth and the legal powers to do so. Therefore, IT systems can be used to enhance the efficiency and productivity of these organisations and to prepare them to compete effectively.

The singling out of the private sector in which to conduct this research may seem problematic for purposes of generalising about other sectors in the Saudi economy. Nevertheless, while this focus eliminates the potentially confounding effects that might arise if totally different sectors were to be studied (such as the mixture of private and public organisations), it may suggest hypotheses that are generalisable and testable beyond the private sector. The problems of making generalisations from the findings to a wider population of private organisations in other sectors in the Saudi economy are considerable. Nevertheless, it would be difficult to argue that this would render the research findings meaningless.

3.6 SUMMARY

This chapter has discussed and presented the data collection methods used at the first phase of this study. It also presented and discussed the key findings of the exploratory study. The activities in the first phase of this research consisted of consulting the literature on IT implementation in general and on SA and its experience with IT in particular. These activities also included conducting individual and group interviews with some IT professionals and academic to assess the current status of IT in Saudi organisations. In addition, during his visits the researcher identified some cases for possible more in-depth study and analysis.

The general findings from the exploratory study indicate that there is a need to focus the study to IT implementation in the Saudi private sector, which, as the literature indicated, has not been studied enough. Therefore, a decision was made to concentrate the research's main questionnaire survey on investigating the experience of the Saudi private sector with IT. This implies that research focusing on this subject would have practical applications which might lead to considerable financial savings and an overall higher success rate in IT implementation in this sector. These important issues highlight the strong need to focus this study on why and how private organisations decide on implementing IT systems and to what extent they assimilate these systems in their businesses.

The next chapter presents an in-depth literature review. It discusses the different issues involved in the implementation of systems such as the problems and barriers that might hinder the implementation process, the success factors, and the success measurements used in the IS literature.

بسم الله الرحمن الرحيم

CHAPTER FOUR
LITERATURE REVIEW

4.1 INTRODUCTION

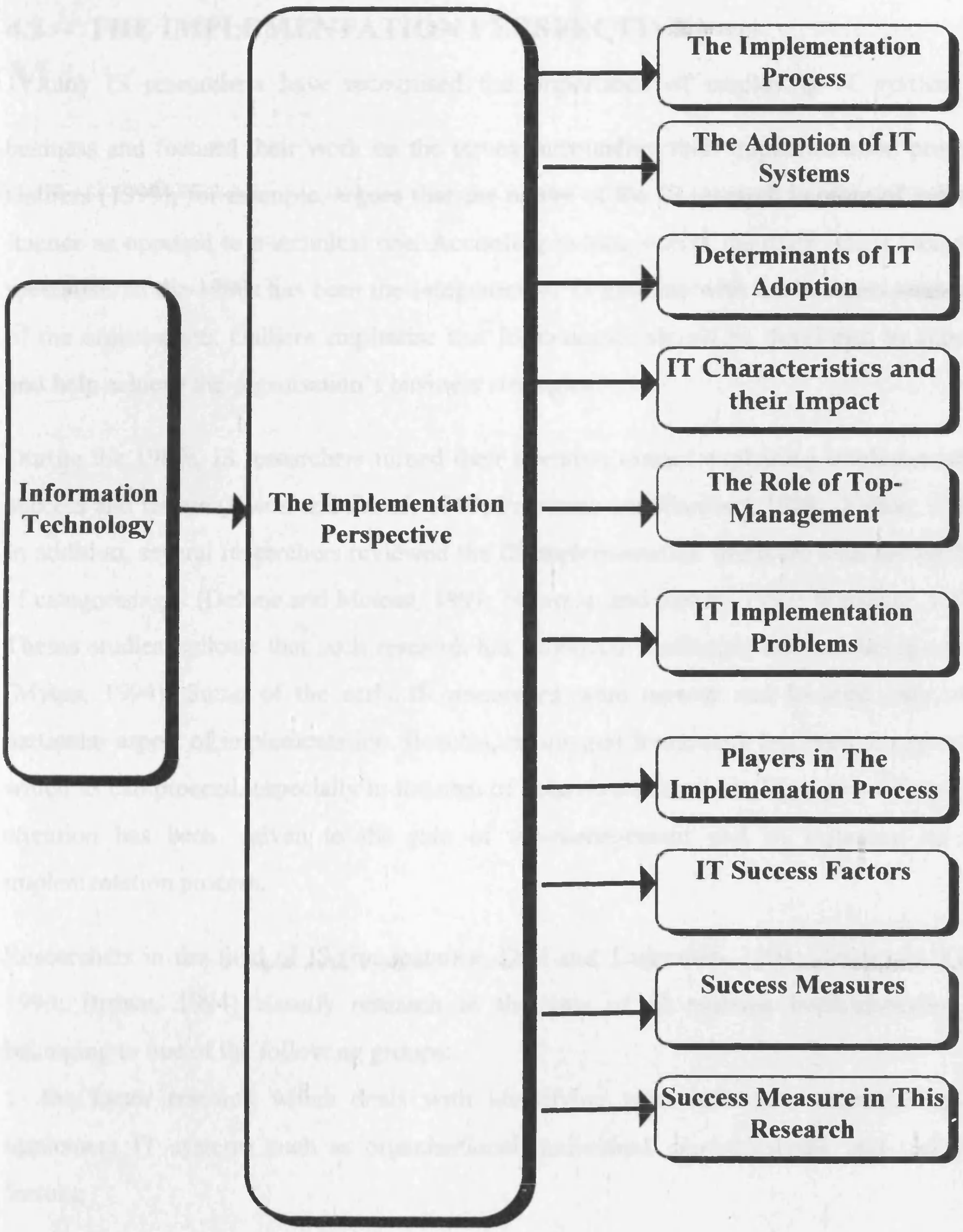
One of the reasons for the increased attention to the implementation of Information Technology (IT) systems is the increasing deployment of these systems into many different types of organisations around the world over the last 20 years. Because not all IT systems have been successfull considerable efforts have been made to discover the factors that underpin successful implementation. See, for example, work conducted by Park, Jih, and Roy (1994), Doherty and King (1994); Abdul-Gader and Alangari (1995), Ramaurthy and Premkumar (1995), Thong and Yap (1995), Whyte and Bytheway (1995), Chau and Tam (1997), Remenyi and Schambreel (1997), AL-Assaf (1997), El-imad and Tang (1998), Doherty, King and Marple (1998) and Khalifa, Irani, and Baldwin (1999). To understand and to be able to have successful IT systems that fulfil the organisation objectives, it is necessary for the top-management to understand the implementation process itself and the factors that influence it.

The main objectives of this research are to identify and examine the factors that entice Saudi private organisations to adopt IT systems and to identify and examine the factors that influence the success of the implementation process in the Saudi environment. In order to achieve these objectives, this literature review is carried out to relate previous research in the Information Systems (IS) field and to identify and understand the factors that are thought to influence the implementation of IT systems. In addition, this review is intended to help the researcher develop the research model and the instrument which will be used to gather data for this study.

Because the use of IT systems is fairly new phenomenon in the Saudi private business environment (Shash and AL-Amir, 1997), there is a little, if any, empirical research to date that examines the experience of Saudi private organisations with IT systems except for limited work. Most of this work focused on specific sectors or a limited number of organisations (Abdul-Ghani and AL-Sakran, 1988; Nabali, 1989; Abdul-Gader, 1990; Abdul-Gader and Alangari, 1995).

In order to determine the information needed for this study, a theoretical research framework was adopted to identified the key information elements at which the study was aimed (see Figure 4.1). It is used to guide the researcher in gathering and presenting the relevant literature for this study. It consists of concepts and definitions derived from the IS literature.

Figure 4.1 The Literature Review Framework



Using this framework, prior work in the field of IS research and IT implementation will be reviewed ın this chapter as it helps explain how IT evolved into an issue of strategic importance for the survival and long-term success of most business organisations. The review will examine and determine the current status of IT implementation research from the implementation perspectives. Using the implementation perspective, we will highlight some selected studies on the implementation of IT systems, the determinants of IT adoption, and the factors that influence the success of the implementation of these systems.

4.2 THE IMPLEMENTATION PERSPECTIVE

Many IS researchers have recognised the importance of employing IT systems in business and focused their work on the issues surrounding their implementation process. Galliers (1993), for example, argues that the nature of the IS research is more of a social science as opposed to a technical one. According to him, one of the main issues facing IS specialists in the 1990s has been the integration of IS systems with the business strategies of the organisation. Galliers emphasise that IS strategies should be developed to support and help achieve the organisation's business strategies.

During the 1980s, IS researchers turned their attention toward explaining implementation success and failure (Kwon and Zmud, 1987; Friedman and Conford, 1989; Walton, 1989). In addition, several researchers reviewed the IS implementation literature with the intetion of categorising it (Delone and Mclean, 1991; Newman and Robey, 1992; Walsham, 1993). Theses studies indicate that such research has produced conflicting and confusing results (Myers, 1994). Some of the early IS researches were narrow and focused only on a particular aspect of implementation. Besides, no integral framework has been suggested in which IS can proceed, especially in the area of behavioural issues in IT systems. Even less attention has been given to the role of top-management and its influence on the implementation process.

Researchers in the field of IS (for instance, Doll and Torkzadeh, 1991; Cragg and King, 1993; Brown, 1994) classify research in the area of IT systems implementation as belonging to one of the following groups:

1- the factor research which deals with identifying what influences organisations to implement IT systems such as organisational, individual, environmental, and technical factors;

2- The scope reseach which deals with identifying the number and kinds of IT systems implemented such as Management Information Systems (MIS), Decision Support Systems (DSS), Executive Information Systems (EIS), Electronic Commerce (EC), Electronic Data Interchange (EDI), and/or other Intranet and Internet systems;

3. The process research which identifies and examines the events and processes that take place before and/or during the implementation of IT systems such as the redesigning or re-engineering the business process;

4. The affect research which deals with the impact of IT systems on the adopting organisation's culture, competitiveness, communication procedures, efficiency, productivity, structure, strategy and tasks.

Other IS academics and professionals argue that there are different aspects or views of implementing IT systems. Each view has its own approach on how to manage the process. Whyte and Bytheway (1995), for example, identify three perspectives which they consider as important:

- the system (product) which is delivered to the users (for example the software and hardware systems, user' manuals and/or training courses);
- the process that creates the system which includes systems analysis, logical and technical design, programme coding, testing and implementation;
- the service package which deals with the critical issues (answering questions, dealing with problems, or whatever else is needed).

In their paper, Whyte and Bytheway (1995) criticise organisations and IT specialists in particular for spending most of their time monitoring aspects of their operations which have little to do with the service which they claim they are providing or are supposed to provide.

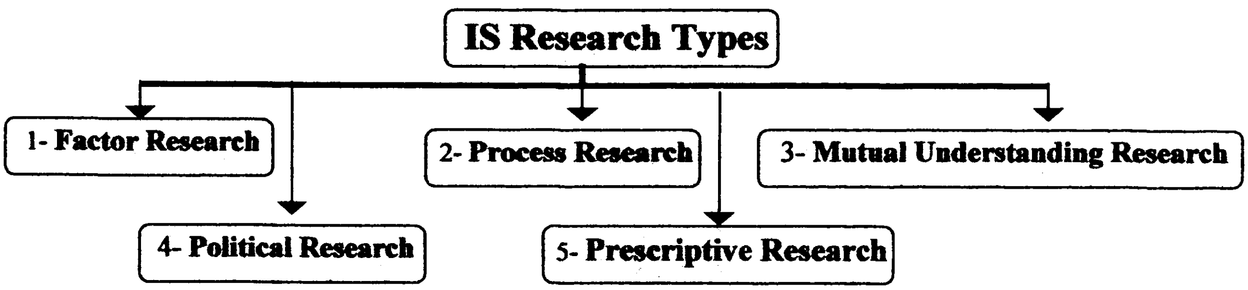
Another view is held by Chaudhry, S., Salchenberger, Linda., and Beheshtian, Mehdi (1996) who proposed a framework for systems implementation which they claim, if followed, will increase the chance of IT success. The stages in the proposed framework are: project assessment, problem analysis, design, development, testing and documentation, implementation and maintenance. These stages and the tasks undertaken in each stage are listed in Table 4.1.

Table 4.1
A Framework For The Development and Implementation of IT Systems

Stage	Tasks
Project Assessment	Define the problem, determine project feasibility and develop project proposal.
Problem Analysis	Analyse processes, select problem solving paradigms, select development software, prototype system to determine system requirements.
Design	Determine logical design of the system, design databases, design modules, design the user interface.
Development, Testing and Documentation	Develop software applications, develop database, load database with test data, refine user interface, implement test models, perform validation testing, evaluate user interface and develop documentation.
Implementation	Identify an agent of change and provide user training.
Maintenance	Develop maintenance plan and budget, perform post-implementation review and make the necessary modifications.

Source: Chaudhry, S., Salchenberger, Linda., and Beheshtian, Mehdi. (1996) A Small Business Inventory DSS: Design, Development, and Implementation Issues. Computers and Operations Research, Vol.23(1), pp. 64.

Kown and Zmud (1987) conducted a review of the IS implementation literature in order to develop a coherent model that encompassed two decades of research streams. It was determined that five research streams exist in the IS implementation literature that could be combined to form a comprehensive IS implementation model. The five dominant IS research types are: Factor research, process research, mutual understanding research, political research, and prescriptive research (Kown and Zmud, 1987; Lucas, Ginzberg, and Schultz, 1990; Galliers, 1993; Whyte and Bytheway, 1995).



1- Factor Research

Factor research is concerned with the set of factors that accounts for either success or failure in implementation. Its aim is to test an empirical association between independent variables (for example top-management support and user involvement, etc) and dependent variables (for example systems success, user satisfaction, and so on). Factor research can explain why and what went right or wrong during the implementation process but it does not explain how things happened (Keil, 1991). It merely associates a level of independent variables with a level of dependent variables, inferring causal linkages between them (Newman and Robey, 1992).

Studies in the IS field have produced different and inconsistent lists of factors that influence the implementation of IT systems (Kwon and Zmud, 1987; Boland, 1989; Ali, 1994; Whyte and Bytheway, 1995; Doherty and King, 1998). Examples of factors associated with the successful implementation of IT system include top management support, training and user involvement during the design and development of the adopted systems (Kown and Zmud, 1987; Slevin, Steiman, and Boone, 1991; Abdul-Gader and Alangari, 1995). Top-management innovativeness, attitudes, IT experience and knowledge were also found to be important determinants to adoption and success (Thong and Yap, 1995; Doherty and King, 1998).

Ginzberg (1975) identified 140 different factors appearing in 14 field studies. Only 38 factors appeared in two or more studies and only one appeared in five studies. Only a few factors reappear as being significantly related to IT success and failure, e.g. top-management support and user involvement (Kwon and Zmud, 1987).

2- Process Research

Process research is concerned with the implementation process itself and how it is managed. Process research views the implementation efforts as a series of stages. The research has concentrated on the development of IT systems. It is a complementary alternative to the factor research (AL-Assaf, 1997). This type of research can be traced back as early as 1960s when researchers started to investigate the implementation of IT systems and their impact on people and organisations. Using this approach meant that more attention and concentration had to be given to the dynamics of social change and to the activities that take place during the implementation process; it also explains why and how targets are achieved, and what is the actual experience of this process (Kling, 1987).

This approach has concentrated on the development of IT systems projects. It also provides the process that can be used to describe the relationship between the independent and the dependent variables. The process approach also involves a study of the organisation's actual experience with the adopted technology and might entail complex analysis (Kling, 1987). Therefore, according to this approach, to ensure success of the implementation process, it is most essential to have adequate organisational commitment to change and accompany the process with a high degree of planning (Tait and Bessy, 1988).

Lyytenin (1987) classifies IS research that uses the process approach into different models such as: life cycle, prototyping, pragmatic-semantic-constructive levels of decision making, evolutionary design, organisational change and discourse process. Lyytenin groups these models into further three categories: engineering, learning and dialogue. The engineering process model suggests that the system implementation process mainly involves the engineering of technical and social activities. The learning process model views the implementation process as individual and collective learning. The dialogue model treats the implementation process as a collective inquiry and a bargaining process that requires mutual dialogue.

3- Mutual Understanding Research

Kown and Zmud (1987) define mutual understanding research as the study of the user-developer understanding and relationship during the systems development process. These researchers and others (Ives and Olson, 1984) maintain that the better the understanding and interaction between the systems' developers and the users, the greater the prospect of successfull implementation.

Many IS academics and researchers agree on the need for more better communications between all the interested parties in an IT system if success is to be attained (Skyrme and Earl, 1990). DeBrabander and Theirs (1984) suggest that relaxed interaction between the users and the systems development team strengthens the possibility of success. Lyytinen (1987) contends that success hinges on the social structures and interactions that prevail during and after the development process.

4- The Political Research

Again, Kown and Zmud (1987) suggest in their research that organisations and their staff may be motivated to promote, engage in, or resist IT systems adoption based on their diverse interests. This implies that many seemingly irrational decisions and outcomes can be explained when the different motives of the players in the implementation are understood.

According to Markus (1988), people resist IT systems because of their own personal agendas or circumstances, because of bad system design or because of bad user-system interaction. Moore and Benbasat (1991) dispute the idea that the implementation of IT systems is merely a matter of technical or economical issues. They argue that the process is more influenced by the political and change process within the organisation.

Moore and Benbasat (1991) also point to the possibility that a cultural clash might happen during the implementation period owing to the incompatibility between the adopted system and the organisation's culture. They emphasise that it is necessary to take into account the organisational dimensions of culture, power and politics during development and implementation.

5- The Prescriptive Research

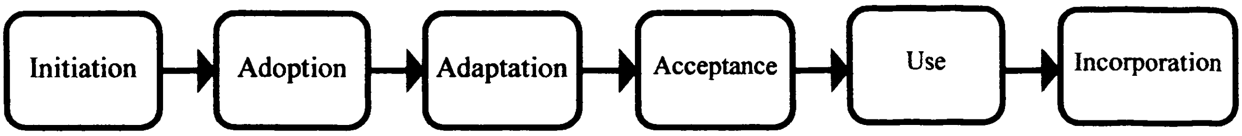
The fifth type of IS implementation research, the prescriptive research, is concerned with the risk factors associated with the IT implementation project and its organisational context. A commitment must also be taken of individual players in the implementation process. This kind of research attempts to develop strategies for the implementation process.

Known and Zmud (1987) combined the major results from the five research streams to create a unified model that can be used to understand IT implementation success (Figure 4.2).

Kown and Zmud (1987) suggest that their model creates a foundation for further IT implementation research that (1) examines the relationships among the stages, or (2) examines a particular stage in more detail. The implementation process in Kown and Zmud's model is broken down to allow for a deeper investigation of the factors associated with the adoption, adaptation, acceptance, use and incorporation of new technology.

Figure 4.2
Information Technology Implementation Model

Kown and Zmud (1987)



The Kown and Zmud model can be used to understand the change process that organisations go through when they adopt new technologies. Understanding the relationship between the process of organisational change and the factors associated with organisational innovation can lead to a better explanation of what contributes to successful implementation of IT systems. Other researchers (for example, AL-Assaf, 1997) suggest other approaches such as: the change process research and the contingency research.

In summary, it can be seen that a variety of research studies has been conducted and many approaches and theories have been offered and suggested for implementing IT systems. Despite the efforts of many researchers during the last two decades to investigate and understand implementation and the variables that influence it, no one study or theory has been widely accepted (Thong and Yap, 1995).

The present study builds upon the work of Kown and Zmud (1987), Thong and Yap (1995) and Abdul-Gader and Alangari (1995) by specifically examining success in terms of IT adoption and assimilation constructs. This study can be considered as belonging to the factor research type. It follows an antecedent approach in which factors that have been identified in the literature as motivators or inhibitors to IT success are examined. An understanding of the factors that affect implementation is essential to manage this process and to increase the chance of success. The objective is to identify and quantify the relative influence of several individual, organisational, technical, contextual and situational factors on IT adoption and assimilation in the Saudi private sector.

In this study, IT success is measured by whether the organisation is adopting IT systems (YES/NO) and by the rate of assimilation of IT systems into the sample organisations as reported by their top-managers. This rate is based on the percentage of computerised departments and functions to the total departments and functions performed in the adopting organisations.

4.2.1 The Implementation Process

Sometimes the term implementation process is used interchangeably with the term diffusion or assimilation to refer to the same activities that take place in this stage of the system life cycle. The implementation process is a major stage that follows the investigation, analysis and design stages of the systems development process. Therefore, implementation is an important activity in the deployment of IT to support an organisation and its end-users.

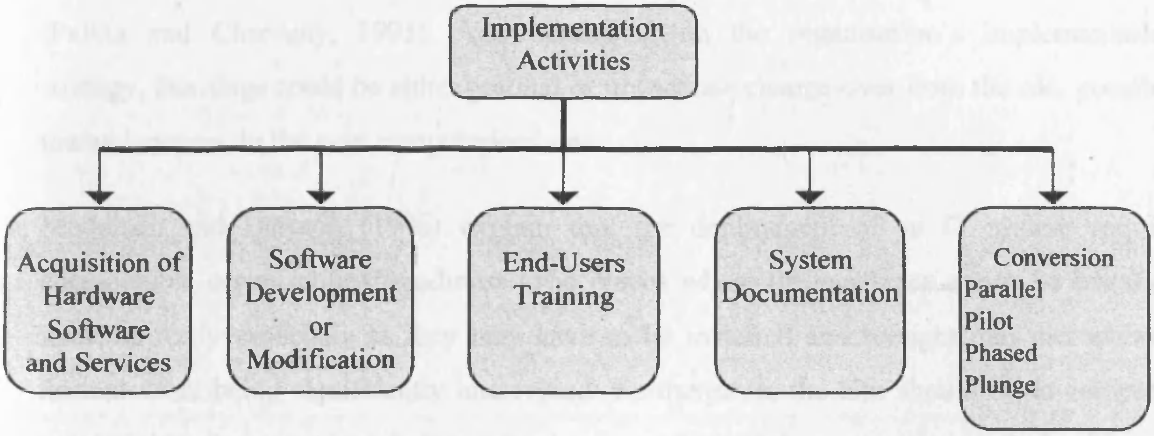
The implementation process also involves determining if the users are accepting the system and are satisfied with it or whether the system needs modifications and improvements. Most implementation studies assume that the system is already developed and has been introduced into the organisation (Lucas, H., Walton, E., and Ginzberg, M., 1988; Whyte and Bytheway, 1995; Palvia and Chervany, 1995).

In order to maximise the benefits from investing in IT, organisations must understand how to manage the implementation process. Implementing IT systems often requires different levels of organisational change and sometimes this change is crucial for a successful implementation (Walton, 1989). Thus, the process must be treated like any other major managerial function and charged to an individual at the top of the organisation with a clear line of responsibility and command.

According to O'Brien (1993), implementation involves a variety of activities: acquisition, installation, documentation, testing and conversion. It also involves the training of end-users in the operation and use of the adopted systems. McKersie and Walton (1991) explain that the implementation of IT systems consists of three main functions: The design function, the staff development function and the management function. Figure 4.3 illustrates the major activities of the implementation process.

Because the implementation process is a complex and uncertain process, top-management executives face an imminent and critical problem in dealing with all the variables that influence this process. The problem for most executives is that the implementation of new technology involves technological, structural and/or administrative change. For these executives it is simple to manage operational problems but very complex to manage change (Malek and AL-shoaibi, 1998).

Figure 4.3



Source: O'Brien, James. (1993) Management Information Systems- A Managerial End User Perspective

IT implementation can end in disaster without a working system. If this happens then the money invested and the efforts devoted by many people to design and develop the system will evaporate in front of the management's eyes. Therefore, Eason (1988) and O'Brien (1993) emphasise the importance of having a carefully planned and managed implementation process.

Many researchers attribute failure to the resistance to change that different members of the organisation show after the introduction of the new technology to their workplace. Introduction of IT into an organisation requires people to change the ways in which they do their jobs. Most people resist because they are comfortable with their current ways of doing things and are afraid or unsure about how the new situation will work out.

The present researcher has personally encountered this kind of attitude during his visits and meetings with business owners in SA. One factory owner, in particular, in AL-Ahssa area is refusing to adopt computer-based information systems because, due to his scanty knowledge about computers, he is afraid that he will lose control of his business if computers were to be adopted. Information systems researchers acknowledge such behaviour and point out that when a new technology is introduced successfully, those who use it or own it see their power and status enhanced, while those who reject it see the reverse (AL-Shoaibi, 1998).

To ensure success, the implementation of an IT system must be treated as an example of planned technological change. To the individuals and the organisations involved, the success or failure of implementation depends on how well the change process is managed (Palvia and Chervany, 1995). And depending on the organisation's implementation strategy, this stage could be either gradual or immediate change-over from the old, possibly manual system, to the new computerised one.

Maddison and Darnton (1996) explain that the deployment of an IT system require considerable organisational readiness. The places where the machines are to be installed must be ready especially as they may have to be installed and brought into use without normal work being significantly interrupted. Furthermore, the aim should be to complete the training for users just before actual use; and careful preparation to deal with any residual problems should be made.

Alavi and Joachimsthaler (1992) link successful implementation to user situational factors (user involvement, training, and experience). They estimated, on the basis of their analysis of other implementation studies, that when users were involved in the development process and were provided with the appropriate training, the rate of implementation success could increase by as much as 30%. Thus, it is very important that the top-management involves users in the development and implementation stages and allocate enough time and financial resource for training these users.

Christie (1985), cited in Lucas (1989), suggested a procedure for adopting and implementing IT systems; this procedure is composed of several steps:

1. there should be a need for the system;
2. analyse the problem;
3. involve key parties (form a team);
4. establish goals;
4. ensure commitment to the system;
6. put the user in mind;
7. maximise awareness;
8. anticipate the assimilation rate;
9. put timetable for the implementation process;
10. be aware of laws and regulations;
11. select the appropriate equipment;
12. manage the transition and changes;

13. start the actual operation and make any necessary changes;
14. provide support.

Lucas (1989) distinguished between implementing off-the-shelf packages and custom-developed system. In the case of the off-the-shelf system, the needs of the adopting organisation have to be carefully compared to the predetermined features of the off-shelf package. Should there be any discrepancies, the package can still be an option if these can be resolved.

Lucas also emphasised the development of a high-level specification to act as a benchmark when evaluating the adopted system. However, in both types of systems, the users must be heavily involved during all of the stages from analysis and design phase to implementation, including the conversion to, and the operation and maintenance of the new system (Lucas, 1989).

From the above discussion, it is evident that for IT implementation to be successful, it is necessary to ensure that all of the steps of this process are followed using a carefully planned approach.

4.2.2 The Adoption Of IT Systems

The adoption of IT systems is seen as a special case of innovation adoption which involves both the acquisition and the subsequent use of these systems. More importantly, this process includes the organisational policies and strategies employed by the organisation to identify, acquire, assimilate and use the adopted systems. Zmud (1984) pointed out the importance of assessing IT systems in order to facilitate their assimilation throughout the adopting organisation.

Spence (1994) distinguished between adoption and assimilation of IT systems. He considered adoption as a process that results from a process which is internal to the adopting individual or organisation. Assimilation, on the other hand, is a social activity in which interpersonal contact and influence are inescapable and essential factors.

Rogers (1995) identified five steps that individuals or organisations go through before they reach conclusions and decide whether to adopt and use or reject a new technology:

1. Acquistion of knowledge about the concerned innovation or technology and its potential;

4. Persuasion which is expressed in a favourable or unfavourable attitude toward the technology,
3. Decision taking after the involvement of the decision unit in activities leading to the acceptance or rejection of the technology;
4. Implementation where the individual or organisation adopts and starts utilising the technology; and
4. Confirmation is a "see for yourself" approach to confirm what you came to know and understand before the adoption and after; the adopting unit might either increase the use of the technology and spread it across its business and functions or discard it.

Success in the implementation of IT systems means that these systems are perceived as being successful by both their initiators (champions) and users (Walton, 1989). As matter of fact, for the purpose of this study, we will treat the implementation as progress from the initiation stage of the computerisation project to the utilisation and maintenance stages.

Studies of IT systems suggest that successful implementation requires long-term commitment and entails an evolutionary process of adoption and adaptation (Leonard-Barton, 1988; McGee, 1991). This means that organisations should constantly monitor, control and manage their IT resources in order to be in control of the delicate balance between success and failure of the adopted systems. In other words, and as Walton (1989) asserts, the challenge of implementation lies in the management's ability to manage the mutual influence of technology and organisation throughout the extended implementation process.

Leavy (1997) argues that successful implementation requires variety in idea generation and multiple independent, and often competing, approaches to improve substantially the odds for success. It also requires a degree of personal or group (champions or agents of change) support and commitment to see an innovation through the initial period of high risk.

Walton (1989) in his book 'Up and Running' attributes the failure of many IT systems to the management's failure to understand the mutual influence of technology and organisation throughout the extended implementation process. In addition, to increase the chance of success, the newly adopted technology has to be adapted or redesigned sometimes by the user in a process that Rogers refers to as re-invention.

Robertson, Swan and Newell (1996) assert that some systems cannot be adopted by organisations as 'off-the-shelf' packages with fixed parameters and universal applicability. Rather, in many cases, they have to be modified and customised to fit the social and cultural context of the adopting organisation. Clark and Newell (1993) refer to this process of modification and reconfiguration of a new system to fit a certain social or organisational setting as the appropriation of innovation.

Doz, Angelmar, and Prahalad (1995) attribute the failure of many firms to their failure to adapt or to adjust to new substitute technologies. Doz et al. go on to suggest that a firm's failure might come from rigidity of internal conditions and/or from inflexible organisational practices rather than from technical incompetence. El-Imad and Tang (1998) attribute the failure of some organisations in their use of IT systems to: (1) lack of will to use the available systems, (2) weak management, or (3) lack of well trained people.

Some firms manage the adoption process better than others despite similarity in their technological competencies. Several studies of success and failure of technology adoption, for example Cooper (1988), Lilien and Yoon (1989), and Rothwell (1992), agree with this assertion.

Research by Lockett (1987), which covered 30 IT projects in the UK, has shown that several factors were behind successful IT projects, these included:
(1) a project champion in the adopting firms; (2) late formalisation of the project; (3) a development team bridging the gap between the IT system function and users; (4) prototyping in the early stages of the IT project; and (5) transition from a development to an implementation phase with different management requirements.

Although these studies highlight the importance of developing close links with the users and markets and communicating this perspective through to the various functions involved in creating new products or services to satisfy these users and markets, they do not provide enough information on how that link might be built.

There is a further difficulty in studying why some organisations succeed in IT systems management while others fail. It stems from the fact that capabilities in the management of these systems are firm specific; what works for one organisation might not work for another or cannot be copied by another with the same result (Bessant et. al., 1996).

4.2.3 Determinants Of IT Adoption

The IS literature has identified many variables that are possible determinants of organisational adoption of IT systems (Chau and Tam, 1997). Most of these studies have investigated the affect of organisational characteristics on the organisation's decision to adopt. Organisational characteristics that have been studied include size, competition, specialisation, functional differentiation, and external integration (Thong and Yap, 1995).

Besides organisational characteristics, the importance of top-management characteristics has also been investigated by some researchers in the IS field (Montazemi, 1988; Howell and Higgins, 1990; Rizzoni, 1991; Grover and Goslar, 1993). The rationale is that each member of the top-management team plays a major role in the organisation and consequently he or she is among the organisation's key decision makers who shape the future of the business.

Thus, the impact of the organisation's top-management characteristics such as its computer knowledge, education level, innovativeness and its attitude towards adoption of IT systems were found to influence both the decision to adopt IT systems and the success of the implementation process (Porter and Miller, 1985; Cragg and Wilson, 1993; Park, Jih, and Roy, 1994; Thong and Yap, 1995).

Some other researchers studied the relationship between organisational factors and technology adoption and identified some other influencing factors. For example, Damanpour (1991) discussed four determinants that he holds as major factors in the adoption of new technologies: the type of organisation, the type of innovation (technology), the stage of adoption, and the scope of innovation. In the following paragraphs we will discuss these determinants in general terms as they relate to this study:

1- Type of organisation. Researchers (such as Van de Ven, 1987) have found that organisations of all sizes and types adopt IT systems to respond to changes in their external and internal environments. However, organisational factors were found to be extremely influencial on the decision to adopt new technology. These factors include the organisation's size and the type of industry or sector in which it conducts its business (Doherty and King, 1998). It was also found that the impact of organisational variables on innovation differs considerably between entrepreneurial (risk taking) and conservative firms (Damanpour,1991).

Clear differences also exist between private and public organisations. These differences include managerial roles, managerial perceptions of external control, structural features, decision-making processes, work-related attitudes among employees and differences in strategies in technology adoption (Peery and Rainey, 1988). Research has also suggested that the high level of bureaucratic characteristics of public organisations has a negative influence on a manager's desire to delegate authority. This in turn inhibits innovativeness.

The very type of industry in which the firm conducts its business was found to influence the type of technology adopted due to the nature of activities, the type of firm-customer relationship and the structures within the organisation. For example, the nature of the activities of manufacturing and service organisations differs. In service organisations (1) the output is intangible and its consumption immediate; and (2) the producer is close to the customer or client and so they must interact for delivery of the service to be complete (Damanpour,1991).

On the other hand, in many manufacturing organisations, products reach the customers without direct contact with the manufacturing firm because there is a buffer in the form of distributors or marketing agents. Thus, many of the problems associated with these kinds of contacts are minimised to the minimum in the manufacturing sector. These differences can affect many organisational functions such as standardisation of work and managerial and production control.

2- Type of innovation (technology). Researchers have maintained that distinguishing types of innovation is necessary for understanding organisations' adoption behaviour and identifying the factors that influence this process. Several types of innovations have been identified. However three types have gained the most attention. Each type centres on a pair of innovation types: administrative and technical, product and process and radical and incremental.

Administrative and technical innovations imply potentially different decision-making processes, and together they represent changes introduced in a wide range of activities in an organisation. Technical innovations relate to products, services and production technologies. Administrative innovations involve organisational structures and administrative processes. They are indirectly related to the basic work activities of an organisation and are more directly related to its management. The adoption of these two types of innovations is influenced by different factors (Damanpour, 1987).

Based on Damanpour's (1991) definition, product innovations are new products or services introduced to meet an external user or market need. Process innovations are new technologies or systems introduced into an organisation's production or service operations:

input materials, task specifications, work and information flow, and/or equipment used to produce a product or render a service. According to Damanpour's study, the rates of adoption of product and process innovations are different during the stages of the development of the business. Firms also differ in their emphasis on product or process innovation for providing competitive advantages.

These researchers have proposed differences between predictors of the adoption of different types of innovations. For example, managerial attitudes toward change and technical knowledge resources have been expected to facilitate radical innovations (Dewar and Dutton, 1986), whereas structural complexity and decentralisation are expected to lead to incremental innovations. Furthermore, these two types of innovations differ in their contribution to the effectiveness of the adopting firm. This fact explains why it is helpful to know the distinction between the available technologies and how they might affect adoption.

3- Stages of Adoption. Damanpour (1991) defines adoption as a process which includes activities that lead to a decision to adopt as well as activities that facilitate putting the adopted innovation into use and continuing to use it. Following the two-stages concept suggested by Rogers (1983; 1995), Damanpour divides the adoption process into two main stages: (1) the initiation stage which he claims includes all activities related to problem perception, information gathering, attitude formation and evaluation and resource attainment leading to the decision to adopt; (2) the implementation stage which consists of all activities and actions pertaining to modifications in both the adopted technology and the adopting organisation as well as the initial and continued use of the technology.

According to Chaudhry et. al. (1996), the implementation of IT systems must be recognised as a process composed of stages that create organisational change because their installation and use will have a major impact on the tactical and operational decision-making. These researchers emphasise the importance of the change agent, who works with the users through all the stages of the implementation process which include:

(1) the unfreezing stage during which the organisation prepares its systems and human resources to increase the receptivity of the organisation to change;

(2) the action (change) stage during which the organisation moves or follow a new course of action, and (3) the refreezing stage during which the organisation returns to a stage of equilibrium.

4- Scope of innovation. Normally, an innovation is adopted in one organisational unit. But its diffusion to other parts of the organisation is dependent on whether the innovation has adequate task scope in the other units or processes in the adopting organisation (Ramamurthy and Premkumar, 1995). These two authors point out that there should be adequate scope in the task environment to diffuse the use of the innovation and gain significant benefits.

Many studies of organisational innovation have measured innovativeness by the number of innovations adopted in a given time period. Large and wealthy organisations adopt many and more expensive innovations in a given time period than small organisations do. Damanpour asserts that when multiple innovations are studied, the influence of innovation attributes decreases and that when all innovations adopted are considered, the role of organisational characteristics becomes more evident.

Therefore, Damanpour (1991) argues, determinants of innovation and the strength of their influence depend on whether or not multiple innovations related to various parts of an organisation are studied.

4.2.4 IT Characteristics and their Impact

Characteristics of IT systems can hinder or facilitate the adoption and use of these systems. Different characteristics have been studied specifically in the IS field. For example, studies by (Rogers, 1983,1995; Cooper and Zmud, 1990; Moor and Benbasat, 1991; Iacovou, 1994; Spence, 1994) were conducted to describe the relationship between the characteristics of the technology and its adoption rate and successful implementation.

IS researchers, for example Cooper and Zmud (1990), Spence (1994), Iacovou, Benbasat, and Dexter (1995), Ramamurthy and Premkumar, (1995) base the rate of adoption and the success of a particular technology on its characteristics which include, but are not limited to:

⇒ **Relative advantage:** this is a motivator to adopt many types of technologies and refers to "the degree to which an innovation is perceived as being better than the idea it supersedes" (Rogers, 1983, p. 213; Ramamurthy and Premkumar, 1995). Relative advantage can be measured in economic terms, social prestige, convenience, increased safety and/or satisfaction; the greater the perceived relative advantage of new technology, the more rapid its rate of adoption is going to be.

Many organisations base their adoption decisions on the technology's perceived relative advantage (Iacovou, Benbasat, and Dexter, 1995). Chao and Kozlowski (1986), cited in Klientop (1993), found positive employee reactions to robots when the robots took over hazardous, hot, heavy and/or monotonous tasks and negative reactions when robots assumed the skilled tasks the employees previously performed or wanted to perform.

⇒ **Compatibility:** this is defined as the degree to which a potential technology is perceived as being consistent with the existing values, past experiences and needs of potential adopters (Cooper and Zmud, 1990). Based on this definition we can relate compatibility to how people feel or think about a technology, or how it fits operationally with what they are doing. The more compatible a new idea or technology with existing systems, procedures and norms, the faster it spreads and is accepted (Rogers, 1995).

⇒ **Complexity:** this is concerned with the degree to which a new technology or idea is perceived as difficult to grasp and use (Macrolin, 1994). Rogers (1995) argues that the simpler and easier a new idea is to understand, the faster it will be adopted and spread. While a new technology may appear to be beneficial, the organisation may not possess the necessary skills or resources to use it. The perceived complexity is generally found to be negatively related to implementation success (Prmkumar, 1994; Rogers, 1995). Thompson et al. (1991) concluded that perceptions of complexity decreased use while perceptions that a personal computer would enhance work performance lead to increased use.

⇒ **Trainability:** this relates to the degree to which a new technology may be tested and experimented with. A new technology that can be tried without conditions and without complete commitment represents less uncertainty and is bound to be adopted and spread more quickly than technology that cannot be tested and tried.

⇒ **Observability:** Potential adopters will be more interested in a new technology and more convinced about it if they can see its results and real benefits before they adopt it.

⇒ **Cost:** The cost of an innovation has emerged as an important key factor sometimes on its own or as part of relative advantage. While high cost is negatively associated with adoption, some researchers have argued that once an adoption decision has been made, these higher costs can be positively associated with diffusion efforts because it is in the best interests of the organisation to optimise its investement (Ramaurthy and Premkumar, 1995).

⇒ **Utility:** if a new product can be seen to be a major improvement on what currently exists then it could be adopted quickly.

⇒ **Competitive pressure:** the more organisations adopt the new product the faster it will be adopted by others. Many organisations in different industries find it necessary to adopt IT systems in order to compete effectively and to protect their market share.

Moore and Benbasat (1991) identified two further characteristics beyond Rogers' classification which they thought important in the decision to adopt a new technology. The first was **image**. They defined this as "the degree to which use of innovation is perceived to enhance one's image or status in one's social system". The second was **voluntariness of use**. This was defined as "the degree to which use of the innovation is perceived as being voluntary or of free will".

Davis (1989) developed a model called Technology Acceptance Model (TAM), which was similar to Rogers' Diffusion of Innovation model. In this model, Davis included two characteristics that he thought important in the decision to adopt and use a new technology: perceived usefulness and perceived ease of use. He defined these as:

- **perceived usefulness**: the degree to which an organisation or an individual believes that using a particular system would enhance its/his functions.
- **perceived ease of use**: the degree to which an organisation or an individual believes that using a particular system would be free from major physical and mental efforts.

A similar view is held by Igbaria (1993) who considers usefulness and ease of use as important factors in determining the decision to adopt and use IT systems. Lockett (1987) in a research which covered 30 IT projects in the UK refers to a number of attributes that he holds as particularly important in successful IT systems:

- Good understanding of customer and end-user needs by those involved in development;
- The use of external information, skills and contacts by system developers and customers;
- Senior management sponsorship, commitment and involvement;
- The existence, and relatively senior position, of an internal champion;
- Effective, but not necessarily fast, technical development of the system.

From the above discussion, we can draw some comparison between IT characteristics proposed by these different researchers. For example, the idea of Rogers (1995) relative advantage and Spence's (1994) utility is similar to Davis' (1989) perceived usefulness; Rogers' and Spence's complexity is similar to Davis' ease of use; Rogers' trialability is similar to Spence's visibility and divisibility characteristics.

In this study we will examine some of the characteristics that were discussed in this section to find out their impact on the decision to adopt IT systems in the Saudi private business environment. We assume that these characteristics play a bigger role in the Saudi top-management's decisions to adopt IT systems than the other characteristics. These include the following:

1- Relative advantage (Perceived usefulness)

2- Ease of use (vs) complexity

3- Cost

4- Competitive pressure.

In the following section, we will discuss the role played by top-managers and their influence on the implementation process.

4.2.5 The Role of Top-Management

The influence of top-management members (the business owners and the executive managers) on the implementation of IT systems is undisputed due to the strong position and the high authority these individuals enjoy inside their organisations. These persons are the chief decision-makers in their organisations (Chau and Tam, 1997). Igbaria, Zinatelli, Cragg, and Cavaye (1997) who studied IT systems acceptance in 203 small organisations in New Zealand, pointed out that top-management support had the greatest influence on IT success in these organisations.

Top-managers make or break other important decisions related to IT in their organisations in such areas as upgrades, choice of technologies and vendors and the installation and outsourcing of IT contracts. Unless the top-managers have the will to innovate or support innovation inside their organisations, there is a little that other members of the business can do to expedite the adoption of IT (Chau and Tam, 1997). Top-managerial involvement and support during the implementation process is a must in order to have successful implementation and to achieve the organisation's objectives from the adoption of these systems (AL-Shoaibi, 1998, Doherty and King, 1998).

In terms of top-management support and IT implementation, there are several possibilities. Top-management may suggest or require the use of IT systems to reduce their organisation's dependency on paper-based communications with its suppliers and clients. For example they can also request a change in the old ways of doing things in the organisation to use interactive "front-end" computerised applications which provide a single-user interface to users regardless of their hardware platforms or their location in the organisation (Eder, 1998).

Top-management characteristics and values are usually associated with their perceptions and attitudes toward the adoption of new technologies (Kown and Zmud, 1987). In the IS literature, there is evidence to suggest that top-management support is positively related to the adoption of new technologies among organisations; and without the understanding and commitment of top-management, the potential of IT to fulfil the organisation's objectives will never be realised (Hoffman, 1994).

The Massachusetts Institute of Technology (MIT) management program suggested a guidelines for the role that top-management can play:

(1) to set the policy for the adoption and implementation of new technologies into their organisations;

(2) to define the desired capabilities and limitations of IT in their business;

(3) to define and announce reasonable organisational goals for IT systems;

(4) to exhibit a strong involvement, commitment and support during the implementation process; and

(5) to communicate the organisation's policy on IT to all employees (AL-Shoaibi, 1998).

4.3 IT IMPLEMENTATION PROBLEMS

New IT products, both hardware and software, are constantly being released onto the market. Some are clearly beneficial to many of the organisation departments while others are less so. In addition, there are many types of users of IT systems and not all tools will suit them all. Therefore, adopting a new system that is compatible with the organisation's current IT facilities and which can meet the organisation's requirements, can raise problems for management. The problems are made more complex by the reality that the needs, expectations and skills of the organisation can and will change over time (Elliot and Melhuish, 1995). This is why we find that system success and failure has become an important area for research and has taken up management attention during the last two decades.

Although precise and detailed figures are hard to list here, it can be estimated, as Martin and Powell (1992) claim, that perhaps 50% of all IT developed systems fail to meet all, or part of their original objectives. IT literature reveals that there are just as many examples of wasted efforts and unsuccessful attempts to use IT as there have been successes. Sizes of IT systems failures varies considerably ranging from the small-scale accounting systems to major government projects, resulting in the loss of millions of Pounds. According to Long (1998), who studied 2000 US firms that had implemented IT systems, at least 40% of these systems did not achieve their objectives due to human and organisational problems. Only 10% of the failures were attributed to technical causes. According to Computer Weekly (31,8,2000) computer breakdowns cause appalling levels of waste and stress; the cost to UK economy estimated at 19 billion Sterling Pounds a year.

Long points out that the last three decades have witnessed a range of implementation problems. During the 1960s, most were attributed to hardware failures. In the 1970s the problems came from software deficiencies. In the 1980s management and organisational problems were responsible. In the 1990s factors related to integration, compatibility or complexity were the main causes of failure.

In 1994, for example, a report in the Scientific American Journal revealed that three-quarters of all large systems are 'operating failures' that either do not function as intended or are not used at all (Smith, 1997). A UK newspaper headline (Computing, 16/11/1995) claims that UK companies spend over 1 billion Sterling Pound per year on software inappropriate to their needs.

Some other examples close to the UK are: London Stock Exchange settlement system (the Taurus project), London Ambulance Service call logging system. Another example is the British government Inland Revenue System (IRS) which still need a huge amount of money to fix the problems that surfaced after these systems have been implemented (Sounders, 1999). A more recent failure was reported by THE TIMES (February 3, 2000) where Anglian Group, a double-glazing windows and conservatories supplier, reported a loss of 50 million Pound in the wake of problems. These problems were caused by the new five-million computer system designed to speed up the manufacturing of plastic window-frames but which instead had led to the wrong sized windows frames being delivered to customers.

Successful implementation can benefit both the supplier and the recipient, though recent studies have shown that the strategic management of IT implementation remains problematic. Some researchers blame suppliers for selling inappropriate systems (Abdul-Rahman, 1992), whilst others put the blame on the adopters for their inability to adopt what is appropriate for their organisations or their inability to absorb the technology they implemented into their organisations (Madu, 1991).

Martin and Powell (1992) warn against the consequences of failure to implement an IT system successfully because failure can be very expensive and disturbing: loss of development efforts, loss of anticipated tactical and strategic benefits, delay of sequential development of other inter-organisational systems, loss of confidence, credibility and morale.

Problems associated with the implementation of IT systems can be classified into several categories: cultural, people, technical, data, management style, complexity and conceptual (Ibrahim, 1985; Yavas et al., 1992). An inaccurate conception of the user' requirements leads to the development of IT systems that solve the wrong problems. Consequently, precious resources are wasted on developing good systems that produce non-essential or wrong outputs.

Lyytinen (1987) listed two types of IS problems: (1) development process (Design), and (2) use process (implementation). Lyytinen further divided the development process problems into: goal problems, technology problems, economy problems, process problems, environment problems and self-image problems. The use process problems, on the other hand, are the product of the users' opinions. Lyytinen classified these problems as: technical problems, data problems, conceptual problems, people problems and complexity problems.

Beatty and Gordon (1988) conducted a study to identify barriers to implementation. In their study, they interviewed more than 200 employees from different managerial levels and identified three types of barriers to success: structural barriers, human barriers, and technical barriers.

The structural barriers are those factors inherent in the organisation's structure or systems that are not compatible with the new technology such as the reporting relationships, the way the organisation is structured, planning, measurement and reward systems. The human barriers include the psychological factors such as the uncertain outcomes and the strong resistance associated with the introduction of the new technology. The technical barriers are factors in the technology itself such as design weaknesses or incompatibility of the adopted systems with organisation's culture (AL-Shoaibi, 1998).

Another type of IT systems problem is the product of poor technical design and weak implementation strategy. Systems might be slow, undependable or very difficult to use. These technical issues may force users to abandon the systems and look for other alternatives. Sometimes disappointment with the new IT systems leads organisations to go back to manual systems (author observation). There are also problems that are related to system complexity. System complexity refers to the difficulties associated with the system use and maintenance. IT systems should be comprehensible and easy to use and maintain.

The literature in the area of IS implementation also points out that there are many problems that are caused by social and conceptual aspects of the IS field (Madu, 1991).

Some IS implementation problems have social aspects. Bell and Wood-Harper (1992) argue that the social issues surrounding the implementation process and their impact on this process must be understood before these processes begin. The present researcher's point of view is that understanding the social issues of the implementation of IT systems should include solutions and remedies for any possible social consequence of this process.

Information systems data could also be a source of implementation problems (Lucas, 1989). IT systems take data as input and process it to produce information. If this data is either inaccurate, incomplete or irrelevant, even the best conceptualised and designed systems will not be of any value to its users. To insure proper use of systems, the systems should be able to discover, pinpoint, and even to self-correct data problems.

Another type of information systems problems refers to problems associated with the local culture and its components. The ability to adopt and adapt IT systems smoothly and successfully in accordance with local culture is an important ingredient of successful management (AL-Sudairy, 1994). Besides, it has been observed that, whenever good technology is linked to mismanagement, poor planning or undefined IT strategy, failure always follows. The mere purchase of IT systems is not enough (Mason & Willcocks, 1992).

Moreover, people's attitudes and reactions to the implemented system are by far the most important factors in implementation. A necessary ingredient of success is the ability of systems to gain users' involvement, satisfaction and acceptance (Lucas, 1989). In designing systems great care must be given to the users' fears of computers and their perceptions of system threats. These and other attitudes and beliefs about computers determine people's future reactions to IT systems (Abdul-Gader, 1989).

However, organisational and management factors still represent the main cause of IT systems failures in the developing countries because in these countries the organisational thinking and management development are still in the development stage (Abdul-Gader and Alangari, 1995).

.To counter problems associated with the implementation process, Thompson (1990) suggests the following:

- ♦ Clear responsibility for the successful outcome of planned organisational change should be allocated;
- ♦ The number of big organisational commitments (projects) and strategic changes being pursued at any time should be limited. The necessary resources located to the implementation of IT systems should not be diverted to other projects;
- ♦ Necessary actions and responsibilities should be identified and allocated;
- ♦ Milestones or progress measurement points, should be established.

Lyytinen (1987) maintains that problems during the development and implementation stages can be reduced or eliminated if we have better IS models that help to develop better development and implementation methods and theories. He bases his claims on the ground that better models can help to analyse, predict and communicate the structure and the contents of the adopted system more accurately, clearly and completely.

Another way that organisations, especially large ones, followed to eliminate or reduce IT problems, was to establish IT departments. The main function of these departments is to guide the implementation in their respective organisations, to manage the organisation's information resources and to solve any problems that arise during the implementation and use of these systems (Alshibl, 1990).

Therefore, decisions to adopt a particular technology should take into consideration all the behavioural, environmental, technical and organisational factors surrounding the organisation. Also, these decisions should be business-oriented and based on a comparison of the costs of acquiring, operating and maintaining that technology weighed against the anticipated returns. This means that when purchasing IT systems, management should take into consideration, what is known as the total costs of ownership. These costs include all the expenses paid by the organisation to buy, operate and maintain the adopted systems; They also include the expenses paid to redesign or appropriate the organisation, its work procedures, its workforce and its environment to use the new systems.

All such decisions must relate the technology to one or more well-defined business needs. The careful specification of business needs should be a prerequisite for any decision to buy any new technology; this should be followed by careful evaluation of the needed technology (Walton, 1989). One thing, which also has to be made clear and must be brought to the attention of management, is that IT systems are only enabling tools. They cannot be bought arbitrarily and expected to run the business or protect the organisation against its competitors.

Management should also be aware that, in most cases, its competitors can utilise their resources to purchase the same or better technology. It is very hard to copy business vision. In addition, management has to understand that the success or failure of IT is dependent directly on the quality of its management rather than the quantity of the investment poured into the organisation's IT resources.

4.4 PLAYERS IN THE IMPLEMENTATION PROCESS

Decisions to implement IT systems involve, and are influenced by, a number of different people. For example, there will be an initiator of the idea, someone with authority to sign the purchase or installation contracts and authorise payments, an eventual user and technical staff or consultants who will check whether the delivered systems meet the specifications and requirements set by the organisation. There is often also an influencer (usually from the top-management) whose opinion affects what to buy and from whom.

From both the literature review (Thong and Yap, 1995; AL-Assaf, 1997) and the exploratory study, we have identified these players to include but not be restricted to:
(1) Top-managers: senior level staff involved in making the decisions to adopt, upgrade and maintain IT systems. Top-managers might include the owner of the company;
(2) IT staff: people working full-time in the organisation such as IT managers, advisors, engineers, analysts, programmers, operators and technicians;
(3) Users: the organisation's employees who use the adopted systems to perform their jobs; these users can be of different managerial and operational levels.

This study does not assess how these different players perceive success. It only concentrates on top-managers' assessment of the factors that influence the organisation's decision to adopt IT systems and on their assessment of whether implementation was successful or not. In this study top-managers refer to business owners, executive officers and includes IT managers or officers who are in a position to influence IT decisions and know about the computerisation efforts in their organisations.

From the literature and the interviews conducted during the exploratory survey, it was found that decisions influencing the implementation of IT systems are mostly initiated, controlled, and influenced by senior managers and IT managers with the latter group being in charge of most of the technical aspects of the implementation process (Applegate, McFarlan, McKenney, 1996).

The big role played by IT managers in the implementation process in many organisations is attributed to the poor understanding of IT among senior managers. However, many of these IT managers do not possess a broad range of management skills and often do not fully understand the business function of their organisations. This often led to setting wrong system requirements and standards or adopting systems for specific technical reasons that could not be justified on business needs.

The following is a quote from an interview with a business owner in the Eastern region in SA:

"because of my lack of knowledge of computers I am afraid if we adopt IT systems I will lose control of the business". He continues: ***"IT staff might install programs that will enable them to play around in my business".***

4.5 IT SUCCESS FACTORS

A list of factors that influence the implementation of IT systems has been identified from the literature review and are listed in Table 4.2. This table also outlines the references that mention these factors. Most of the factors listed in Table 4.2 were adopted from the literature. There are, however, some that were identified or produced later by this research and hence are not listed in Table 4.2.

Table 4.2
Factors Influencing The Implementation Of IT Systems

	Factor	References
1	Skilled manpower	Avgerou,1990; Madon,1992;Woherem,1992; Grifiths and Willcocks,1994; Abdul-Gader and Alangari, 1994.
2	Sufficient funding	Ein-Dor and Seveg,1988; AL-Sudairy, 1994; Abdul-Gader and Alangari,1995; Reimus,1997.
3	IT planning	King,1988; Alavi, Nelson and Weiss,1988; Porter and Goran,1988; Galliers,1993.
4	Adequate infrastructure	Lu, Youzin,and Guimaraes,1988; Cragg and King, 1993.
5	Availability of native language system	Madon,1992; Abdul-Gader,1990; AL-Turki and Tang, 1998
6	Vendors' support	Waema and Walsham,1990; Woherem,1992
7	Affordable IT systems (cost)	Cragg and King, 1993; Chau and Tam,1997
8	Sufficient training programmes	Montazemi,1988; Lu et al.,1988; Abdul-Gader,1990; Madon; 1992
9	Sufficient computer knowledge (literacy)	Abdul-Gader, 1990; Bhatangar,1990
10	User involvement	Robey et al.,1990; Madon, 1992; Cragg and King,1993; Wong and Tate,1994
11	Co-operation between users and data processing department	Botner,1987
12	Accepting change	Leonard-Barton and Kraus, 1985,Matta and Boutros, 1989; AL-Sudairy,1994; Edward, 1996
13	Top-management involvement, commitment and support	Delone,1988; King et al.,1989; Abdul-Gader, 1990; Ramamurthy and Premkumar, 1995; Remenyi, 1995; Reimus,1997; Doherty and King, 1998.
14	Top-management awareness of IT potential.	Madon,1992; Walsham and Han,1992
15	Compatibility with local culture	Robey et al.,1990; Abdul-Gader,1990; Abdul-Gader,1992; AL-Sudairy,1994; AL-Turki, 2000
16	Presence of rewards & incentives programmes	Ein-Dor and Seveg,1988; Far and Ford,1990; Bhatangar,1990
17	Positive relations within the adopting organisations	Rogers,1983,1995; Robey et al.,1990; Waema and Walsham,1990; Madon,1992; Reimus,1997
18	Technical support	King et al.,1989; Woherem,1992; Abdul-Gader and Alangari,1994.
19	Organisational size	Abdul-Gader,1990; Cragg and King,1993; Doherty and King, 1998.
20	Ease of use	Delone and Meclean, 1992; Kleintop, 1993
21	Existence of IT standards	Lu et al.,1988; Woherem, 1992
22	Presence of system champions and supporters	Locket, 1987; Madu, 1989; White and Bytheway, 1995; Ramamurthy and Premkumar,1995

4.5.1 Comments

Some comments can be made concerning previous work on factors influencing the implementation of IT systems:

- None of the research attempted to identify a comprehensive list of factors. The greatest number of factors is found in a study conducted by Abdul-Gader and Alangari (1995) who listed in their work 43 factors that influence IT assimilation as identified in the IS literature.
- The factors presented in Table 4.2 are adopted by the present researcher from the reviewed literature.
- These factors were used by previous studies to test their influence on different aspects or stages of IT implementation in different countries. For example, some studies adopted these factors to test IT adoption in Hong Kong (Tye and Chau, 1995) and in Canada (Iacaovou, Benbasat, and Dexter, 1995), IT assimilation in Saudi Arabia (Abdul-Gader and Alangari, 1995), IT systems (Spreadsheets) usage and end-user satisfaction in the UK (AL-Gahtani, 1995), the role of national culture in the transfer of IT (Shore and Venkatachalam, 1996), and diffusion and infusion of Intranet systems in the USA (Eder, et al.,1997).
- It is hard to claim that factors listed in Table 4.2 represent all possible factors that might influence the implementation process.
- Although the names of factors listed in Table 4.2 were adopted from the literature, they may differ from one study to another.

4.6 SUCCESS MEASURES

Organisations are naturally eager to determine how well their efforts and investments in IT systems have been. This in turn can help them better assess future investments and guide their future decisions with regards to IT system enhancements, upgrades or total migration to newer technologies. Besides, information technology could be seen from different viewpoints in attempting to measure its degree of success. In fact measurement has been recognised as the most difficult part of research in the IS area.

Defining an IT success measure is very important because the evaluation of an IS practice, policies and procedures requires an IS success measure against which various strategies can comparisons among studies difficult. Previous work on success measures can be categorised into three main categories:

1. Work that used a single measure to define success, for example, user satisfaction (Hiltz and Johnson, 1990; AL-Gahtani, 1995);

2. Work that used more than one measure (up to 5) but correlated such measures with only one factor (Soh et al., 1992);

3. Work that used up to 6 measures though none of these attempted to correlate the measures with any factor. Delone and Mclean (1992) used 6 success measures in their paper. Examples of these and other measures are listed in Table 4.2.

One comment can be made about the work on success measures is that no work which used more than one measure attempted to link such measures with the different stages of the implementation process.

In the following paragraphs we will discuss some of the success measures found in the IS literature:

- User Acceptance

In earlier work Ives and Olson (1984) adopted two classes of IS outcome variables to measure IS success: system quality and system acceptance. The system acceptance category was defined to include system usage, system impact on user behaviour and information satisfaction. However, the early studies were more concerned with investigating the independent variables (e.g. user involvement) than with the dependent variable (IS implementation success).

Other researchers have suggested surrogate measures to reflect the implementation success. For example, Igbaria (1993) and Davis (1993) hold user acceptance as the critical factor in determining the success or failure of IT systems. These authors point out that when users accept and are satisfied with the adopted systems, they are keener to use them. They consider user acceptance as an important sign of success.

One of the commonly used measures of acceptance is User Satisfaction (US) (Baily and Pearson, 1982; Raymond, 1987; Melone, 1990). Another measure is System Usage as suggested by Davis (1993) and Igbaria (1993). Voluntary and enthusiastic use of the adopted systems helps in a big way in the implementation success, and user acceptance of the adopted systems leads to the achievement of the organisation's objectives from its investment in IT.

Table 4.3 Success Measures

Success measure	Reference	Method adopted
User satisfaction	Baily and Pearson (1983) Melone (1990) Magal (1991) AL-Qahtani (1995) Delone and Mclean (1992) Yap et. al. (1992) Soh et al. (1992) Doll and Torkzadeh (1991) Tait and Vaessey (1988)	Literature review Literature review Literature review Literature review Literature review Comparison study Literature review Literature review Literature review
On time	Soh e. al. (1992) Doll (1985)	Comparison study Survey (Questionnaire)
Within budget	Soh et. al. (1992) Doll (1985)	Comparison study Survey (Questionnaire)
Economic return	Slevien, Stieman, and Boone (1991) Delone and Mclean (1992) Yin (1992)	Case study (Questionnaire) Literature review Case study (Questionnaire)
Impact on individuals and organisations	Delone and Mclean (1992) Tait and Vessey (1988)	Literature review Literature review
System performance	Ein-Dor and Seveg (1992)	Literature review
System or information quality	Mahmood (1987) Delone and Mclean (1992) Armoroso and Cheney (1992)	Field study Literature review Literature review
System Usage	Delone and Mclean (1992) Soh et. al. (1992) Abdul-Gader and Alangari (1995) Davis (1993) Igbaria (1993); Park, Jih and Roy (1994)	Literature review Comparison study Literature review Literature review Literature review
Rate of Diffusion	Rogers (1983, 1995); Abdul-Gader and Alangari (1995); Eder (1998)	Case studies
Rate of Infusion	Eder, Anandarajan, and Arinze (1997), Eder (1998)	Literature review and Questionnaire

-User Satisfaction (US)

Baily and Pearson (1983) define user satisfaction (US) as a multi-dimensional attitude of the user toward different aspects of IT systems. The US measure is well established in the literature and provides the most frequently used "surrogate" measure of IT systems success (Doll and Torkzadeh, 1988; Melone, 1990). User satisfaction as explained by AL-Gahtani

(1995) is conceptualised as the end user's attitude toward the computer application he/she uses in the traditional data processing environment.

Livari (1987) raises another issue regarding user satisfaction when he describes it as the extent to which users believe the adopted system available to them meets their information requirements. This aspect of user satisfaction was discussed as a measure of system success by other researchers such as Melone (1990) and Allingham and O'connor (1992). Doll and Torkzadeh (1988) argue that the nature of the US instrument assumes a more traditional computing environment which is not application specific.

Another way to measure system implementation success is to adopt system usage measures which can be obtained through actual recorded or self-reported use of the adopted systems.

- System Usage (Utilisation)

System usage has been the focus of many studies by a number of researchers in the past two decades (for instance, Ives and Olson, 1984; Amoroso and Cheney, 1992; Igbaria 1993; Davis, 1993; Torkzadeh and Dwyer, 1994). Srinivasan (1985) defines it as a behavioural measure and explains that if users exhibit increasing evidence of system use in situations where use was voluntary, they must find the system useful. In Delone and Mclean (1992) research three levels of system use were cited:

(1) use that results in management action;

(2) use that creates change;

(3) recurrent use.

If users understand the tools and have the motivation to use them, then the full potential of IT systems will be realised. Moreover, greater computer related skills, education and experience have been found to positively affect one's use of corporate IT resources (Nelson and Cheney, 1987). Further, some IS researchers argue that utilisation is directly connected to the user community's sense of satisfaction with IT resources and services in their organisations (AL-Qahtani, 1995).

Use of reports and other forms of outputs produced by the adopted system is one of the most frequently adopted measures of system success. But IS researchers question this by asking "Use by whom?". Some researchers, such as Delone (1988) who surveyed IT success in small manufacturing firms, consider chief executive use of IT systems while

Raymond (1985) consider that by company controllers. This measure includes direct use and use through others like secretaries and assistants.

Some of the early studies investigating system usage were cited in Delon and Mclean (1992). These studies have computed actual, as opposed to reported, use by managers through hardware monitors which have recorded the number of computer inquiries, or recorded the amount of user-connect time. Other objective measures of use were the number of computer functions utilised, the number of client records processed or the actual charges for computer use. Still other studies cited by Delone and Mclean adopted a subjective or perceived measure of use by questioning managers about their use of an information system.

Other researchers (Ives and Olson, 1984) argue that system utilisation can be a good indicator of system success for two reasons:
(1) if users consider the system to be unreliable or its data inaccurate, their usage will reflect these doubts;
(2) if usage is voluntary, the system will be avoided.

Therefore, if system usage is mandatory by management, for political motivation, or for self-protection in justifying poor decisions, subjective measures may be more appropriate in this involuntary situation.

System use is often measured by using reported actual system usage as a measure of user acceptance. AL-Gahtani (1995) lists five system usage indicators that were found and used in several IT studies (Thompson, Higgins, and Howell, 1991; Davis, 1993; Igbaria, 1993):
(1) time spent on using the system per day;
(2) frequency of systems use;
(3) the number of software packages used by the participants;
(4) the number of applications for which the systems is used; and/or
(5) level of sophistication of usage.

Raymond (1987) asserts that an approach based on users' subjective judgement is preferable to an approach based on objective measure of usage and performance. He gave three disadvantages inherent in the system usage measure, applicable except in the case of controlled laboratory experiments: 1) the delayed effect of usage upon performance, 2) the difficulty of specifying acceptable measures of performance, and 3) the necessity of using controlling factors which may affect performance.

Amoroso and Cheney (1992) explain the reasons why management so diligently seeks a good measure of usage. One reason held by these researchers involves the need to justify investments in IT systems which different departments throughout the organisation might demand. Another reason is the continuous development and rapid advancement of IT systems which frequently create pressure on organisations to adopt new systems or risk losing some or all of their market share. These researchers maintain that there is an urgent need to devise standard usage measures which are presently not available.

The relationship between user satisfaction and system usage is still under debate (Torkzadeh and Dwyer, 1994). Delone and Mclean (1992) argue that usage and user satisfaction affect each other and that there are reciprocal influences. According to Srinivasan (1985), while much IS research implies a positive relationship between user satisfaction and the utilisation of the adopted systems, a negative association was found. However, user satisfaction and system usage have rarely been included in the same study or measured simultaneously within a single sample (Igbaria, 1993).

AL-Gahtani (1995) distinguishes between the two proposed methods by pointing out that user satisfaction measures the subjective value of the product while system usage attempts to measure an objective value which is a function of its specification in relation to competing products.

- Rate of Assimilation

Another indicator of successful IT systems implementation can be based on the rate of assimilation (diffusion and infusion) of these systems within organisations. Examining the factors that influence the diffusion or spread of IT systems among organisational departments and users, and the infusion or penetration of these systems into business processes, would provide useful information to those seeking to understand what contributes to successful implementation.

The rate of assimilation has been used by many researchers. For example Yavas and Yasin (1994) used this method to assess the computerisation process of manufacturing firms in SA. Also, this method was used by Abdul-Gader and Alangari (1995) who studied IT assimilation in Saudi public organisations. In addition, it was used by Shash and AL-Amir

(1997) who conducted a study to investigate the extent of computer use and their applications in construction contractor firms in SA. A more recent study by Eder (1998) also used this method to study diffusion and infusion of Internet systems in American companies.

4.6.1 Success Measure In This Research

Our main data-gathering instrument (a questionnaire) will be directed to top-managers (owners, chief executives, or IT officers) at the sample organisations who are assumed to be in a good position to know about their organisations' experience with IT systems. Therefore, top-managers' self-assessed and reported rate of IT systems assimilation (diffusion and infusion) into their organisations' departments and functions can be used to check the levels of IT systems success in this study.

This measure is valid and practical for our study because we are not testing the success of a particular IT system. On the contrary we are interested to know the experience of Saudi private organisations with any IT-based system whether it is a stand-alone computer system such as word-processing, decision support, spreadsheets, payroll or accounting system, or a system that supports organisation-wide operations within and beyond its boundaries such as electronic mail, electronic commerce and/or other Internet-based applications.

To achieve the objectives of this study, we will measure two aspects of the implementation process. The first aspect is adoption which will be tested using a dichotomous (Yes/No) measure indicating the adoption or non-adoption of IT systems. The second is assimilation which will test using a relative measure (percentage) of the number of computerised departments and functions (rate of assimilation) in the adopting organisation relative to the total number of departments and functions available in the organisation.

The rate of assimilation of IT systems will be used to measure and categorise IT implementation success in Saudi private organisations. This will be done by categorising respondents organisations into three groups:

1- **Successful:** if top-managers report that the adopted systems are assimilated into up to 50% of their organisations' departments and functions;

2- **More-successful:** if top-managers report that the adopted systems are assimilated into more than 50% of their organisations' departments and functions; or

3- **Unsuccessful:** if top-managers report that their organisations did not adopt IT systems.

This method is valid and has been used by other researchers in the IS field. For example Park, Jih, and Roy (1994) used it in their investigations of MIS success in 300 companies in the USA. Lyytinen (1988) also used a similar categorisation to discuss computerisation failure which he called expectation failure.

Another study that used success categorisation is Soh, Yap, and Raman's (1992) in which they studied 211 businesses in Singapore. Soh, et al. categorised computerisation success into three different categories. The first is project success. This is used to evaluate the extent to which the implemented system is completed on time and within budget and how well the implemented system satisfies user requirements. The second is service success. This is used to evaluate the quality of service that is provided in terms of user satisfaction and system usage. The third category of computerisation success in Soh et al study was economic success. This is used to measure the economic benefits of computerisation in terms of (1) the change in operation costs after computerisation, (2) the impact of computerisation on staff productivity.

The categorisation of IT implementation success into three levels, as suggested by Soh et al. (1992), serves three purposes. First it distinguishes between the process and the outcome of IT implementation. Second, it clarifies the perspective from which the computerisation process and outcome are evaluated. Third, it facilitates the selection of variables and measures most appropriate for each level of success.

A comprehensive checklist of potentially computeriseable departments and functions in topical business organisations was developed from the literature and is thought to be applicable for exploratory type research. This checklist will be used to analyse which departments and functions are most computerised in Saudi private organisations. A similar method was used by Attiyyah (1988) when he conducted a study to assess the impact of computers on Saudi public organisations. Attiyyah measured the degree of computerisation in his sample organisations by the number of computer applications or programmes in use in these organisations.

However, to measure the extent of assimilation, a multiple-choice question was included in the questionnaire and directed to the top-managers. They were asked to give their estimate of the percentage of the computerised departments and functions in their organisations as compared to the total number of departments and functions found in the organisation.

A more recent study that used this method was Eder's (1998) study, which was carried out to examine Intranet systems' diffusion and infusion in 1,000 American businesses.

4.7 General Comments on IT literature

Some general comments arose from the literature review.

- Most of the factors, measures and implementation stages mentioned in the IS literature were originally identified either from previous work or from personal experience, with few as the result of empirical work;
- Little of the work in the literature is comprehensive. Most of the studies focused on a specific process or a stage of the implementation process;
- There is a gap in linking the above areas of research together;
- Most of the previous IS work that attempted to measure IT implementation success took the end-user as the unit of analysis;
- Little work on IT implementation in the Saudi private sector has been undertaken.

4.8 SUMMARY

This chapter presented a comprehensive review on some issues related to IT implementation such as definition of IT adoption, determinants of IT adoption, IT characteristics and their impact on the implementation process, top-management role and IT problems. In addition, this chapter discussed the different factors that influence IT success. Some of the identified success measures in the IT literature were discussed and one was chosen for this study.

The purpose of the next chapter is to develop a logical and statistically sound model that provides support for either accepting or rejecting a number of hypotheses stated and which we intend to test in this study. In order to develop the research model, chapter five will also discuss previous implementation models suggested or adopted by IS researchers. In particular the work of Kown and Zmud (1987), Tornatzky and Fleisher (1990), Abdul-Gader and Alangari (1995), Thong and Yap (1995) and Chau and Tam (1997) will be reviewed and presented in chapter five as the theoretical base for the study model.

بسم الله الرحمن الرحيم

CHAPTER FIVE

THE RESEARCH MODEL AND HYPOTHESES

5.1 INTRODUCTION

The universal nature of IT systems suggests that more attention should be devoted to the construction of a theoretical model of IT implementation that can be used to facilitate the implementation of these systems in any organisation anywhere in the world. However, due to the different cultures and business practices that prevail in many different countries around the world, such a model is not available yet. In addition, the lack of research on IT implementation in the Saudi environment suggests that there is no alternative but to build on existing IS theories and implementation models previously suggested in the IS literature in other countries. However, there is a necessity to make the proper modification of these theories and frameworks to fit the Saudi context.

Therefore, the purpose of this chapter is to find the most suitable implementation framework which achieves the research objectives and fits the Saudi context. The derived implementation model will help us examine the influence of the main factors that facilitate or inhibit the implementation of IT systems in Saudi Arabia (SA). This in turn will enable us to develop organisational guidelines that will help organisations in their IT implementation efforts.

The following sections discuss some earlier theoretical frameworks proposed by IS researchers such as Kown and Zmud (1987), Tornatzky and Fleischer (1990), Thong and Yap (1995), and Abdul-Gader and Alangari (1995). A research model derived from these research frameworks is then presented, followed by the research hypotheses.

5.2 PREVIOUS IMPLEMENTATION MODELS

A review of the IS and IT implementation literature suggests that the frameworks developed by such well known IS researchers and academics as Kown and Zmud (1987), Tornatzky and Fleischer (1990), Thong and Yap (1995), and Abdul-Gader and Alangari (1995) may provide a useful starting point to look into IT systems implementation for they highlight the different contexts in which the implementation of these systems take place.

These frameworks provide a useful background to look into IT systems implementation. They allow us to evaluate the importance of different factors which affect organisations' inclinations to adopt IT systems.

5.2.1 Kown and Zmud (1987) Model

Kown and Zmud's (1987) model was the results of a review of both empirical and non-empirical studies regarding organisational innovation and IS implementation. It identified the key forces that contribute to success in introducing new technologies into organisations. Kown and Zmud's review identified five major forces representing the constituent elements of Leavitt's (1965) organisational model as well as the environmental considerations of Price's (1968) and Duncan's (1974). (see Kown and Zmud, 1987).

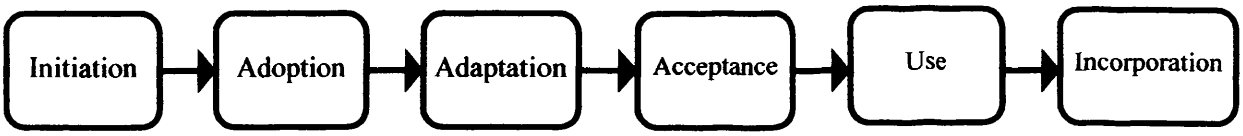
Kown and Zmud combined the major results from the IS research streams (see section 5.3 of chapter five) to create a unified model that can be used to understand IS implementation success. In their view, organisational innovation is considered as a six-stage process: initiation, adoption, adaptation, acceptance, use and incorporation (Figure 5.1). Initiation refers to an acknowledged pressure to make a change to solve a performance problem or to seize a business opportunity. Zmud (1982) defined this as a need-push or a technology-pull force (Kown and Zmud, 1987).

Zmud (1982) asserts that, in a need-push situation, organisations recognise the need for a change which may present itself as a result of a performance problem or market opportunity. In a technology-pull situation, a new technology such as an IT system is seen as a promise to improve performance. In either case, the initiation for change takes place. This is related to the adoption stage in the Kown and Zmud model in which resources are dedicated to adopt the new technology. Hence, understanding the factors associated with the organisational adoption of IT can lead to a better explanation of what contributes to the success of IT systems implementation.

The implementation process in Kown and Zmud's model is broken down to allow for a deeper investigation of the factors associated with the different constructs of this process. Kown and Zmud (1987) suggest that their model creates a foundation for further IS implementation researchs that either examine the relationships among the stages or examines a particular stage in more detail.

Figure 5.1
Information Technology Implementation Model

Kown and Zmud (1987)



According to Kown and Zmud (1987) IS implementation is influenced by five major forces: **(1) Individual Factors.** These factors are concerned with the adoption behaviours. They include: job tenure, cosmopolitanism, education and role involvement.

(2) Structural Factors. According to Kown and Zmud's (1987) study, both formal and informal structural arrangements exist inside organisations and influence the introduction of new technologies. Factors identified in Kown and Zmud's work include: specialisation, centralisation, formalisation and informal networking.

(3) Technological Factors. This group of factors is concerned with the influence of characteristics of the potential technology on the implementation process. The most identified characteristics are: compatibility, relative advantage and complexity.

(4) Task-related Factors. These factors are concerned with job attributes that stimulate change and provide a challenge and meaning to work and consequently influence organisational behaviours. These factors include: task uncertainty, autonomy, responsibility, variety, identity and feedback.

(5) Environmental Factors. Environmental factors are those that come from the outside of the organisation and over which it has little control such as government regulations and laws as well as heterogeneity, uncertainty, competition, concentration and dispersion and inter-organisational dependence.

Kown and Zmud's (1987) main discussion of the above factors relates to their positive or negative influence on the different constructs of the implementation process (for detailed discussion of these factors see Kown and Zmud, 1987). The present study derives some aspects of its research model from the Kown and Zmud (1987) implementation model and from other IT implementation frameworks which will be discussed in the following sections. It does this by specifically examining IT implementation as consisting of two main stages: initiation and adoption (adoption as stage one) and adaptation, acceptance, use and incorporation (assimilation as stage two).

5.2.2 Tornatzky and Fleischer (1990) Implementation Framework

In the Tornatzky and Fleischer (1990) implementation framework, there are three elements that influence the implementation process. They are (1) the external environment context, (2) the technological context, and (3) the organisational context.

According to this framework, the environmental context is the place in which an organisation conducts its business. This includes the industry, competitors, regulations and relationships with the government. These are factors external to an organisation that present constraints and opportunities for technological implementation. Among these, market conditions, in terms of competitive market forces and market uncertainty, are a major factors in the implementation of new technologies.

One of the early studies that investigated the influence of market conditions on organisational decisions to adopt new technologies was Mansfield's and his associates (1977). In this study, empirical evidence was found to support the theory that intense competition stimulates the adoption of new technologies and that firms, when confronted with a high degree of market uncertainty, are more likely to pursue an aggressive technology policy (Chau and Tam, 1997).

The technological context relates to the technologies available to an organisation. Its main focus is on how the technology characteristics themselves influence the organisational implemtation decision (Tornatzky and Fleischer, 1990). The characteristics of a technology have been used often to describe the relationship between a technology and its implementation (see for example, Rogers, 1995).

Tornatzky and Klein (1982) concluded in their meta-analysis of research findings from 75 articles that, while over 30 characteristics had been studied, ten characteristics were most frequently addressed. Among them, compatibility and complexity were most consistently related to implementation decisions. We discussed several of these characteristics and their affect on the decision to implement new technologies in chapter five.

Different organisations may face very different market opportunities. Whether these opportunities can be exploited depends on the degree of match between the technology's characteristics and the practices adopted by the organisation and IT infrastructure available to the organisation. This is very clear in the case of Saudi organisations, which until recently were restricted from using Internet and Intranet systems due to the lack of adequate IT infrastructure in SA (Malek and AL-Shoaibi, 1998, AL-Sudairi and Tang, 1998). In addition, the political and religious nature of the country restricts the adoption of certain businesses and technologies (AL-Turki and Tang, 1998).

Nevertheless, not all technologies are relevant to organisations. The degree of relevance depends on the potential or perceived benefits from the prospective technology and its adaptability. Chau and Tam (1997) assert that new technologies that induce radical changes, involving the development of significant new products or processes, may impose large knowledge barriers which outstrip their potential benefits.

The organisational context of the Tornatzky and Fleischer model describes the characteristics of the organisation that wants to adopt a new technology and the influence of these characteristics on the adoption and implementation of this technology. Common organisation characteristics include size, industry type, degree of centralisation, formalisation, complexity of its managerial structure, the quality of its human resources and the amount of slack resources available internally. It describes the structure and processes of an organisation that constrain or facilitate the adoption and implementation of new technologies.

Even though the Tornatzky and Fleischer (1990) framework provides a good starting point for examining new technology implementation, Chau and Tam (1997) advise that it should be used with care when applying it to study the links between contexts and implemention decisions.

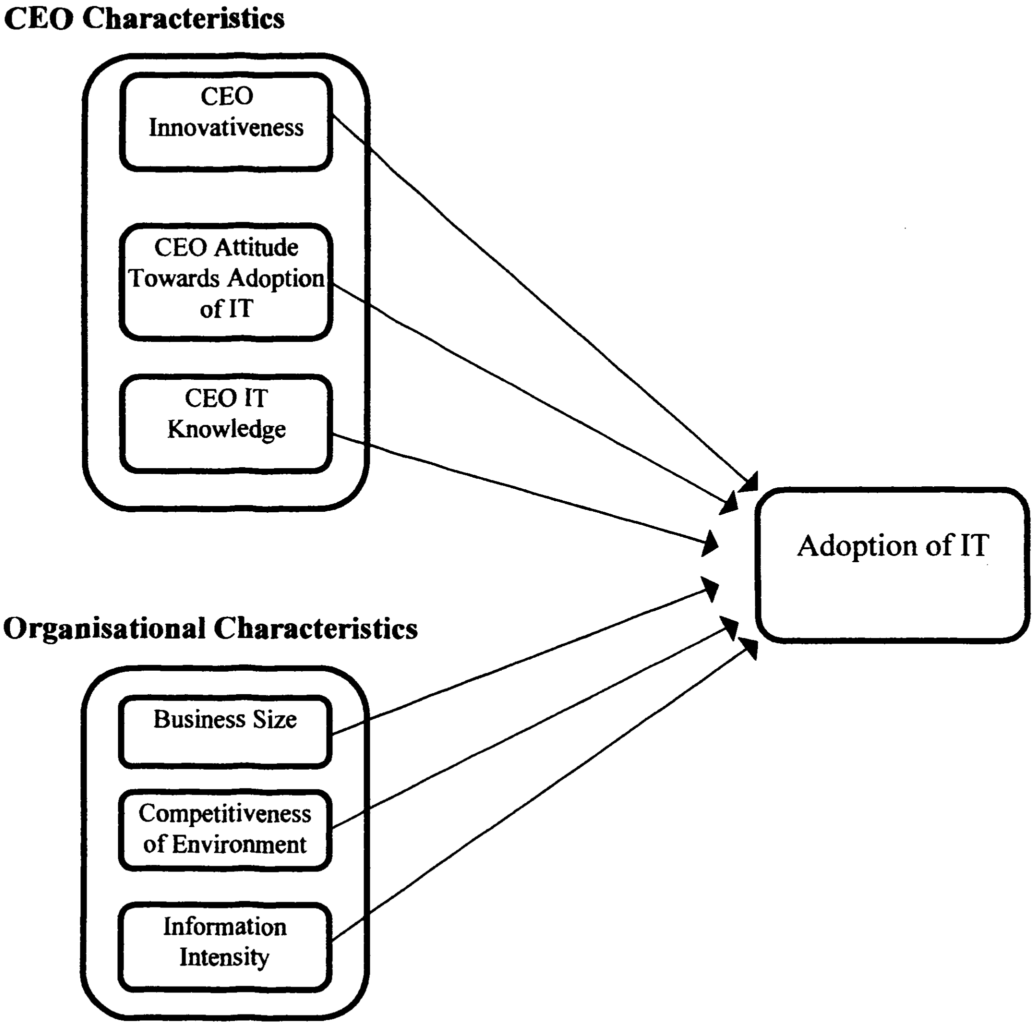
5.2.3 Thong and Yap (1995) Adoption Model

The Thong and Yap (1995) adoption model was developed to study the adoption process of IT from a technological innovation perspective. It was based on an extensive review of technological innovation literature. Thong and Yap's objective in this model was to identify the primary relationships involved in the adoption as a one stage process (see Figure 5.2).

The dependent variable in the Thong and Yap (1995) model is adoption. In their work, these two authors define adoption as using computer hardware and software applications to support operations, management and decision-making in the business. The primary purpose of their study was to identify the major factors that lead to adoption of IT in small business context.

Figure 5.2 outlines the six main factors of the Thong and Yap adoption model grouped into two major classes: (1) CEO characteristics, and (2) Organisational characteristics. In the first group of factors outlined in the Thong and Yap model there are three variables that relate to the CEO characteristics and his/her role in the adoption process: innovativeness, attitudes towards adoption of IT and IT knowledge.

Figure 5.2
Thong and Yap (1995) IT Adoption Model



(1) CEO Characteristics

CEO Innovativeness as explained in Thong and Yap's (1995) work is the tendency of the CEO to adopt innovations in running his/her organisation. Innovations here include adopting new tools, practices and/or processes. Thong and Yap contend that the CEO's qualities are the determinants of the overall management style of the business and that the rate at which an organisation changes depends not only on factors like business size or market forces, but also on the abilities and inclination of the CEO and the extent to which he is able or prepared to use modern management tools and practices.

The second variable is the **CEO's own attitude**. According to the Diffusion of Innovations theory suggested by Rogers (1983, 1995), formation of a favourable or unfavourable attitude towards an innovation takes place before a decision to adopt is made. According to Thong and Yap (1990), the chief decision-maker is the CEO. Therefore, the CEO's perception of adoption is of prime importance. A degree of uncertainty and risk is associated with the adoption of any new technology but if the CEO perceives that the benefits of IT outweigh the risks, then the organisation is more likely to adopt IT.

CEO IT Knowledge. There is evidence from IT implementation studies that suggests that organisations that lack IT knowledge and technical skills reject the notion that IT could be of any use to their business as they had no idea of the benefits that IT could potentially offer; therefore, top-management in these organisation may well reject adopting IT systems.

(2) Organisational Characteristics

Business Size. Larger organisations have more potential to implement IT systems than smaller organisations. This is due to many factors. For example small organisations operate in a highly competitive environment (80-95 of business organisations in most countries are small), face more frequent financial constraints, lack professional expertise and are more sensitive to external forces (Thong and Yap, 1995). Consequently, small organisations face substantially more barriers to implement IT and are thus less likely to adopt than large organisations.

Large organisations, on the other hand, have more financial resources to hire the best IT experts and can afford more expensive technologies. Consequently, they can adopt IT systems to become more efficient and more competitive to expand their market share and revenues at the expense of the smaller organisations. Many studies suggest that the adoption of IT systems is positively related to firm size because increasing size creates "economies of scale", making the adoption and use of IT systems more feasible (Eder, Anandarajan, and Arinze, 1997).

Competitiveness of environment. Competition is a major factor that entices organisations in many different kinds of businesses to adopt new technologies. Market power is also generally believed to have a positive influence on innovation (Link and Bozeman, 1991). Porter and Miller (1985) identified five competitive forces that entice organisations to adopt IT systems: new entrants to the business, the threat of substitute products or services, customer bargaining power, supplier bargaining power and rivalry amongst current competitors. Porter and Miller assert that IT systems can help organisations overcome competition, build more customer loyalty, increase switching costs and outperform rivals by changing the rules of competition.

Therefore, as Thong and Yap (1995) point out in their study, a business in an environment that is more competitive will feel a greater need to turn to IT to gain a competitive advantage. On the other hand, a business in a less competitive environment is less likely to be pushed to innovate or adopt new technologies.

Information intensity. IS studies have shown that businesses in different sectors have different information processing needs and those in more information-intensive sectors are more likely to adopt IT than those in less information-intensive sectors Yap (1990). Further, Yap argues that the greater the information intensity, the greater the potential for strategic uses of IT in a business. For example, airlines and travel agencies are more information intensive, as their main functions are to process and package travel information. They will be more inclined therefore to adopt IT systems to keep track of or to announce the latest offers.

The Thong and Yap (1995) adoption model provides a simple one-stage model that relates independent and dependent variables without any intermediate variables. It can be used with the proper adaptation to fit the Saudi context and to examine the factors that influence the decision to adopt IT systems.

The current study incorporates and will test some of the Thong and Yap' (1995) constructs and are shown in the research model in Figure 5.5.

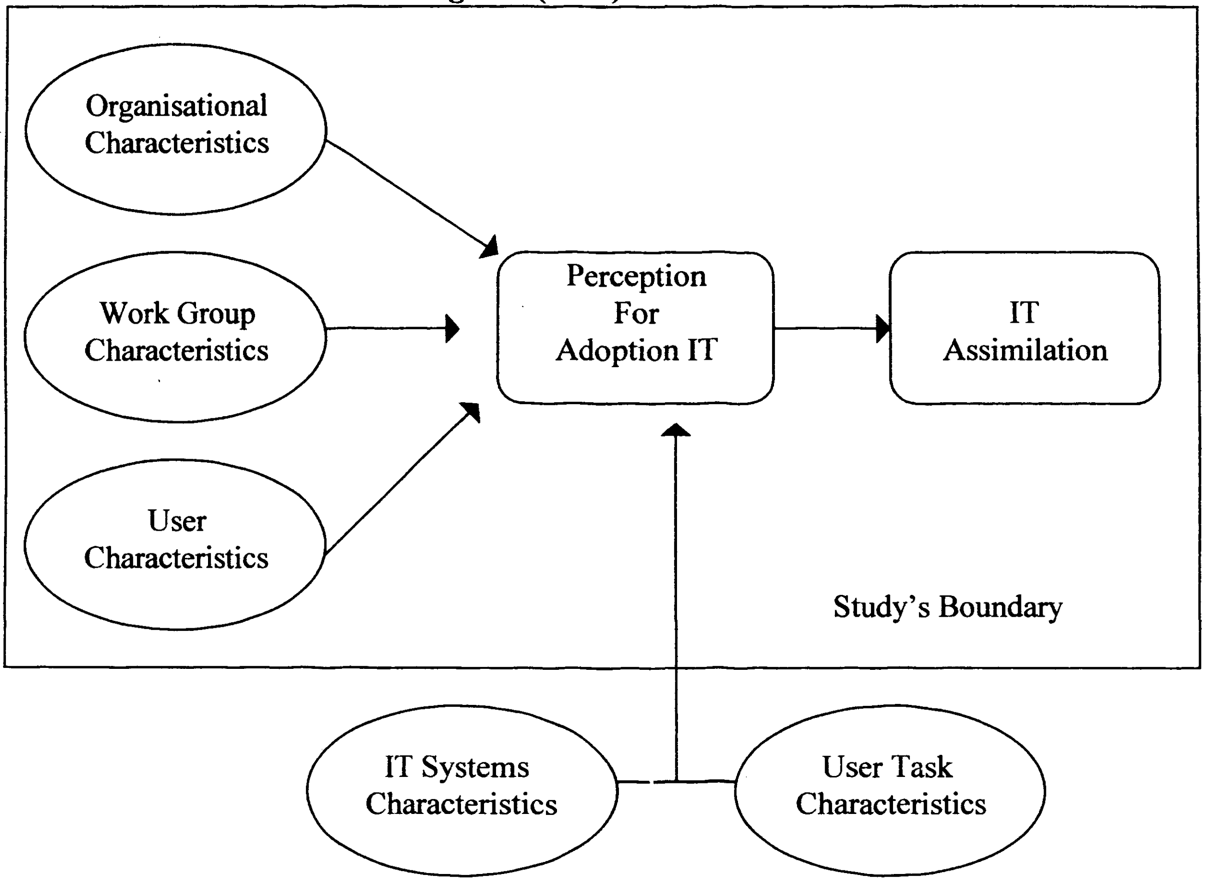
5.2.4 Abdul-Gader and Alangari (1995) Assimilation Framework

The Abdul-Gader and Alangari (1995) assimilation framework (Figure 5.3) comprises 18 variables that influence IT assimilation. These variables are grouped into three major categories: (1) Organisational characteristics; (2) Work group factors; and (3) User characteristics with two additional groups of factors. User task characteristics and system characteristics were not tested in their study.

The Abdul-Gader and Alangari (1995) study has concentrated on the Saudi public organisations. It investigated a number of organisational, work group and individual variables that have been identified in the literature as determinants of IT assimilation success or failure. The researchers' rationale for selecting the 18 variables in their assimilation model was based on an extensive literature review of IT implementation research both in the developed and the developing countries.

Figure 5.3

Abdul-Gader and Alangari's (1995) Determinants of IT Assimilation



These researchers expanded the three categories into 18 variables as shown in Figure 5.4:

- Organisational variables:

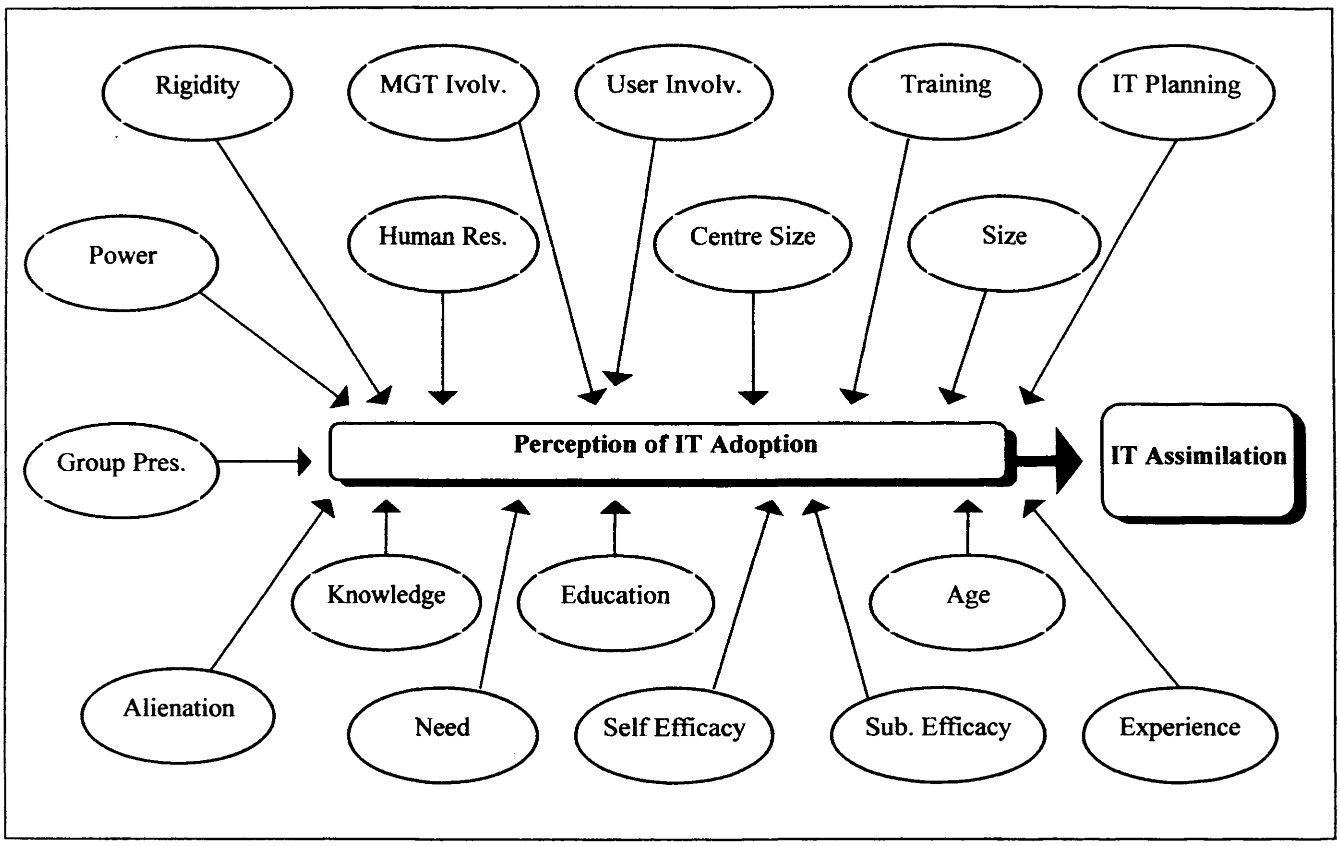
(1) IT planning; (2) Perceived IT training level; (3) Perceived user involvement in IT development and other decisions; (4) Top management involvement; (5) Perceived rigidity of organisational procedures; (6) Size of organisation; (7) Size of computer centre; (8) IT human resources level; and (9) Organisational power.

- **Work group variable**: (10) Group pressure to use IT applications; and

- **Individual variables**: (11) Computer alienation; (12) Felt need for IT application; (13) Self efficacy; (14) Subordinate efficacy (competence); (15) Work experience; (16) Computer knowledge; (17) Level of education; and (18) Age.

Figure 5.4

Abdul-Gader and Alangari's (1995) IT Assimilation Model



Abdul-Gader and Alangari used different measures to test the adopted variables. For example, for the IT planning variable they asked management questions about the availability of their IT plan, the level of success in implementing it and whether the organisation had written policies concerning IT purchases, application development, standards for data exchange and security. For top-management involvement these authors inquired about the level of management involvement in IT introduction, diffusion and infusion into the organisation. Information about the organisation size was also solicited through a question about the number of people employed by organisation.

One thing that should be mentioned about Abdul-Gader and Alangari's work is that it did not check for the effect of interactions between the independent variables in their model. The focus of their study was on the direct effects of the barriers on IT assimilation not on the interactions between them.

Many researchers have previously investigated the proposed variables in Abdul-Gader and Alangari model. For example, Robey, Gupta, and Rodriguez-Diaz (1990) have described a multinational corporation's experience in implementing a computer application in two Latin American countries. The same application failed in one country and succeeded in the other. The differences in implementation outcomes between the two countries were attributed to organisational and cultural factors, including users' perceived threats from the system, lack of user's involvement, the absence of a manual in the local language and no local management involvement in the project team. Implementation of IT applications can be effective if project developers can understand users' needs, communicate effectively, identify and involve individuals who can expedite the new system and generate organisation-wide support (Abdul-Gader and Alangri, 1995).

This study adopts some of the variables examined in Abdul-Gader and Alangari's (1995) model and attempts investigate these variables in the Saudi private business environment instead of the public sector.

5.3 THE RESEARCH MODEL

Within the context of the Saudi private sector, this study attempts to investigate a number of individual, organisational, technical, contextual and situational variables that have been identified in the literature as determinants of IT implementation success or failure. Since the main objectives of this study are to identify those main factors that entice Saudi private organisations to adopt IT systems and those that influence the implementation success, it was decided to develop and use a model that satisfies the two-stages model of the implementation process as defined in this research.

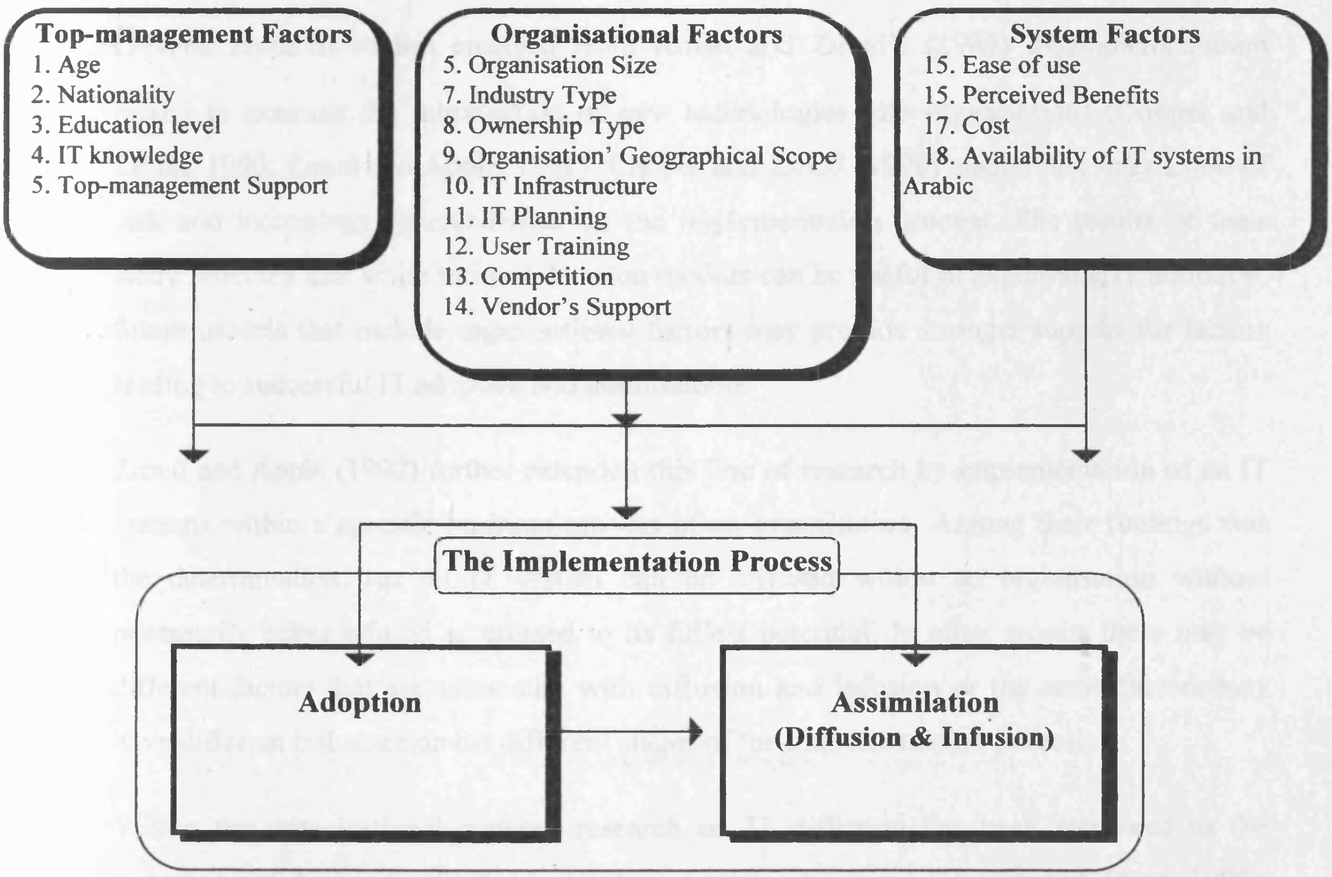
The adopted model is based on a review of the literature on IS implementation and technological innovation (Kown and Zmud, 1987; Walton, 1989; Cooper and Zmud 1990; Zmud and Apple, 1992; Doherty and King, 1994; Thong and Yap, 1995; Abdul-Gader and Alangari, 1995; Chau and Tam, 1997). Figure 5.5 outlines the three major variable groups that affect IT implementation. The adopted model incorporates the two main constructs of the implementation process in the previously discussed IT implementation frameworks. It attempts to examine the relationships between the dependent and independent variables and will concentrate on investigating the effect of the selected factors on the implementation in the Saudi business environment.

In model the dependent variable, the implementation process, is divided into adoption and assimilation. Adoption of IT refers to the management's decision to purchase IT systems to support operations, management and decision-making in the business (Thong and Yap, 1995). Assimilation, on the other hand, refers to the activities that take place after adopting IT systems; these include diffusion and infusion (this includes acceptance, utilisation and maintenance as defined in other frameworks) . Figure 5.5 displays the research model and its components.

Owing to the exploratory nature of this study, only a subset of all possible factors has been studied. Other factors were excluded because a more detailed investigation of how they present themselves in organisations is required before a data collection instrument can be developed. Hence, we have selected some factors which we think are more applicable to the implementation process in the private business environment.

Figure 5.5

The Research IT Implementation Model



The selected factors are gathered into three major groups:

(A) Top-management Factors: age, nationality, education level, IT knowledge and support.

(B) Organisational factors: organisation's size, industry type, ownership type, organisation's geographical scope, IT infrastructure (hardware, software and human resources), IT planning, training, competition within the industry and vendors' support.

(C) System factors: perceived ease of use, perceived benefits, cost, and availability of IT systems in Arabic.

In the following sections, brief discussions about the dependent and independent variables are presented to refresh the reader's knowledge and meaning of these variables as they are used in this study.

5.3.1 The Dependent Variables in the IS Literature

Several research studies emerged from Kown and Zmud's (1987) IS implementation model to examine the introduction of new technologies into organisations (Cooper and Zmud, 1990; Zmud and Apple, 1992). Cooper and Zmud (1990) studied the interaction of task and technology characteristics on the implementation process. The results of their study reflected that while rational decision models can be useful in explaining IT adoption, future models that include organisational factors may provide stronger support for factors leading to successful IT adoption and assimilation.

Zmud and Apple (1992) further extended this line of research by implementation of an IT systems within a specific business process of an organisation. Among their findings was the determination that an IT system can be diffused within an organisation without necessarily being infused or utilised to its fullest potential. In other words, there may be different factors that are associated with diffusion and infusion or the same factors may have different influence on the different stages of the implementation process.

Within the organisational context, research on IT diffusion has been measured as the spread use of the newly adopted technology, system or process (Cooper and Zmud, 1990). Cooper and Zmud (1990) measured diffusion as the percentage of all possible users of the technology that were actually using it. While the percentage of users is a simpler measure of diffusion, it also provides adequate information about the spread of an IT systems within an organisation.

McFarlan and McKenney's (1982) definition of diffusion reflects the different levels of diffusion. Cooper and Zmud's (1990) definition of diffusion represents the degree of usage spread throughout an organisation. Infusion occurs when the adopted technology is used within the organisation to its fullest potential (Cooper and Zmud, 1990). To understand the diffusion or spread of use of IT systems among the departments and infusion into the functions of the adopting organisation, the use of percentage would appear to be the clearest measurement of successful implementation for this study. Delone (1988) measured IT success using reported use by the chief executives and their rating of IT impact.

5.3.2 The Dependent Variables in this Research

Drawing from the IS literature, this study attempts to extend the work of early IS researchers (Kown and Zmud, 1987; Walton, 1989; Cooper and Zmud 1990; Zmud and Apple, 1992; Thong and Yap, 1995; Abdul-Gader and Alangari, 1995; Chau and Tam, 1997; Doherty and King, 1994; 1998), by examining adoption and assimilation of IT systems together as related, but as separate elements of the implementation process.

In our model, adoption of IT refers to the management's decision to acquire IT systems to support operations, management and decision-making in the business (Thong and Yap, 1995). Assimilation, on the other hand, refers to the activities that take place after the adoption. This include diffusion and infusion. This implies that the adopted systems have been accepted and used.

Two aspects of IT implementation in private organisations in SA are considered in this research: the adoption versus non-adoption of IT systems and the extent of assimilation. The extent of assimilation in the adopting organisations is used here as a measure of the implementation success in the adopting organisations. The greater the assimilation of IT systems in an organisation, the more successful the implementation.

5.3.3 Independent Variables: Top-management, Organisational and Systems' Factors

Focusing on IT implementation in the Saudi private sector, the present study examines top-management, organisational, and IT systems' characteristics as factors that entice private organisations in SA to adopt IT systems and as factors that influence the outcome (success or failure) of the implementation process as a whole.

The model, as depicted in Figure 5.5, outlines the eighteen (18) factors (the independent variables) which are thought to influence organisations' decisions to adopt IT systems and influence the extent of assimilation (the dependent variable) of these systems and consequently influence the implementation outcome. These eighteen (18) factors will be tested and discussed to assess the relationship between them and the organisational decisions to adopt IT and the extent of their assimilation (implementation success) as perceived and reported by top-management in the adopting organisations. In the following section, we will give a brief explanation about each factor before stating its related hypothesis. In chapter seven we relate each hypothesis to the questions that test it.

5.3.4 The Research Hypotheses of Interest[1]

The IS literature suggests that the implementation process is affected by many factors found within and outside the organisation. Some of these factors are thought to influence either the adoption or the assimilation stage; while some other factors influence both of the stages and consequently the implementation outcome. Therefore, the hypothesis for each factor will reflect whether this factor influences one, either or both of these stages. For example, top-managers' characteristics such as age, nationality and education level are expected to influence organisation's decision to adopt IT systems but exerts less influence on assimilation.

A greater understanding of these factors could assist private organisations in SA to determine the best approach to increase the success rate of IT in their businesses. The proposed hypotheses are numbered in the same order as their factors in the research model. A specific hypothesis is proposed for each factor in the model. Each factor and its influence will be tested and analysed using different statistical techniques in chapters eight and nine.

A- Top-Management Factors

The IS literature identified a range of variables that would seem to influence IT implementation. In particular, characteristics of the owner/manager were identified and in some previous studies these factors were classified as individual/user oriented factors (Alavi and Joachimsthaler (1992).

In Alavi and Joachimsthaler's study, user factors were divided into: user cognitive style (for example, how users process and utilise information); user personality (for example, need to achieve, degree of defensiveness ..etc.), user demographics (for example, user age, gender and education); and user-situational variables (for example, experience, involvement and training).

In this research, we will use a mixture of top-managers' demographic and situational attributes such as: age, nationality, education level, IT knowledge and support. Top-management characteristics are investigated mainly with respect to their impact on adoption and assimilation.

1- Top-manager age

In a study cited in Cragg (1990) it was found that owner's age was negatively correlated to whether he had taken a computer class. The same findings were reported in Nabali's (1991) study in which she pointed out that older employees are likely to experience more difficulties in working with IT systems. Abdul-Gader and Alangari (1995) found that Saudi public managers are less likely to accept IT application if they themselves are old. Younger managers are more willing to change their way of doing business while older managers are more resistant to change.

Jarvenpaa and Ivis (1991) found that the top-managers's age is a significant predictor of the progressive use of IT. Jarvenpaa and Ivis attribute this to three possibilities:

(1) the existence of a "young" managers might represent an organisation that has experienced rapid organisational restructuring which might have involved IT; alternatively

(2) young executives are now generally used to IT in the workplace and might be more likely to rely on new IT-based change strategies than older executives who have grown reliant on more traditional change mechanisms; or

(3) firms who have turned to younger managess have done so to signal that their firms require fresh approaches and innovation.

Considering the relatively new introduction of IT systems into the Saudi private sector, young managers in this sector are more likely to have been exposed to computerisation through formal education than older ones. Consequently, initiation of or willingness to adopt and use IT systems may be more forthcoming from these young managers. Besides,

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[1] See the complete list of the research hypotheses of interest and the research null heypotheses at the end of this chapter.

from the researcher's own experience, it is easier to convince Saudi younger business owners and managers to adopt and use computers in their businesses than their older counterparts.

Therefore it is assumed in this study that the younger the organisation's managers are, the more likely it is that their organisations will adopt IT systems. However, it is also assumed that there is no direct association between the manager's age and the extent of assimilation.
H1- Private organisations in SA which are managed by younger managers are more likely to implement IT systems than those which are managed by older managers.

2. Top-managers' nationality

Some private organisations in SA are managed by Saudi and/or foreign managers (especially in joint-venture organisations which are owned by Saudi and foreign partners and in large organisations). Respondent managers are expected to include both Saudi and foreign managers. Foreign managers are often referred to as expatriates because they are employed by organisations in SA for expertise which they can contribute to the organisations they work for.

Expatriates are individuals from various countries, employed on contract or as part of a joint-venture agreement between Saudi and foreign companies to work in SA for a specific length of time. These expatriates are placed in management positions because of their expertise, knowledge and experience. Private organisations in SA benefit from their expertise which is transferred to Saudi personnel over time (AL-Qahtani, 1996).

After reviewing the literature, the researcher found no study that examines the influence of top-management nationality on the implementation of IT systems in Saudi organisations. This study can be considered the first to examine the influence of this factor on the implementation of IT systems in the Saudi business environment.

It is assumed in this study that private organisations in SA whose top-managers are non-Saudis are more likely to adopt IT systems. This assumption is based on the notion that non-Saudi top-managers are contracted to manage private organisations in SA for a variety of reasons among which are that they are more educated and have more experience and expertise in their field of business. They are also expected to have been exposed to and used modern management practices and tools more often than Saudi managers. Therefore, the following hypothesis is formed to test the influence of managerial nationality on IT implementation in SA.

H2- Private organisations in SA which are managed by non-Saudi managers are more likely to implement IT systems than those organisations which are managed by Saudi managers.

3- Top-managers' education level.

Education is assumed to play an important role in achieving management status in various organisations. It is also considered as an important vehicle that gives top-management members greater expertise in their fields and, therefore, better knowledge and understanding of the latest developments in technologies and management practices in their fields. Therefore, it is assumed that those in top-management positions with higher education levels will be more likely to direct or at least encourage their organisations to implement IT systems.

Several studies found a positive association between top-managers' levels of education and their likelihood to adopt and use IT systems. For example Rahman and Abdul-Gader (1993) revealed that a positive relationship exists between the user's computer productivity and his/her education level. Abdul-Gader and Alanagri (1995) also found that Saudi public organisations whose managers are more educated are more likely to adopt IT systems. Nabali (1991) supports these findings when she asserts that less educated employees are likely to experience more difficulties in working with IT systems.

This study assumes, therefore, that private organisations in SA whose top-managemers are more educated will be more likely to adopt IT systems. But it also assumes that there is no direct association between top-managers' education levels and the extent of assimilation of these systems in the adopting organisations.

H3- Private organisations in SA which are managed by managers with higher education levels are more likely to implement IT systems than those which are managed by managers with lower education levels.

4- Top-managers' IT Knowledge

Computer or IT knowledge is a term used to describe the ability of the organisation's management and workforce to understand and use computer technology easily and effectively. Computer knowledge is viewed increasingly as a necessary skill for management advancement at most companies. In a study on the reactions towards computers, it was found that workers recognised that computer knowledge would be necessary for them to continue in their job (Gray, 1990). Some studies use the term computer literacy to refer to the same variable discussed here as IT knowledge (see for example, Kleintop, 1993)

IT knowledge can be obtained in two ways: from experience and through training. Acquiring knowledge from experience can be classified as an informal acquisition route and training as the formal acquisition route through which staff are trained to use the adopted systems (Lee, 1989). Findings from IT studies suggest that strategic application of IT systems is likely to be more successful if the organisation and its management has gained expertise and knowledge from using similar systems (Neo and Soh, 1998).

Laudon and Laudon (1997) contend that organisational IT knowledge is one of the most valuable assets for firms today and that organisations must use internal and external sources of information effectively in order to remain viable and competitive. Cragg (1990) found that top-managers' knowledge of computers, and their involvement with computers is directly associated with the success of computer operations.

Boynton, Zmud, and Jacobs (1994) argue that a major component of an organisation's absorptive capacity regarding IT is represented by the conjunction of IT-related and business-related knowledge possessed by, and exchanged among, top-managers and business units.

Thong and Yap (1995) also contend that organisations run by top-managers, who are more knowledgeable about IT, are more likely to adopt IT. They cite in their work that the failure of some European small businesses to utilise IT was attributed to a lack of IT knowledge. Similarly a lack of IT knowledge was found to be a discouraging factor in 50% of the firms studied by Cragg and King in 1993. For example, in one of the firms studied, the owner's low level of IT knowledge discouraged others from exploring possibilities. In another the owner had never heard of a spreadsheet.

In a study conducted by Gable and Raman (1992) about Singapore small businesses, it was found that top-management members tended to lack basic IT knowledge and awareness. Many of these managers rejected the idea that IT could be of any use to their business. Among the major factors that have prevented Saudi public managers from adopting IT systems is their lack of sufficient IT knowledge (Abdul-Gader and Alangari, 1995).

In this study, it is assumed that the more IT knowledge the organisation's top managers have, the more likely that their organisations will successfully implement (adopt and increasingly assimilate) IT systems.

H4- Private organisations in SA which are managed by managers with more IT knowledge are more likely to implement IT systems than those organisations which are managed by managemers with lower IT knowledge.

5- Top-management's support

Top-management support is a factor that has received considerable attention from many researchers (for example, Ives and Olson, 1984; Cooper and Zmud, 1990; Cragg and King, 1993; AL-Assaf, 1997); AL-Shoaibi, 1998). In the IS literature, there is evidence to suggest that top-management support is positively related to the adoption of new technologies among organisations (Tornatzky and Fleisher, 1990; Kown and Zmud, 1987).

Management support can take many forms. For example, management can encourage staff to accept and use IT systems through rewards, training, leadership and participation. The focus of these efforts is to enhance or maintain a good relationship between the organisation and its workforce after adopting new technology which might have weaken the psychological contract between the workforce and the organisation (Klientop, 1993). The psychological contract refers to the unwritten understanding and familiarity which the employee have about the organisation and its current operations, procedures and systems.

Damanpour (1991) notes that when positive top-management attitudes regarding a new technology have been communicated to users, there is a greater likelihood of implementation success. Top-management support for the assimilation of IT systems can be achieved by effective communication between top-management and the staff of the various departments. Kleintop (1993) contends that when an organisational hierarchy supports the use of IT, communicates with its employees, allows them to participate in the decision making about the innovation and provides good training, it is more likely to see successful adoption and use.

Neo and Soh (1998) asserts that the decisions to implement IT systems happen more frequently when management supports and devotes the necessary resources to implementing these systems. Other researchers have emphasised the critical role of top-management in developing commitment to the adopted system and achieving IT implementation success (Cooper and Zmud, 1990; Thong and Yap, 1995). Jarvenpaa and

Ives (1991) found differing degrees of association between CEO participation, involvement and the progressive use of IT.

Top-management support was also found to be critical for the success of other IT related critical functions such as IS planning. In a survey by Galliers (1987), senior management commitment, support and involvement ranked first, second and third respectively in the list of the ten most important factors for IS strategic planning success (Gàlliers, 1991).

In this study, we assume that top-management support during the implementation process will increase the likelihood of implementation success of IT in the adopting organisations.

H5- Private organisations in SA whose top-management is more committed and supportive to IT implementation are more likely to implement IT systems than those organisations whose top-management is less committed and less supportive to the implemenation process.

B- Organisational Factors

The interest in organisational factors arises from the observation that, even within organisations having similar business environments and facing similar environmental conditions, some will be more innovative than others. One argument put forth is that people-related factors play an important role in the extent of innovations adopted by any one organisation (Rogers, 1983, 1995). Abdul-Gader and Alangari (1995) and Thong and Yap (1995) presented stronger arguments for the role of organisational factors such as structural and contextual variables.

Many researchers have directed their interest at factors that influence the effectiveness, success or usefulness of IT systems and a range of organisational factors have been identified in the IS literature. The main factors that have been studied in relation to innovations and IT implementation include but are not limited to:

6- Organisation size

Several studies have demonstrated the importance of organisational size in predicting organisational innovation, adoption and use of IT (Park, Jih, and Roy, 1994; Chau, 1995). IS studies suggest that, in some cases, the size of the organisation necessitates the adoption and usage of IT systems, whereas in others, IT systems are used more in larger organisations because their size facilitates the resources necessary to adopt their usage.

Nabali (1991) contends that the effect may be indirect in nature since size has also been associated with other organisational structural variables. Directly, the size of an organisation can lead to economies of scale that facilitate the adoption of new technologies by making them economically feasible. Indirectly, size typically leads to more time-specified tasks and to the specialisation of personnel.

Information systems research has also pointed out that small business organisations suffer from resource poverty, characterised by severe constraints on financial resources, a lack of trained personnel and face substantially more obstacles to adopt IT systems. They are, therefore, less likely to adopt IT systems than large businesses (Soh et al., 1992). Montazemi (1987) examined the computerisation environment of small businesses and found that: (1) few small businesses have access to a qualified IT experts; (2) none of these businesses has a specific policy towards the development of required IT systems; and (3) none has a precise and clear system requirement. Another factor that might affect IT implementation in small organisations is that most of them lack IT departments, which are considered to play an important role in IT implementation success.

Cragg and King (1993) cited a study (Suter, 1985) which reported that 80% of failure to adopt IT systems in their sample could be attributed to managers who considered their organisations too small to adopt computers. Delone and Mclean (1992) suggests, but does not empirically determine, that organisational size is directly related to number of computer applications implemented. Moreover, he demonstrates a direct association between organisational size and the percentage of an organisation's revenues that are allocated to the IS function within the adopting organisation. However Delone and Mclean contend that an organisation's size is not significantly associated with either end-user satisfaction or system utilisation.

Another study, (Edrer Anandarajan, and Arinze., 1997), contended that larger organisations have used computer technology for a longer period of time than smaller ones in a study of 74 manufacturing organisations. This suggests that larger organisations are earlier adopters of new technological innovations than smaller ones. It is clear, too, that larger organisations have more computers installed than smaller ones. Thong and Yap (1995) argue that even amongst small businesses, the larger the business, the more able it is to hire people with IT skills.

Other researchers suggest that larger businesses have more potential to use IT than small businesses, simply because of their larger scale of operations (Chau, 1995). However, some firms choose to stay small and this affects their decision not to adopt IT systems; and firms that actively seek company growth may behave differently with respect to computers (Cragg and King, 1993). Cragg and King propose that IT projects are less likely to succeed in smaller organisations than in larger ones.

Most of the earlier studies looked at the relationship between organisational size, adoption and usage of IT systems. There has been little, if any, emphasis on the relationship between organisational size and the success of the implementation of the adopted systems. The present study examines the relationship of organisational size to both the adoption and the implementation success.

In many studies, organisation size is determined by the number of employees working for the organisation. This criteria has been used by many researchers, for example, Chau (1995), Cragg and Zinatelli (1995), Yap, Thong, and Raman (1994); and Thong and Yap (1995). In the Yap, Thong, and Raman (1994) and Chau (1995) studies, a small business was defined as an establishment with less than 50 employees. Several previous studies have used similar (50-100 employees) guidelines to distinguish between small and large businesses (for example, AL-Shoaibi, 1991; Yap, Thong and Raman, 1992; Cragg and Zinatelli, 1995; AL-Obaidi, 1999). In this study, we will use a similar criterion: organisations that employ 100 people or less will considered small, organisations that employ between 101 and 500 people will be considered medium and organisations that employe more than 500 people will be considered large.

For the most part, the studies mentioned seem to indicate a positive relationship between size, the likelihood of adoption and the extent of assimilation of the adopted systems. It is, therefore, hypothesised that the large the organisations in the Saudi private business sector will be more likely to succeed in implementing IT systems than their smaller counterparts.

H6- Larger private organisations in SA are more likely to implement IT systems than smaller organisations.

7- Organisation's (Industry) Type

In addition to organisational variables and their relationships to innovation, adoption and diffusion, the context in which the organisation exists and conducts its business has also been found to be significantly related to innovation adoption and usage (Premkumar and Ramamurthy, 1997; Eder, et. al., 1997).

It is generally known that organisations in different industries have many differences in terms of organisational structure, tasks performed and the way the operations are performed. In the management literature, organisation type generally refers to the nature of the industry in which the organisation conducts its business (Damanpour, 1991). It can be classified as being either service or manufacturing (sometimes called industrial) and not-for-profit (public) or for-profit (private). This classification is valid and in accordance with the recent developments in the business world which divides businesses, in general, into two large main types (Eder, 1998): 1-businesses that manufacture products, and 2-businesses that provide services.

Manufacturing organisations are very different in nature from service organisations. While information is very important to both, their motives for investing in IT systems are different. According to a survey cited in Yavas and Yasin (1994), the top investment motive for manufacturing organisations is consolidation of operations and the integration of processes and systems. In the case of service organisations, the top motive is to meet the demand of high quality service as opposed to goods for their customers. This major difference in the operational orientations of manufacturing and service organisations has a direct impact on the information flow and the scope of IT systems used to support the operational system.

Differences also exist among facilitators of the adoption of new technologies in each type (Damanpour, 1991). For example, the nature of activities of manufacturing and service organisations differs. Unlike the situation in manufacturing organisations, in service organisations (1) the output is intangible and its consumption normally immediate, and (2) the producer is close to the customer or client - they must interact for delivery of the service to be complete. In a manufacturing context, the producer of the output may never interact with the actual consumer. Another difference between service and manufacturing organisations is the degree of standardisation in work processes. Manufacturing processes tend to be highly standardised while service processes tend to be more customised (Damanpour, 1991). These differences would unequally affect both the determinants of innovation and the strength of their influence in each context.

Based on these differences it would seem more likely that the implementation of IT systems would be more successful in a manufacturing context than in a service context. However, there is a conflicting evidence to suggest that service organisations are more likely to deploy IT systems (Yap, 1990; Eder, et. al., 1997). Eder, et. al. reported that there was a significant difference between service and manufacturing firms and their use of IT systems. Their conclusion was based on the reasoning that, because the nature of service organisations is more information intensive in order to produce customised service output, service firms will be more likely to adopt and use IT systems to interact with their consumers than manufacturing firms. Additionally, Yap (1990) found that within the service sector, organisations with a greater IT skilled workforce were more likely to use computers than those with a less skilled workforce.

The present research deals with private organisations from different types of industries in the Saudi private sector by classifying organisations in this sector as either belonging to the manufacturing or to the service sectors. The latter includes organisations in the health, education, bank and finance, hotels and lodging, and other types of businesses in which organisations offer services. The manufacturing sector, on the other hand, includes any organisation that deals with manufacturing and producing goods by turning raw material into finished or semi-finished products.

For the purpose of this study, the sample organisations will be drawn mainly from the Saudi non-oil private licensed manufacturing and service establishments, which are members of the Chamber of Commerce in the Eastern Province of SA. Therefore, industry type in this study will refer to whether the organisation is in the Saudi manufacturing or the service sectors.

It is proposed in this study that Saudi private organisations are not homogeneous in their experience with IT systems and it is expected that organisations in the manufacturing sector are more likely to incorporate IT systems successfully into their businesses than their counterparts in the service sector. This assumption is based on the facts that private organisations in the Saudi manufacturing sector are more organised, receive more government support have more financial resources and have more stable information flow structure than organisations in the service sector (Ministry of Planning, 1997; The Chamber of Commerce, 1996).

One last point about this variable is that differences may exist within each of the manufacturing and service sectors. For example differences exist between health and finance organisations in the service sector or between the manufacturers of food and beverages and the manufacturers of chemical and plastic products in the manufacturing sector. However, we will not examine the differences within each industry in this study.

H7- Private organisations in the manufacturing industry are more likely to implement IT systems than their counterparts in the Saudi service industry.

8- Organisation's Ownership Type

The nature of Saudi business ownership is varied: they are either totally Saudi owned (Saudi) or jointly owned by Saudi and foreign partners (Joint-venture). With regard to this variable, the research did not find any literature that empirically discusses this factor. Because no research has been found that examines the influence of this factor on the implementation process, SA presents a unique opportunity for investigating it and its influence on IT implementation. This study is the first of its kind to examine the influence of organisation ownership on IT implementation in organisations in SA.

From experience and observation, it is expected that joint-venture organisations in SA are more likely to adopt and use IT systems for several reasons. For example, joint-ventures have: (1) more financial resources; (2) greater access to modern business technologies, (3) type of business that requires the use of IT systems to keep up-to-date and to be in contact with their headquarters and/or branches outside SA; (4) have more IT experience and greater access to IT expertise due to their foreign contacts.

H8- Private joint-venture organisations are more likely to implement IT systems than pure Saudi owned organisations.

9- Organisation's Geographical Scope (business spread

In this study, an organisation's geographical scope refers to three different locality types:

- **Local organisation** is an organisation which conducts its business within the boundaries of one province in Saudi Arabia. However, this type of organisation can have one or more branches within its province boundaries;

- **National organisation** is an organisation that has branches in two or more of the Saudi provinces (for example, in the Eastern and Western provinces); and

- **International organisation** is an organisation that conducts business inside and outside Saudi Arabia.

Like the previous variable, there was no literature that tackled the influence of this variable on IT implementation. Nevertheless, we propose in this study that in the Saudi private sector national and international organisations are more likely to adopt IT systems than Saudi local organisations.

We also assume that decisions to adopt IT systems in these organisations may be based on the size of their business and/or their need to access and produce updated information about their branches and to manage better their expanded business in the other geographical areas both inside and outside SA. Local organisations, on the other hand, may have only one branch or be small in size and feel no need to use computers in their business.

H9- National and international organisations in SA are more likely to implement IT systems than Saudi local organisations.

10- IT infrastructure

An IT infrastructure has been comprehensively defined as "a set of shared, tangible IT resources that provide a foundation to enable present and future business applications" (Duncan, 1995, pp. 39). There is a general consensus in the innovation literature that any technological innovation should be compatible with, or at least related to, the firm's hardware, software, and human capabilities and skills (Grover and Goslar, 1993).

According to Neo and Soh (1998) IT infrastructure includes three main components: physical, human, and organisational. While the physical part includes the basic building blocks of computing and communication hardware, operating systems and peripherals; the human part includes both the knowledge, skills, and expertise that are needed to develop useful services from the physical infrastructure. Organisational IT infrastructure are the policies and processes governing the acquisition, use and development of the physical and human components of IT infrastructure.

Building a responsive IT infrastructure was ranked sixth in importance among the ten most important issues IS executives expected to face during the 1990s as revealed in a study conducted by Niederman, Brancheau, and Wetherbe (1991).

An organisation's decision to implement IT is directly influenced by how adequate and advanced is the IT infrastructure in their internal and external environments. Neo and Soh (1998) found in their research that around 43% of the organisations they examined reported that their existing computer resources facilitated their future expanded use of IT system. This suggests that a firm's existing set of IT applications can be a potential enabler and a gold mine for future organisational enhancements and for accomplishing strategic goals. Moreover, the types of applications that organisations are capable of developing and implementing are dependent on the available and reliable telecommunication and computing facilities at their disposal.

Duncan (1995) suggests that IT infrastructure is the key to the feasibility of implementing an innovative information systems. Duncan further suggests that the unique characteristics of the IT infrastructure in different organisations will affect the cost and the value of the technology being implemented. Earl (1994) contends that a combination of hard and soft IT infrastructure is required to create the opportunity environment in different business sectors. Neo and Soh (1998) assert that high performing firms will have greater levels of human and organisational IT infrastructure assets than low performing firms but that there will be no differences in their levels of physical IT resources.

With regard to private organisations in SA current evidence of the importance of IT infrastructure in enabling organisations to adopt IT systems is the present situation facing thousands of organisations in the Kingdom which wish to connect to, and build, Internet and Intranet business systems. Hundreds of business organisations in the Saudi retail sector, for example, were unable to implement EDI systems because of the lack of an adequate national IT infrastructure in terms of qualified human resources, standards, training programs, and capacity and speed of telecommunications (AL-Sudairy and and Tang, 1999).

This study assumes that successful implementation of IT systems in SA is greatly influenced by the availability of both the organisational and national IT infrastructure. This study also attempts to investigate how both organisational and national IT infrastructure affects the Saudi private organisations decisions to implement IT systems.

H10- Private organisations in SA are more likely to implement IT systems if they have an adequate IT infrastructure available to them.

11- IT planning

Planning is defined by Alangari (1992) as the process of determining in advance the optimum direction of organisational efforts by establishing strategic or operational goals, budgeting for achievement and analysing the actions taken. Information Technology planning is identified as the activities that precede and continue during IT implementation. Planning for IT, however, is more complex than traditional planning for four reasons: (1) the fast rate of growth and advancement in the IT field, (2) the scarcity of IT qualified human resources, (3) the mixed experience with IT among organisations, and (4) the high investments required in IT projects.

There are many frequently applied IT planning methodologies. According to Lederer and Sethi (1988), they include:

(1) The Business Systems Planning, developed by IBM in 1975 which involves top-down planning with bottom-up implementation. Using this methodology, a firm recognises its business mission, objectives and functions and how these determine its business processes.

(2) Strategic Systems Planning (SSP), developed by Robert Holland in 1986 which defines a business function model by analysing major functional areas. The steps in the SSP procedure are similar to those in BSP.

(3) Information Engineering (IE), developed by James Martin in 1982 which provides techniques for building enterprise models, data models, and process models. These form a comprehensive knowledge base which then creates and maintains IT systems. IE is more technical than the other two methods.

For more detailed discussions of these and other frequently used IT planning methodologies such as Method/1(Arthur Andersen and Co., 1982), readers are advised to refer to Lederer and Sethi (1988).

Many studies indicated that planning is one of the most important factors for successful IT implementation (Galliers, 1987; Delone, 1988; Barki and Hartwick, 1994; AL-Sudairy, 1994; Abdul-Gader, 1997). In a study by Niederman et al.(1991), IT planning ranked third among the ten most important issues facing organisations in the 1990s. Furthermore, a study conducted in SA about IT systems assimilation in the public sector indicated that IT implementation is endangered in Saudi public organisations which lack or have weak IT planning (Abdul-Gader and Alangari, 1995). Saudi IT academics, managers, and vendors all agreed that lack of IT planning ranks as the most important barrier against successful IT assimilation in SA.

Organisations are advised to plan and to define their requirements for IT. Alavi, Nelson, and Weiss (1988) and Galliers (1987, 1991, 1993) strongly emphasise the importance of IT planning for the success of the implementation process. They assert that lack of proper IT planning can be a major inhibitor to IT success. Yavas, Lugmani and Mustafa (1992) pointed out that many organisations in the developing countries engage in short-term planning and fail to utilise systematic and scientific means of planning. Yavas et al. also pointed out that in these countries, organisational objectives are stated in very broad terms and are not communicated clearly and fully to the lower levels of management. Earl (1994) points out that IT planning must be 'hands-on' by senior management. It must also encourage continuous exploitation of IT and cope with continuous change and learning.

Several Arab IS and management researchers (for example, Kassem and Habib, 1989; Abdul-Gader and AL-Bureay, 1993; and Abdul-Gader and Alangari, 1995) found that a low percentage of businessmen in SA practise formal strategic planning as is defined in the Western management literature. These researchers found that the planning function in SA is influenced and often hindered by economic instability, political uncertainty, and lack of accurate and reliable data. They also found that, due to these circumstances, managers in SA are hesitant to commit themselves to long-term planning.

Based on the findings of these studies, we expect that IT implementation in Saudi private organisations is very much influenced by the lack of IT planning. If Saudi organisations practise planning, there will be successful IT implementation. Otherwise, little success, or even failure, will be the outcome of their efforts.

H11- Private organisations in SA are more likely to implement IT systems if they practise IT planning.

12- Training

Given the extensive skills needed to enhance the implementation success of the adopted systems, training provides a method for upgrading employees skills and identifying what behaviours are expected of them with respect to the new technology. Indeed, training is the formal knowledge acquisition route through which the workforce are educated to use the adopted systems appropriately (Lee, 1989).

Training is often cited in IS literature as a primary requirement for successful implementation. For example, Mawhinney (1996) found that IT utilisation is strongly and positively associated with the amount of computer training given to the users. Moreover, computer training has been proven to be a significant success factor in the IS literature. As argued by Olorunsola (1997), problems can arise in the use of IT systems if staff are not properly trained. A workforce trained in the use of IT systems is expected to be more skilful and more tolerant of these systems (Raymond and Bergeron, 1992).

Raymond (1988) asserts that training leads to a more positive attitude, less resistance to change and more effective computer use. He also points that lack of training in computer skills can be a major problem for organisations wishing to adopt IT systems. Staff who acquire computer training will be more familiar with the operation of the adopted systems and the type of support these systems can provide for the tasks they perform.

A study by Goodman, Griffith and Fenner (1990) indicates that a variety of training possibilities. This includes formal classroom training to hands-on-experience and trial and error efforts are significant forms of training and useful for giving the adopting organisation's staff the necessary knowledge and skills to operate, utilise and maintain the adopted systems successfully. Indeed training can be used to retain good IT people. Marcus Harris, managing director of a British company, points out that people stay with a company that cares about their skills development. He also insists that "training and development is a big motivation in the industry. If people think their employer will not allocate time or is refusing to put resources into training, they will go elsewhere.") (Freelance Informer, 19.2. 1999). Gordon Ewan, a director at the Information Technology Training Organisation (ITNTO) in the UK, agrees: "*If employers would use training as a development tool, to try and manage individuals' aspirations ... then they could improve staff retention and development.*". Ewan advises companies not to be reluctant to train their staff for fear that they might leave the company and take their new skills elsewhere. Harris bases his advice on the fact that, by creating an environment of continuous learning, where each employee has a training plan, IT staff will feel that the company is taking an interest in their career and is committed to developing their skills (Freelance Informer, 19.2.1999).

During the initial phase of this study, which involved interviews with some business owners, executives and IT managers, training was frequently mentioned as an important factor in facilitating the use and success of the adopted systems. For example, one business owner said: "*Training was an important factor in preparing our workforce to use the adopted IT systems successfully.*".

We assume that organisations that provide adequate IT training programs for their employees will have more success in their IT implementation efforts than those organisations which do not. Therefore, our hypothesis in this respect is:

Table 5.2 Linking the research hypotheses with the findings from the exploratory study and the references in the literature review

Research Hypotheses	Exploratory Study methods	Literature Review References
H1- Private organisations in SA which are managed by younger managers are more likely to implement IT systems than those which are managed by older managers.	Intrerview.Q1, background Information (age) group discussions	Nabali,1991; Abdul-Gader,1991; Abdul-Gader & Alangari,1995.
H2- Private organisations in SA which are managed by non-Saudi managers are more likely to implement IT systems than those organisations which are managed by Saudi managers.	Interview Q1, background information (Nationality) & group discussions	Dahlawi,1989; Sindi,1991; AL-Qahtani, 1996.
H3- Private organisations in SA which are managed by managers with higher education levels are more likely to implement IT systems than those which are managed by managers with lower education levels.	Interview Q1, background information (education level) & group discussions	Nabali,1991;Sindi,1991;Rahman & Abdul-Gader, 1993.
H4- Private organisations in SA which are managed by managers with more IT knowledge are more likely to implement IT systems than those organisations which are managed by managers with lower IT knowledge.	The interview background information (IT experience) & group discussions	Thong & Yap,1995; Laudon &Laudon, 1997; Neo & Soh,1998
H5- Private organisations in SA whose top-management is committed and supportive to the implementation process are more likely to implement IT systems than those organisations whose top-management is less committed and less supportive to the implementation process.	Interview Q1/Q9, group discussions and mini-case studies I & II.	Cragg & King,1993; Yavas & Yasin,1994;ALSudairy,1994;AL-Assaf,1997;Al-Shoaibi,1998.
H6- Larger private organisations in SA are more likely to implement IT systems than smaller organisations.	Interview Q1, background information (organsation size) & group discussions	Park,et.al,1994;Yavas&Yasin,1995;Chau,1995;Thong&Yap,1995.
H7- Private organisations in the Saudi manufacturing sector are more likely to implement IT *systems than their counterparts in the Saudi service sector.*	Interview Q1, background info. (business sector), *group discussions & mini-case studies I & II.*	Yasin & Yavas, 1994; Shash & AL-Amir, 1997.
H8- Private joint-venture organisations are more likely to implement IT systems than pure Saudi owned organisations	Interview Q1, background information (ownership type) & group discussions.	Yasin & Yavas, 1994; Shash & AL-Amir, 1997; Eder,1998.
H9- National and international organisations in SA are more likely to implement IT systems than local organisations.	Interview, focus group discussions and mini-case II.	Rahman & Abdul-Gader, 1994; AL-Qahtani,1996.
H10- Private organisations in SA are more likely to implement IT systems if they have adequate IT infrastructure available to them.	Initial literature review, interviews Q12, group discussion and mini-case II	Niederman, Brancheau & Wetherbe,1991; Neo & Soh,1998
H11- Private organisations in SA are more likely to implement IT systems if they practise IT planning.	Initial literature review, interviews Q3, group discussion and mini-case II.	Alangari,1991; Niederman, et.al,1991; Abdul-Gader, 1997.
H12- Private organisations in SA are more likely to implement IT systems if they provide IT training to their staff.	Initial literature review, interviews Q8, group discussion and mini-cases I & II	Raymond & Bergeron, 1992; Abdul-Gader & Alangari, 1995.
H13- Private organisations in SA are more likely to implement IT systems if their top-management thinks there is competition in their industry.	Initial literature review, interviews Q10, group discussion and mini-case II	Cragg & King, 1993; Iacovou, Benbasat & Dexter, 1995; Neo, 1998.
H14- Private organisations in SA are more likely to implement IT systems if they are provided with adequate vendor support.	Initial literature review, interviews Q6, group discussion and mini-case I & II.	Attwell, 1992; Cragg & King, 1993; Khalfan & Gough, 2000.
H15- Private organisations in SA are more likely to implement IT systems if their top-management perceives IT systems as easy to use.	Initial literature review, interviews, group discussion and mini-case II	Thompson, 1991; Igbaria, 1993; Ramamurthy&Premkumar, 1995.
H16- Private organisations in SA are more likely to implement IT systems if their top-management perceives IT systems as beneficial to the business.	literature review, interviews Q10, group discussion and mini-case I & II.	Igbaria,1993;Iacovou, et.al,1995; Ramamurthy&Premkumar, 1995.
H17- Private organisations in SA are unlikely to implement IT systems if their top-management perceive these systems as expensive.	literature review, interviews Q12, group discussion and mini-case I & II.	Cragg & King, 1993; Cox & Ghoneim, 1996; Remenyi, 1996.
H18- Private organisations in SA are more likely to implement IT systems if these systems are available in Arabic.	literature review, interviews Q11, group discussion and mini-case I & II.	Robey; et.al, 1990; Sindi, 1991; Abdul-Gader & Alangri, 1995.

بسم الله الرحمن الرحيم

CHAPTER SIX

RESEARCH METHODOLOGY

" Just as we select a tennis racquet rather than a golf club to play tennis because we have a prior conception as to what the game of tennis involves, so too in relation to the process of social research; we select or favour a particular kind of methodology because we have implicit or explicit conceptions as to what we are trying to do in our research" Morgan (1993)

6.1 INTRODUCTION

Conducting a research project requires the development of appropriate research methodology and the adoption of data collection techniques. The quality of the collected data determines the quality of the findings of the research. Different research methodologies and data collection techniques have been used by researchers in the Information Systems (IS) field. These methodologies and techniques have both strengths and weaknesses, and are either qualitative or quantitative and analytical or descriptive (Gill and Johnson, 1997).

The use of a particular methodology for a research project depends on the scope, purpose, target population, etc. of the study as well as the resources available to the researcher. It is essential, therefore, that in order to achieve their objectives, researchers adopt the right methodology to achieve the research objectives; and select the right data collection techniques through which they can collect the required data within their available resources.

The following section will present a brief discussion about the IS research methodology literature. The meaning and characteristics of the approach and data collection techniques adopted in this research will be presented next. They also explain why a quantitative survey method was used as the main method.

The last sections discuss in detail other aspects of the research methodology in this study such as the questionnaire design and structure, the sample size and the unit of analysis. Furthermore, the sampling technique and the survey procedures are explained as well as the data analysis methodology.

6.2 THE RESEARCH METHODOLOGIES LITERATURE

Research studies are conducted for the purpose of obtaining data that is not available from other sources regarding a specific area of knowledge. Obtaining empirical data can be done using many different techniques. Those most common include interviews, observations, case studies and questionnaires. The method selected depends on the goals and objectives of the research, the sample of respondents involved, the time set for the completion of the study, and monetary considerations.

Research methodology refers to the procedural framework within which a research is conducted and within which the facts are placed so that their meaning may be seen more clearly. It provides guidelines rather than firm prescriptions as to how research should be conducted and Information Systems (IS) researchers should be cautious about their overuse in detail (Remenyi and Williams, 1995).

In social science, there are two main types of empirical research: the quantitative approach and the qualitative approach. The quantitative approach is characterised by a methodology of formulating hypotheses which are tested through controlled experiment or statistical analysis (Kaplan and Duchon, 1988). This approach uses techniques such as experiments, surveys and analysis of archival information; it gives a wide but shallow emphasis (AL-Sudiary, 2000). Most studies of IT systems are based on methods that measure quantitative outcomes. These outcomes can be grouped into technical, economic, and effectiveness and performance measures (Kaplan and Duchon, 1988).

The qualitative approach, on the other hand, utilises techniques such as case study, participant observation and interviews. It emphasises an interpretative method that uses data to both pose and resolve research questions. This approach gives a narrow but more detailed focus.

Many researchers such as Kraemer (1991), Serkaran (1992) and Churchill (1995) point out that quantitative research, while being very useful, is greatly improved when used in conjunction with other qualitative research methods such as case studies, interviews and observation. When qualitative and quantitative research approaches are combined, we have what is called triangulation in action (Jik, 1989). Triangulation is used by researchers to improve the accuracy of their judgement by collecting different kinds of data bearing on the same phenomenon. Triangulation allows researchers to be more confident of their results. Furthermore it can stimulate the creation of unconventional data collection techniques such as seminars, teleconferencing, presentations and focus group to collect data and receive feedback about the study subject.

The main purpose of combining qualitative research with quantitative research is to achieve one or more of the following (Morgan, 1998):

(1) to arrive at better understanding of the topic being studied;

(2) to design a research methodology;

(3) to learn from specialists about certain issues related to the subject matter;

(4) to become acquainted with problem areas or constraints;

(5) to assess the feasibility of the topic being researched.

6.3 THE RESEARCH APPROACH IN THIS STUDY

In a country such as Saudi Arabia (SA) in which religion and traditions penetrate all aspects of the society, it is essential for researchers to be aware of the cultural characteristics and the values of the research environment (see chapter three and chapter four). Researchers should be particularly sensitive when conducting research in this environment otherwise their attempts will fail to produce the required co-operation or will end up with meaningless results.

This study employed both qualitative and quantitative survey methods. With these particular methods it is possible to collect data from a large number of individuals in a wide range of organisations. A clear advantage of this approach is that it has been used and proven by many IS researchers such as Igbaria (1993) AL-Gahtani (1995), abdul-Gader and Alangari (1995), and AL-Shoaibi (1998) as an effective method for the collection of data on IT implementation. This allows quantitative analysis in the testing of hypotheses and also has the potential to generalise the findings to similar types of organisations.

This research used an implementation perspective. Under the implementation perspective, IT implementation was viewed as an extended process that included adoption as the first stage and assimilation (diffusion and infusion) as the second stage. The research period was divided into three main phases:

-Phase One:

This phase lasted from January 1, 1996 to April 30, 1996. During this period, an extensive literature review in the field of diffusion of innovations and IT implementation was conducted to find out about the latest researches and studies in the subject matter. Also, during this period, a two months (March 1- April 30, 1997) exploratory visit to SA was made during which the researcher visited various Saudi public and private organisations and met and interviewed many IT academics and professionals in SA.

The purpose of this visit was to gather information to arrive at a better understanding of the IT environment in SA. Another purpose was to identify traces of a research environment that could have a bearing on the investigation and to assess the feasibility of a more structured quantitative study at a later stage. Additionally, the researcher searched for any studies related to the present research in SA. A research framework was developed at this stage to guide the study. In addition, the researcher reviewed the IS research methodology literature with the intention of developing and/or adopting a methodology suitable for this particular research.

-Phase Two: lasted from the beginning of June 1997 to the end of November 1999. At this stage, the study population was defined, informants were identified and the sample organisations were selected. Furthermore, two focus group meetings were held at AL-Ahssa and the Dammam industrial cities in the Eastern Province of SA. Time was also spent on the design, development, Arabisation and piloting of the questionnaire.

The main quantitative survey was conducted during this period. Five hundreds organisations from the Saudi private sector were contacted through mailed questionnaires and telephone and fax communications. In addition, time was spent on entering and storing the responses, updating the literature, analysing data, testing the research hypotheses and discussing the results of the questionnaire survey. Furthermore, mini-case studies were investigated and written.

-Phase Three:

The remaining time of the research period, which ran from the beginning of December 1999 to the end of May 2001, was spent developing the suggested managerial guidelines for IT implementation and writing up the thesis (see Research Phases & Milestones at the end of chapter one).

6.3.1 Data Collection Methods Used in this Research

Meaningful research studies depend on selecting the right approach, asking the right questions and picking the most effective method for collecting data. The right questions and the best methods to apply to research studies conducted in SA are likely to be those which take into account local culture traditions and values which have shaped so many aspects of the Saudi society (see chapter three and four).

After reviewing the various types of research methods found in the literature, the researcher decided to employ different methods to collect data. The reason behind this decision was the desire, among other research objectives, to document the Saudi IT environment and the experience of Saudi private organisations with IT.

Two visits of two and five months respectively in 1997 were made to SA. The first was carried out for a preliminary identification and assessment of the problems that face Saudi organisations when they decide to adopt IT systems. Also to obtain an initial idea of the ways in which business owners and top-managers value and participate in the implementation of IT in their organisations. The second was to conduct the questionnaire survey, the aim was being to identify and discuss the factors that influence the implementation of these systems in the Saudi private business environment.

The application of both the exploratory survey and the main questionnaire survey suggest the appropriateness of the research approach and methods used in this research. These methods included:

- Face-to-face and telephone interviews;
- Sites visits and observations at some Saudi private organisations;
- Focus groups (meetings and interviews);
- Mini-case studies; and finally
- Questionnaire.

The first four methods were discussed thoroughly in Chapter Three. In the following subsections we will discuss how the questionnaire techniques were used in this research.

- THE QUESTIONNAIRE

The questionnaire is another technique for collecting data. It is the most frequently used method in the social science field (Easterby-Smith et al, 1996). It is a highly structured method of collecting specific information as a response to highly directed questions. It is simply a list of questions that take the form of "close" (fixed alternatives) and "open-ended" choices (AL-Shoaibi, 1991). Questionnaires tend to be used to explore attitudes and opinions about certain issues, objectives, and situations; the questionnaire also has other functions: measurement of awareness, knowledge, and behaviour (AL-Assaf, 1997).

In the case of a questionnaire, the researcher must be familiar with the guidelines for questionnaire preparation and with good practice in this field. Oppenheim (1992) indicated that the main factor in questionnaire design is clarity, and that complex and confused wording must be avoided. Therefore, it is absolutely essential that a pilot study be conducted to establish that the proposed questionnaire is intelligible and clear to members of the target population. Also, the researcher must ensure that the questionnaire is unambiguous, reliable and valid for the purpose for which it is to be used (Remenyi and Williams, 1995).

In addition there are some guidelines which must be followed by researchers wishing to use the questionnaire as their data collection instrument. These guidelines include (Remenyi and Williams, 1995):

(1) Economy: only questions which will be used in answering the research problem should be included;

(2) Completeness: all issues which may have a bearing on the research should be addressed;

(3) Comprehensibility: the questions should be fully understood and clear;

(4) Consistency: questions should include checks to ensure that respondents are being consistent;

(5) Quantification: questions should be set in such a way that the answers will be quantifiable in terms of an acceptable scale;

(6) Balance: leading questions should be avoided in order to minimise the danger of unintended bias.

Information system researchers suggest that a questionnaire has the advantages of increasing the generalisation of data while at the same time giving the respondents freedom to express their points of view (Casewell, 1989; AL-Gahtani, 1995). Among its other advantages the questionnaire is relatively inexpensive, it can be administered by a relatively unskilled person; it can be distributed in person or by mail; and it generally offers the anonymity that may lead respondents to be more open and truthful (AL-Assaf, 1997).

The use of the questionnaire also has the advantage of overcoming many cultural factors. For example, it is part of the Arab culture that personal and family or business information should not be discussed outside the boundaries of the family or the company as such matters are viewed as being very private (AL-Qahtany, 1996). In the case of SA, for example, managers of public and private organisations are not accustomed to being questioned about their company or their abilities as managers. Such information is viewed as being confidential and therefore should be classified as confidential. Responses to the questionnaire, therefore, may hold greater credibility as respondents do not have to identify themselves or their organisations.

Time is also an important factor. Personal interviews and observations require an extensive amount of time and effort. A researcher can minimise these two factors with the use of a questionnaire while, at the same time, reaching a larger number of his target population within a short time. Moreover, respondents view research studies in a more favourable way if they can reply to the questions at their convenience.

Cooper and Emory (1995) suggest that mail questionnaires with a return rate of about 30% are often considered satisfactory. In Saudi Arabia where this study was conducted, a response rate of 15% is considered normal (AL-Arfaj, 1996). This low response rate can be attributed to the following reasons:

1. Researcher's lack of understanding of the local culture;
2. Researcher's lack of good contacts in the sample organisations;
3. Wrong timing (for example, Summer and official holidays) of the survey.

Many studies, for example Davis and Cosenza (1993), have shown that those who are better educated and more interested in the topic, tend to answer mail survey. In order to increase the response rate, researchers, for example AL-Arfaj (1996), suggest using different techniques among which are the following:

- **Questionnaire length**: researchers should be aware that long questionnaires discourage the target respondents from completing the instrument and consequently either it is not fully completed or not returned at all. In both cases, the study's validity will be jeopardised. Therefore, many researchers try to make their questionnaires as short as possible.

- **The Survey sponsorship**: if the study is sponsored by recognised organisations, respondents are motivated to complete and return the instrument. This study was sponsored by King Faisal University in SA and supported by the Chamber of Commerce and Industry in the Eastern Province of SA. The researcher was supplied with two official letters from these two respected organisations confirming their sponsorship of this study and encouraging the sample organisations to participate and complete the accompanied questionnaire. (See the copy of these two letters with the questionnaire at the end of this thesis).

- **Follow-up efforts**: This technique is one of the most effective ways to increase the response rate. It is used either to check if the respondents received the instrument or to remind them to complete it and return it. In recent years, researchers have greatly improved data collection in mail surveys by applying a technique called the Total Design Method (TDM) (Nachmias and Nachmias, 1996).

The follow-up technique is to send a reminder letter or a postcard to respondents who have not replied within two weeks of the first mailing. A second follow-up letter with a new questionnaire and a return envelop should be sent to the respondents at the end of the third week of the original mailing if no reply is received. A third follow-up letter including a questionnaire must be sent registered by mail to all of the sample organisations which have not replied by the end of week seven of the original mailing.

The present researcher carried out field visits and used telephone and fax communications to contact most of the sample organisations which did not reply within 3-5 weeks of the original mailing. This technique was very useful because about 40 questionnaires or about 23% of the total (178) received responses were gathered using this follow-up method.

- **Cover letters**: A cover letter is an important factor that can increase the response rate because it tells the target respondents about the purpose of the study, its importance and its sponsors. Cover letters should also assure the respondents of the confidentiality of their answers and that the information provided will be used for research purposes only. The present researcher has covered the questionnaire with a letter that fulfilled the above suggestions. Other methods used by researchers to increase the response rates include enclosing postage-paid return envelopes and the use of motivating incentives such as money and/or gifts.

In spite of the novelty of employing the questionnaire technique in SA and some difficulties encountered by its early users (ALAMRI, 1995; AL-Arfaj, 1996), the questionnaire instrument was adopted as the main instrument to collect data. The reasons for using a questionnaire in this research are:

1- It is the most common method of data collection in survey research because it assures the anonymity of respondents and enables them to respond more freely and at their convenience. This has a positive effect on the credibility of the research since the data gathered is believed to be representative of the respondents knowledge of the subject;

2- It is suitable for an individual researcher who has limited resources in terms of time and financial resources;

3- Most of the objectives of this study (identifying and analysing the main factors that entice private organisations in SA to adopt IT systems and the factors that influence the implementation process) can be accomplished through the employment of several statistical techniques;

4- It can be distributed to large numbers of respondents and a wider range of respondents gives greater credibility to the data collected. Thus, the questionnaire is the most appropriate technique;

Other factors that encouraged the present researcher to use this instrument include:

1. The researcher considered that the other data collection techniques (personal and focus groups interviews and mini-case studies) which were used in the early phases of the study were not adequate on their own;

2. The researcher had the support of both King Faisal University and the Chamber of Commerce and Industry in the Eastern Province of SA which offered their IT and postal services to contact the sample organisations and to distribute the questionnaires. Also, two letters of introduction directed to the management of the sample organisations had already been provided by these two establishments to confirm their official support.

Detailed explanation of the design, development, and application of the questionnaire is presented in the following sections.

6.4 PROCEDURES OF THE QUESTIONNAIRE SURVEY

During the planning stage of this study, it was found that there were very few research studies and little information about IT implementation in the Saudi private sector. Therefore, it was felt that the questionnaire method would generate far more data while at the same time minimising the time and efforts required of the researcher and the respondents. This method is generally found to be the best technique to collect data from a large group of respondents in a short time and provides the opportunity for the respondents to give frank and precise answers.

In this study, business owners and top-management executives were the key informants because they were considered as having the necessary responsibility and the authority to implement such an important decision as approving and installing IT systems in their organisations. Furthermore, their position gives them power to motivate staff positively and promote a successful implementation and use of IT systems in their organisations. Indeed, these executives were expected to be highly knowledgeable about their organisations' experience and plans for IT. Top managers' responses will be used to test the research hypotheses and to interpret results of the questionnaire analysis.

6.4.1 Questionnaire Design

Conducting a questionnaire survey is the process of translating concepts into measurable variables (Saunders, Lewis and Thornhill, 1997). The research variables were tested by questions in a quantitatively measurable way using existing scales in the literature such as Likert-style rating, ranking and dichotomous questions.

The questionnaire was designed and developed by the researcher after a review of prior studies in the field of technological innovations and IT implementation carried out by: Kwon and Zmud (1987), Cooper and Zmud (1990), Reich and Benbassat (1990), Delone and Mclean (1992), Cragg and King (1993), Klientop (1993), Park, Jih, and Roy (1994), Yap, Thong, and Raman (1994), Abdul-Gader and Alangari (1995), Iacovou, Benbassat, and Dexter (1995), Churchil (1995), Cox and Ghoneim (1996), Chau and Tam (1997). Some of the items and measures in the questionnaire were directly adopted and/or adapted from the work of some of these researchers.

The aim of the questionnaire was to collect the data necessary to help quantify the degree of association between each of the 18 factors and the degree of IT implementation success as defined in the previous chapters. The questions in the instrument sought information on three areas: top-management characteristics organisational characteristics and system characteristics that were hypothesised as influencing IT implementation.

The questionnaire was designed to be closed-ended and specific enough to reveal answers to the instrument's questions, yet general enough to allow respondents not to reveal any sensitive information. A closed-ended question offers a selection of answers from which the respondent is asked to select one. Closed-ended questions direct all respondents to answer the same questions with answers that can be meaningfully compared and analysed *using statistical techniques* (Foddy, 1993). *Other researchers* (Oppenhiem, 1992; AL-Arfaj, 1996) suggested or found this method acceptable for collecting data on causes and effects in social and marketing studies.

Many of the questions in this instrument were constructed according to the Likert-type method with a value of 1 indicating a low agreement for the factor and a higher number indicating a high agreement to the degree of influence of the factor. This type of measurement has been used because of its suitability in achieving the objectives of the study. Other types of questions in the instrument sought dichotomous "Yes" or "No" answers to indicate agreement or availability of an IT resource or activity inside the adopting organisations.

Most of the questions in this research instrument were closed-ended and simply required the respondent either to tick an appropriate square or box, to insert a √ symbol or to write a digit number in a box or bracket. Additionally, at the end of some questions, the respondents were given the chance to make comments or to add other information. This process enabled the respondents to indicate their answers to most questions.

Before Arabising the instrument the researcher discussed its questions with John Beckett, a statistician from the Computer Centre at Leicester University, for their suitability to test the research hypotheses. The questionnaire was then Arabised, pilot tested, edited and coded for the purpose of computer processing in the later stage of analysis. The purpose of the Arabic version of the questionnaire was to permit respondents with little or no knowledge of English, yet actively involved in IT implementation in their organisations, to participate in the survey.

Translating the questionnaire into Arabic was relatively easy because the researcher has an acceptable command of both Arabic and English (the researcher has completed his undergraduate (Bachelor) and graduate (Master) degrees in English in the USA and currently doing this study in the UK). In addition, to ensure the grammar and language correctness of both versions of the questionnaire, they were given to two members of the faculty of the Arabic and English languages departments in the College of Education at King Faisal University. After minor corrections had been made, the questionnaire was ready for pilot testing.

In an attempt to give this study an academic and an official profile and to increase the response rate, the cover letters of the questionnaire were printed on the official papers of the Chamber of Commerce and Industry in the Eastern Province of SA, University of Leicester and King Faisal University- the employer and sponsor of the researcher. The purpose of the cover letters was to encourage the sample organisations to co-operate with the researcher and to complete and return the instrument. A copy of the questionnaire in both its Arabic and English versions can be found in the Appendix section.

In the cover letters of both versions, a definition of IT was given, guidelines on how to complete the questionnaire were explained and the respondents were reassured of the confidentiality of their responses. The respondents were supplied with the postal and Email addresses and the telephone and fax numbers of the researcher and the research supervisor in case they needed more information or wanted to discuss any issue related to the research.

It was made clear that this questionnaire was to be answered by a senior executive who had enough knowledge about the organisation's experience with IT. This person could be the business owner, chief executive officer, or the IT manager. To reduce hesitation and concern about completing the questionnaire, the researcher assured the respondents that their answers would only be used solely for the academic purpose of this research.

6.4.2 Questionnaire Structure

The questionnaire was divided into five parts in order to provide motivation for the respondents to complete and to reduce the possibility of boredom inducing the respondent to give up; thus it was designed to give an impression of answering short sections, rather than a long questionnaire. The most significant constraint was the need to have the questionnaire returned back as quickly as possible. Telephone calls and fax communications were used to contact some of the sample organisations which indicated that either they did not receive the questionnaires or that they had misplaced them.

The questionnaire was designed to ensure that respondents followed precise and specified instructions. It was attractively presented to facilitate ease of response and to encourage the respondent to continue and complete the instrument. The final version of the questionnaire consisted of five parts containing 50 questions:

Part I: The Respondents' (top-managers) Information and Characteristics

Part one consists of 8 questions (Q1-Q8) which focus on collecting information about the respondents' characteristics which were thought might influence IT implementation. These questions were related to the research hypotheses. They were directed to classifying the respondents' positions held in the company and their characteristics. This will be used to analysis and to provide access to information such as telephone and/or fax numbers for future communication if clarification or more information were needed during the analysis stage. The respondent's managerial position, nationality, age, education and English levels, IT knowledge and experience were requested.

The respondent's name, organisation's name and address were left to be supplied optionally or if he wanted a summary of the research results then these information were requested. Other information elicited in this part is whether or not the sample organisations receive top-management support and commitment during the implementation process.

Part II: The Organisational and IT systems Characteristics

Part two consists of 18 questions (Q9-Q26) and focuses on collecting information about organisation's characteristics such its size, industry type, ownership type, geographical scope. In this part, a distinction is made between organisations which are already implementing IT systems and those organisations which are not. Respondents who identified their organisations as non-users of IT systems were directed to skip to the last three questions which ask about the reasons for not implementing IT systems and whether the organisation plans to adopt them in the future and how soon.

Moreover, part two was concerned with identifying what characteristics of the implemented IT systems were perceived as offering ease of use and cost perceived benefits. In this section we also checked whether or not these characteristics encouraged the organisations to go ahead and adopt these systems. In this part the researcher attempted to solicit information to find out the relationship between the characteristics of IT systems and the adoption decisions in the Saudi private business environment.

Information was gathered about whether or not the adopting organisations in SA practice IT planning, sought professional IT advice or provided training to their employees and the effect of these on the implementation process.

Part III: The Organisation's Procedures During the Implementation Process

In this part, 3 questions (Q27-Q29) with multiple statements and answer options were directed to the respondents to indicate what procedures and actions their organisations have followed or usually follow when they decide to adopt or purchase new IT systems. This kind of information is necessary because it can help in identifying and analysing the factors that facilitate or hinder the implementation process. In addition, other information which was thought necessary to know for this research such as the reasons (computerisation motives) that enticed organisations to adopt IT systems was gathered in this part of the questionnaire.

Part IV: The Organisation's IT Environment and Extent of Assimilation

Part four consisted of 13 questions (Q30-Q42). They were designed to obtain information about IT environment in the sample organisations. Information was also collected about the departments and the functions that have been computerised, the types of hardware and software already implemented, the number and functions of the organisation's IT employees. One question in this part checks whether or not the adopting organisations actually have an IT department. The purpose of these questions was to assess the degree of IT assimilation in the adopting organisations' departments and functions.

From the data gathered in this part of the questionnaire, a categorisation will be made of the responding organisations based on their success level in implementing IT systems indicating whether it was successful, more successful or unsuccessful. This in turn will be used to generalise about Saudi private organisations experience with IT.

Part V: Organisational Awareness and Attitudes Towards IT Systems.

This part contained eight questions (Q43-Q50). In this part of the questionnaire, the attempt is to arrive at better understanding about how Saudi private organisations look at IT systems. Do they plan to increase their IT facilities? How satisfied are they with IT systems. Then, the last three questions in this part attempt to find out what advantages the organisation is getting from the implementing IT systems. The reasons which hindered some organisations in the Saudi private sector from adopting IT systems and whether or not they plan to adopt IT systems in the future and how soon if they do.

The information obtained from the survey instrument will be used later to develop the suggested managerial guidelines for IT implementation. Figure 6.1 shows an example from the questionnaire and Table 6.1 shows the relationships between the research hypotheses and the instrument's questions.

Figure 6.1 An Example from the Questionnaire (Arabic and English versions)

Part I: The Respondent Information and Characteristics

Please use the √ symbol to mark your answers.

Q3. What is your age range?

1- Less than 30 years		2- Between 31-40 years	
3- Between 41-50 years		4- over 50 years	

Part II: The Organisation's Characteristics and Information

Please use the √ symbol to mark your answers.

Q11. How is your organisation owned?

1- Saudi 100%		2- Joint Venture (Saudi and Foreign)		3- Foreign 100%	

الجزء الأول: أسئلة عن صفات المجيب على الإستمارة

أستخدم √ لاختيار إجابات أسئلة هذه الإستبانة

س٣ كم عمرك التقريبي؟

١- أقل من ٣٠ سنة		٢- بين ٢٦-٤٠ سنة	
٣- بين ٤١-٥٠ سنة		٤- أكثر من ٥٠ سنة	

الجزء الثاني: أسئلة عن صفات المنشأة:

س١١ ما نوع ملكية منظمتكم؟

١-( ) سعودية ١٠٠% ٢-( ) مشتركة (سعودية و أجنبية) ٣-( ) أجنبية ١٠٠%

Naturally, the questions in the data collection instrument were designed to elicit information that could be used to support or reject the research hypotheses concerning the independent variables and their influence and relation with the dependent variable (implementation success).

Table 6.1
The Relationships Between the Research Hypotheses and Survey Questions

Hypothesis	Questions
1	Part I: Q3; Part II: Q16
2	Part I: Q2; Part II: Q16
3	Part I: Q4 and Q5; Part II: Q16
4	Part I: Q6, Q7 and Q8; Part II: Q16
5	Part I: Q9 items 1,2, and 3; Part III: Q29 item 9; Part IV: Q38; Part V: Q43
6	Part II: Q10 and Q16; Part IV: Q29, Q30 and Q31; Q48 item 1
7	Part II: Q11 and Q16; Part IV: Q31
8	Part II: Q12 and Q16; Part IV: Q31
9	Part II: Q13 and Q14 and Q16; Part IV: Q31
10	Part II: Q16, Q19; Part IV: Q29 -7; Q31 Q32, Q33, Q34, Q35; Q48 -3 and 7
11	Part II: Q16, Q20, and Q21; Part III: Q26 item 1; Part IV: Q31
12	Part II: Q16, Q22 and Q24; Part IV: Q31
13	Part II: Q15; Q16 and Q18-4
14	Part II: Q16 and Q14; Part III: Q29-6, Q31, Part V: Q48 item 6
15	Part II: Q16, Q25-1; Part III: Q29-1, Q31
16	Part II: Q16; Q26 -2; Part III: Q29-2, Q31
17	Part II: Q15; Q25-3; Part III: Q29-3, Q31; Q48 -4 and 11
18	Part II: Q15; Q25-4; Part III: Q29-4, Q40, Q41 and Q42; Part V: Q48-5

6.4.2.1 Validity & Reliability

Validity and reliability are the two major issues that a researcher must take into consideration when he or she uses a data gathering or measurement instrument. The importance of validity and reliability has been well documented within the research methodology literature. Straub (1989) argued that researchers should use previously validated instruments wherever possible and that the researcher should be careful not to make significant alteration in the validated instrument.

- Validity

Validity refers to the extent to which a test measures what researcher actually wish to measure. Spector (1994) asserts that one of the most vital steps in developing and/or validating a scale is the conceptual task of defining the construct, in other words, the construct of interest must be clearly and precisely defined.There are different kinds of validity. Generally, however, there are three basic types of validity of measurement that most researchers are concerned with. They are content validity, construct validity and criterion-related validity (Davis and Cosenza, 1993).

- **Content validity.** The content validity of an instrument is the extent to which it provides adequate coverage of the topic under study. To evaluate the content validity of an instrument researchers must first agree on what elements constitute adequate coverage of the problem. The determination of content validity is judgmental. The designer may determine the validity through a careful definition of the topic of concern, the items to be scaled, and the scales to be used (Sekaran, 1992).

The content validity of the instrument of this study was established through two pilot studies as discussed in the following section. In the first piloting, the questionnaire was distributed to IT academics and professionals from King Faisal University- the employer of the researcher. The second one was when the questionnaire was distributed to 16 real business organisations in Al-Ahsssa region in SA - the hometown of the researcher. The goal was to ensure that the instrument was applicable to the research objectives. Participants in the two pilot studies were asked to comment on such areas as the questionnaire wording, clarity, length, ambiguous items, items order and their significance to the subject matter of the research.

The results showed that the questionnaire covered the important aspects identified within the exhaustive search of the literature during the exploratory stage where interviews and focus groups methods were used. The results also showed that minor modifications were needed before the questionnaire could be used in the final distribution.

- **Criterion-related Validity.** This form of validity reflects the success of measure used for some empirical estimating purpose. Researchers may want to predict some outcome or estimate the existence of some current behaviour or condition. The criteria used may be subjective (does the evidence agree with what a researcher believes) as well as objective (does the evidence agree with other researcher findings) (Davis and Cosenza, 1993).

The test was successful in providing results that are consistent with what the researcher believes and expected (see the next two chapters). Also, it provides some results that are consistent with other research findings such as those related to IT implementation and conducted by Abdul-Gader and Alangari (1995), Shash and Amir (1997). It could be concluded, therefore, that the criterion-related validity of this study is good.

- **Construct Validity.** This deals with the degree to which the scale represents the concept being measured (Davis and Cosenza, 1993; Hawkins and Tull, 1994). Attitude scales and personality tests generally concern concepts that fall into this category. Even though this validation situation is much more difficult, researchers still want assurance that their measurement has an acceptable degree of validity.

The questionnaire used in this study contained clear and direct questions; this was reflected from the piloting tests which showed that the construct validity is acceptable. Moreover, using the personal interviews and focus group meetings as supportive data gathering techniques contributed positively to the construct validity. This is because the interviewer could explain to the interviewees the actual constructs. Finally, using the Likert scale with its 3,4 or 5 categories also contributed to improving the construct validity.

- Reliability

Reliability is concerned with the accuracy and precision of a measurement procedure (Sekaran, 1992; Davis and Cosenza, 1993). Reliable instruments are refined to the degree that they can be used over and over and work well at different times and under different conditions. In general, the researcher can improve reliability if external sources of variation are minimised and the conditions under which the measurement occurs are standardised.

There are three common methods of estimating reliability (Nachmias and Nachmias, 1996): 1- the test-retest, 2- the parallel-forms and 3- the split-half. The test-retest method is used to administer the instrument to the same group at two different times and to compute the correlation in the two sets of scores. The coefficient that the researcher obtains is the reliability estimate. With this method, error is defined as anything that leads a person to get different scores from the two different measurements (AL-Shoaibi, 1998).

In the parallel-forms method, the researcher develops two parallel versions of a measuring instrument. These two versions are administered to the same group of people, and then the two sets of results must be correlated in order to obtain an estimate of reliability. The split-half method estimates reliability by treating each of two or more parts of a measuring instrument as a separate scale. Each of the two parts is treated separately and scored accordingly. The two parts are then correlated.

Another method to test the reliability of the instrument is to use similar questions in different parts of the questionnaire (Cooper and Emory, 1995). This is called items' internal-consistency reliability test. It means that "multiple items, designed to measure the same construct, will interrelate with one another" (Spector, 1994). This reliability procedure when run for each scale shows how the individual items of that specific scale compete to be incorporated in it whilst maintaining an acceptable level of reliability.

The reliability for the scales and items of the instrument used in this study were tested to ensure that satisfactory internal consistency was present. This was done by constructing some of the questions to collect similar answers or to check the correctness of the answers given for each question in the instrument. For example, questions 6, 7 and 8 checked the consistency of the respondents in their answers. Questions 13 and 14 did the same. Other examples are questions 19, 20, 21 and 23.

It should be noted that when the completed questionnaires were received, they were checked for correct completion. This process of editing and checking was conducted to ensure maximum reliability and validity of the data gathered. The methods of analysing the data will be discussed in Chapter Eight.

6.4.2.2 Pilot Studies (testing the instrument)

Information systems researchers emphasise the importance of conducting a pilot study to establish that the proposed questionnaire is understandable and clear to the members of the target population. Pilot study enables the researcher to ensure that the questionnaire is unambiguous, valid, reliable and suitable for the purpose for which it is to be used (Remenyi and Williams, 1995). For the purpose of this research, two different pilot studies have been carried out. The first one was conducted to check the satisfaction of the participants in the pilot study with the questionnaire's wording, clarity and length. In this round of testing, eight IT academics from the College of Management Sciences and Planning and eight IT professionals from the Information Centre, both are parts of King Faisal University, were approached to evaluate and comment on the questionnaire's clarity and length. These academics and professionals were asked to comment on the early draft of the questionnaire containing questions compiled and deemed important after the literature review.

All of the participants in the first pilot study returned the questionnaires and their valuable comments were used to enhance the questionnaire's clarity and to make it reasonable with regard to the length and the time required to complete it.

In the second pilot study, the objective was to conduct a small-scale version of the main survey according to the same specifications. This round of testing was directed at actual business organisations in AL-Ahssa region which is part of the Eastern Province of SA. In the second pilot study, 16 organisations from different business sectors were contacted to check if they were willing to participate in this pilot study. These organisations were assumed to have the same characteristics as those of the population in the main survey. Table 6.2 lists the names of the organisations that participated in the second pilot study.

Table 6.2
Organisations Which Participated In The Second Pilot Study

	Name of Organisation
1	National Furniture Factory
2	The National Textile Company
3	AL-Shoaibi Plastic Company
4	Saudi Ceramics Company
5	AL-Mudhafir Cement Products Company
6	AL-Hussain Eye-Glasses Factory
7	AL-Mussa Garage Doors Factory
8	Naji Bu Sroor Factory
9	AL-Hussain and AL-Afaliq Group of Companies
10	Hussain AL-Ali Group of Establishments
11	Al-Yaseen Agriculture Company
12	AL-Jawad Travel and Tourism Agency Company
13	Nassir Bin Zaraa and Sons Company
14	Abdul-Gader AL-Muhaidib and Sons Company
15	AL-Mahlia Instalments Company
16	AL-Jbr Commercial Company

The second pilot study was conducted to assess the validity of the questionnaire in its current form and its reliability as a means of differentiating between organisations with various characteristics on the basis of responses to questions designed to measure these dimensions. After agreeing to participate, these organisations were informed that this round of the study was a pilot survey to check if the questionnaire was clear, understandable and covered most aspects of the implementation process which an organisation wishing to adopt IT systems would encounter. It was also explained that their comments would be needed to enhance the questionnaire for the forthcoming main survey.

The results of the second pilot study confirmed that there was little need for revision. All 14 respondents in the second pilot study expressed their satisfaction with the instrument and indicated no difficulty in understanding the items in the instrument. This confirmed the validity of the questionnaire and consequently its reliability because, as Sekaran (1992) indicated, if the researcher can demonstrate the validity of his instrument, he can presume that it is reliable.

When the remaining two organisations were contacted by telephone in an attempt to identify why their executives had not responded, the researcher was told that they were out of the Kingdom and coming in two-to-three weeks time. At that point, it was felt that the questionnaire was ready for the main survey because it had received a high response rate and few negative comments with regard to its contents and design.

6.4.3 The Research Population

While population is the entire group of organisations, people, events, or things of interest that the researcher wishes to investigate, the population frame is a listing of all elements in the population from which the sample is to be drawn (Sekaran, 1992)..

The population of this study is the private organisations in the Saudi private sector in the Eastern province of SA (see map of SA in the Appendix section). It was chosen for two principal reasons: (1) its importance to the national economy as a means of diversification; and (2) its potential for investigating the issue of IT implementation in a sector that has seen very limited studies of this kind.

6.4.4 The Sampling Technique

Sampling is very important for researchers engaged in survey studies. It is necessary for the researcher to specify the method used in selecting a sample because the sampling method is critical to the validity of inferences made from a sample to a population. Sekaran (1992) defines sampling as a procedure that uses a small number of subjects or that uses subsets of the population to make a conclusion regarding the whole population. Sampling is used because in many cases, for some restricting reasons such as time and financial limitations, it is impossible to reach the entire population. Moreover, Churchil (1995) states that studying a sample rather the entire population is likely to lead to more reliable results, mostly because there will be less fatigue, and hence fewer errors in collecting data.

Hawkins and Tull (1994) point out some important issues that researchers should be aware of when choosing a sample for their study; these include:

1- Who is the relevant population?

2- What type of sample shall be drawn?

3- What sampling frame shall be used?

4- What size of sample is needed?

5- How much will the sample cost?

According to Sekaran (1992), there are two types of sampling designs. One is probability sampling in which the elements in the population have some known chance or probability of being selected as sample subjects. A great advantage of using probability sampling is that selection bias will be mostly eliminated and sampling error, differences between the sample and the population will be reduced. This method consists of several kinds of sampling such as simple random (unrestricted random sampling), systematic, stratified random, and cluster sampling (restricted random sampling). These sampling designs are used when the representatives of the sample is of importance for the purposes of wider generalisation.

The other method is non-probability sampling in which elements in the population do not have any probabilities attached to their being chosen as sample subjects. There are several reasons which drives researchers to use non-probability sampling over probability sampling even though the later has more advantages. First, as Serkaran (1992) points out, if the there is no need to generalise the findings of the research to the whole population. Second, is the high costs associated with probability sampling in terms of money and time.

Third, if the total population may not be available (Cooper and Emory, 1995). Finally, if there is no feasible alternative (AL-Arfaj, 1996). This method consists of four kinds of sampling: convenience, purposive, judgement, or quota sampling. (for more detailed explanation about the different sampling designs and methods read Sekaran, 1992; Oppenhiem, 1992; Cooper and Emory, 1995; Nachmias and Nachmais, 1996). Figure 6.2 summarises the different types of sampling designs/methods (adopted from Serkaran, 1992).

6.4.4.1 The Sample

In order to achieve the objectives of the study it was considered desirable to involve a diverse collection of private organisations. The sample organisations were selected from different business sectors using stratified random sampling because this technique is an efficient research sampling method. It allows for segregation of organisations according to size, industry, profits or to any other categorisation. Thus we may study any particular issue concerning an organisation such as its experience with IT which is the case in this study.

This method also ensures that different groups of a population are adequately represented in the sample. Moreover, this technique provides much information with a given sample size (Sekaran, 1992). Oppenheim (1992) reaffirms the view that stratified random sampling maximises variation between groups and variation within groups.

The sample organisations for this research were selected from the 1997/1998's membership database of the Chamber of Commerce and Industry in the Eastern Province of SA. The Chambers of Commerce and Industry in SA represent the main links between Saudi private organisations and the local, national, and international business and marketing activities and industrial contacts that take place between SA and other countries. Every private business establishment in SA is obliged to subscribe to the Chamber of Commerce and Industry in its respective city or province. Any organisation that does not subscribe to the Chamber in its area does not receive:
(1) the necessary certifications and authentication needed to conduct business in SA;
(2) recommendations/approval for more foreign workers;
(3) invitation to business opportunities, promotions; and
(4) the support facilities provided by the Saudi Chambers of Commerce and Industry.

According to the Saudi Chambers of Commerce and Industry membership classification, organisations are classified into the following grades: Premier (Excellent), First, Second, Third, or Fourth. The Premier class consists of establishments with large working capital and number of employees. The annual fee for this class is SR. 10,000. The first class is for all establishments which have more than SR. 5,000,000 working capital and the fee to join this class is SR. 5,000. The second class is for all businesses which have less than SR. 5,000,000 working capital and the fee is SR. 2,000. The third class is for all establishments other than the ones which are registered as premier, first or second classes. The fee to join the third class is SR. 800. The last class includes all small businesses such as corner shops, petrol stations and fast food outlets, etc. and the fee to join this class is SR. 300.

Figure 6.2 Types of Sample Designs and Methods

Sample Design	**Description**	**Advantages/Disadvantages**
Probability Sampling		
1. Simple random sampling	All elements in the population are considered and each has an equal chance of being chosen as the subject	High generalisability of findings. Not as efficient as stratified sampling
2. Systematic sampling	Every nth element in the population is chosen starting from a random point in the population frame	Easy to use if population frame is available. Systematic biases are possible.
3. Stratified random sampling (Str.RS) A- Proportionate Str.RS. B- Disproportionate Str SR.	Population is first divided into meaningful segments; thereafter subjects are drawn: in proportion to their original numbers in the population. based on criteria other than their original population numbers.	Most efficient among the probability designs. Population frame for each stratum is essential. Would adequately represent strata with low numbers.
4. Cluster sampling	Groups that have heterogeneous members are first identified; then some are chosen at random; all the members are in each of the randomly chosen groups are studies.	In geographical cluster, costs of data collection are low. The least reliable among all the probability sampling designs.
5. Area sampling	Cluster sampling within a particular area or locally.	Cost-effective. Useful for decisions regarding location.
6. Double sampling	The same people or a subset of the sample is studied twice.	Offers more detailed information on the topic of study. Original biases, if any, will be carried over.
Nonprobability sampling		
6. Convenience sampling	The most easily accessible members are chosen as subjects.	Quick, convenient, less expensive. Not generalisable at all.
8. Judgement sampling	Subjects selected on the basis of their expertise in the subject investigated.	Sometimes, the only meaningful way to investigated. Generalizability is questionable.
9. Quota Sampling	Subjects are conveniently chosen from targeted groups according to same predetermined number or quota.	Very useful where minority groups' participation in a study is critical. Not easily generalizable.

The selection criteria in this study is that all the sample organisations must be members of the Chamber and are registered among the Premier (Excellent), First, or Second classes. This was done to enable the researcher reach the most organised and structured organisations in the Saudi private sector which are expected to use IT systems in their businesses. Also, this technique enabled the researcher to avoid the one-man-only establishments and corner shops which are expected to be far behind in adopting modern management practices and technologies.

A total number of 1,521 organisations satisfied this criterion: 133 organisations in the Premier class, 492 in the First, and 1,016 in the Second class of the Chamber of Commerce and Industry of the Eastern Province's 1997/1998 membership classification. In order to obtain the necessary 500 organisations to make up the sample organisations for this study, the researcher divide the population in the three membership classes into the two main industries as suggested earlier in chapter two and chapter six: manufacturing and services. Systematic sampling was then used to select the needed 500 organisations (250 organisation from each industry).

An important note about the adopted sample selection technique is that the above membership classification will not be used in the analysis of the responses because it has nothing to do with the research hypotheses. The technique was used only to arrive at an appropriate sample for this study. However, the sample organisations came from different business sectors within the larger Saudi non-oil private sector in the Eastern Province; and they all were categorised into the two main industries: manufacturing or service. The purpose was to facilitate the development of the research hypotheses and the analysis of the responses.

The Eastern Province in SA is one of the leading provinces in terms of business and industrial activities in the Kingdom. The Eastern Province of SA accounts for not less than 20% of the IT market in the country (Yavas and Yasin, 1994). Many private organisations in SA have their headquarters or main branches in this province; and many of them have branches in other regions of the Kingdom (The Chamber of Commerce Eastern Province, 1996).

Also, these organisations operate in the same environment and under the same business and industrial laws and regulations which apply to all private organisations in SA. They receive the same encouragement and incentives from the Saudi government as all other private organisations in SA (Ministry of Planning, 1997). These factors, taken together, make the sample organisations of this study true representatives of the Saudi private organisations in general.

The Information Technology Centre at the Chamber of Commerce and Industry in the Eastern Province provided the researcher with a computer printout of the Chamber's members in the first three classes of membership (Premier, First and Second). The IT centre also prepared a cover letter directed to the management of the sample organisations encouraging them to participate and complete the questionnaire. It also made label printouts of the sample organisations' addresses which saved a considerable time and effort for the researcher.

6.4.4.2 The Size of the Sample

Another important issue in sampling is deciding the appropriate sample size. The researcher needs to make sure that the number of units of analysis in the sample is such that neither (1) too few are selected as to render the risk of sampling error intolerably large, nor (2) too many units included, which would raise the cost of the study to make it inefficient (Luck and Rubin, 1987). A compromise must be struck between obtaining sufficient data to give validity to the research and minimising research costs.

This study attempts to investigate the relative impact of factors contributing to IT implementation success across hundreds of organisations. Chau and Tam (1997), Davis (1993) and Thong and Yap (1995) attempted something similar. Their experience indicated that a sample size more than 100 would be needed if statistical analysis were to be conducted satisfactorily. Other IS researchers suggest that there should be at least 4 to 5 times more cases (sample units) than the total number of the independent variables (Abdul-Gader and Alangari, 1995).

Therefore, the target number of the sample organisations in this study has to be at least 90 organisations (18*5). The total number of the sample organisations in this study is 500 organisations. This number constitutes more than 28 times the 18 independent variables and much higher than the suggested sample number in the IS literature. This is assumed to increase the validity and reliability of this study.

There is no comprehensive and detailed statistical treatment or directory of the extent and business nature of private organisations in SA. Therefore, it is difficult to assess the size of the sample in relation to the size of the Saudi private business organisations population as whole. However, because all of private organisations in SA conduct their business under the same laws, regulations, and under the same business, economic and cultural environments, the sample can be considered suitable to generalise the results and to make recommendations of the study to the rest of the population.

6.4.4.3 Unit of Analysis

Determining the unit of analysis is an important aspect of a research design. Usually, this is done based on the research questions because the data collection methods, sample size, and even the variables included in the research framework may sometimes be determined or guided by the level at which data will be aggregated at the time of analysis (Sekaran, 1992).

The unit of analysis in this research is the organisation. Previous researchers of IT systems implementation have discovered that the adoption process by organisations varied from early to late and that the subsequent use of the technology ramped from minimal to high. Some, too, chose not to adopt (Rogers, 1983, 1995; Damanpour, 1991, Thong and Yap, 1995; Chau and Tam, 1997). Their results have been attributed, in part to individual and organisational differences, as well as to managerial attitudes and perceptions towards new information technologies and implementation strategies.

As defined in the research model, organisations make decisions regarding the implementation of IT systems based on many factors which might facilitate or hinder these decisions. Therefore, the organisation is the appropriate unit of analysis for this study.

6.4.4.4 Informants (Respondents)

Five main groups are typically considered for collecting data related to IT activities in an organisation. These are: business owners, senior executives, departments managers, IT managers/officers, and users. These groups overlap since they may or may not be users of IT systems.

This research aims to find out the opinions of the top managers of the private business organisations in SA regarding the possible reasons, effects, motives and barriers of IT systems implementation. Therefore, chief executives officers of these organisations regardless of their size, business type (sector), ownership type, or their geographical scope will be the informants in this study. They are thought to be the appropriate individuals and in the right position to provide the needed information about their organisations' IT experience. This in turn helps to ensure the suitability and credibility of the data to be collected.

Top-managers were chosen as informants for several reasons. Chief among these reasons are:

first, empowerment. These people have the authority to approve or disapprove organisational actions. They have hiring/firing powers and other responsibilities generally associated with executives. They are undoubtedly better placed and aware of organisational activities, and thus better able to describe organisational procedures regarding IT implementation.

second, senior executives are often the key figures who are responsible for making strategic decisions such as IT implementation decisions. Thus they can support or hinder the implementation of new technologies in their organisations.

In choosing the key informants for this study, the researcher used the non-probability judgement sampling which involves the choice of subjects who are in the best position to provide the information required (Serkaran, 1992).

6.4.5 Distribution of the Questionnaire

Following the sampling procedure a questionnaire survey was carried out in SA for a period of four months from the beginning of November 1997 to the end of February 1998. A total of 500 private business organisations were contacted through the Chamber of Commerce and Industry in the Eastern Province in SA. The questionnaire was distributed in both Arabic and English versions to provide an opportunity for any top-management executives who might prefer to complete it in either version.

Follow-up contacts were carried out through telephone and fax communications and through the postal services at King Faisal University. These procedures helped the researcher achieve an overall response rate of 36% (178/500) which is not far from the planned rate of 40%. The useable response rate was about 34% (170/500). Figure 6.3 displays the mechanics and the process flowchart of the questionnaire survey in this study.

The questionnaires were addressed to the top-management executives at the sample organisations. Computer labels bearing the names and addresses of these organisations were printed by the IT centre at the Chamber of Commerce of the Eastern Province of SA. Each questionnaire package consisted of:

1- a cover letter addressed to the top-management of the organisation explaining the purpose of the study, how to complete the instrument, and assuring the respondent of the confidentiality of his responses. Also, the return post and Email addresses and telephone/fax numbers of the researcher and the research supervisor were supplied in case the respondents wished to contact the researcher for any issue related to the study;

2- a questionnaire copy in both Arabic and English; and

3- a return addressed envelope to facilitate the return of the completed questionnaire.

The questionnaires were sent in the second week of November 1997 to all of the sample organisations. After 4 weeks, 97 organisations had completed and returned the questionnaire, two of which were not useable because they were not fully completed. At that time, 403 organisations had still not sent any reply. This led the researcher to contact some of these organisations through telephone and fax letters to check if they had received the instrument and to encourage them to send back completed questionnaires.

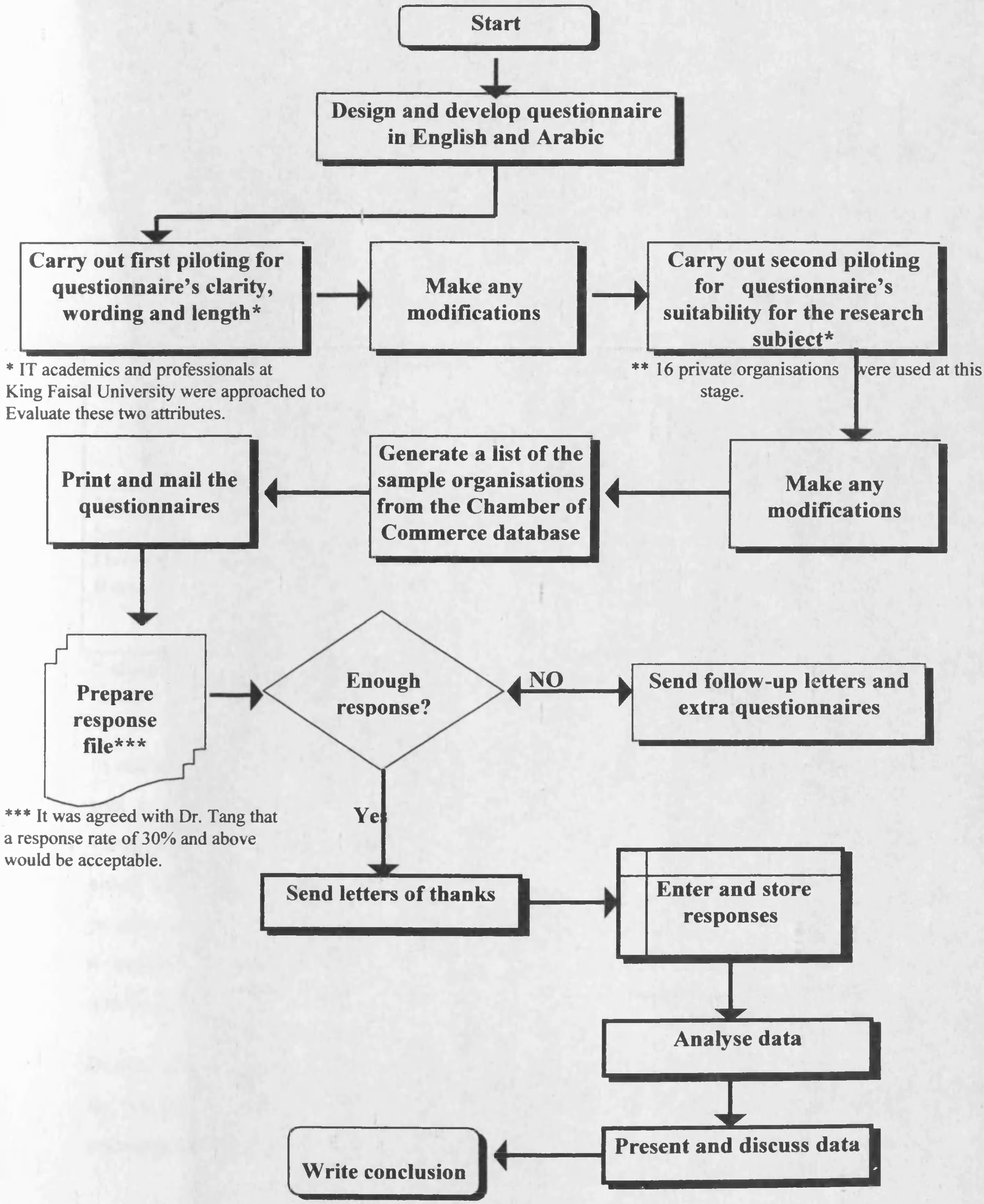
In addition, in an attempt to increase the response rate, the researcher, armed with copies of the questionnaire, visited some of the sample organisations which had still failed to reply. They were all located either in AL-Ahssa region, the researcher's home region, Dammam, or in the industrial city of Jubail both of which are located about one and two hours drive respectively from his home town. In these visits, the researcher distributed new copies of the questionnaire to those organisations which claimed that either they had not received questionnaires or they had misplaced the earlier copies.

At the same time, the researcher took the opportunity to pick up some of the completed questionnaires from some of these organisations. The researcher also telephoned some of his contacts in some of the sample organisations requesting them to find out what was delaying the return of the questionnaires in their organisations and asked them to return a completed questionnaire. By the end of January 1998, an extra 58 completed questionnaires had been returned, of which 40 (about 23% of the total returned were received), as a direct result of the researcher's follow-up visits, telephone calls and faxes.

In addition, in order to increase the response rate further and to achieve an acceptable response rate, the researcher prepared and sent out reminder letters with new questionnaires to the remaining organisations which had not replied. The second round of questionnaire mailing was carried out in the last week of January 1998 through the postal services of King Faisal University, the researcher's employer and sponsor for this study. A total of 250 follow-up letters and questionnaires were despatched in this round of mailing. By the end of the field survey period (end of February 1998), a total of 178 of questionnaires had been returned among which 170 were complete and useable. This provided a useable response rate of 34%. This response rate, after consultation with Dr. Nelson Tang, the research supervisor, was considered reasonable and acceptable for this study.

This response rate is considered highly satisfactory, since responding to mail questionnaires has not been a widely accepted practice among business firms in SA. This is confirmed by other researchers for example Yavas, Luqmani, and Qurashi (1992), AL-Arfaj (1996), AL-Qahtany (1996), AL-Assaf (1997), and AL-Obaidi (1999). The researcher's decision to maximise the response rate by collecting the completed questionnaires himself directly from the sample organisations is an approach recommended by other researchers such as Nabali (1989) and Oppenhiem (1992). They assert that this method of data collection not only ensures a high response rate but also permits the researcher to build personal contacts and obtain extra details.

Figure 6.3
The Mechanics and Process Flowchart of The Questionnaire Survey



The cut off date for returning questionnaires was March 1, 1998. Table 6.3 displays the response rates achieved during the data collection period. The cause of non-response can be attributed to the fact that some organisations had either closed down or had failed to update their addresses with the Chamber of Commerce. This came to light when about 20 questionnaires were returned and were labelled "unknown organisation" by the postal services. Some other respondents simply did not have the time or were not sufficiently motivated to complete the instrument.

Table 6.3
Data Collection and Responses statistics for the Questionnaire Survey

Industry	Planned Sample Size	Expected Response		Actual Response		
		Number	Rate	Unusable	Useable	Useable %
Manufacturing	250	100	40%	3	81	32.4
Services	250	100	40%	5	89	35.6
Overall Responses	500	200	40%	8	170	34.0
				Total received 178 Total received% 35.6		

* about 20 questionnaires were returned because of closed down organisations or changes in organisations' addresses.

In addition, the low response rate may be attributable to the fact that questionnaires were sent in a period which included the month of Ramadan and the Eid Islamic festival vacations. This is a time of the year in which many Saudi business owners and managers either take their vacations, do not spend much time in the office, or who were under pressure of work at the time they received the questionnaire. Therefore, the researcher recommends that it may be better for other researchers when they are conducting questionnaire surveys in the future to avoid conducting them in such periods.

Despite all of these circumstances, the questionnaire was the most appropriate instrument for this study because of the large size of the sample and the limited time and financial resources available to the researcher.

Although

6.5 Data Analysis Methodology

Although data was analysed after conducting the questionnaire survey, much thought was given to the testing and analysis of results during the questionnaire design. The normai first step in analysis, especially in surveys, is the editing and coding of collected data. The researcher has checked the data to make sure it is as accurate as possible, consistent with other facts secured, uniformly entered, as complete as possible and arranged to facilitate coding and tabulation. The analysis of responses was carried out on a personal computer using Statistical Package for Social Science (SPSS), a popular statistical software often used in social studies. More details about the data analysis of this study and the different techniques and tests carried out are found in chapters seven and eight.

6.6 Summary

The present chapter has explained the research approach adopted in this study. It presented the factors which influenced the choice of these techniques and approaches and their advantages and disadvantages. It also reported the procedures followed in the design and development of the questionnaire, this study's main data collection instrument. This chapter also explains the sampling techniques followed in this study and how it was conducted. Finally it gives details of the questionnaire field work procedures and reports the achieved response rate.

The next two chapters will discuss the major findings of the questionnaire survey, explain the details of these findings, test whether or not the research hypotheses are acceptable and discusses the major differences between organisations in their experience with IT systems.

بسم الله الرحمن الرحيم

CHAPTER SEVEN
DATA ANALYSIS PART I: DESCRIPTIVE PRESENTATION

7.1 INTRODUCTION

An important part of the methodology followed in this study was the use of a questionnaire to reach the sample organisations in Saudi Arabia (SA). An adequate sample size is critical to increase the power of the statistical tests in the study (Howell, 1992). In order to receive a reasonable number of responses for this study, five hundreds questionnaires were sent to private organisations in the Eastern Province of SA. The valid questionnaires were 170. In eight of the returned questionnaires many points remained unanswered. These questionnaires, therefore, were dropped from the analysis.

The last chapter presented the methodology used in this study. The aim of this chapter is to present and discuss the survey findings. This discussion focuses on the characteristics of the 170 organisations which responded to the mail survey. This chapter also presents a descriptive statistical analysis (frequencies, percentages, cross-tabulations and correlation analysis) of the three different sets of factors which are thought to influence Saudi private organisations' decisions to adopt IT systems and consequently to influence the assimilation of these systems in adopting organisations.

7.2 UTILISATION OF SPSS FOR ANALYSIS OF DATA

The statistical Package for Social Science (SPSS) was used to enter the collected data and to compute correlation, frequency distributions, tables and other statistical measurements and tests needed in this study. SPSS is a software system for data analysis. It is built around a graphical user interface and features an innovative Output Navigator (Norusis, 1997). SPSS also made it possible to select the most appropriate statistical tools from a comprehensive range. It provides tools for data storage and retrieval, data modification and programming, report writing, file handling, and finally statistical analysis. The system version used in this research was version 10.0 under the Windows 98 operating system. It was the standard package licensed to the University of Leicester at the time.

The researcher wishes to express his appreciation and thanks to Mr. John Beckett from the Computer Centre at Leicester University and Mr. Tom Allen (an independent freelance

statistician) for their advice and suggestions regarding the design of the questionnaire and the choice of the appropriate statistical techniques for this study.

7.3 PROCEDURES FOLLOWED BEFORE DATA ANALYSIS

The development of the survey instrument followed an extensive search of the relevant literature. Before analysing and presenting data collected from the survey, issues related to the responses received are investigated first. In the following sections some of the issues surrounding the development of the survey instrument are discussed.

7.3.1 Data Entry Validity

As a first step toward the analysis, data collected from the respondents was transferred by the researcher into an SPSS file. All data was reviewed by another person to check for entry errors. No data entry errors were found. The data was then screened for patterns of missing values, outliers, response bias and non-linearity. No serious cases of these conditions were found. It was felt, therefore, that the collected data was valid for the statistical tests suggested in the statistical methodology literature.

A decision was made regarding missing values. Any questionnaire missing values or answers to more than 5 questions was dropped from the analysis completely; but with 1 to 5 missing the questionnaire would be useable for the other completed questions. In addition, the researcher contacted the organisations whose questionnaire either contained 5 or less missing responses or significant contradictions to make sure they understood the questions. This procedure increased the number of valid and completed questionnaires significantly.

7.3.2 Response Rate

Though there is, inevitably, a suspicion that the non-respondents may have widely differing views from those returning the questionnaire, the results do give insight into the use of IT systems in private organisations in SA. A total of 178 completed questionnaires were returned out of the 500 that had been mailed. 79 questionnaires were received during the first three weeks, while the remaining 99 were received after the follow-up letters, telephone calls and visits by the researcher. This provided an overall response rate of approximately 35.6% (a percentage which is not far from the planned/expected response rate of 40%). However, eight of these questionnaires were incomplete and could not be included in the analysis because the respondents had left too many questions unanswered. This meant that the useful response rate is 34%.

This response rate is considerably higher than the average response rate of 20-22% for mailed surveys (Kettinger and Grover, 1997). It was considered highly satisfactory because responding to mail questionnaires has not been a widely accepted practice among business firms in SA. This is confirmed by other Saudi researchers for example AL-Qahtani (1996), AL-Assaf (1997) and AL-Obaidi (1999). Twenty unopened questionnaires were returned without forwarding addresses and were marked unknown by the postal services. This shows that there are some private organisations which either closed down or did not update their information with the Chamber of Commerce. This is a typical problem that face researchers in the developing countries where the reluctance to update information makes research difficult.

Of the 170 complete questionnaires, 152 were returned from organisations, with varying degree of success which will be discussed later, which were using IT systems. This meant an implementation rate of 89.4% among the sample organisations. It also meant that about 10.6% of the organisations, which participated in this study, were not using IT systems at all and, according to the classification of this study, will be considered unsuccessful adopters. Several respondents who wanted a summary of the research results indicated that the telephone calls and personal visits which were carried out by the researcher motivated them to complete and return the surveys.

In order to ensure that the survey did not suffer from a serious non-response bias, a random sample of non-respondents was contacted by telephone. Each organisation contacted was asked whether or not they received the questionnaire and whether or not they had completed and returned it. If a questionnaire had not been received, then the non-respondent was asked if he would be willing to complete the questionnaire if another one was mailed. If "yes", then a new questionnaire was sent and the next name was contacted. If "no" then the non-respondent was asked to answer three questions on the phone. The first one was about the type of business the organisation is involved in (Q11); the second one was about whether the organisation was using IT systems or not (Q16). The respondents were, finally, asked to provide reasons for deciding not to participate in this study.

A total of 25 responses were achieved. The responses to the first two questions were examined and compared to the responses from the 170 respondents. This comparison revealed that a non-response bias was not a major issue in this study. Reasons given for not responding to the survey fell broadly into three categories. These categories and responses distribution are presented in Table 7.1.

Table 7.1
Reasons For Not Participating In The Survey

1- Time constraints	12
2- Not interested	8
3- Company policy not to respond	5
Total	25

As can be seen from Table 7.1, the primary reason for not responding to the questionnaire was the unavailability of time. Time constraint may consequently be expected to lower the response rate, but not to bias the sample to a significant extent. Also a high percentage of those organisations, which did not respond have stated that they were not interested in participating in such studies. This also reflects some of the problems facing researchers in SA where many private organisation do not value academic research because they do not see direct benefits from participating in these studies.

7.3.3 Handling Missing Responses

It is not unusual that some of the participants do not answer every item in the questionnaire. Questions may be left blank because the respondent did not understand the question, did not wish to answer due to the sensitivity of the information requested, or was simply not interested enough to complete the instrument.

Researchers in the literature have suggested many techniques for handling blank responses. One way to deal with a blank response to an interval-scaled item with a midpoint would be to assign the midpoint in the scale for blank responses when the analyses are done (Sekaran, 1992). Another way is to allow the computer to ignore blank responses when the analysis is done. This, of course, will reduce the sample size for analyses using that variable. A third way is to assign the item the mean value of the responses of all those who have responded to that particular item. A fourth is to give the item the mean of the responses of this particular respondent to all other questions. A fifth is to give the missing response a random number within the range of numbers that could occur. The best way, as Sekaran (1992) suggests, is either to give the midpoint in the scale as the value or to ignore the particular item during the analysis. The computer can be programmed to do so. The latter technique is probably the best way to handle missing data to enhance the validity of the study, especially if the sample size is big (Serkaran, 1992).

The researcher decided to apply the last technique to deal with the situation where many responses are missing. In addition, the researcher followed a procedure in which he contacted organisations whose questionnaires were missing answers to 5 questions or less. This procedure increased the number of completed questionnaires significantly. Also, data code 99 was used to indicate missing values in some questions.

7.3.4 Coding

Coding involves assigning numbers or other symbols to answers so that the responses can be analysed and grouped in different classes for frequencies and percentage counting. Coding helps the researcher to reduce time and effort when entering responses. Coding can be done by letters, numbers or a combination of both. For example, instead of entering the word 'male' or 'female' in response to questions about gender, the codes "M" or "F" could be used. Another way is to give the code 1 for one answer and 2 for the other.

7.3.5 Test of Responses' Representativeness

The 170 complete and usable questionnaires were checked for representativeness of the original sample of 500 organisations. The primary concern was the industry representativeness of the organisations in the set of usable questionnaires. It was found that 83 organisations from manufacturing industry and 87 from the service industry responded. This gave a close and fair representation of both kinds of industry. The original sample was made up of 250 organisations from each industry. Returned questionnaires indicated that people from varying top-management positions had participated in the survey. They commented on IT projects of varying degree of importance and on selected applications to which different technologies had been employed. Table 7.2 provides a comparison of the organisations in the original sample and those in the set of 170 usable questionnaires. Based on the close similarity in the percentage distribution across the original sample and the set of usable questionnaire, the sample did not seem to exhibit any industry group bias.

Table 7.2
Representativeness of the Sample Organisations*

Industry group	No. in original sample	No. of usable questionnaires
Manufacturing	**250 (50)**	**83 (47.8%)**
Service	**250 (50)**	**87 (51.8%)**
Total	**500 (100%)**	**170 (100%)**

*The sample was drawn from the businesses membership of the Chamber of Commerce and Industry in the Eastern Province of SA (from the Premier, First and Second ranks).

7.3.6 Respondents Comments

In the last part of the questionnaire the respondents were given the opportunity to make any further comments they wished regarding their organisations' experience with IT. Sixty-six respondents (about 39% of the total participants) took this opportunity to highlight their experience and/or to list some of the specific advantages they received from implementing IT. Some of them also pointed out some of the problems they faced during implementation. The following are some of the personal comments found in the returned questionnaires:

Executive manager in a small service organisation: " IT systems must be developed in Arabic to increase the benefits and ease the use of computers".

IT officer in a big manufacturing company: " Success involves aligning IT strategy objectives with the organisation's objectives".

IT director in a big manufacturing company: " Among the basic barriers to success are: 1- lack of indigenous skilled workforce; 2- lack of adequate IT training; 3- developing inappropriate systems; 4- lack of IT awareness and knowledge".

MIS group manager in a big manufacturing company: " The company is implementing IT systems to improve communication capability. Today's inadequate service will cost the company at least SR. 2 million in hardware and software because of our inability to install a central (group level) server and database"[1].

Manager in a big construction company: " We decided to use computers to increase our efficiency and meet the industry current trends/requirements".

[1]SR. 2 million =~ 350,877 Sterling Pounds.

IT manager in a big manufacturing company: " Top management and user involvement is very important to implement any system successfully".

Financial controller in a small service company: " Factors influencing IT success include: 1- using latest and economical technology; 2- training for the optimisation of results; 3- development of programs for the organisation based on its needs; 4- availability of Internet and E-mail applications; 5- virus problems with off-shelf packages; 6- lack of technical support".

About 70% of the participants who wrote personal comments indicated that Arabisation of IT systems, training, management commitment and vendor support are the keys to successful implementation.

7.4 DATA ANALYSIS TECHNIQUES

A considerable study of statistical methods (in Babble and Halley, 1994; Bryman and Cramer, 1997; Norusis, 1997) was undertaken. Expert advice was also sought from Mr. John Beckett- a statistician at the Computer Centre of Leicester University and Mr. Tom Allen- a freelance statistician to choose the most appropriate analysis and tests in this study. The literature stated that there are five common types of data measurements used in determining which procedures can be used with which type of variables (Sekaran, 1992; Norusis, 1997, Campbell, 1998): 1) binary (categorical), 2) ordinal (categorical), 3) nominal (categorical), 4) interval (metrical) or 5) ratio (metrical).

Binary is a special case of a nominal interpreted as showing the presence or absence of an attribute. Most researchers and statistics books treat interval and ratio as the same (Campbell, 1998). Ordinal measurements are based on a continuous scale (for example height and age). They are used when it is possible to rank or order all variables according to some values. Nominal measurements involve no assumption about relations between values. In other words, nominal is where the researcher gives a particular value to a particular measure. It is only necessary to differentiate. For example, gender can be represented as nominal by using binary values: 1 for male and 2 for female or vice versa. Within the interval measurements, some arithmetical operations are allowed because interval measurements have the property of meaningful distance between values. Ratio measurements, for example, have the same ordering and distance properties of an interval scale. In this research, ordinal and nominal measurements, and the appropriate test methods for them are used.

According to the statistical methodology literature, there are two main types of statistical analysis available to researchers: 1- descriptive and 2- inferential (Bryman and Cramer, 1997; Norusis, 1997). Both of these help researchers develop explanations for complex phenomena that deal with relationships between variables. They provide the tools to analyse, represent, and interpret these relationships (AL-Shoaibi, 1998).

- Descriptive Analysis

The purpose of using descriptive analysis is to present data in an understandable and less complex form. It describes data that has been collected for the purpose of the study. The calculation of averages, frequencies and percentages is the most common form of summarising data. Some descriptive statistics summarise the distribution of attributes on a single variable, while others summarise the association between variables, called measures of association (AL-Sudairy, 2000).

Frequency analysis can be used to produce a table of frequency counts and percentages for the value of individual variables. This techniques was used in this research to provide descriptive presentation of such data as frequency, percentages, means and summaries of the responses to the questions in the instrument.

- Inferential Analysis

Inferential statistics are tests used to make inferences or generalisations about a population on the bases of a sample. Inferential statistics can be categorised as parametric or non-parametric (distribution-free) (Bryman and Cramer, 1997; Norusis, 1997). The term parameter refers to a measure, which describes the distribution of the population such as the mean or variance. According to some statisticians (Bryman and Cramer, 1997), it is only appropriate to use parametric tests when the data fulfils the following three conditions:

1- the level or scale of measurement is of equal interval or ratio scaling;
2- the distribution of the population scores is normal; and
3- the variance of both variables are equal or homogeneous.

Parametric statistics are mostly used when data is collected on an interval or ratio scale but used with ordinal data. The analysis of variance (ANOVA), Person correlation, paired samples t-test, one sample t-test and Z-test are some examples of parametric tests. Parametric tests are more robust than non-parametric tests if their assumptions are met (Norusis, 1997).

On the other hand, non-parametric statistics make no explicit assumptions regarding the normality of distribution in the population and are used when data is collected on a nominal or ordinal scale (Bryman and Cramer, 1997). They are most useful for small samples and when outliners are present for the outlying cases will not influence the results as much as they would if researchers used a test on an easily influenced statistics like the mean. Non-parametric tests include: the sign test, Wilcoxon match-pairs signed-rank test, the Mann-Whitney test, the Kruskal-Wallis test and the runs test (Norusis, 1997).

Because the study attempts to achieve several objectives, the data collection instrument was designed to capture different types of data; for example nominal, ordinal, interval/ratio and dichotomous. To analyze these types of data and test the research hypotheses, the researcher employed different descriptive and inferential statistics. These statistics will be discussed in the appropriate sections in this and the next two chapters. Figure 7.1 on the following page depicts the data analysis and presentation method used in this study.

7.5 DESCRIPTIVE ANALYSIS

Descriptive analysis refers to the transformation of the raw data into a form that will make it easy to understand and interpret. It describes data that has been collected using statistical frequencies, percentages and correlation. Describing responses is usually the first step in data analysis (AL-Sudairy, 2000). In order to construct an aggregate profile of the responding organisations, the following information was sought (see the questionnaire in the Appendices section):

A- Top-management profile:

- managerial position (owner, executive manager, IT manager/director or other position);
- nationality (Saudi or non-Saudi);
- age in years categorised into four different groups (less than 30 years, between 30-40 years, between 41-50, and over 50 years);
- education level (high-school or less, Bachelor or Masters degrees or Ph. D);
- English fluency (fluent or weak);

- IT Knowledge (good or weak);
- cross-tabulation of top-managers' characteristics and IT adoption in their organisations.

B- Organisation profile:

- size (small, medium or large);
- ownership type (Saudi 100%, joint-venture or foreign 100%);
- industry type (manufacturing or service);
- geographical scope (local, national or international);
- IT adoption (Yes/NO) cross-tabulated with size, industry type and business sector
- date of adopting IT systems;
- motives to adopt IT systems.

C- Procedures Followed by the Organisations

- procedures followed before implementing IT systems;
- procedures followed after implementing IT systems;
- IT planning practice (Yes/NO), and level of planning (low, medium, or high);
- provision of IT training (Yes/NO) and training levels (low, medium, or high).

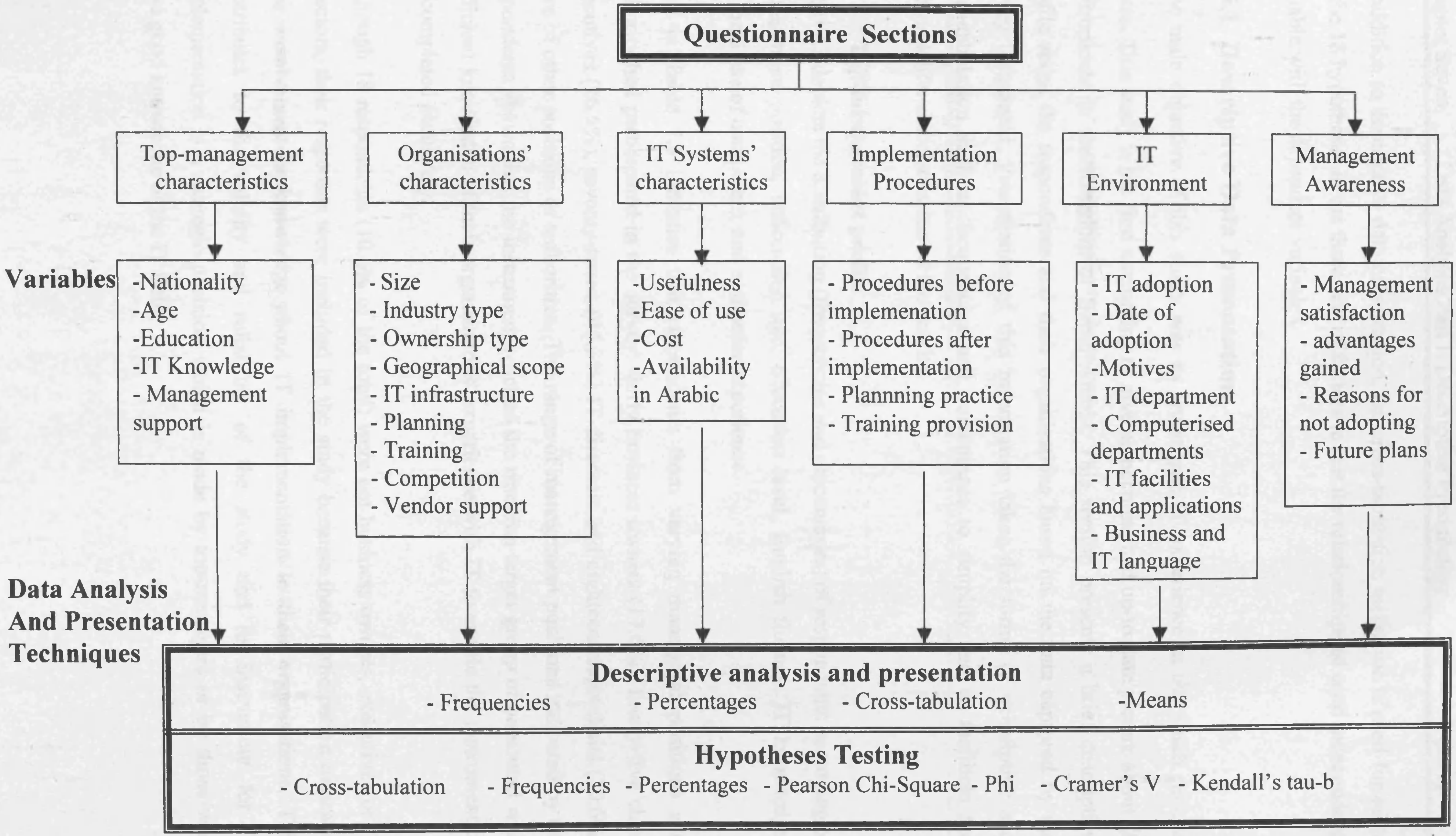
D- IT Environment

- availability of IT department (Yes/NO);
- whether or not the organisation has an IT budget;
- the number and names of the departments and functions supported by IT systems;
- IT facilities and applications used by the organisation;
- types and number of computer machines installed;
- number of workforce using IT systems in the sample organisations;
- official language used in business (Arabic, English, both or other language);
- preferred language for IT systems (Arabic, English or both).

E- Organisational Awareness and attitudes towards IT systems

- management satisfaction with IT systems;
- advantages gained from implementing IT systems;
- reasons for not adopting IT systems;
- future plans.

Figure 7.1 Data Analysis and Presentation Method



In addition to descriptive data presentation, the cross-tabulation technique is used for each of the 18 hypotheses in the three sets of factors to test the relationships of each independent variable with the dependent variables.

7.5.1 Descriptive Data Presentation

The main objective of this study was to investigate IT experience in the Saudi private sector. This study is the first attempting to give an accurate and up-to-date picture about IT environment in the Kingdom of Saudi Arabia. This section presents a brief descriptive profile about the respondents and their organisations based on the data captured by the survey instrument. Presentation of this information takes the forms of descriptive and cross-tabulation such as frequencies and percentages to simplify and to facilitate the interpretation and discussion of the results.

A- Top-management profile

Table 7.3 depicts the distribution (frequencies and percentages) of respondents according to management position, nationality, age, education level, English fluency, IT knowledge, personal use of computers, and computer experience.

Data in Table 7.3 indicates that respondents from varying managerial positions and authority had participated in the survey: thirty business owners (17.6%), fourty-five chief executives (26.5%), seventy-seven (45.3%) IT directors and eighteen respondents (10.6%) were of other positions or authorities. The range of management positions indicated by the respondents shows that the instrument reached the research target group of personnel with sufficient knowledge of their organisations' experience with IT to enable the instrument to be completed accurately.

Although 18 respondents (10.6% of the total) were not business owners, executives or IT directors, their responses were included in the study because their participation indicates their involvement or knowledge about IT implementation in their organisations. This contributes to the validity and reliability of the study and its instrument for IT implementation is a strategic decision which is made by top-managers or by those who have good knowledge of the IT field.

Table 7.3 Top-Management Profile

Managerial Position	**Frequency**	**Percent**
Business Owners	30	17.6%
Chief Executives	45	26.5%
IT Directors	77	45.3%
Others	18	10.6%
Nationality		
Saudi	114	67%
Non-Saudi	56	33%
Age		
Less than 30	24	14.1%
Between 30-40	74	43.5%
Between 41-50	52	30.6%
Over 50	20	11.8%
Education Level		
High-school or Less	41	24.1%
University Level (e.g. Bachelor)	101	59.4%
Masters or Ph.D	28	16.5%
English Fluency		
Fluent	114	67%
Weak	56	33%
Computer Knowledge		
Good	107	63%
Weak	63	37%
Personal Computer Use		
Yes	126	74%
NO	44	26%
Computer Experience		
No previous experience	18	10.6%
Less than 1 year	41	24.1%
Between 1 and 5 years	44	26.0%
Between 6 and 10 years	36	21.1%
More than 10 years	31	17.2%
Total	170	100%

Nationality is the second demographic variable researched in this study. The respondents profile in this study sample shows that Saudi managers/owners were the majority (67%) who completed the instrument. This may be attributed to the importance they thought of this study, their desire to control what information to supply to the researcher or to show the knowledge they had about IT implementation in their organisations.

Table 7.3 shows also that the respondents are of different age groups: twenty-four or about 14.1% of the respondents were aged less than 30 years. One hundred and twenty six (about 74.1%) of the informants were between 30-50 years old. Only twenty (11.8%) were older than fifty. This indicates that most of the top-managers in our sample are relatively young or middle-aged, and therefore, as hypothesised in this study, might be more willing to change from manual and traditional ways of doing business and more inclined to adopt and use IT systems.

In terms of education qualifications, 41 (24.1%) managers have high-school or less education level, 101 managers (59.4%) have university level degrees and 28 (16.5%) managers have Master or Ph.d education levels. The remaining data indicates that 114 (67%) of the responding managers have a good command of English, 107 (63%) have good computer knowledge, 126 (74%) use computers personally and, finally, 111 (65.2%) have had at least one year experience with computers. All these attributes are expected to contribute positively to the experience of Saudi private organisations with IT. These figures indicate that most of the respondents from the adopting organisations have a good education background.

It is interesting to note that responses came from top-managers as requested in the questionnaire. It is also interesting to know that 77 organisations representing a fairly good percentage (45.3%) of IT adopters have IT directors or officers specifically charged with an IT function. This shows the importance given to the IT function in the adopting organisations and this is considered a healthy trend in Saudi private organisations see Table 7.3). The gender of the respondents was not researched in this study because the researcher did not expect to find any female working in a high position in the private sector especially in relation to IT implementation. However, it was interesting to find out that two respondents were actually females one Saudi and the other was expatriate. Both of them were working in the health services sector and were in charge of the computer service in their work.

B- Organisation profile

Table 7.4 shows seventy-three (42.9%) were small organisations, sixty five (37.2%) were medium and thirty two (17.8%) were large. This number represents a true distribution of organisations in the Chamber of Commerce and Industry's premier, first and second classification of membership. The low percentage of small organisations did not surprise the researcher because he avoided selecting any organisation from the third and fourth classes of the Chamber's membership. This was done to avoid the one-man and corner shop establishments, which were expected to be far behind in IT implementation.

Table 7.4 presents a summary of the characteristics of organisations from the perspective of industry type, size, ownership type and geographical scope. It shows that the sample organisations were equally represented from both industries: 83 (47.8%) from manufacturing and 87 (51.2%) from the service industries. This indicates that both industry types were adequately represented. These organisations came from different sectors within each industry type. The results show that 30 organisations (17.6%) came from contracting (construction, operation & maintenance) within the service industry. This number represents the greatest number of organisations in the sample. They were followed by organisations from the metal products sector (20 or 11.8%) within the manufacturing industry.

Only 12 (7.1%) agricultural organisations were found among the sample. This is an acceptable number because SA is not an agricultural country and its land is mostly dominated by desert. Additionally, organisations were well presented from each size, ownership and geographical scope category. It is important to bring to the attention of the reader that the research main analysis and discussion will be based on the differences between the two main industries (manufacturing and service) under which these sectors fall.

One hundred and thirty-eight organisations (81.2%) out of the sample were Saudi owned while thirty-two organisations (17.8%) were joint-ventures. No foreign organisations were among the sample. This surprised the researcher because it was expected that some of the organisations in the premier class of the Chamber's membership would be foreign but none was picked up during the sampling procedure. The majority (82.3%) of the sample was local or national organisations operating within SA. Thirty (17.6%) organisations were international doing business inside and outside SA.

Table 7.4

Profile of Responding Organisations

Industry Type:			
Manufacturing:	**83**		**==➔ 47.8%**
Food & Beverages		15	==➔ 7.8%
(Textile, Clothing & Leather Wood & Furniture Products Paper, Printing & Publishing)		17	==➔ 10.0%
Chemical & Plastic Products		18	==➔ 10.6%
Ceramic, China-wear & Glass		13	==➔ 7.6%
Metal Products		20	==➔ 11.8%
Services:	**87**		**==➔ 51.2%**
Agriculture		12	==➔ 7.1%
Health Care		19	==➔ 11.2%
Hotel & Lodging		10	==➔ 5.9%
Contracting (Construction, Operation & Maintenance)		30	==➔ 17.6%
Trade		16	==➔ 9.4%
Organisation Size (number of employees)			
Small (1-100)		73	==➔ 42.9%
Medium (101-500)		65	==➔ 37.2%
Large (more than 500)	32		==➔ 17.8%
Ogranisation's Ownership (Saudi 100% = totally owned by Saudis; Joint-venture is owned by Saudi and foreign owners; Foreign 100% is owned totally by non-Saudis)			
Saudi 100%		138	==➔ 81.2%
Joint-venture		32	==➔ 17.8%
Foreign 100%		0	==➔ 0%
Geographical Scope **(whether the organisation is doing business locally, nationally or internationally)**			
Local		67	==➔ 39.4%
National		73	==➔ 42.9%
International		30	==➔ 17.6%

- Date Of Adoption

Table 7.5 displays data related to when IT systems were first adopted in the sample organisations. The number of organisations from each industry type is tabulated against the approximate date of adoption. Eight (5.3%) organisations in the sample adopted IT systems before 1980 and all of them came from the manufacturing industry. Twenty-eight organisations (17.4%) adopted IT between 1980-1985. This indicates a clear and a steady trend in computerisation by Saudi private organisations. The years after 1985 witnessed an increase in IT adoption in the Saudi private sector where the number of organisations adopting IT systems is almost doubling every year thereafter (AL-Shoaibi, 1998). The highest IT adoption rate among the sample organisations happened after 1991.

It can be seen from Table 7.5 that manufacturing organisations have been using IT systems earlier than their counterparts from the service sector. Manufacturing organisations also adopted IT in greater numbers than those from the service sector until 1990s when the Saudi service sector became more organised and more aware of the new technologies and modern management practices (AL-Qahtany, 1996; AL-Shoaibi, 1998). The majority of the participating organisations (116 76%) adopted IT systems after 1985. The findings of the exploratory study (Table 2.2) gave similar trends; Saudi organisations were adopting IT systems in an increasing rate after 1985. This can be attributed to four factors:

1- the 1980s were the years when the Saudi economy witnessed its highest boom and international appeal because of its high income from oil;
2- During the 1980s there was a huge technology revolution particularly in computer technology (for example the introduction of personal computers);
3- Many international computer hardware and software companies Arabised their systems in late 1980s and early 1990s;
4- Drop in computer prices.

This also can be attributed to awareness and education programs which were conducted by the Chambers of Commerce and Industry throughout SA and directed at private organisations in the Kingdom in an effort to encourage these organisations to adopt and use modern management tools and practices.

Table 7.5 Industry Type and Adoption Date Cross-tabulation

Industry Type	Adoption Date				Total
	Before 1980	Between 1980-1985	Between 1986-1990	Between 1991-1997	
Manufacturing	8	16	24	29	77
Services	--	12	19	44	75
Total	**8** **5.3%**	**28** **17.4%**	**43** **27.3%**	**73** **48%**	**152** **100%**

The computerisation trend in the Saudi private sector can be linked to the national development plans through which the Saudi government has set up incentive programs to encourage private organisations in different sectors of the Saudi economy to adopt modern technologies. However, the government gave more attention and encouragement to the manufacturing sector which, in return, imported new management tools and technologies when signing agreements with foreign partners especially from the UK and the USA (Ministry of Planning, 1996, 1997).

- **Motives to adopt IT systems**

Respondents were asked to rate the importance of ten factors in their organisations' decision to implement IT systems. Responses were recorded on a four-point Likert type scale ranging from 1 = not important at all to 4 = most important. As noted in Table 7.6, respondents from both groups of industries cited replacement of manual operations and the desire to improve and facilitate decision-making as the primary reasons for implementing IT systems. These two were followed by the need to improve product and service quality and competitiveness. While prestige and doing like competitors were the least important factors. The results in Table 7.6 suggest that using computers for prestige had a relatively greater significance to service organisations. The results of the exploratory study showed the same reasons; the participants in the focus groups stated that replacing manual operations (89%) and improving decision-making (83%) were the most important motives to adopt IT.

Table 7.6 factors to implement IT systems

Factor	Total Responses	Over-all Mean
1- To replace manual operations	147 (96.7%)	3.97
2- To improve and facilitate decision-making	121 (79.6%)	3.80
3- To improve product and service quality	113 (73.3%)	3.74
4- To overcome competition	113 (74.3%)	3.72
9- To give prestige and good image	6 (3.9%)	1.64
10- To do like competitors who adopted IT	3(2%)	1.57

C- Procedures followed and Actions Taken in Implementation

What kinds of actions, changes, maintenance arrangement and software development efforts did the organisations undertake during implementation? Some interesting insights into these issues can be gleaned from the results presented in Table 7.7 and Table 7.8. As can be seen from these two tables there were some procedures followed and actions taken before and after the decision to implement IT systems.

From the information presented in Table 7.7 it can be seen how private organisations in SA planned the implementation process. Seventy-four (47.7%) of the adopting organisations confirmed that they conducted a feasibility study. This shows that conducting a feasibility study, which is considered a form of IT planning is not practiced by most organisations in the sample.

The two most common methods used by private organisations in SA to get information about IT systems before implementation are:

1- seeking advice from their own or external IT specialists (in this case 122 (80.3%) organisations confirmed that they follow this method); and/or

2- inviting IT service suppliers to present demonstrations about the required systems (in this case 104 (67.4%) organisations confirmed that they use this method).

Table 7.7 also shows that visiting IT suppliers to get technical information is practiced by many organisations. These results indicate the importance of establishing good and reputable IT consultancy services in SA because many private organisations seem to turn to external expertise when deciding to implement IT systems. This also was clear from the participants in the focus groups; most of the participants indicated that their organisations turn to IT vendors for information about new systems.

Table 7.7 Procedures Followed Before Implementing IT systems

Procedures	Totals
Sought advice from IT specialists	122 (80.3%)
Invited IT suppliers to present systems' demonstration	104 (67.4%)
Visited IT suppliers to get information	75 (49.3%)
Conducted a comprehensive requirements and feasibility study	74 (47.7%)
Other actions	47 (30.9%)

As can be seen from Table 7.8 almost all of the adopting organisations buy ready-made packages. These packages may include accounting packages, word-processors, spreadsheets and project management applications. Private organisations in SA also are very interested in requesting customised programs to run their businesses. These are the two most frequently taken actions by private organisations in SA. These are followed by training existing employees (143 organisations or 94.1% of the adopting organisations) and hiring new employees with IT skills (116 or 67.3% of the adopting organisations).

Table 7.8 Procedures Followed After Implementing IT systems

Procedures	Totals
Bought Ready-Made Software Packages	148 (97.4 %)
Requested Customised Applications	146 (96.1%)
Trained Existing Employees	143 (94.1%)
Hired new Employees With IT Skills	116 (76.3%)
Established an IT Department/Centre	69 (45.4%)
Changed Organisational Procedures and Structure	52 (34.2%)
Signed Operation and Maintenance Contract With IT Vendor	38 (25.0%)
Other Actions	16 (10.6%)

It is also clear from the Table 7.8 that about 34% of the participant organisations made some changes to their business procedures or structure. This is in accordance with a study conducted by AL-Shoaibi (1998) in which he found that almost half of his sample agreed or strongly agreed that IT can be linked with the structural changes that can take place in their organisations. About 38 (25%) of organisations from the sample signed a maintenance and operation contract with IT vendors to run or maintain their IT facilities. This represents a good opportunity for IT service providers in SA to increase their involvement in IT service provision to the private sector.

Planning is a major managerial function. Among the main issues this study tried to investigate is whether or not Saudi private organisations practice IT planning when they decide to implement IT systems. Table 7.9 displays the responses. 117 (77%) organisations confirmed that they practise IT planning with different levels low, medium or high). Thirty-five organisations that are using IT systems and those which didn't adopt IT indicated that they don't practice IT planning.

Table 7.9 IT Planning Before Implementation * Industry Type

	Yes	NO
Does Your Organisation Do Planning Before Implementation	117 77%	35 23%

The majority of the sample organisations provided some form of IT training to increase the success of IT systems in their organisations. As can be seen from Table 7.10, 122 (80.3%) organisations provide training. These organisations provide different training programs for their employees. For example, they provide training for data entry, operating and maintaining computers, system analysis and design, database, spreadsheet, and networking and telecommunications.

Table 7.10 IT Training * Industry Type Frequency Table

	Yes	NO
Does Your Organisation provide IT training	**122 80.3%**	**1** **9.7%**

The sample organisations were also asked to specify the general level of training they provide. Eighteen (about 11% - the non-adopters) organisations confirmed that they did not provide any IT training because they had to implement IT system. Ninety (59.2%) organisations provided low level training, fifty-four (about 35.5%) medium level training and only eight (5.3%) organisations provide high level training for their users.

D- Business and IT Environment

One of the main objectives in this research was to document the type of business and IT environment in which Saudi private organisations conduct their business. For example, the date of IT adoption, availability of IT department, the language used and/or preferred for the organisation official business, the intensity of business competition, the number and types of computers installed and whether these organisations set aside budgets for their IT activities.

- Availability of IT departments

The participating organisations were asked whether they had IT departments or not. Table 7.11 shows that sixty nine (40.6%) organisations (fourty four manufacturing and twenty five service organisations) established or already had, IT departments/units when this study was conducted. The inception of IT department is expected to increase the assimilation of IT systems inside the adopting organisation because both departments and users will have more organised training programs and better technical support. In the exploratory study it was found that 40% of the visited organisations have IT department. The same results can be attributed to the fact that both the exploratory study and the questionnaire survey were conducted few months apart.

Table 7.11 Organisation with IT Departments

	NO	Yes
Does your organisation have an IT department	**101 (59.4%)**	**69 (40.6%)**

- Departments and functions supported by IT systems

The purpose of investigating this issue was to find out two important aspects of IT implementation in Saudi private organisations:

1- the rate of assimilation of IT systems within organisational functions and departments;

2- what are the most computerised departments and functions within the participant organisations.

This type of information has a practical application and can be used by IT software houses and hardware vendors to direct their application development and marketing and sales efforts respectively towards satisfying the market needs and organisational requirements. Table 7.12 shows the eight most computerised departments and functions in the Saudi private organisations based on data received from the sample.

Table 7.12

Departments which are Most Computerised in Saudi Private Organisations

	Department	Frequencies	Percentage
1	Accounting	152	100%
2	Inventory/Warehouse	148	97.4%
3	Personnel	148	97.4%
4	Sales	140	92.1%
5	Information Services	134	87.2%
6	Purchasing	104	67.4%
7	Marketing	74	47.7%
8	Manufacturing/Production	70	46.1%

- IT Systems and applications

Table 7.13 presents the relative use of IT facilities and computer applications by the sample organisations. The data is presented in descending order to simplify observation and understanding of the extent of use of these facilities and applications. An observation that readily emerges from these results is that the degree of IT utilisation between organisations from the two groups of industries is significantly different in most application areas surveyed. These results are logical and practical because the business nature and the type of information and flow differ in each industry.

Table 7.13 shows the number and percentage of organisations using software packages that can support decision-making and other daily business activities. All of the adopting organisations in the sample are using accounting systems and word-processing software. Some advanced applications, such as computer-aided design and computer-aided manufacturing systems, were less commonly used by the participant organisations. It is also interesting to note that these advanced IT systems and powerful machines are more prevalent among manufacturing organisations.

Accounting packages, word-processors, spreadsheets and statistical and database applications were the leading applications used by Saudi private organisations. Internet services were not officially available in SA at the time of the study. It was officially introduced in the last months of 1997. This explains the low usage rate of Internet services in the sample. This kind of service is accessed by certain big organisations through special arrangement or through Internet service providers located outside SA in the neighbouring countries of Bahrain and United Arab Emirates. Only 18 organisations (11.8%) of the adopting organisations in the sample were using Internet systems such as Email.

Table 7.13 IT Systems and Applications in the Sample Organisations

Systems	Total	
	Freq.	%
Mainframe computers	18	10.6%
Minicomputers	101	59.4%
Microcomputers	152	89.4%
Laptop computers	65	37.2%
Applications		
Accounting (accounts receivable, general ledger, etc.)	152	89.4%
Word Processing	152	89.4%
Spreadsheets	126	74.1%
Statistics	119	70.0%
Database	104	61.2%
Computer-aided design	73	42.9%
Project management	69	40.6%
Graphics	58	34.1%
Computer-aided manufacturing	58	34.1%
Internet services	18	11.8%
Desktop publishing	16	9.4%

- Computer Types

Table 7.13 also displays the different types of computers (i.e mainframe, minicomputers, Microcomputers and laptops) used by the surveyed organisations. Eighteen organisations (10.6%) used mainframe in their businesses. The number of the mainframes at these organisations varied. One hundred and one organisations (59.4%) used minicomputers or servers to run their functions. More clearly Table 7.13 reflects that all (152 or 100%) the adopting organisations are using microcomputers. The microcomputers were either stand-alone or connected to a mainframe or mincomputer server by different network setups which was not covered in this study. However, only 65 organisations (38%) used laptop computers. From the results we can see that the manufacturing organisations have more mainframe computing orientation than the service organisations. The exploratory study reflected similar usage (mainframes were used by 13%, minicomputers by 20% and microcomputer were used by all of the adopting organisations or 90% of the total visited organisations).

- IT workforce

Table 7.14 shows the number of employees using IT systems in the sample organisations. On average, 21 employees use different software packages some of which are ready off-the-shelf programs such as word processors and accounting systems. Other packages are developed to the specific requirements of the adopting organisations. Data in Table 7.14 also shows that majority (69%) of the people using IT systems in the sample organisations are expatriates. These expatriates are hired either for their specific knowledge of the applications used by their employing companies or because their salaries are much lower when compared to those for Saudi employees who usually demand higher salaries if they have the required IT skills. The private organisations in SA look for a cheaper workforce while still expecting good skills. From the researcher's experience and observation, most of the IT expatriates working in the Saudi private sector are from Arab countries such as Egypt, Syria, Jordan and Palestine or from India, Pakistan and the Philippines.

Table 7.14 Total number of Employees Using IT Systems in the Sample Organisations

Number of Employees	N	%
Saudis	963	31%
Expatriates	2140	69%
Total	3103	100%

- Business competition

In an attempt to investigate the Saudi business environment, the researcher inserted a question to find out how much competition the sample organisations feel they encounter. Table 7.15 displays the participants responses in frequencies and percentages of each level based on how the organisations from both the manufacturing and service industry view competition.

Table 7.15 Competition in Saudi Business Environment

	No Competition at all	Some Competition	Extreme Competition	Total
Competition Level	12 7.1%	45 26.5	113 66.5%	(1 00%)

- IT budget and language used in administration and business

Other information revealed about the business and IT environment in the participating organisations include:

- ✓ only 38% of the sample organisations (fourty-two manufacturing and twenty-three service) reported that their organisations specify budgets for IT projects and services.
- ✓ fifty-four (31.8%) organisations stated that they use Arabic as the only language for business and administration while only 14 (7.2%) stated that English is the main language. However, a majority of 102 (60.%) organisations confirmed that they use both Arabic and English in administration and business.
- ✓ Sixty-eight (40%) organisations prefer using Arabic IT systems, twenty-two (about 13%) prefer using English IT systems and eighty (47.1%) organisations prefer using IT systems that can accommodate for languages.

These responses concerning preferred language for IT systems support the study's hypothesis that private organisations in SA prefer, or are more willing to implement IT systems, if they are available in Arabic. This issue will be investigated further in the next chapter when the research hypotheses are tested.

The information presented in the last paragraphs reflects the type of IT environment in Saudi private organisations and indicates the type of IT usage. It shows that most private organisations in SA are not using sophisticated IT systems. They are simply using IT applications for routine administrative and office work. None of the sample organisations indicated that they use advanced Intranet or Internet systems such as EDI or E-Commerce systems which are considered now the trend among organisations in the advanced countries.

However, these findings present good opportunity for IT vendors and service providers in SA. These vendors can approach private organisations in SA and demonstrate to them the advantages of using the latest IT systems (for example Email and E-commerce). These vendors also can demonstrate to potential organisations how these systems enable the adopting organisations to improve their market share or how to facilitate and improve communications with customers regardless of locations. Moreover, IT systems help organisations retain customers.

E- Organisational Awareness and attitudes towards IT systems

This section presents key information about how members of the top-management in the Saudi private sector look at some of the issues surrounding IT implementation at their organisations.

- **Satisfaction with implementation of IT systems**

As can be gleaned from the results depicted in Table 7.16, respondents from both groups of organisations were generally similar in their satisfactions regarding IT systems. They tended to be satisfied with the benefits that the computers (hardware), the software, the staff operating the computers and IT systems made to the decision making process in their organisations. They did, however, express some dissatisfaction with the Arabic software available. None of the differences between manufacturing and service organisations was statistically significant. While there is a computerisation gap between Saudi organisations and their counterparts in industrialised countries, this gap will narrow significantly in the near future. This is evident not only from their future computerisation plans (see the following paragraph) but also from their overall satisfaction with IT implementation.

Table 7.16 Top-management Satisfaction with IT Implementation

	Mean*
Satisfaction with the computers (hardware)	2.74
Satisfaction with the software	2.58
Satisfaction with staff operating IT systems	2.43
Satisfaction with IT contribution to the business □ Mean scores can range between: 1=not satisfied at all, 2=satisfied and 3=very satisfied	2.59

- **Advantages gained from implementing IT systems**

Organisations varied in realising IT benefits. Table 7.17 below displays how top-management responded when they were asked about their evaluation of IT implementation and what gains they think their organisations obtained. The majority (97.4%) of the adopting organisations stated that their internal and external communications with their staff and clients had improved dramatically after implementation. Other advantages were claimed for increased productivity and better control over their business and costs. The results in the table below suggest that implementing IT systems into business organisations in SA can help them prosper through the combination of improved communication, better product quality, increased productivity and better control.

Also, the findings from the personal and the focus group interviews showed that some IT managers in Saudi private organisations believe that IT can help their organisations expand and be more efficient as well as having other benefits. They believe that awareness of IT potential and how to exploit it is one of the most important issues when considering implementation. Some researchers (Harris and Katz, 1991) assert that while the level of spending on IT is important, the way in which it is used to pursue economic benefits may be even more important.

Table 7.17 Advantages Gained from Implementing IT Systems

	Mean*
Improved internal and external communications	3.84
Improved quality of work	3.82
Increased control over work	3.81
Increased productivity	3.77
Reduced costs of running business □ Mean scores can range between: 1=Strongly disagree, 2=disagree, 3=agree and 4= strongly agree	3.73

- **Resistance to use IT systems**

One important issue this study attempted to investigate was whether Saudi private organisations face resistance from their staff when implementing IT systems. The responses indicate that resistance to IT is not a big problem as far as Saudi private organisations are concerned. Only 43 organisations (27.3%) of the adopting organisations stated that they faced some kind of resistance. When the sample organisations were asked what they thought might cause resistance in Saudi private organisations, the four most frequently stated reasons were:

1- Lack of top-management support;
2- Lack of vendor support;
3- Lack of sufficient training programs;
4- Employees fears of losing their jobs.

- Future Plans

Finally, the adopting organisations were asked about whether they planned to expand their IT facilities (hardware and software). As summarised in Table 7.18, about 65% of both types of industries had expansion plans. In the case of the manufacturing organisations, the major areas of expansion were the installation of more computer machines and printers. These were followed by software development and application of Internet systems such as Email. Neither future plans nor areas of expansion yielded any significant differences between the manufacturing and service organisations.

Table 7.18 Future Plans for IT Facilities Expansion in the Sample Organisations

	Totals	
Software Expansion (installing new systems e.g. Internet applications such as Email)	98	64.5%
Hardware Expansion (purchasing more computer machines, printers . Etc.)	99	65.1%

7.6 NON-ADOPTING ORGANISATIONS

This section identifies and discusses the factors which hindered some of the sample organisations from implementing IT systems and whether or not they had planned to do so in the future. Table 7.19 shows the rank order of the main reasons which are thought to obstruct implementation in the Saudi private sector.

- Reasons for not adopting IT systems

Among the 170 responses there were 18 which stated that they were not using IT systems. These 18 organisations included 6 from the manufacturing organisations and 12 from the service industry. Table 7.19 lists in ranking order the eight main factors which hindered IT implemention in some of the sample organisations. The high costs of IT systems and lack of financial resources were selected by the respondents as the leading factors hindering private organisations from adoption. This claim might have something to do with the fact that most of the organisations which did not adopt are small. Small organisations, in most economies, are the least able to adopt new technologies because of their financial limitations.

Table 7.19 Factors hindering IT implementation in Saudi Private Sector

Factor	Mean
1st High cost of IT systems	4.67
2nd Lack of financial resources	4.56
3rd Current way of doing business is sufficient	4.56
4th Business is too small to use IT systems	4.17
5th Lack of infrastructure	3.00
6th Lack of qualified IT staff	3.00
7th fear of computers	3.00
8th Lack of Arabic IT systems	2.78

Other leading factors hindering Saudi private organisations from implementing IT as this study reveals include: high costs, current way of doing business is sufficient, business is too small, lack of qualified IT staff. The first four reasons have something to do with organisation size. This confirms the research hypothesis that the larger the organisation the more likely that it adopts IT systems.

From the focus group interviews, some interviewees, whose organisations were all IT adopters, stated that their organisations faced problems in implementing advanced IT systems (such as Electronic Data Interchange EDI and Internet applications) because of the lack of suitable IT infrastructure in the Kingdom. This problem is not unique to Saudi organisations. Research undertaken by Compaq, E-business Expo and Computer Weekly shows that skills shortage, lack of bandwidth, and lack of budget are hampering UK businesses from implementing advanced IT applications such as E-Commerce and M-Commerce (Mobile Commerce) (IT-Director.com, 30,10,2000).

Other interviewees from non-adopting organisations stated that their top-management or owners refused to adopt IT systems because they were happy with their current of running their businesses without IT. Please remember that one business owner even stated that using computers in his business might cause him to lose control because he did not know how to use computers and his workers might take advantage of the situation. This claim contradicted the general understanding that using IT systems enhances control over business operations (Yavas and Yasin, 1994).

- Future Plans

When the 18 non-adopting organisations were asked whether they planned to implement IT systems in the future, fifteen of them stated that they did. Among these 15 organisations are five (33%) from the manufacturing industry and ten (67%) from the service industry. Table 7.20 and Table 7.21 show how the non-adopting organisations stated their future implementation plans and the timeframe for these plans.

Table 7.20
IT Implementation Plans for Saudi non-adopting Organisations

	Organisation's IT Implementation Plan		Total
	NO	Yes	
Total	3	15	18

Table 7.21
IT Implementation Plans for non-adopting Saudi Organisations

Timeframe	Organisation's IT Implementation Plan
Within a Year	6
Within the next 2 years	7
Within 2-5 years	2
I don't know	3
Total	18

7.7 SUMMARY

A total of 170 questionnaires were received back from the sample organisations. 152 of these organisations are IT users while the remaining 18 are not. Data was analysed using SPSS- a statistical package for social science studies. Where applicable, descriptive statistics (frequencies, percentages, cross-tabulation and by calculating and comparing the means) of the dependent and independent factors were used in analysing and presenting the results.

Several observations can be made from the results presented in this chapter. First, it appears that, consistent with their customer focus, service organisations, more so than manufacturing organisations, appear to be advocating IT adoption in order to replace manual operations. A service organisation can increase its service level either by increasing the number of workers or by increasing the service rate through computerisation. The fact that Saudi service organisations have chosen the latter option is not surprising in view of the severe staff shortage in SA. Second, manufacturing organisations, consistent with their efficiency orientation, use IT systems to manage routine activities such as customer and suppliers accounts. Third, manufacturing organisations are more likely to develop their own software compared with service organisations. Finally, both service and manufacturing organisations appear to be satisfied with their implementation of IT systems and have plans for future expansion. While there is a computerisation gap between Saudi organisations and their counterparts in industralised countries, this gap will narrow significantly in the near future. This is evident not only from organisations' future IT plans but also from their overall satisfaction with IT systems as the Saudi national IT infrastructure is upgraded and expanded and Internet service introduced.

The next chapter will present definition of the different statistical tests used to test the 18 hypotheses proposed in this study. Chi-Square was used to test the relationships between the dependent and independent variables. The results will be presented and discussed using cross-tabulation tables.

بسم الله الرحمن الرحيم

CHAPTER EIGHT
DATA ANALYSIS PART II:
TESTING THE HYPOTHESES & DISCUSSION

8.1 INTRODUCTION

The main objectives of this study were:

1) to examine top-management, organisational and system variables that influence on IT implementation in Saudi private organisations;
2) to investigate the experience of Saudi private organisations with IT; and
3) to suggest some guidelines to help organisations succeed in their implementation efforts.

Each of the independent variables and their associated hypotheses are reviewed and explanations are provided for the study's findings. No previous studies have been published on the subject. Therefore, this study attempts to provide an important insight into IT experience in the Saudi private sector. A study such as this is timely and relevant.

The last chapter focused on presenting a descriptive profile of the organisations which participated in this study. It also presented cross-tabulation of the variables covered in this research based on the data collected. This chapter continues the analysis of the responses and test, the hypotheses proposed in chapter seven. It consists of two main sections:

1- Definitions of statistical terms and procedures used to test and analyse the responses.
2- Testing the hypotheses and discussion of the results.

8.2 Definitions of Statistical Issues & Terms

The following subsections will define some of the statistical terms and discuss the types of tests used in this study.

8.2.1 Correlation Coefficient

The correlation coefficient is a numerical summary measure of the degree of correlation between two variables. By definition, the value of the coefficient must lie within the range of –1 and +1 (Bryman and Cramer, 1997) where:

- Coefficient =+1 represents perfect positive correlation.

- Coefficient = 0 represents no correlation (possibly independent variables).
- Coefficient = -1 represents perfect negative correlation.

8.2.2 Significance (confidence) Level

There is always some possibility that an apparent correlation coefficient could have arisen by fluctuation in the random sampling. It is important to decide how low the probability of this occurring will be set in a research project. Most statisticians use a significance level of 5% as the criterion, but values as low as 1% or 0.1% might be needed if the consequences of the test were to be very costly or crucial (Martin and Firth, 1983). Correlation with 0.05 or lower significance levels was considered significant for the purpose of this research. Table 8.1 shows how Martin and Firth described different significance levels.

Table 8.1 Description of significant levels

Significance (confidence)Level	Description
5%	Reject the null hypothesis with reasonable confidence
1%	Reject with a high degree of confidence
0.1%	Reject with an extremely high degree of confidence
Close to 5%	No reason to reject the null hypothesis but no particular reason to accept it either. In this case it might be possible to take a further similar sample.
No confidence	Accept the null hypothesis

The null hypothesis is the assumption that the variables under consideration are independent. Each test produces a probability value in the table (P-value) for the value of the test statistics. This is a probability value (P value) of obtaining the results in the table by chance alone. Therefore, if we obtain a very small or low value of probability (the table P-value), this will indicate that the results are unlikely to have happened by chance alone. This means that there must be some factors which make the variables not independent and that they are related.

Therefore, we will reject the null hypothesis in favor of the alternative hypothesis, if the P-value is lower than the stated significance value which has been set by the researcher under the null hypothesis, assuming the null hypothesis is true (i.e the variables are independent). The significance value (α) set by the researcher is the probability of rejecting the null hypothesis as false when it is actually true (type I error). There is a chance that the results obtained have in fact happened just by chance alone. The given significance value (α) represents the level of the risk that is taken in dismissing the null hypothesis in favor the alternative. This means that the researcher is prepared to accept this risk of making an error equivalent to the significance value (for surveys in general researchers usually use a significance value of 0.05).

The present survey with 170 complete instruments received, enables the power of the study to have a B= .95 and an α =0.05. With B= .95, there is 95% chance of correctly rejecting the null hypothesis, or a 5% chance of making a Type I error. With α = 0.05, there is a 5% chance of incorrectly rejecting the null hypothesis when in fact it is true (type I error).

8.2.3 The Statistical Tests Used In This Research

There are a large number of statistical tests available which provide accurate summaries of the association between the dependent and independent variables in cross-tabulation form. These summaries are called correlation co-efficients or measures of association (Bryman and Cramer, 1997). The technique used in this thesis allows the inspection and comparison of differences among groups as suggested by Davis and Cosenza (1993). It is advisable not to use all the tests available but to concentrate on the most appropriate ones depending on the size and type of data collected.

- The Chi-Squared Test

The study hypotheses will be tested using Chi-square procedure, which is based on a comparison of observed frequencies with those that could be expected to occur by chance. It is the most frequently used non-parametric test because it is relatively easy to follow and is applicable to a wide range of research problems (Norusis, 1997). A chi-square is a non-parametric test which makes no assumptions about the populations from which the sample has been drawn, in contrast to parametric tests which require data to be drawn from a population with a normal distribution and homogeneity of variance. The Chi-square statistic also indicates the strength of relationships between the variables, if they exist. It does not, however, indicate the direction of the relationship. The higher the Chi-square value the more significant the result of the test; but it is dependent on the degrees of freedom.

With Chi-square you can have a significant result with bigger sample sizes. Chi-square may be used to examine hypotheses about data that are summarised by a cross-tabulation.

Cross-tabulation is a way of displaying data so that a researcher can accurately check the association between two variables. Cross-tabulation was used here to allow the inspection and comparison of differences among groups as suggested by Davis and Cosenza (1993).

Chi-square is used here as a comparative measure to compare one variable/hypothesis to another. It is used this way because the sample size is large and the same for all of the hypotheses; therefore, it is safe to use the Chi-square to test the research's hypotheses in this comparative way. This use will account for the variation in chi-squared because its value and significance is dependent on the sample size.

8.3 TESTING THE HYPOTHESES

According to the study model, three groups of factors influence IT implementation (adoption and assimilation) through their effect on a top-management decision to adopt or increase the use of IT systems in the organisation's departments and functions. Eighteen top-management, organisational and system factors influence implementation through the hypothesised effect. A hypothesis has been formulated for each factor. In this section, both the null and the alternative hypotheses are stated and tested. In order to accept the research hypotheses, the null hypotheses should be rejected.

8.3.1 How is it Going to be Done?

A standard procedure will be followed to test each hypothesis consisting of stating the null and alternative hypotheses, the significance level set at 0.05, the tests statistics i.e. Chi-Squared, (Fisher's exact test where applicable) and Kendall's tau-b, followed by the reslults and discussion.

Analysis was carried out to establish whether relationships exist between the different independent variables (top-management, organisational and system characteristics) and the dependent variable (implementation of IT systems). This analysis was also necessary to find out about the experience of Saudi private organisations with IT and the success level of their implementation. By doing this analysis we can form our conclusions and recommendations about the hypotheses developed in Chapter 6.

H1: Independent variable (control) Dependent Variable (response)

Q3 (Manager age categories) Q16: IT implementation (adoption) Yes/No

Null hypothesis: There is no difference in IT implementation between Saudi private organisations, which are managed by young or old managers.

Alternative Hypothesis: Private organisations in SA, which are managed by younger managers are more likely to implement IT systems than those which are managed by older managers.

Significance level = 0.05

Statistical tests results:

Table 8.2 Top-managers' Age * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
		NO	Yes	
Less than 30 years	Count Expected	1 2.5	23 21.5	24 24.0
Between 30-40 years	Count Expected	5 7.8	69 66.2	74 74.0
Between 41 and 50 years	Count Expected	5 5.5	47 46.5	52 52.0
Over 50 years	Count Expected	7 2.1	13 17.9	20 20.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	14.834 3 df	0.002	Reject the null, very significant

Presentation & Interpretation

On a four-category scale, the respondents were asked to tick the category box appropriate to their ages within a range of under 30 years to over 50 years. Organisations run by older managers were hypothesised to be less likely to adopt IT systems or have a lower assimilation rate if they adopt.

The test was performed to investigate whether there are any correlation between top-management characteristics and their organisations' adoption of IT systems. It was found that there is a significant negative relationship between top-manager age and IT adoption in their organisations. In other words, there are more organisations, which are run by young managers, using IT systems than organisations run by older managers in the Saudi private sector.

The null hypothesis assumed that IT adoption is independent of the age of top-managers. However, this hypothesis is rejected based on the test results in Table 8.2. The negative relationship between implementation and the age of the managers was supported. This may be attributed to the fact that young managers are more receptive to change and more willing to use new technologies. This may also be attributed to the education that younger managers may have received in IT training which is becoming more available in new education establishments.

These findings are supported by earlier finding from the exploratory study which was reported in chapter three (Table 3.1). It was found in that study that about 77% of managers were between 45 years or younger whose organisations are adopting IT systems.

H2: Independent variable (control) **Dependent Variable (response)**
Q2 (Managers' nationality) Q16: IT implementation (adoption)

Null hypothesis: There is no difference in IT implementation between Saudi private organisations which are managed by Saudi or non-Saudi managers.

Alternative Hypothesis: Private organisations in SA which are managed by non-Saudi managers are more likely to implement IT systems than those organisations which are managed by Saudi managers.

Significance level = 0.05
Statistical tests results:

Table 8.3 Top-managers' Nationality * IT Adoption Cross-tabulation

Count

			IT Adoption	Total	
		NO	Yes		
Nationality Saudi	Count Expected	16 12.1	98 101.9	114 114.0	
Non-Saudi	Count Expected	2 5.9	54 50.1	56 56.0	
Total	Count % of total	18 10.6%	152 89.4%	170 100%	
	Actual value	**P-Value**	**Decision criteria: reject the null hypothesis if the P-value < 0.05**		
Chi-square	4.343 1 df	0.037	Reject the null, significant		

Presentation & Interpretation

This is the first study that investigates the influence of the nationality of senior managers in Saudi private organisations on IT implementation. In this case we are comparing Saudi managers to non-Saudi managers and the results in Table 8.3 indicate that the proportion of Saudi managers whose organisations did not adopt IT is approximately four times those run by non-Saudi managers. 114 Saudi managers responded to the survey compared to 56 non-Saudi. The number of Saudi managers whose organisations did not adopt is 16 (14%) compared to only 2 (3.6%) organisations run by non-Saudis.

We reject the null hypothesis that IT adoption in Saudi private organisations is independent of the nationality of top-managers running the organisation. This is because the results support the alternative hypothesis that organisations run by non-Saudi managers are more likely to implement IT systems than run by Saudi managers. Some possible factors for the results could be that:

1- Private organisations in SA hire non-Saudi managers to run their business for their expected knowledge of modern management practices and new technologies which include IT.
2- The Saudi education system is not preparing enough graduates who have sufficient knowledge of computers to the extent required in today's business world. However, the test results are not highly . This means that at present the non-Saudi managers have a wider experience of newer IT technology. As the Saudi education system implements more IT education programs, there should be more organisations run by or Saudi managers adopting IT systems.

The exploratory study found a similar result, except that the sample sizes in the interviews and the questionnaire survey are different. In the exploratory study (Table 3.3) only 5 (17%) of the sample interviewees were non-Saudis whose organisations use IT systems. In contrast, three of the 25 (83%) Saudi interviewees have not adopted any IT system. Thus, the result reached here is in line with the findings of the exploratory study.

H3:	**Independent variable (control)**	**Dependent Variable (response)**
	Q4 (Manager's education level)	Q16: IT implementation Yes/No

Null hypothesis: There is no difference in IT implementation between Saudi private organisations which are managed by highly educated or less-educated managers.

Alternative Hypothesis: Private organisations in SA which are managed by managers with higher education levels are more likely to implement IT systems than those which are managed by managers with lower education levels.

Significance level = 0.05
Statistical tests results:

Table 8.4 Education Level * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Education Level		NO	Yes	
High-school or less	Count Expected	15 4.3	26 36.7	41 41.0
University level (e.g Bachelor degree)	Count Expected	3 10.7	98 90.3	101 101.0
Master or Ph. Degree	Count Expected	0 3.0	28 25.0	28 28.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	38.777 2 df	0.000	Reject the null, highly significant

Presentation & Interpretation

Education is generally associated with a receptivity to change because more educated managers have broader perspectives and more outside contacts. Thus, it is hypothesised that the more the manager is educated, the more he is inclined to direct his organisation to implement IT systems. The null hypothesis assumed that IT adoption is independent of the education level of senior managers.

On a three-category scale, from high-school or lower to Master and Ph.D levels, the respondents were prompted to indicate their level of education. As shown in Table 8.4, most of the respondents 129 (75.9%) had university level or higher degrees. IT implementation in Saudi private organisations was found to be positively associated with the education level of the top-managers. This finding is in line with a study conducted by Al-Obaidi (1999) who found that Saudi private organisations which are managed by more educated managers are more successful in their business than those managed by less educated managers.

In comparing the results of the analysis here and the exploratory study section, the consistency can easily be observed, as the exploratory study concluded that organisations which are run by more educated managers are adopting IT more than other organisations, whose managers are less educated. This conclusion among other key findings is presented in Table 3.3. In this table 76% of the interviewees indicated having at least university-level education.

H4: **Independent variable (control)** Q6 (IT knowledge) — **Dependent Variable (response)** Q16: IT implementation Yes/No

Null hypothesis: There is no difference in IT implementation between Saudi private organisations which are managed by IT knowledgeable managers or IT illiterate managers.

Alternative Hypothesis: Private organisations in SA which are managed by managers with more IT knowledge are more likely to implement IT systems than those organisations which are managed by managers with less IT knowledge.

Significance level = 0.05
Statistical tests results:

Table 8.5 Managers' IT knowledge * IT Adoption Cross-tabulation

Count

			IT Adoption		Total
IT knowledge Level			NO	Yes	
Weak	Count Expected		14 4.2	26 35.8	40 41.0
Good	Count Expected		4 13.8	126 116.2	101 101.0
Total			18 10.6%	152 89.4	170 100%
	Actual value	**P-Value**	**Decision criteria: reject the null hypothesis if the P-value < 0.05**		
Chi-square	32.927 1 df	0.000	Reject the null, highly significant		

Presentation & Interpretation

The respondents were asked to indicate the level of their IT knowledge based on their skills, personal use of computers and number of years using computers. Looking at Table 8.5 we see the results that support the research hypothesis that IT knowledge plays an important part in whether the organisation adopts IT systems or not. The results in these tables can be tied to the previous hypothesis results because, in a way, IT knowledge is becoming a factor in recent trends in the education systems in many countries which inserted computer courses into their curriculum. This also ties in with H2 concerning managers' ages where younger managers had attended training courses in IT or enjoyed the benefits of the recent education systems which emphasized training in the use of computers in different fields.

Delone (1988) found significant association between IT assimilation and top-management IT knowledge and on-site computer training courses. Ein-Dor and Seveg (1988) have asserted that the extent of IT assimilation is closely related to top-management use which is usually based on IT knowledge.

H5:	**Independent variable (control)**	**Dependent Variable (response)**
	Q9 (top-management support)	Q16: IT implementation Yes/NO

Null hypothesis: There is no difference in IT implementation between Saudi private organisations, which are managed by supportive managers or non-supportive managers.

Alternative Hypothesis: Private organisations in SA whose top-management is supportive of the implementation process are more likely to implement IT systems than those organisations whose top-management is less supportive.

Significance level = 0.05
Statistical tests results:

Table 8.6 Top-management's support * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Top-management support		NO	Yes	
None	Count	15	26	41
	Expected	4.3	36.7	41.0
Moderate	Count	3	98	101
	Expected	10.7	90.3	101.0
Strong	Count	0	28	28
	Expected	3.0	25.0	28.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	**P-Value**	**Decision criteria: reject the null hypothesis if the P-value < 0.05**
Chi-square	131.179 2 df	0.000	Reject the null, highly significant

Presentation & Interpretation

The implementation of IT systems in Saudi private organisations is a complex task involving a great amount of money and significant management commitment if the system is to function appropriately. In the organisations surveyed management commitment and support was claimed to be sufficient. The participants were asked how adequate was their top-management support and commitment to IT implementation. 88.4% of the managers stated that the implementation received moderate to strong support from the top-management.

The responses to the different items in question 9 are important because they demonstrate that respondents recognise the significance and role of management commitment for achieving successful implementation. IT success will not be achieved if management support and commitment is not present. It is clear that management support, commitment, and the priority given to IT implementation was found to be high, and this key factor is also identified in the literature as significant for the successful implementation of IT systems. Management support appears to be important throughout the implementation stages. In both cases the relationship is positive, as was expected. The findings were statistically significant.

Several IS researchers have reported that IT success has long been believed to be dependent on the support and commitment of senior management (Abdul-Gader and Al-Angari, 1995; Clegg et al, 1997; AL-Sudairy, 2000). Lack of management attention was also identified as a primary cause of low adoption of computing systems and failure (Waema and Walsham, 1990; Nabali, 1989; Ho, 1992; AL-Sudairy, 1994). Likewise, the strong statistical evidence generated by this survey confirms the importance of top-management support for IT success. Therefore, securing active top-management support and commitment when developing or implementing IT systems is the major factor for IT success.

While the analysis in this section points the importance of support given by top-managers to IT implementation, one of the important issues raised in the exploratory study as a potential problem is the lack of top-management support. This implies that the analysis result confirms the foresight of the interviewees in pointing out the possible barriers for the successful implementation. This issue is presented in Tables 3.3 and 3.5 in chapter three where the results of the exploratory study is presented.

H6:	**Independent variable (control)**	**Dependent Variable (response)**
	Q3 (Organisation size)	Q16: IT implementation Yes/NO

Null hypothesis: There is no difference in IT implementation between small Saudi private organisations and large Saudi private organisations.

Alternative Hypothesis: Large private organisations in SA are more likely to implement IT systems than smaller organisations.

Significance level = 0.05
Statistical tests results:

Table 8.7 Organisation's Size * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Organisation's Size		NO	Yes	
Small	Count Expected	15 7.7	58 65.3	73 73.0
Medium	Count Expected	3 6.9	62 58.1	65 65.0
Large	Count Expected	0 3.4	32 28.6	32 32.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	13.888 2 df	0.001	Reject the null, highly significant

Presentation & Interpretation

There are differences between organisations of various sizes in the use of IT systems. Many scholars have presumed that smaller organisations are less likely to have successful IT experiences. This is attributed to the smaller organisations' inability to create a favourable atmosphere for assimilation because of their tendency toward centralisation and their lack of adequate resources (Abdul-Gader, 1990). The lack of specialised knowledge is more apparent; especially in the area of information technology systems in small and medium-sized organisations.

As discussed in the literature review chapter, the organisations were classified into three sizes: 1) large, 2) medium and 3) small. It was hypothesised in this study that larger organisations in the Saudi private sector are more likely to adopt IT systems and be more successful in assimilating them than smaller organisations. Table 8.7 shows the results of the different tests performed to check the significance level of the relationship between the independent variable (organisation size) and the dependent variable of this study (the implementation success).

The Chi-square test shows a value of 13.888. and a significance level of 0.001. These statistics indicate strong positive association between organisation size and IT implementation. In other words, the size of the organisation is associated with the management's decision to adopt IT systems and influences the rate of assimilation of these systems into the organisation's departments and functions.

Significant findings from previous researches indicate, for example, that larger and financially stronger organisations tend to be more innovative than smaller and financially weaker organisations (Zmud, 1982). Wroe (1987) studied ten small construction industry companies over the period of five years. The objectives of the study was to identify the nature of problems experienced by small companies when introducing micro-computer-based information systems and the variables relating to the degree of success achieved. During the period of the research five companies abandoned the project, and the remaining companies continued to experience organisational difficulties relating to the system development. Economic strains in the construction industry, and the companies' attempts to maintain sufficient work to survive, added to the difficulties in the development and implementation of computerised systems.

A study cited by Adamson (1994) showed that organisations with fifty or fewer employees were significantly different from those with more than fifty. Organisations with more than fifty tended to be computerised. Studies conducted by the Human Sciences and Advanced Technology (HUSAT) Research Institute at Loughborough University showed that small and medium organisations are at a disadvantage compared to large ones. Decision makers in small organisations do not possess the necessary IT expertise, and often do not know where to obtain independent external advice (Adamson, 1994). As a consequence, there may be many small organisations who only manage to develop very routine computing systems hardly adequate to their company needs.

The results of the exploratory study showed that all large and medium organisations were using IT. This gives support to the findings of the survey where all large and almost all medium organisations were using IT systems.

H7:	**Independent variable (control)**	**Dependent Variable (response)**
	Q11 (Industry Types)	Q16: IT implementation

Null hypothesis: There is no difference in IT system implementation between Saudi private organisations in the manufacturing industry or service industry.

Alternative Hypothesis: Private organisations in the Saudi manufacturing sector are more likely to implement IT systems than their counterparts in the Saudi service sector.

Significance level = 0.05
Statistical tests results:

Table 8.8 Industry Type * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Industry Type		NO	Yes	
Manufacturing	Count Expected	6 8.8	77 74.2	83 83.0
Service	Count Expected	12 9.2	75 77.8	87 87.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	1.933 1 df	0.164	Fail to reject the null, not significant

Presentation & Interpretation

To measure industry type, respondents were asked to classify their organisations as manufacturing or service organisations. The expectation that manufacturing organisations would have higher levels of IT implementation was based on the assumption that these organisations are more organised, have better organisational structure and receive more financial and administrative assistance from the Saudi government than service organisations (Ministry of Planning, 1997).

The null hypothesis assumed that IT implementation is independent of the type of industry in which the organisation conducts business. The results in Table 8.8 show that we fail to reject this hypothesis at the .05 significance level. There was no support for the alternative hypothesis H7 which proposed that industry type would affect the implementation of IT systems in the Saudi private sector. Although we accept from this there is no significant difference statistically, the negative value of Kendall's tau-b (not in the table) show a slightly more adoption in the manufacturing organisations 77 (45.3%) against 75 (44.1%) from the service organisations. Also, from the results in the tables we see that the number of organisations (12) which did not adopt IT from the service industry is double that (6) of organisations from the manufacturing industry.

The present findings suggest that implementation of IT systems is different between manufacturing and service organisations. This finding is not unusual because, overall, the number of service organisations in Saudi Arabia is greater than the number of manufacturing organisations. Therefore, it appears that industry type has less to do with the way IT is being implemented in organisations than other factors.

The empirical result validates the findings of the exploratory study as regards to correlation between the size of the Saudi companies and IT implementation. Because, as can been in chapter three (Tables 3.2 and 3.3), the exploratory study concluded that all large and majority of the medium organisations are using IT systems.

H8: Independent Variable (control) Q12 (Ownership type) **Dependent Variable (response)** Q16: IT implementation Yes/No

Null hypothesis: There is no difference in IT implementation between purely Saudi-owned private organisations and joint-venture (Saudi-foreign-owned) organisations.

Alternative hypothesis: Private joint-venture (Saudi-foreign-owned) organisations are more likely to implement IT systems than purely Saudi owned organisations.

Significance level = 0.05
Statistical tests results:

Table 8.9 Organisation ownership type * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Ownership Type		NO	Yes	
Saudi 100%	Count Expected	18 14.6	120 123.4	138 138.0
Joint-venture	Count Expected	0 3.4	32 28.6	32 32.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	4.666 1 df	0.031	Reject the null, fairly significant

Presentation & Interpretation

This study is the first to test the influence of the organisation's ownership type on whether or not the organisation implements IT systems. The null hypothesis assumed that IT implementation is independent of the type of ownership. However, by looking at Table 8.9 we see the results support the research alternative hypothesis that joint-venture (Saudi and foreign ownership) organisations are more likely to implement IT systems than those owned completely by Saudi owners.

Yavas and Yasin (1994), found significant differences between Saudi manufacturing and service establishments with aspect to three organisational characteristics. For example, they found that service companies tended to be smaller and were primarily Saudi-owned.

Because of a severe shortage of an IT qualified indigenous workforce, the data processing activities in both manufacturing and service establishments were headed by expatriate managers. Otherwise, manufacturing and service organisations were similar in terms of the educational backgrounds and IT experience of their data-processing managers.

These findings are in agreement with the finding of this study. In this study, service organisations were smaller, mostly owned by Saudi nationals and their managers were characterised with similar backgrounds in terms of age, education level and IT knowledge.

In the exploratory study (Table 3.3) we had a mixed sample from both public and private organisations. All of the ten public organisation visited were using IT systems while the three organisations which did not adopt IT systems were from the private sector. We did not seek the sector in which the private organisation does business therefore we cannot comment on this issue further.

H9: Independent variable (control) Q3 (Organisation's geographical scope) **Dependent Variable (response)** Q16: IT Implementation Yes/No

Null hypothesis: There is no difference in IT implementation between Saudi local private organisations and Saudi national/international private organisations.

Alternative Hypothesis: Saudi national and international organisations are more likely to implement IT systems than Saudi local organisations.

Significance level = 0.05

Statistical tests results:

Table 8.10 Organisation's geographical Scope * IT Adoption Cross-tabulation

Count

			IT Adoption	Total
Geographical Scope		NO	Yes	
Local	Count	12	55	67
	Expected	7.1	59.9	67.0
National	Count	6	67	73
	Expected	7.7	65.3	73.0
International	Count	0	30	30
	Expected	3.2	26.8	30.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	7.780 2 df	0.020	Reject the null, very significant

Presentation & Interpretation

Similar to the case of the previous variable, this study is the first to test the influence of the organisation's geographical scope (business spread) on whether or not organisations implement IT systems. The null hypothesis assumed that IT adoption is independent of the geographical spread of the organisation. The respondents were asked to classify their organisations in accordance with one of the following geographical categories: 1) Local organisation (doing business in one city regardless of its number of branches); 2) National organisation (doing business in more than one city but inside SA); and 3) International organisation (doing business inside and outside SA).

Looking at Table 8.10 we see the results that support the research alternative hypothesis that Saudi national and international organisations are more likely to implement IT systems than Saudi local organisations. The results also show that geographical spread plays an important part in whether or not organisation adopt IT systems. The results in the table can be interpreted that:

1)- Saudi national and international organisations may find it to their advantage to implement IT to keep up with their business partners requirements and to ease communication and business dealings via IT systems.

2)- the actual amount of data involved in national and international organisation would require IT systems to be implemented whereas, in a single local organistaion, direct communication by word of mouth or written transaction is sufficient.

3) national and international organisations generally have greater financial resources available to spend on IT implementation (see the discussion on H6- regarding the organisation size).

The results confirms the findings of the exploratory study, which attempted to find the geographical impact through another dimension. The conclusion, which can be reached from the exploratory study is that organisations which have branches in other cities are adopting IT systems more than locally based organisations. Hence, the results of the exploratory study confirms the significance of geographical (or business) spread and impact, albeit in a limited sense.

H10: Independent variable (control) Q18 (availability of IT infrastructure) **Dependent Variable (response)** Q16: IT implementation

Null hypothesis: IT implementation in Saudi private organisations is independent of the IT infrastructure availability to them.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if they have an adequate IT infrastructure available to them.

Significance level = 0.05

Statistical tests results:

Table 8.11 Availability of IT infrastructure * IT Assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
IT implementation was easy due to the availability of IT infrastructure		Up to 50%	More than 50%	
Disagree somewhat	Count	5	7	12
	Expected	3.3	8.8	12.0
Neutral	Count	3	1	4
	Expected	1.1	2.9	4.0
Agree somewhat	Count	26	66	92
	Expected	24.2	67.8	92.0
Strongly Agree	Count	6	38	44
	Expected	11.6	32.4	44.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	10.175 3 df	0.017	Reject the null, very significant

Presentation and Interpretation:

Availability of suitable hardware/software infrastructure such as telecommunication lines, processing systems and local language interfaces influence greatly the implementation of IT systems. Likewise, the availability of qualified IT workforce can be translated to good IT systems development, smooth IT operation and good user support. Evidence suggests that developing countries striving towards IT use are constrained in their efforts by the scarcity of a suitable hardware/software infrastructure and a competent work force (Abdul-Gader, 1990; Woherm, 1992).

In this study, IT infrastructure was discussed as being composed of sufficient and reliable hardware, software and human resources. Thus, it was hypothesised that if sufficient and suitable IT infrastructure is available to Saudi organisations, they may be expected to adopt IT systems and have a higher assimilation rate. Tests were conducted on these three aspects by assessing management agreement or disagreement with the influence of the availability of IT infrastructure on implementation.

The null hypothesis assumed that IT implementation is independent of the infrastructure available to Saudi organisations. However, looking at Table 8.11, we see that the results support the research alternative hypothesis that IT infrastructure plays an important part in whether or not organisations adopt IT systems. It also means that organisations with better IT infrastructures available to them are more successful in implementation than those with poor IT infrastructures. Therefore, the alternative hypothesis is supported.

The results from the survey also show the level of management agreement with the statement that the availability of an infrastructure will make implementation possible. In the related printouts concerning implementation against the hardware, software and skilled IT personnel (infrastructure) found in the adopting organisations, we can see that an increase in all three of these variables increases in the number of computerised departments and functions. This corroborates earlier findings by Duncan (1995) suggesting that greater IT infrastructure availability and telecommunication capability are positively related to IT service capabilities. The results also show that, in terms of hardware, service organisations have a microcomputer and manufacturing organisations a mainframe data processing environments.

The tests results provide answer to the potential IT barriers and problems which were discussed as threatening IT implementation in SA and which were listed in Table 3.8. like previous research (AL-Tayyeb and wrenn, 1992; and Abdul-Gader and Alangari, 1995; AL-Sudairy and Tang, 1998), this study concluded that lack of national IT infrastructure could be an important barrier in IT implementation in SA. The findings here confirm that this has been a barrier. For instance, the fey findings of the focus group indicated that the lack of EDI adoption and Internet, as it was not available at that time, is due to lack of infrastructure. Hence, the failure in the national infrastructure prevents innovative nature to flourish as well as prevents the use of new technologies by organisations.

Based on these findings, organisations with sufficient and suitable IT infrastructure are more likely to have a higher level of implementation success than organisations whose IT infrastructure is old or unsuitable.

H11: Independent variable (control) Q19 and Q20 (IT planning)

Dependent Variable (response) Q31: IT Implementation (Assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of IT planning practised by the management.

Alternative hypothesis: Private organisations in SA are more likely to implement IT systems if they practise IT planning.

Significance level = 0.05
Statistical tests results:

Table 8.12 IT Planning efforts * IT assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
Organisation IT planning efforts		Up to 50%	More than 50%	
Low	Count	24	24	48
	Expected	12.6	35.4	48.0
Medium	Count	9	48	57
	Expected	15.0	42.0	57.0
High	Count	7	40	47.0
	Expected	12.4	34.6	47.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	20.305 1 df	0.000	Reject the null, highly significant

Presentation and Interpretation:

IT planning is essential for implementing IT systems. It is also important to have both a business plan and an IT plan because the link between these two is important for the development of competitive strategies and to achieve organisational goals (AL-Sudairy, 2000). These strategies can be implemented and the goals achieved using IT systems. IT planning should be realistic and cover such issues as the size of the required IT budget and the implementation time-scale and scope.

The hypothesis regarding this variable was measured using two questions: Question 19 which checked whether the organisation practised IT planning or not and its influence on adoption. Question 20, on the other hand, evaluated the management efforts in IT planning against the success level of implementation. IT planning efforts were classified into three planning categories: - organisations with high levels of planning, organisations with medium levels and organisations with low levels.

The null hypothesis assumed that implementation success is independent of the level of IT planning practiced by the management. However, by looking at Table 8.12, we see that the results support very strongly the research alternative hypothesis that IT planning plays an important part in whether or not the organisation implement IT systems. Planning also influences the success level of implementation. From the statistics, we see that planning levels are positively associated with the success levels among the surveyed organisations. Therefore, we reject the null hypothesis regarding this factor and accept the alternative hypothesis.

Several studies that investigated "Important IT issues" have pointed to IT planning as the first ranked IT issue (Remenyi, 1994; Whyte and Bytheway; 1995). Alavi, Nelson, and Weiss (1988) strongly emphasised the importance of IT planning for successful implementation. They asserted that lack of proper planning can be a major inhibitor to assimilation. The availability of high quality formal plans to guide the creation and operation of IT facilities should help in integrating these facilities with the organisation's basic goals (Abdul-Gader and Alangari, 1995). Other studies of similar interest (for example, AL-Shoaibi, 1998, AL-Mushayt, 2000) found a significant relationship between practising IT planning and implementation success. Doherty and King (1994) and AL-Mushayt (2000) found that conducting realistic IT planning is statistically correlated with overall IT systems success.

It should be noted at this point that the same issue was tackled by the exploratory study as well. One of the key findings from the focus group was that many Saudi organisations lack of IT planning and do not follow clear implementation procedures. This barrier is also mentioned among the main obstacles to successful IT implementation in Table 3.8. Thus, the conclusion of this section confirms or in line with previous findings.

Based on the results from the exploratory study and the survey here, the researcher emphasises the importance of IT planning and encourages any organisation wishing to implement IT systems to practice IT planning in order to have a successful implementation.

H12: Independent variable (control) Q21 & Q23 (IT training) **Dependent Variable (response)** Q31: IT implementation

Null hypothesis: IT implementation in Saudi private organisations is independent of the IT training provided to their staff.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if they provide IT training for their staff.

Significance level = 0.05
Statistical tests results:

Table 8.13 IT Training levels * IT assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
Organisation IT training levels		Up to 50%	More than 50%	
Low	Count	23	37	60
	Expected	15.8	44.2	60.0
Medium	Count	13	56	69
	Expected	18.2	50.8	69.0
High	Count	4	19	23.0
	Expected	6.1	16.9	23.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	**P-Value**	**Decision criteria: reject the null hypothesis if the P-value < 0.05**
Chi-square	7.402 2 df	0.025	Reject the null, very significant

Presentation & Interpretation

In general, training is concerned with improving the workforce ability to function efficiently by increasing their knowledge and skills. Professional development programs, tutorials, computer-assisted instruction, and in-house expertise are examples of the possible training techniques (Abdul-Gader and AL-Angari, 1995). According to the Learning and Skills Council in the UK, Businesses that invest in training grow their profits nearly twice as fast as those that don't (Ambassador, May 2001). IT Training, in particular, leads to better utilisation of IT resources and consequently more productivity. It should be expected, therefore, that the availability of IT training is positively related to implementation success.

The respondents were asked to assess computer training in their organisations. Their responses were coded so that a high score indicates an exceptionally high level of training. As shown in the tests results for this hypothesis, 60 (38.5%) of the respondents described training efforts at their organisations as low, 69 (45.4%) indicated training levels as medium, and only 23 (15.1%) stated that the level was high. The tests indicate a very significant positive relationship between training levels and assimilation rates (success level). Therefore, it appears that organisation, whose top-managers think highly of their organisational IT training, have more implementation success.

Looking at Table 8.13 we see the results that support the research hypothesis that IT implementation success is dependent, among other factors, on providing sufficient training. IT knowledge plays an important part in whether the organisation adopts IT systems or not. The results in Tables 8.13 can be tied to the previous hypothesis results because IT training should follow sensible IT planning; such planning will covers all aspects of implementation and its requirements among which is training.

Previous IT research (Whyte and Bytheway, 1995; Clegg et al., 1997) suggests that comprehensive training and awareness programs during the implementation period are prerequisite for the success of any IT system. Furthermore, conducting appropriate training was identified as one of the most important determinants of the successful outcome of IT success (Doherty et al, 1998). The results in Table 8.13 are supported by those reported in the previous studies and reiterate the importance of providing sufficient training in order for the adopting organisation to succeed in implementation.

H13: Independent variable (control) **Dependent Variable (response)**

Q14 (business competition) Q15: IT Implementation Yes/No

Null hypothesis: IT implementation in Saudi private organisations is independent of the top-management attitude towards competition in their industry.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if their top-management feels there is a competition in their industry.

Significance level = 0.05
Statistical tests results:

Table 8.14 Business competition * IT Adoption Cross-tabulation

Count

		Adoption		Total
Organisation IT planning efforts		NO	Yes	
Low	Count	6	7	13
	Expected	1.4	11.6	13.0
Medium	Count	10	41	51
	Expected	5.4	45.6	51.0
High	Count	2	104	106
	Expected	11.2	94.8	106.0
Total		18 10.6%	152 89.4%	170 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	30.230 2 df	0.000	Reject the null, highly significant

Presentation & Interpretation

The theory that suggests that competition and market uncertainty are positively related to the adoption of new technologies was established in two early studies by Mansfield (1968; 1977). Mansfield reported that when firms are faced with a higher degree of market uncertainty, they are more likely to take on an aggressive technology policy. McFarlan (1984) established that IT can give the adopting organisation competitive edge over its competitors. Organisations in competitive environments are more likely to implement IT applications aggressively, at higher levels of assimilation, than organisations in less competitive environments. However, in a competitive industry there is a need for organisations to evaluate technologies and adopt it to gain competitive advantage (AL-Sudairy, 2000).

Researchers have identified competition as an important variable that influence technology adoption (Yavas and Yasin, 1994). AL-Sudairy (2000) asserted that the use of IT systems by competitors, sometimes forces others in the industry to use the technology. Intense competition was found to be linked to the rapid diffusion of innovations among organisations (AL-Tamimmy, 1998). In the USA and the UK the competition is extensive and influences organisations to adopt IT systems.

The statistically significant relationship between competition and IT implementation found in this study supports this notion. The null hypothesis assumed that IT implementation is independent of the competition that private organisations in SA face. However, a statistically high significant relationship was found between the competitive climate of organisations and IT implementation at P-value 0.000, thus rejecting the null hypothesis at the .05 significance level.

The results in Tables 8.14 support the research alternative hypothesis that business competition plays an important part in whether organisations implement IT systems or not. Further research that provides evidence of the actual impact of higher assimilation levels of IT systems on organisational competitiveness would be a beneficial complement to these findings. The result, furthermore, confirms the earlier findings in the exploratory section. As displayed in Table 3.4 is that overcoming competition is suggested as being the main factor enticed organisations to adopt IT systems.

H14: Indpendent Variable (control) Q25 (vendor support level) **Dependent Variable (response)** Q31 IT implementation (assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of the provision of IT vendor support available to them.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if they are provided with adequate vendor support.

Significance level = 0.05
Statistical tests results:

Table 8.15 Vendor support level * IT assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
Organisation IT training levels		Up to 50%	More than 50%	
Low	Count Expected	14 14.5	41 40.5	55 55.0
Medium	Count Expected	24 21.1	56 58.9	80 80.0
High	Count Expected	2 4.5	15 12.5	17.0 17.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	2.437 2 df	0.296	Fail to reject the null, not significant

Presentation & Interpretation

The null hypothesis assumed that IT implementation is independent of the vendor's support level. Looking at Tables 8.15 we see that the results do not support the research alternative hypothesis which assumed that vendor support plays an important part in whether an organisation implements IT systems or not. This can be attributed to various factors such as:

1- Organisations that have well trained IT personnel have already adopted IT systems without necessarily having vendor support. Hence they will go ahead and implement IT systems in various departments and functions using their own expertise;
2- Vendor support could be at fault because once equipment and software has been sold, the support service providers may be considered unreliable in their promises;
3- Some organisations turn down service and support contracts offered by the vendors. Again, many organisations try to manage with their own IT resources for competition and security purposes;
4- Most of the organisations in the sample come from the highest ranking category (Premier, First and Second) in the Chamber of Commerce membership classification.

These organisations might have enough financial and technical human resources to do without vendor support.

In addition to the test above, the researcher conducted a correlation test between human resources, infrastructure and availability of IT departments in the sample organisations against assimilation rates reported by the respondents. The results of this test provide some explanation on why there was low association between the level of vendor support and IT assimilation rates. The second test showed low correlation between the availability of an IT department/centre and the level of vendor support which means that, whenever an IT department is available in the organisation, the vendor support is reported to be low. This finding can be used to explain the results of the test above. This is true because, usually, an IT department is given the responsibility for the hardware and software installations, and the responsibility for maintaining and updating IT applications for the organisation as well as giving support to systems users.

H15: Independent Variable (control) **Dependent Variable (response)**
Q26 item 1 & Q29 part 2 (Ease of use) Q31: IT Implementation (Assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of top-management's perception of the ease of use of IT systems.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if their top-management perceives IT systems as easy to use.

Significance level = 0.05
Statistical tests results:

Table 8.16 Systems ease of use * IT Assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
Perceived ease of use encouraged management to implement IT		Up to 50%	More than 50%	
Disagree somewhat	Count	1	1	2
	Expected	.5	1.5	2.0
Neutral	Count	3	15	18
	Expected	4.7	13.3	18.0
Agree somewhat	Count	14	78	92
	Expected	24.2	67.8	92.0
Strongly Agree	Count	22	18	40
	Expected	10.5	29.5	40.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	24.260 3 df	0.000	Reject the null, highly significant

Presentation & Interpretation:

The null hypothesis assumed that IT implementation is independent of the perceived ease of use of the system. However, by looking at the results at Tables 8.16 we reject the null hypothesis. We accept, therefore, an alternative hypothesis that there is a strong relationship between system ease of use and implementation.

The original alternative hypothesis (directional) assumed that Saudi private organisations are more likely to implement IT systems if they perceive that these systems are easy to use. From the results of the chi-square and the other tests we can conclude that the level of implementation (adoption and assimilation) is not influenced by the management's perceived difficulty of use. This means that Saudi private organisations are implementing IT systems regardless of the difficulty of using these systems. The results can be attributable to:

1- Saudi private organisations will implement systems to keep up with their competitors despite any difficulties in the use of these systems.

2- Saudi private organisations value the benefits of adopting systems to a degree that they are not concerned about the difficulty of using these systems.

3- Saudi private organisations have skilled workforces and sufficient training programs to overcome any system difficulties after implementation.

4- One could argue that if individuals in an organisation, due to their IT knowledge, find an IT application 'easy to use' then they will make full use of it and encourage others to use it and, therefore, will attach little importance to how difficult it is to use.

Pressure from business partners can also be a factor that forces Saudi private organisations to implement IT systems regardless of the difficulty perceived by the management. For example, AL-Sudairy (2000) mentioned that Saudi Aramco - one of the world's leading oil companies uses Electronic Data Interchange systems (EDI) throughout the value chain and pressures its local suppliers to use EDI or it will stop doing business with them if they do not implement EDI. Some large companies in the USA, such as Wal-Mart, Sears and K-Mart, have also threatened to stop doing business with suppliers who do not have the necessary IT links for business transactions.

H16: Independent Variable (control) Q26 item 2 (benefits of IT) **Dependent Variable (response)** Q31: IT Implementation (assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of top-management's perceptions of the benefits of IT systems to the business.

Alternative hypothesis: Private organisations in SA are more likely to implement IT systems if their top-management perceives IT systems as beneficial to the business.

Significance level = 0.05
Statistical tests results:

Table 8.17 Systems benefits * IT Assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
Perceived benefits encouraged management to implement IT		Up to 50%	More than 50%	
Agree somewhat	Count Expected	5 2.6	5 7.4	10 10.0
Strongly Agree	Count Expected	35 37.4	107 104.6	142 142.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	3.097 1 df	.078	Fail to reject the null, not significant

Presentation & Interpretation:

The null hypothesis assumed that IT implementation is independent of the perceived benefits from adopting IT. The results in Table 8.17 confirm the null hypothesis. Although the null hypothesis is not rejected, there is a slight tendency towards acceptance of the alternative hypothesis (P value of .078 is not that far away above our significance level of 0.05).

Hence, the results of this particular test item indicate that the amount of implementation is independent of the perceived benefits and this is somewhat unexpected because the alternative hypothesis state that more implementation is related to more benefits perceived by management from implementing IT.

There is one possible reason for obtaining this non-significant result. Since all the responses of the dependent variable were either 'agree somewhat' or 'strongly agree', this implies that all these organisations who have already adopted IT systems perceive the benefits of implementation as very important. Hence, because of this lack of variation in the responses in the dependent variable, we obtain a statistically non-significant result.

AL-Sudairy (2000) found similar results when he studied adoption of EDI in the Saudi retail industry. He found that the use of EDI by Saudi organisations is not based on benefits or EDI characheristics. AL-Sudairy also found that the decision to use EDI in some Saudi business organisations was based on local customer use and on overseas suppliers who mandated that local suppliers and retailers used it. One of the managers who participated in the study commented on EDI adoption: "We implemented EDI to maintain a trading relationship with large customers or suppliers; EDI is not beneficial to us. Therefore, we are using EDI only to send and receive requests from the customer to satisfy his need".

This is not unique to Saudi organisations; according to a recent survey in the Computer Weekly (17 May, 2001, p18), it was reported that the use of technology in some UK organistions is being severely stunted by a lack of understanding of the business benefits of IT at board level. The survey revealed that many CEOs' look at IT as just some kind of administrative service and IT is low on these officers' priority lists.

Adopting for benefits from IT systems was not defined in the same manner in the exploratory study section. But instead among the key findings (Table 3.3) it is mentioned that Saudi organisations tend to install IT systems due to, among others, providing better quality services and products, enhancing the decision making process and for having a better communication with suppliers and clients. Such end results can be defined as 'beneficial', and thus, the result of the exploratory section can be used to substantiate the faindings in this section.

H17:	**Independent Variable (control)**	**Dependent Variable (response)**
	Q26 item 3 (System costs)	Q31: IT Implementation (assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of top-management perceptions of cost.

Alternative hypothesis: Private organisations in SA are likely to implement IT systems if their top-management perceives these systems as inexpensive.

Statistical tests results:

Table 8.18 Systems costs * IT Assimilation Cross-tabulation

Count

		Assimilation	Rate	Total
High costs of IT systems is considered as big obstacle to implementation of these systems		Up to 50%	More than 50%	
Disagree somewhat	Count	0	18	18
	Expected	4.7	13.3	18.0
Neutral	Count	6	34	40
	Expected	10.5	29.5	40.0
Agree somewhat	Count	29	47	76
	Expected	20	56.0	76.0
Strongly Agree	Count	5	13	18
	Expected	4.7	13.3	18.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	14.586 3 df	0.002	Reject the null, highly significant

Presentation & Interpretation:

The null hypothesis assumed that IT implementation is independent of the cost of the system. Looking at Tables 8.18 we see that the results support a research alternative hypothesis that cost of implementation is an important factor because the results are significant and cost does play a part in whether the organisation implements an IT systems or not.

In fact, the results indicate that more implementation is associated with the idea that high cost is not a big obstacle in implementation. This is supported by the fact that 18 organisations were more successful in implementation although they all disagreed that high cost was an obstacle to implementation. Further support for this assertion is shown in the accompanying scatter diagram done by the researcher, which displays the distribution of the responses showing the management's agreement/disagreement about the cost item as being an obstacle to implementation. The display also clearly shows a slightly negative slope, which indicates that more implementation is associated with the concept of the low value attached by the management to implementing IT systems.

The findings imply that if hardware and software companies increase their product costs and licensing fees greatly then users may look for other alternatives or continue to use older systems. This claim is supported by a recent report in Computer Weekly (17 May, 2001, p1) which expresses a similar view; particularly about Microsoft's latest policy on software licensing to organisations. A further point in this survey shows high correlation between implementation and the size of the organisation. This implies that large companies, which would not necessarily be too concerned about the cost of implementation, would actually have a higher rate of implementation because they have more capital and a willingness to spend more on IT systems.

H18: Independent Variable (control) Q26 item 4 **Dependent Variable (response)** Q31: IT Implementation (Assimilation)

Null hypothesis: IT implementation in Saudi private organisations is independent of the system being available in Arabic or not.

Alternative Hypothesis: Private organisations in SA are more likely to implement IT systems if these systems are available in Arabic.

Significance level = 0.05
Statistical tests results:

Table 8.11 Availability of IT systems in Arabic * IT Assimilation Cross-tabulation
Count

		Assimilation	Rate	Total
Availability of IT systems in Arabic encouraged management to implement these systems		Up to 50%	More than 50%	
Strongly disagree	Count Expected	0 .5	2 1.5	2 2.0
Disagree somewhat	Count Expected	0 2.6	10 7.4	10 10.0
Neutral	Count Expected	8 10.5	32 29.5	40 40.0
Agree somewhat	Count Expected	14 13.7	38 38.3	52 52.0
Strongly Agree	Count Expected	18 12.8	30 35.4	48 48.0
Total		40 26.3%	112 73.7%	152 100%

	Actual value	P-Value	Decision criteria: reject the null hypothesis if the P-value < 0.05
Chi-square	8.215 4 df	0.084	Fail to reject the null, nearly significant

Presentation & Interpretation

The null hypothesis assumed that implementation is independent of the interface language used to develop IT systems. But from the results in Table 8.19, we see that this null hypothesis is not rejected at the significant value of 0.05 level according to the Chi-squared value (8.215 at 4df giving a P-value of 0.084). However, there is a slight tendency to reject the null hypothesis bearing in mind the percentages showing the choice of languages preferred (see below). Of the total who took part in the survey, 32% stated that their main business and administration language is Arabic, 8% use English and 60% stated that they use both Arabic and English. However, when the respondents were asked about their preferred language for IT systems, 40% preferred Arabic, 13% prefer English and 47% prefer having systems that can handle both languages.

This study has revealed that a high percentage of top managers in Saudi private organisations are in favour of having systems in both Arabic and English. This is quite interesting because the native language in Saudi Arabia is Arabic and yet the majority of the managers prefer a bi-lingual system. This may be due to the fact that business and administrative communication between organisations and their suppliers and/or customers requires having a system capable of handling both languages. This also can be attributed to the fact that English is the common communication language in big and medium Saudi organisations where hundreds of expatriates are working.

Nevertheless, it is Saudi government policy to request that any official communication from private organisations to government agencies must be in Arabic. Whether IT systems are to be developed in Arabic or English is clearly a local Saudi issue to be addressed as part of the determination of organisational needs.

We have already obtained from the respondents in this sample the results of H2, H8 and H9 (managers' nationality, organisation's owner type and the organisation's geographical scope) that IT implementation is influenced by the manager's nationality being non-Saudi and the organisation being more international both in ownership and business spread. This would account for the no preference of Arabic as the language for IT systems.

A study by Sindi (1991) found that Saudi managers are indifferent about having IT systems in either Arabic or English. A study conducted by Ali (1995) to investigate the impact of computers on the audit and accounting professionals in some Gulf countries found that 83% of his respondents stated that their main language of administration is English. He attributed this to the fact that most of the users were of non-Arabic origin and that most of the Arabic users are forced by necessity to use English as a medium for business communication. Ali attributed his findings to:

1- Dominance of the English language as an international business, commerce and computer communication language.

2- Dominance of the expatriates workforce in the Gulf whose first language is non-Arabic particularly Asians.

The above findings confirm the dominance of the English language as the language most frequently used by IT users in many private organisations in SA and in the Gulf region. It also demonstrates the need for Arabisation of software as a tool for transfer of technology and training of locals. In addition, from the interviews conducted and visits by the researcher to many IT suppliers in SA during the research period it was found that the overwhelming majority of computer hardware and software suppliers' workforce are expatriates among which is a high number of non-Arab expatriates. This is quite understandable in the light of the composition of this industry's workforce and the insufficient supply of locally skilled workforce.

8. 4 SUMMARY OF DATA ANALYSIS

The main objective of this study was to identify and investigate some of the selected factors that are thought to influence IT implementation success in the Saudi private sector and suggest guidelines to help organisations in their implementation efforts. This chapter presented the results of hypotheses testing. Mainly Chi-square tests were employed in this research. Based on the results of the survey, the implementation was found to be influenced by variables some of which are related to: 1) the senior managers who run the business; 2) the organisation itself; and 3) the adopted system. Out of the 18 independent variables, 3 variables (Industry type, vendor support and systems benefits) were found to have statistically non-significant relationships with IT implementation. The null hypotheses for these variables were accepted. Table 20 shows the summary of the tests results.

From the tests results, manager age, system ease of use and cost have shown a significant association with IT implementation, which supports the research alternative hypotheses that the younger the senior managers, the more ease of use and the less costly the systems, the more likely that their organisations implement IT systems. Other issues such as managers' nationality, education level and IT knowledge have also emerged as important and significant factors in IT implementation in Saudi private organisations.

Table 8.20 Summary of the Hypotheses Tests

Variable	Hypothesis & related questions	Hypothesised Direction of the relationship	Results for the alternative
1- Manager age	H1, Q3	Negative	Supported
2- Manager nationality	H2, Q2	Positive towards non-Saudi	Supported
3- Manager education level	H3, Q4	Positive	Supported
4- Manager IT knowledge	H4, Q6	Positive	Supported
5- Top-management support	H5, Q9	Positive	Supported
6- Organisation size	H6, Q10	Positive	Supported
7- Industry type	H7, Q11	Positive towards manufacturing	Not supported
8- Organisation ownership	H8, Q12	Positive towards joint-venture ownership	Supported
9- Organisation geographical scope	H9, Q13	Positive towards national and international organisations	Supported
10- IT infrastructure	H10, Q18	Positive	Supported
11- IT planning	H11, Q20	Positive	Supported
12- IT training	H12, Q23	Positive	Supported
13- Business competition	H13, Q24	Positive	Supported
14- Vendor support	H14, Q25	Positive	Not Supported
15- System ease of use	H15, Q26-1	Positive	Not Supported
16- System perceived benefits	H16, Q26-2	Positive	Not Supported
17- System costs	H17, Q26-3	Negative	Supported
18- Availability of systems in Arabic	H18, Q26-4	Positive	Not supported

Table 8.21 contrasts the responses received concerning some of the factors investigated in this study as assessed by the Saudi top-managers from both the survey and the focus group interviews. Overwhelmingly, continuous management support and better IT planning practice were viewed by Saudi managers as the most significant factors in successful implementation. Furthermore, results from the survey indicate that private organisations

with sufficient IT training programs have higher levels of perception to implement IT. In addition, respondents expressed a welcome for technical guidance during implementation.

Table 8.21

Overall Analysis of Some Responses of The Survey and The Exploratory Study

Areas of Concern	The Survey	The Exploratory Study
Top-management Support	Management Support is a key factor for IT success. Ensure continuous management commitment and support	- Top-management support has to be present throughout the implementation process
IT Planning	IT planning is a key factor for IT success.	Organisation needs to set up organisational IT plan. Organisational IT plan must support the business plan. Identify organisational IT needs and requirements
IT Training & Human resources issues	IT training is very important Establish human resources development programs.	Identify organisational training needs. Outsourcing is possible solution for lack of internal IT expertise
IT Vendor Support	- Internal IT expertise can compensate for vendor support	Lack of qualified IT vendors is hindering IT implementation in SA.
IT Arabic Systems	- Most organisations in the survey prefer their IT systems to be able to handle both Arabic and English.	Availability of IT systems in Arabic is a key factor in IT adoption in SA.
User Involvement	Was not tested but was discussed in the interviews and the focus group meetings	Appropriate users involvement is a key factor in IT implementation. Select representatives from users depts. and involve them throughout the implementation process.
Determine organisational information needs	Was not tested but was discussed in the interviews and the focus group meetings	There are various tools that can be used to determine organizational information needs for example Critical success factors
Assess Total Costs	Was not tested	See section below

Similarly, IT officials in the focus group interviews were in agreement with the respondents in the survey on most of the variables affecting IT implementation. They emphasised the importance of employing qualified IT workforce and contracting qualified IT suppliers. They also assigned high ratings on other issues such as the importance of providing adequate training and customising the adopted systems to handle the local language of the adopting organisations.

The data gathered from the personal and the focus group interviews showed that some Saudi organisations have several attitude and technical problems. Many organisations spend large amount of money on purchasing IT systems without assessing their real needs for those systems. For example, in one of the participating organisations, lack of IT planning resulted in several incompatible systems being installed. In another organisation working in the construction sector, the use of Computer Aided Design system (CAD) was resisted by a group of older engineers even though the introduction of this system was preceded by sufficient planning and backed with management support.

Another problem found in some Saudi private organisations is that some owners and top-managers adopt computers as a way to “show off”; such managers want it to be noticed that they are using modern technology in performing their jobs, whereas, in reality, they are not. AL-Shoaibi (1998) pointed out to similar problems faced by Saudi companies.

From the literature review (Abdul-Gader and AL-angari, 1995) and the focus group interviews, several findings have emerged that support the findings of the study. IT implementation is endangered in Saudi organisations which:

1) lack or have weak IT planning;
2) lack sufficient IT training;
3) lack of user participation;
4) low management support;
5) lack of technical support; and
6) lack of IT skilled workforce.

Based on these results, it is believed that lack of top-management support, lack of IT planning and human resources related problems are the main obstacles to success in the Saudi private sector.

- Other major findings

Two other major findings of this study is that any Saudi organizations do not use systematic and clear methods to determine organizational information needs and do not correctly estimate the costs of implementing IT systems. These two factors were not tested by the questionnaire survey but were discussed in the exploratory study which included the interviews and the focus group meetings. In the exploratory study we found that many organizations do not practice IT planning which is the main guidance for any implementation. Many interviewees mentioned that their organizations do not thoroughly study their IT needs and requirements; they suffice to minimum listing of what they want.

Most of the participants in the focus group meetings and the interviewees pointed out that many of the failures in the IT implementation in Saudi organizations is related to underestimating the costs of adopting and implementing IT systems. The total costs include the purchasing costs, the installation costs, the operating and maintenance costs. Many managers limit the costs to the initial purchasing and installation costs; they do not put in considerations the cost of training and preparing the workforce to use the adopted systems. In addition, they either underestimate or leave to later the costs of running and maintaining these systems.

In chapter 9, we will discuss some of the methods which can be used to estimate to determine organizational information needs and requirements from IT systems. Also there will be a discussion of some the methods which can be used to estimate the correct costs of implementing IT systems.

In addition, the next chapter will present and discuss the suggested implementation guidelines. The purpose of these is to help organisations in their efforts to implement IT successfully.

CHAPTER NINE
THE PROPOSED GUIDELINES FOR IT IMPLEMENTATION

9.1 INTRODUCTION

Many IS researchers (for example Galliers, Merali and Spearing, 1994; AL-Shoaibi, 1998; Doherty and King, 1998; AL-Sudairi, 2000) found that many IT projects fail to deliver what is expected of them due to a lack of or inappropriate implementation guiding strategy. These researchers emphasize the importance of having a plan or a strategy to guide the organisation in its implementation efforts and warn that lack of planning reduces the chance of success.

One of the main objectives of this study is to suggest implementation guidelines based on the findings of this research. The purpose of this chapter is to present and show how to apply the proposed managerial guidelines to help organisations when they decide to implement IT systems. In the following sections we will discuss the importance of having IT plan and then present the suggested guidelines.

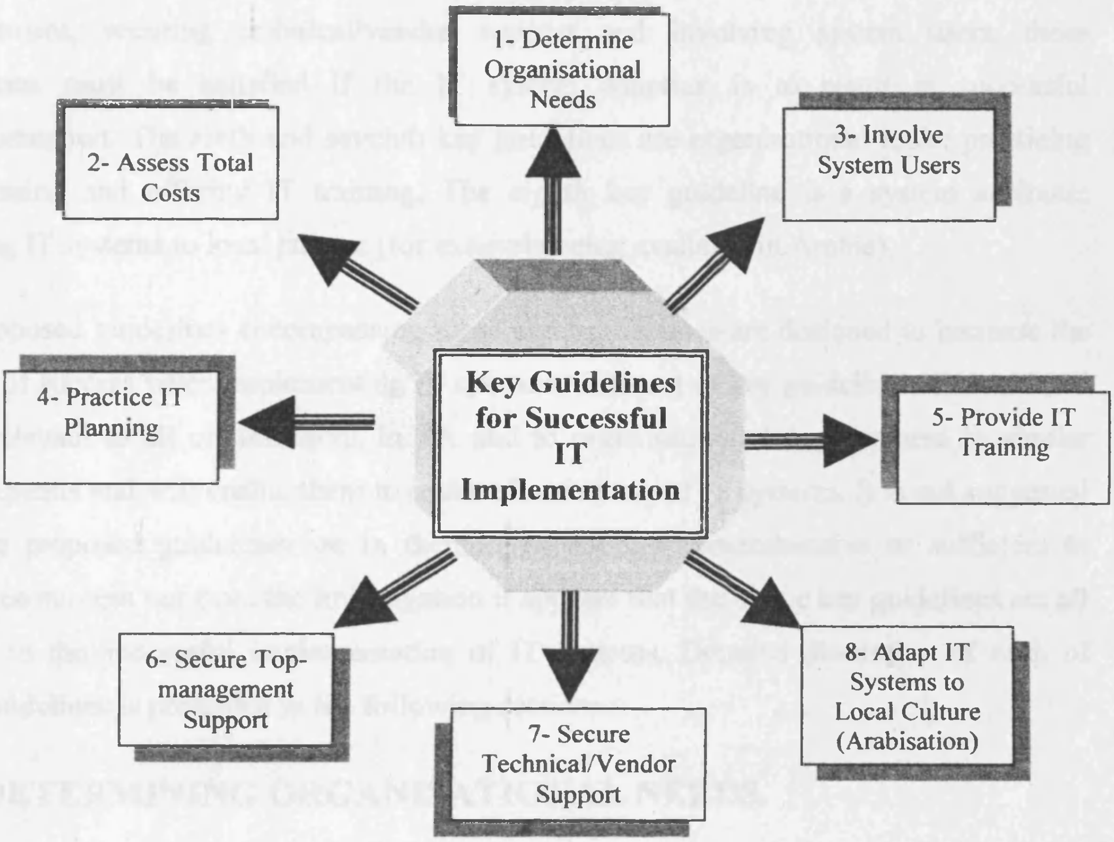
9.2 THE KEY GUIDELINES

Eight key guidelines for implementation were identified from practical experience in the field, from an analysis of the literature and from the findings of this study (Figure 9.1). These proposed guidelines are then evaluated by some IT academics and professional from Saudi Arabia (SA). Although key guidelines number one (determining organisational needs) and number three (involving systems' users) were not tested in the questionnaire survey, they were included in this suggested implementation guidelines for four reasons:

1- They were found as very important factors in the interviews and the focus groups meetings, which were conducted in the initial stage of this research. Chapter three presented detailed discussions about these interviews and meetings.

2- From organisation theory principles which state that organisation and its business and experience is like an open system that can be affected by internal and external conditions or factors. Among the internal factors that affect the organisation and its experience with new technologies and processes is the staff or workers. These workers, which we can refer to in this study as the users of the adopted system have to be involved in the big changes that affect the organisation and its business. This is very important because if these users are ignored or not involved in decisions like implementing IT systems, the implementation will not achieve its objectives and these users may resist using the new systems. This, hence, provides support for the inclusion of these two factors among others in the suggested guidelines.

Figure 9.1
Organisational Guidelines for Successful IT Implementation



3- These two factors were found to be very important factors in any implementation projects in the IS literature (see for example, Doherty and King, 1994; Wong and Tate, 1994; Barki and Hartwick, 1994). There is, thus, a general consensus of acknowledging the crucial importance of these among any guidelines regardless whether there is a direct reference made or not in the study. This is another point of support for the inclusion of these factors.

4- All of these suggested guidelines were tested by a number of IT academics and professionals in SA. These people were among those who participated in the Gulf Internet 2000 symposium which was held between the 18th and 22nd of November, 2000 and was hosted by the Chamber of Commerce and Industry in the Eastern

Province of SA. The researcher participated in this event with the objective of meeting some IT people to test the guidelines as well as presenting a paper titled "Are Saudi Organisations ready for E-Commerce?".

Although all of these guidelines are regarded essential to the successful implementation of IT systems, they are different in kind. The first two key guidelines are processes through which the organisation's needs and the total costs of implementation are determined. The third, fourth and fifth key guidelines are conditions for success: securing top-management commitment, securing technical/vendor support and involving system users, these conditions must be satisfied if the IT system adoption is to result in successful implementation. The sixth and seventh key guidelines are organisational tools: practicing IT planning and offering IT training. The eighth key guideline is a system attribute: adapting IT systems to local culture (for example being available in Arabic).

The proposed guidelines encompassing these eight guidelines are designed to increase the chance of success when implementing IT systems. This set of key guidelines is considered to be relevant to all organisations in SA and to organisations doing business in similar environments and will enable them to make effective use of IT systems. It is not suggested that the proposed guidelines are in themselves entirely comprehensive or sufficient to guarantee success but from the investigation it appears that the above key guidelines are all critical to the successful implementation of IT systems. Detailed discussion of each of these guidelines is presented in the following sections.

9.3 DETERMINING ORGANISATIONAL NEEDS

The main objective of adopting IT systems is to improve the whole organisation and to provide accurate and timely information for use in managing the business and activities of the adopting organisation. Irwin (1999) stated that the purpose of IT systems is to generate valid and usable information that will help organisations detect and correct errors and plan future activities. Information can be seen as the backbone and blood supply of the organisation and decision-making. Hence the implementation of IT systems should enhance the creation, delivery and dissemination of accurate information and should support the function of the organisation rather than just serving individual departments.

Organisational needs are defined as the clear overall strategic goals and objectives of the organisation. Determination is concerned with establishing organisational needs and assessing how IT systems can contribute to satisfying these needs. Here, it is assumed that the organisation has approached the stage of deciding whether it needs to adopt IT systems or not and that the decision to adopt has been agreed upon.

The following section discusses the importance of determining organisational needs and its relationship with strategic planning.

9.3.1 Importance Of Determination Of Organisational Needs

The determination of organisational needs to be met by IT systems is of paramount concern to the organisation now and in the future. Determining organisational needs and requirements must be carried out before making the decision to adopt IT systems because it will influence whether the organisation buy ready-made packages or request customised applications. This way the management is able to know exactly what hardware, software and human resource are needed to convert to the new way of running its business. Significant amounts of efforts, money and time will be wasted if the needs are not clearly determined.

If organisational needs are not identified at the outset and an IT system is developed or purchased which as result does not satisfy the organisation's requirements, management will have to go back to the starting point of the cycle until the organisational needs are properly defined. The initial task of top-management is to determine the overall goals and objectives of the organisation. If it is decided that there is a need for IT systems, the top managers will want to know how IT systems can fulfil the organisation's needs and whether IT systems investment and design will support the strategic goals of the organisation.

Activities in this process also includes defining the organisation's information needs for the present and in the future, and specifying what IT system is expected to do for the organisation. An assessment of the feasibility of IT use in the particular organisation is important. Clearly, this assessment of current and future information and processing needs requires more skillful analysis than some organisations can afford or provide because, in many cases, this involve hiring a consultant.

Lees and Lees (1987) suggest that managers write out a checklist of objectives and requirements and that functional specifications be generated. In their study Lees and Lees found that 89% of their respondents reported that defining what they expected the computer to do was important or extremely important. Almost as many (87%) believe that considering future business needs is similarly important. Other researchers such as AL-Assaf (1997) point out that determining organisational needs (goals) is an explicit and first step in the planning process.

- How to apply this guideline?

This study has clearly shown a need for Saudi organisations to adopt IT systems to increase their efficiency and productivity in order to overcome the increasing local, regional and international competition. Determining organisational needs is the first step to be taken by business organisations in order to have a successful implementation.

There are several general approaches available, such as soft systems Methodology (SSM), Strategy Set Transformation (SST), Business System Planning (BSP) and Critical Success Factors (CSF). These methods provide useful suggestions on how to determine organisational needs. SST is a methodology primarily for describing organisational information requirements level from the objectives of the organisation (Davis and Olson, 1985). BSP is based on the organisational processes, for example, the groups of decisions and activities required managing each of the resources of the organisation. It is based on the assumption that these processes remain relatively constant (see Friedman, 1989). Edwards, Ward and Bytheway (1991) defined CSF as 'those things which must go right if the objectives are to be achieved). The CSF idea was developed by Rockart in the late 1970s to help executives define their information needs. CSF can be used to highlight specific information needs and identify the critical areas of organisation activity where improved systems will have the most benefit; this methodology is useful in IT planning.

McFarlan, Cash, and Mckenny (1992) recommend the use of such tools as systems specification standards and feasibility study specifications when determining organisation's needs and requirements. The choice of methods and techniques available for determining organisational needs will be determined by what is appropriate to the organisation in its cultural context.

It is proposed that Checkland's Soft System Methodology (SSM) be used for the process of determining organisational needs and planning for their achievement. SSM was developed in the 1970s by Checkland and his colleagues at the University of Lancaster in the UK and it grew out of the failure of 'System Engineering' when faced with messy complex problem situations. SSM was developed expressly to cope with the more usual situations in which the people in a problem situation perceive and interpret the world in their own ways and make judgments about it using standards and values which may not be shared by others (see Checkland and Schols, 1990).

SSM was Originally developed to be used in broad problem solving situations. It appears to be very relevant to this key guideline. SSM has now became widely known and is being applied increasingly by professionals in the field. It has been fruitful in determining organisational needs (see for example, Galliers, 1987, Watson and Smith, 1988; Checkland and Scholes, 1990). It is an iterative and backtracking process with seven stages. It may be run many times especially during systems building phases. It can be described in the following sequence:

1- Problem situation considered problematic
2- Problem situation expressed
3- Root definitions of relevant purposeful activity systems determined
4- Conceptual models of the systems named in the root developed
5- Comparison of models and real world undertaken
6- Desirable and culturally feasible changes determined
7- Actions to improve the problem situation agreed or initiated.

As opposed to scientific approaches based on 'hard system thinking', the soft system methodology involves the study of 'wholes' rather than 'parts', where the former is considered to be different to the sum of its parts. 'Hard' is structured while 'Soft' is unstructured. Soft system Methodology views IT systems as 'Human Activity Systems', constructed of managers and others with different and conflicting goals and attitudes. Human activity Systems consist of problems that unstructured or soft. They are difficult to gauge. Therefore, SSM is pointed towards analysing and understanding complicated, unstructured situations through carrying out debates with manages involved in the organisation.

According to Watson and Smith (1988), SSM has been found able to translate the determination of organisational needs, via root definitions, into activity systems models from which categories of information required can be readily extracted. In order to use SSM effectively in the Saudi context it will be necessary for the adopting organisations to recognise that as business grows, competition intensifies and as IT systems become increasingly sophisticated, the need for careful planning of IT becomes of great importance.

If the organisation is large and the required system is huge and complex then having a steering committee becomes necessary to follow up with every step during the development and implementation stages of the system. This steering committee should report to the highest management level in the organisation. A team approach both to determine organisational needs and to plan for IT implementation is essential.

Some of the members of the steering committee would form a 'task force', the team responsible for the detailed work. The IT task force, part of the steering committee, would be headed by a knowledgeable person in both business and IT. This task force will include management representatives, 'actors', from different departments of the organisation which are expected to be affected by the introduction of IT systems. The establishment of such a team will also assist with meeting one of the key conditions for IT success, securing top-management commitment and support.

SMM is relevant to determining organisational needs. The dynamics of the SSM process may be described by means of the diagram in Figure 9.2. Similar diagrammatic presentations may be found in, for example, Watson and Smith (1988), Checkland and Scholes (1990) and Wilson (1990). The material presented below is mainly borrowed from Galliers (1985).

Problem Situation: Stages 1 and 2

The first two stages are addressed to understanding the overall 'problem situation'. This will allow the 'problem solvers' such as system analysts, designers and developers to gain an insight into the problem area(s) and to identify the different views of the users. This of course will help to build as rich picture as possible for the determination of organisational needs and requirements.

Root Definition of Relevant Systems and Conceptual Models: Stages 3 and 4

These stages aim at building or requesting 'conceptual models' of activity systems to the 'problem situation'. These should consider different 'futures' for the organisation. From the end of the previous stage 'problem situation expression', the system solvers must develop an understanding of the adopting organisation as a system which can be defined in terms of its purpose, processes and environment. These stages are essential as it is from this analysis that the base definitions are created and from the definitions the conceptual models are developed.

Comparison of Stage 4 with the first two Stages: Stage 5

In this stage a comparison is made between models and the 'problem situation' with a view to initiating discussion with the users involved to identify the means by which improvements can be made. This stage iterates and backtracks through stages 1,2,3,4 and 5, until the 'system solvers' and 'actors' agree on the definitions, models and views defined.

Recommendations for Change: Stage 6

The 'system solvers' make recommendations of activities or organisational changes which are felt to be feasible and desirable based on a comparisons made in stage 5. These recommendations will be debated with the users and the management. It is, however, during this stage and the previous one that, for example, inconsistencies in management practices, lack of communication channels within the organisation will become clear. These issues must be addressed within the organisation.

Map Information Needs/Flows: Stage 7

The purpose of this stage is to define conceptual information inputs and outputs for each activity identified in stage 4. The analyses of external information flows to the systems as well as information flows which are not linked with any computerised system should be included. This stage involves documentation of the flow of the information between activities, sources of information and characteristics of information, for example, degree of detail, accuracy, and format.

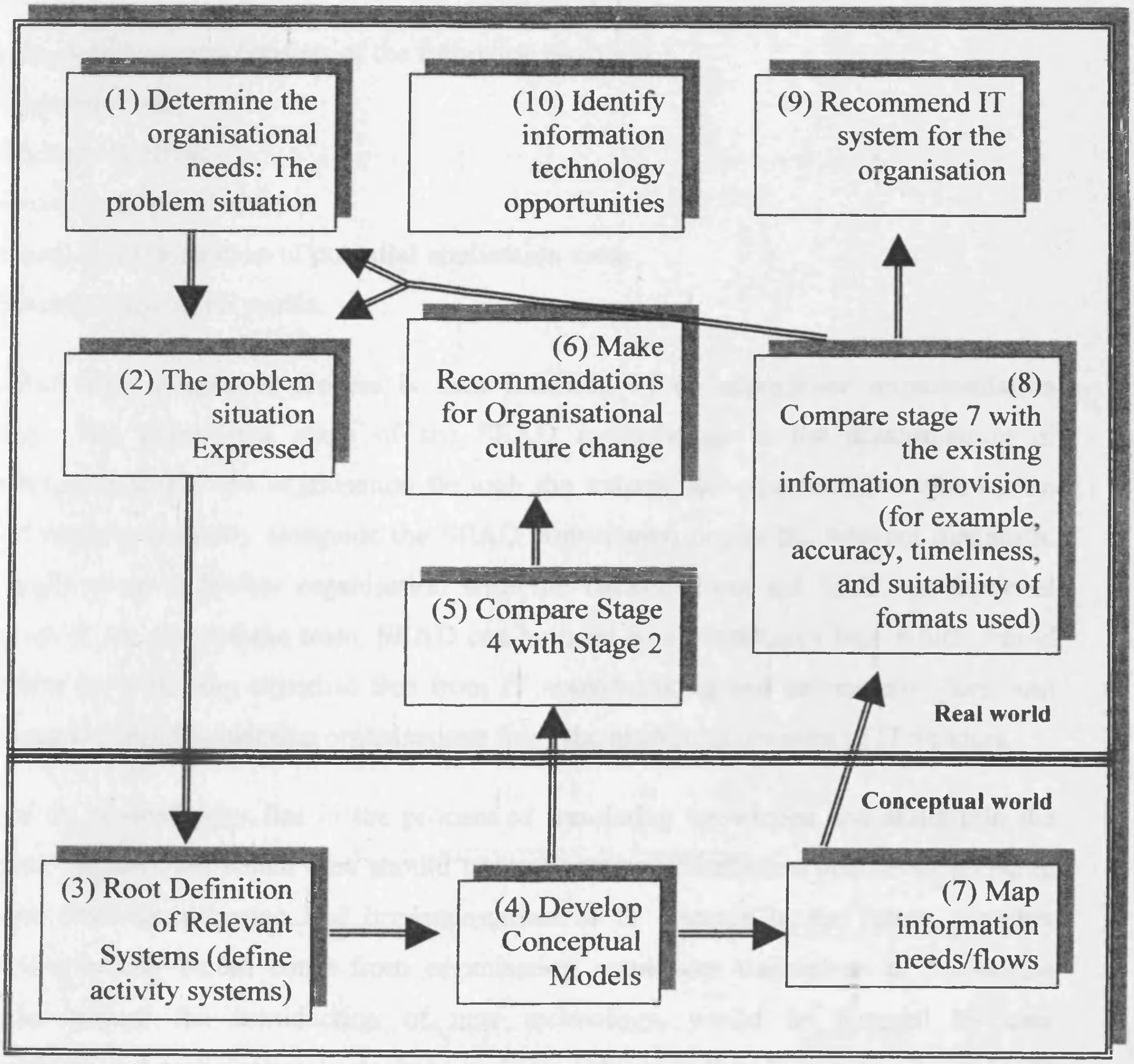
Comparisons of Stage 7 with the first two Stages: Stage 8

In this stage the identification of information gaps is carried out and the problems related to accuracy of information, its timeliness and the format in which it is handled are addressed. Also in this stage the gaps in the information provided are underlined by comparing this level of information provision with the information required by the 'conceptual models'.

Recommended an IT system: stage 9 AND
Identification of Information Technology Opportunities: Stage 10

Following the previous stages (stages 1 to 8), an IT system is recommended to be developed or purchased. The 'system solvers' should seek procedural and information technology solutions to the problem situation in hand, recommend which module(s) must be computerised and evaluated the extent of change and its impact on the organisation. In summary SSM consists of finding out about the problem situation, naming the relevant human activity systems in 'root definitions', building ' conceptual models' from the 'root definitions' and taking action in the situation to bring about improvements.

Figure 9.2 Stages Model of Checkland Soft Systems Methodology



Another method, which can be used to guide organisations in specifying their IT needs, is the System Efficiency Audit Development (SEAD) methodology. SEAD was developed in the 1980s by the Business Information Systems Group (BISG) at Wolverhampton University and the Human Sciences and Advanced Technology (HUSAT) research Institute at Loughborough University of Technology. The purpose of SEAD is to provide decision-making route and impartial assistance for organisations to define their requirements during the selection of IT systems (see Figure 9.3).

The first step shown in the SEAD methodology is the recruitment of a user-representative in the adopting organisation. The next stage consists of training the user-representative during the five-stage diagnostic process being performed in his/her organisation (Adamson, 1994).

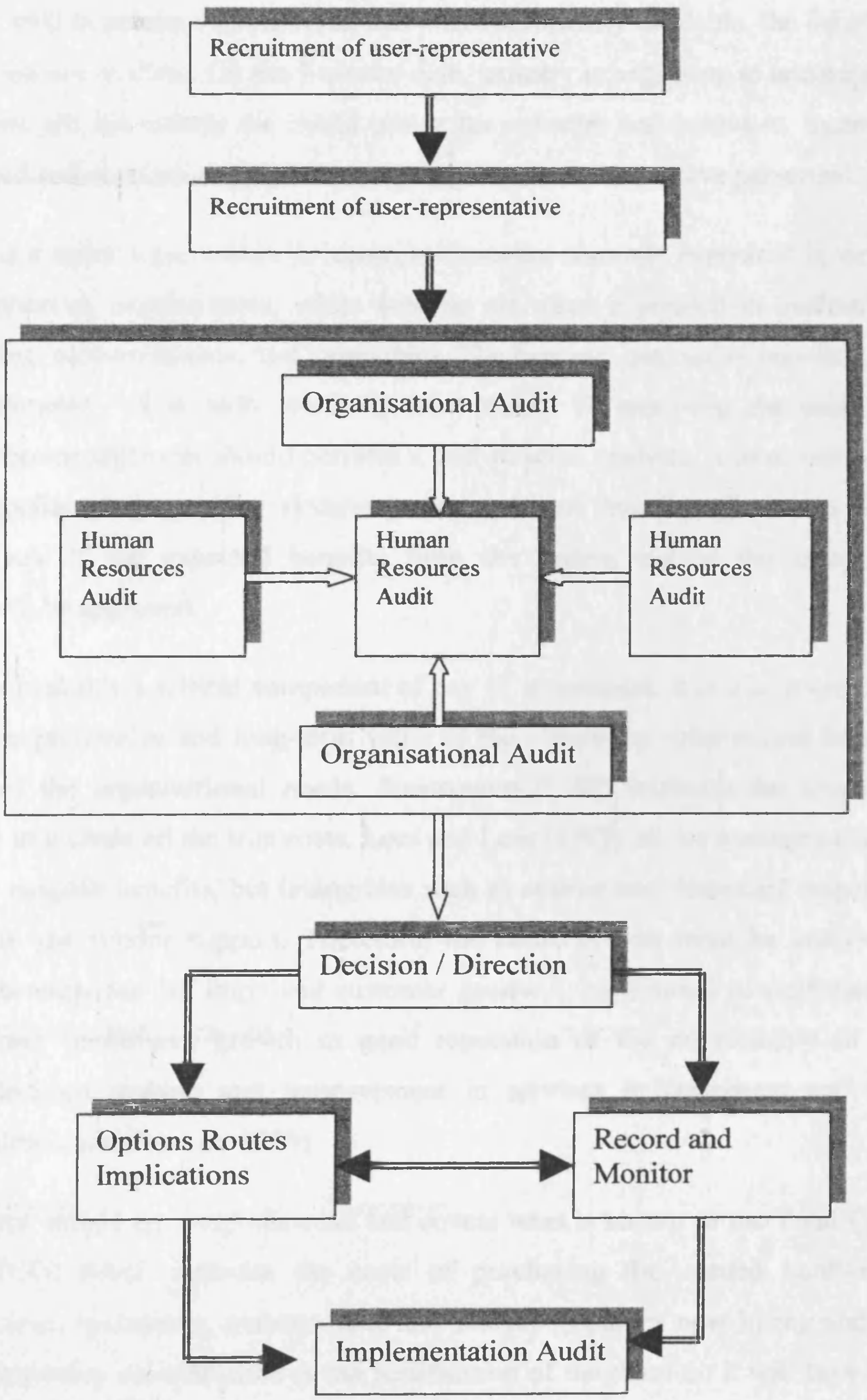
The diagnostic process consists of the following analysis:

1. Organisational
2. Human resources
3. Existing technical systems
4. Needs and priorization of potential application areas
5. Security and control needs.

The five stage diagnostic process is then followed by an appropriate implementation strategy. The educational stage of the SEAD methodology is the dissemination of knowledge back into the organisation through the trained user-representative who by the end of training (working alongside the SEAD consultants) posses the relevant diagnostic and apply these in his/her organisation with the back-up from the SEAD professional members of the programme team. SEAD can be used as a consultancy base which would provide a wide-ranging expertise free from IT manufacturing and service providers; and consequently free the adopting organisations from the marketing pressure of IT vendors.

The of the methodology lies in the process of translating knowledge and skills into the adopting organisation which then should become more self-sufficient and better prepared to cope with the selection and implementation of IT systems in the future. Another important benefit would come from organisation employees themselves as favourable attitudes toward the introduction of new technology, would be fostered by user involvement and participation in decision making. Education therefore plays a crucial role in the organisation's change of attitudes.

Figure 9.3 The System Efficiency Audit Development (SEAD) Methodology



Source: Adamson, Ivana. (1994).

9.4 ASSESSING THE COSTS OF IMPLEMENTATION

In the early days of data processing computers were used to replace manual systems where cost of the existing systems could be easily compared to the costs of the new systems. Now as computers are used to produce information that was not formerly available, the benefits in cost reduction are not so clear. On the financial side, industry is beginning to understand more that the costs are not merely the initial outlay for software and hardware. Systems must be maintained and sophisticated systems require talented and expensive personnel.

Cost assessment is a major topic within IS research. Costs are normally expressed in terms of quantitative monetary requirements, while benefits are often expressed in qualitative terms of cost-saving, cost-avoidance, and intangibles. The first two qualitative benefits can be assigned a monetary value with relatively little effort. In assessing the costs of implementation, top-management should perform a cost-benefits analysis. It must compare the costs and benefits of its existing systems to the cost and benefits of various new systems alternatives. If the expected benefits from the system exceed the cost, the implementation will be approved.

While cost is unmistakably a critical component of any IT investment, it is also important to consider the comprehensive and long-term value of the computing solution and how it will service all of the organisational needs. Strassmann (1985) criticises the frequent failure in practice to include all the true costs. Lees and Lees (1987) advise management to consider not only tangible benefits, but intangibles such as ease of use, decreased response time, better credit and vendor support. Therefore, the entire system must be analysed. Other intangible benefits can be: improved customer goodwill, high moral of staff due to improve in working conditions; growth in good reputation of the organisation in its locality, better decision making and improvement in services to customers and the community (Schultheis and Sumner, 1995).

The cost assessment should be comprehensive and covers what is known as the Total Cost of Ownership (TCO) which includes the costs of purchasing the needed hardware, software, installations, operations, maintenance, and human resources new hiring and/or training. A very important consideration is the justification of the duration it will take for the system benefit to be realised. It is not uncommon for the benefits of IT improvements to take several years to appear. Costs, on the other hand, start to appear during the planning stage and as soon as time is spent on the project. This is why management may have to wait for a long time before appreciating the benefits from the system. Indeed, according to

Herzog (1991), management and staff must appreciate that in most cases it is unrealistic to predict overnight benefits. The process usually takes longer than originally expected.

- How to apply this guideline

The implementation of IT systems is costly and cannot be carried out on a trial-and-error basis and without planning. Feasibility studies based on cost-benefits assessment must be conducted to help organisations in their decisions to implement IT; and cost assessment techniques must be used in planning.

Giertz (2000) asserts that in order to predict the costs of IT systems, it is necessary to understand how IT cost is built up. In its simplest form, it can be reduced to two types of costs: development and standstill. Development costs are all costs for adding new functionality or overhauling existing functionality. It doesn't include the costs of changing business processes. Standstill costs are all costs associated with application support, maintenance and operation of the adopted systems. It includes the cost of licenses, infrastructure, system software, and help desk and operational staff.

To be able to predict present and future IT costs, organisations should understand the cost escalation and put processes in place to manage the cost. The purposes of the processes as Giertz (2000) points out are:

- To collect and maintain information about all major development under way within the organisation.
- To report to the top-management the predicted development, operations, applications support and maintenance costs for all major projects.
- To collect and maintain historical data regarding standstill costs generated by development in the organisation's specific environment.

Therefore, it makes sense to utilise some kind of cost assessment tools such as cost-benefit analysis or cost-effectiveness analysis when deciding on adopting new or updating existing systems. The problem, however, is that the benefits infrequently are directly measurable. Doherty and King (1998) found that undertaking cost-benefit analysis came first as the most important issue addressed by organisations when deciding on implementing an IT system.

Many studies were carried out to study the total cost of ownership in the past few years. For example Mathews (1999) stated that total cost assessment must cover all costs in deploying applications- from developing the application to network costs to the cost of running the data centre, including operation, power, and personnel. Remenyi, Money, Sharewood-smith and Irani (2000) state that the initial cost estimates that contribute towards determining the level of IT investment required is often governed by the performance characteristics set during the organisation's needs and requirements planning stage.

Hochstrasser (1992) as cited in Remenyi, e. al. points out that many organisations underestimate that total cost of their IT projects, with between 30-50% of costs occurring outside the official IT budget. In one large manufacturing company studied by Willcocks and Lester (1993), IT department user and training costs were 29% of total project cost but, hidden in other departmental, often non-IS related budgets. Ezingeard and Race (1996) offer further empirical evidence by suggesting that many manufacturing companies fail to account for the full complement of IT related costs. Doherty and King (1994) found that unrealistic estimates of project's costs were among the leading factors in systems failure.

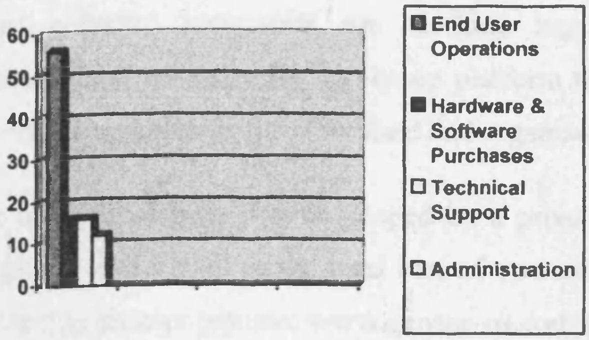
Farbey, land, and Targett (1993, 1995) have reported the increasing actions of project champions who are totally committed towards the success of the IT investment, and who often ignore the full cost implications of their IT investment. These project leaders often highlights the benefits and savings and don't do as much efforts to point out the hidden costs.

Mathews (1999) examined and compared the TCO of using two large centralised IT systems. He conducted his study to compare the variable costs of ownership between two cetralised environments: one using UNIX servers and the other using IBM mainframe. He found that the choice of different hardware platforms and processing technologies will influence the cost of IT investment. Microsoft has extensively researched the overall cost of owning and managing IT systems (desktop PCs) by organisations. It studied the day-to-day operation of PCs and the types of costs incurred during their use. Microsoft found that one factor that adds to the cost of owing PCs is the differing levels of operating versions, dynamic linked libraries, and applications software that need to be supported. Another factor is the reality that users are limited to only the machine at their desks.

However, the most significant component of the day-to-day cost of owning IT systems is related to labour costs, as helpdesk workers, technicians, and even end-users themselves spend time supporting individual desktops. In some cases, users accidentally delete system files as their hard desk fills up, or change system configuration settings, which in many cases delay work and cost time and money to reconfigure the system. Gartner Group found similar findings. Figure 9.4 shows a breakdown of PC total cost of ownership for any given year according to Gartner's study. The highest cost area is End User Operations- end users wasted time due to system failures as well as unproductive activities attributed to the extensibility of today's PC environment.

Figure 9.4 Desktop Total Cost of Ownership Breakdown

Source: Microsoft White Paper (www.microsoft.com/platform/info/tcotvostrat.html)



While the other three cost factors in Gartner's Group's model- capital costs, technical costs and administration, are hard, budgeted costs, most organisations do not typically account for end user costs in their cost determination process. Therefore, to provide maximum reductions in TCO, factors that influence both IT budgets and unbudgeted end user cost must be addressed. Garnters Group's study also shows that budgeted costs are largely incurred around " boundaries of change" – purchasing and deploying new hardware and software – and the labour costs of maintaining and supporting a desktop computer infrastructure.

From these discussions it becomes very clear that correct estimation of the costs of implementing IT systems will help the organisation to direct sufficient financial and human resources for the implementation; this clearly will increase the chance of system success and consequently the benefits will be realised.

Some companies such as Microsoft have developed strategies to help organisations reduce the cost of ownership of IT systems. Microsoft strategy is designed to deliver to customers a complete range of client solutions which address the core problems facing organisations today – how to reduce TCO and increase return on investment. This strategy is supported by two primary tools:

- The "Zero Administration" Initiative which gives organisations new levels of control and manageability over their Window-based environment systems by automating such tasks as operating system updates and application installation, and by providing tools for central administration and desktop system lock down.
- The Network PC which is a new technology that is designed to reduce the costs of business computing by optimising design for a particular class of " Task Oriented " users that do not require the flexibility and expandability of the traditional PC.

In addition, hardware and software companies are working together to create a comprehensive, open standard-based hardware and software platform that maximises the value of a distributed computing environment for individual and organisations.

A copy of cost-assessment template, which was developed by a private company in the USA to help organisations assess and list all of the total cost of ownership of a typical IT system is printed at the end of this chapter (source: www.genacc-us.com/tcotemp.htm).

9.5 INVOLVE SYSTEM USERS

Users' involvement is concerned with how and when users take part in the implementation of IT systems and the influence that users can/should exert over IT systems' development and implementation. The IS/IT literature (for example, Doherty and King, 1994; Wong and Tate, 1994) contains many claims that user involvement in IT systems development and implementation decisions is a necessary condition for the success of these systems. It has also been shown that user involvement in the implementation of IT systems can subsequently increase their sense of ownership and satisfaction with the adopted system.

Users' involvement in the implementation process is probably the most important organisational factor influencing the ultimate success or failure of a project (Doherty and King, 1994). Doherty and King point out that user involvement not only ensures that the project is based on requirements-pull rather than technology-push and, therefore, fully satisfies the user requirements, but also helps create a positive attitude towards the proposed system. As outlined by Ives and Olson 1984, user involvement is predicted:

(A) To improve system quality by: 1- providing a more accurate and complete assessment of user information requirements. 2- providing expertise about the organisation the system to support, expertise usually unavailable within the information system group. 3- avoiding development of unacceptable or unimportant features. 4-improving user understanding of the system.

(B) To increase user acceptance by: 1- developing realistic expectations about system capabilities. 2- providing an arena for bargaining and conflict resolution about design issues. 3- leading to system ownership by users. 4- decreasing user resistance to change. 5- committing users to the system.

The willingness of managers and users to spend the necessary time and effort to make effective use of IT systems will depend on their attitude toward the adopted systems and on the incentives and encouragement provided to them by the top-management.

As already noted fear of unknown complex system is one of the major obstacles to IT use and it can be overcome by involving users in the implementation process from its early stages. The IT user must be informed as to how the new job is going to be performed and the user must be educated about the tangible and intangible benefits for the organisation as well as for the individual user. Amoko-Gyampah and White (1993) found that it is important for managers to foster positive attitudes and open communications between the users and the other groups to assure users of the importance of their role in system development and implementation.

If users are not involved in the activities that take place during the implementation process, they may resist using the adopted systems or other problems may arise which may lead to unsuccessful experience with IT. AL-Mushayt (2000) found significant correlation between the adoption of users' participation as good practice and the overall success of IT systems development. It is also necessary to consider users attitudes and expectations when implementing IT systems, otherwise the system will be likely to fail from lack of use. Experience has shown that neglecting this key guideline can have disastrous results for the success of the project (see for example Herzog, 1991).

Abdul-Gader and AL-angari stated that " the results of a number of implementation studies suggested that implementation failure is more likely when users are not involved or hold unrealistic expectations about a system". Research in other areas, especially product evaluation and user satisfaction, also shows a connection between users' involvement and outcomes. Abdul-Gader and AL-anagri's work reports on a case study of users' involvement as an essential ingredient of project success or failure; their study clearly shows that users who were involved from the beginning of the implementation are more satisfied with the system and use it more than those who didn't participate.

Communication with users and their participation are primary approaches for reducing resistance to new systems (see Land, 1990). A field study was carried out by Moynihan (1990) in Ireland to learn more about the experiences of managers in introducing IT in organisations. One particular point of interest from this survey is the finding that managers from all three levels (Chief Executive Officers, the Senior Functional Manager and the IT Manager) wanted users to take more responsibility for systems projects and put more effort into specifying requirements. The main obstacle according to the managers is seen to be users' lack of the necessary creative and analytical skills, not disinterest. The problem here is the ability of the users to contribute and participate positively.

Despite the acknowledge difficulties (for example conflict of users' interests, lack of technical and business skills and lack of trust) that sometimes arise from involving the users a strong case can still be made to support user involvement on logical, ethical and rational grounds. Effective user involvement is essential to effective user sense of ownership of the resultant system.

User involvement in the implementation of IT systems is advocated for Saudi organisations in order both to increase participation and to ensure accurate specification of user requirements. It is clear from the discussion in this chapter and the earlier chapters that the more active the users are in determining their requirements, the more likely they are to accept the system and utilise it appropriately. The Saudi case is no exception, as the IS literature and the interviews conducted before and during the survey supported user involvement in the implementation of the adopted system.

In a particular case, some users in one Saudi organisation did not cooperate with the systems providers to the point that they even refused to use the system. In another organisation the business owner ignored user requirements and employed compulsion to ensure the users used a system which was inadequate for the users and had no documentation. The team approach and SSM, as mentioned earlier, will help to build an IT system that will be used.

- How to apply this guideline

As noted earlier the reasons for IT failure tends not to lie only in the technical side, though the technology is complex, nor in the economic side, though it is expensive to build these systems. The reasons for failure are more likely to be caused by the users. This problem is due to the lack of cooperation when the systems are being developed and resistance to change that occurs when IT is implemented.

Determining when and how much, or even if, user involvement is appropriate are questions that have received insufficient research attention. Ives and Olson (1984) and Jarvenpaa and Ives (1991) reviewed the link between user involvement and system success. Ives and Olson outlined the benefits that occur from effective involvement and identified three categories of users: top-managers, line-managers, and non-manager personnel.

IS researchers Mumford and Wier (1971) developed a method called the ETHICS (Effective Technical and Human Implementation of Computer-based Systems). This method advocates user involvement throughout the implementation process to produce a 'sociotechnical system' which will benefit both the business and the working environment of the users (Wong and Tate, 1994). It also views the interaction between technology and people as important for producing systems which are both technically efficient and lead to high job satisfaction. Figure 9.5 display the systematic steps that the implementation group should follow in order to produce and implement a 'best sociotechnical solution'.

ETHICS is a method to help a design group (made up of management, users and technical experts) diagnose and formulate the problem, set objectives and develop alternatives to improve job satisfaction, and experts develop technical alternatives to increase business efficiency. ETHICS consists of the following systematic steps (Wong and Tate, 1994):

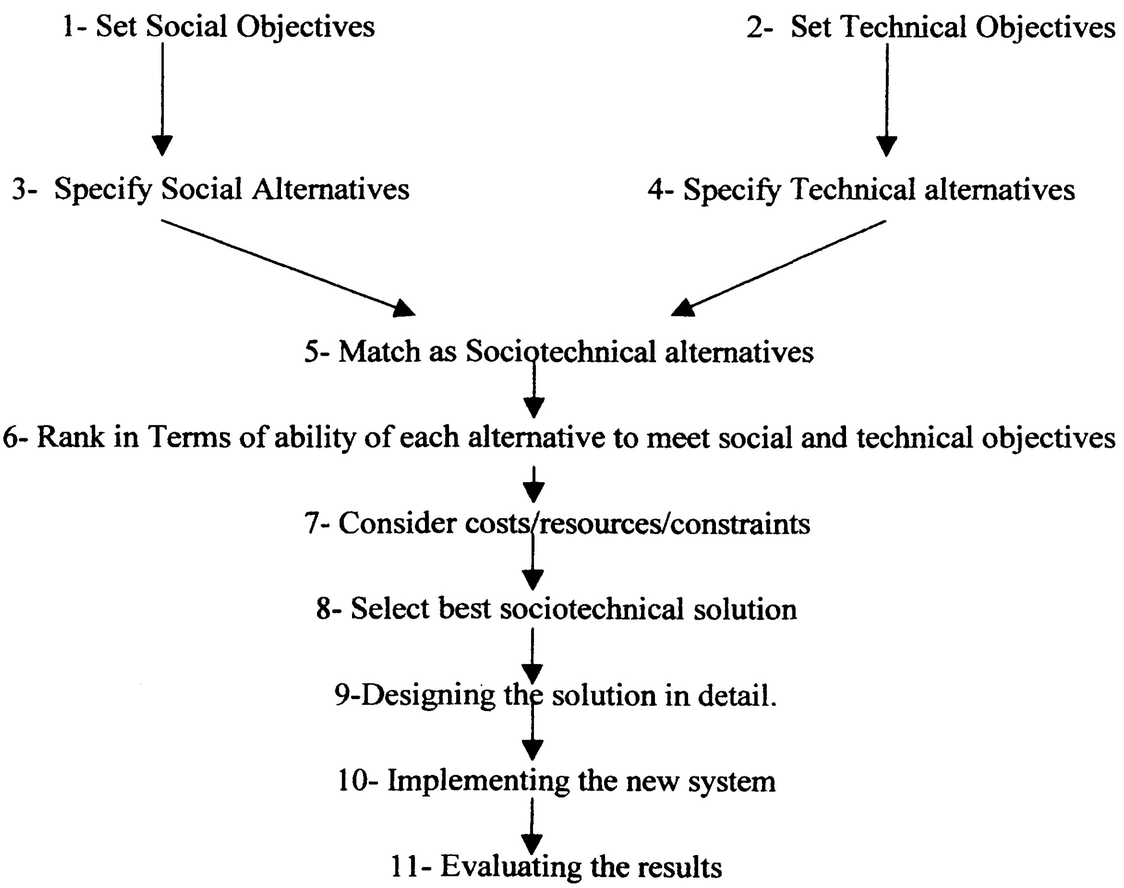
1) Diagnosing business and social needs and problems
2) Setting efficiency and social objectives.
3) Developing a number of alternative solutions.
4) Choosing the most satisfying solution.
5) Designing the solution in detail.
6) Implementing the new system.
7) Evaluating the results.

EITHICS was modified by Wong and Tate (1994) to include all the steps listed above because the original model depicts only steps (1) to (4) and does not specifically include steps (5) to (7). Furthermore, the original ETHICS's description and diagram specify only activities; it does not depict the outputs explicitly.

Figure 9.5 was prepared by the researcher to reflect Wong and Tate's modification and additions to the original ETHICS steps. The ETHICS can be used by organisations wishing to involve the users in the development and implementation of IT to reduce resistance and to increase satisfaction with the adopted systems and consequently improve the chances of having successful systems.

Figure 9.5

The ETHICS Method to Guide User Involvement in IT System Design and Implementation



Source: Wong and Tate (1994) page 53. (adapted by the researcher to reflect the Wong and Tate modification of the original ETHICS method).

9.6 PRACTICE IT PLANNING

Planning for the introduction of IT systems is very crucial because of the great impact these systems will have on the way the organisation does its business and on its human resources' efficiency and productivity. For example, many jobs may either be desskilled or require new skills acquisition after the introduction of IT.

In the 1990s, IT strategic planning systematically became a part of overall organisation strategy because well-planned use of IT is critical for success. This goal can be achieved only when strategic planning for IT use is integrated with the strategic plans of the organisation (Hoffman, 1994). Ashmore (1991) asserts that successful IT planning lie in the following six simple rules:

- Focus first on the business;
- Choose IT investment opportunities wisely;
- Understand the risk (and be prepared to manage it);
- Avoid unnecessary technological change;
- Plan ahead, and
- Secure total commitment.

Edwards, Ward and Bytheway (1991) point out the importance of treating IT planning as a continuing process integrated with business planning. These researchers also point out two important issues related to successful IT planning:

1- The business and IT people who will implement the strategy must own it and hence must be involved actively in its development and understand its implications.

2- The process must be manageable, both in terms of scope and duration and deliver valuable results throughout the process, not just at the end. There must be checkpoints where agreement is reached and management endorsement obtained, before continuing more detailed analysis and formulation.

Both of these imply that whatever approach is adopted all parties, including senior management, line management and IS/IT professionals, must be educated before the start as to what is involved, how it is to be achieved and what the expected products are to be.

Planning is a continuing process and deals with defining objectives and plans to satisfy the organisation's goals. These goals may be defined accurately or defined loosely as a range of alternative paths. At the strategic level it is necessary to have a framework for evaluating relationships between the solution(s), the internal framework of the organisation and its environment. Since the environment and these relationships are dynamic it requires the planning process to be likewise.

Barnatt (1994) points out that the implementation of IT systems will require more efforts and planning than necessary in the establishment of a new set of human-centred working practices because these systems tend to have a far lower flexibility tolerance than that possessed by most employees.

It is crucial to ensure compatibility between organisational needs and IT strategic planning. Ways of doing so differ in the different approaches to the strategic planning process. For example, IS researchers suggest that strategic planning is the process of deciding on goals of the organisation, and on policies that are to govern the acquisition, use and assimilation of these resources.

- How to apply this guideline?

Considerable time, efforts and money are spent in planning when an organisation decides to implement IT systems. Abdul-Gader and Alangari (1995) for that IT implementation is unsuccessful in organisations that lack IT planning. Therefore Saudi organisations must take the planning function more seriously and professionally.

In the course of IT planning a variety of methods have been developed to aid the IT planner in making the necessary planning decisions and to facilitate the construction of these systems. Earl (1987) developed a framework which seeks to indicate a preferred mode of IT planning according to the IT strategic context in which the organisation or business unit is placed (Figure 9.6).

Organisations in sectors where goods and services are delivered or underpinned by IT need to emphasize their technology requirements in IT strategic planning. Organisations that find their business strategies increasingly depend on IT for their implementation have to identify business needs first in their IT strategic planning. In organisations where IT may provide new strategic opportunities, a mix is required of business direction, user vision and enabling technological support.

Parker and Case (1993) advise organisations to follow specific steps in order to have successful IT systems. These steps include: planing the implementation, announcing the implementation to the users then obtaining the hardware and software resources, preparing the database, preparing the physical facilities, educating the participants and users and then switching to the new system (see Figure 9.7).

IS researchers such as Frenzel (1992) and Edwards, Ward and Bytheway (1991) recommend that during planning a team should be formed representing the organisation's top-management, IT specialists and user departments to develop an implementation plan whose purpose is to create an environment for success.

Figure 9.6 Modes of IT Strategic Planning

Strategic Context	Characteristic	IT strategic planning
IT is the means of delivering goods and services in the sector	Computer-based transaction system underpin business operations	Infrastructure-led
Business strategies increasingly depend on IT for their implementation	Business and functional strategies require a major automation, information, communications capability and are made possible by these technologies	Business-driven
IT potentially provides new strategic opportunities	Specific application or technologies are explained for developing business and changing way of managing	Mixed

Source: Michael J. Earl (1987) Information Systems Strategy Formulation in Boland and Hirschheim's Critical Issues in Information Systems Research.

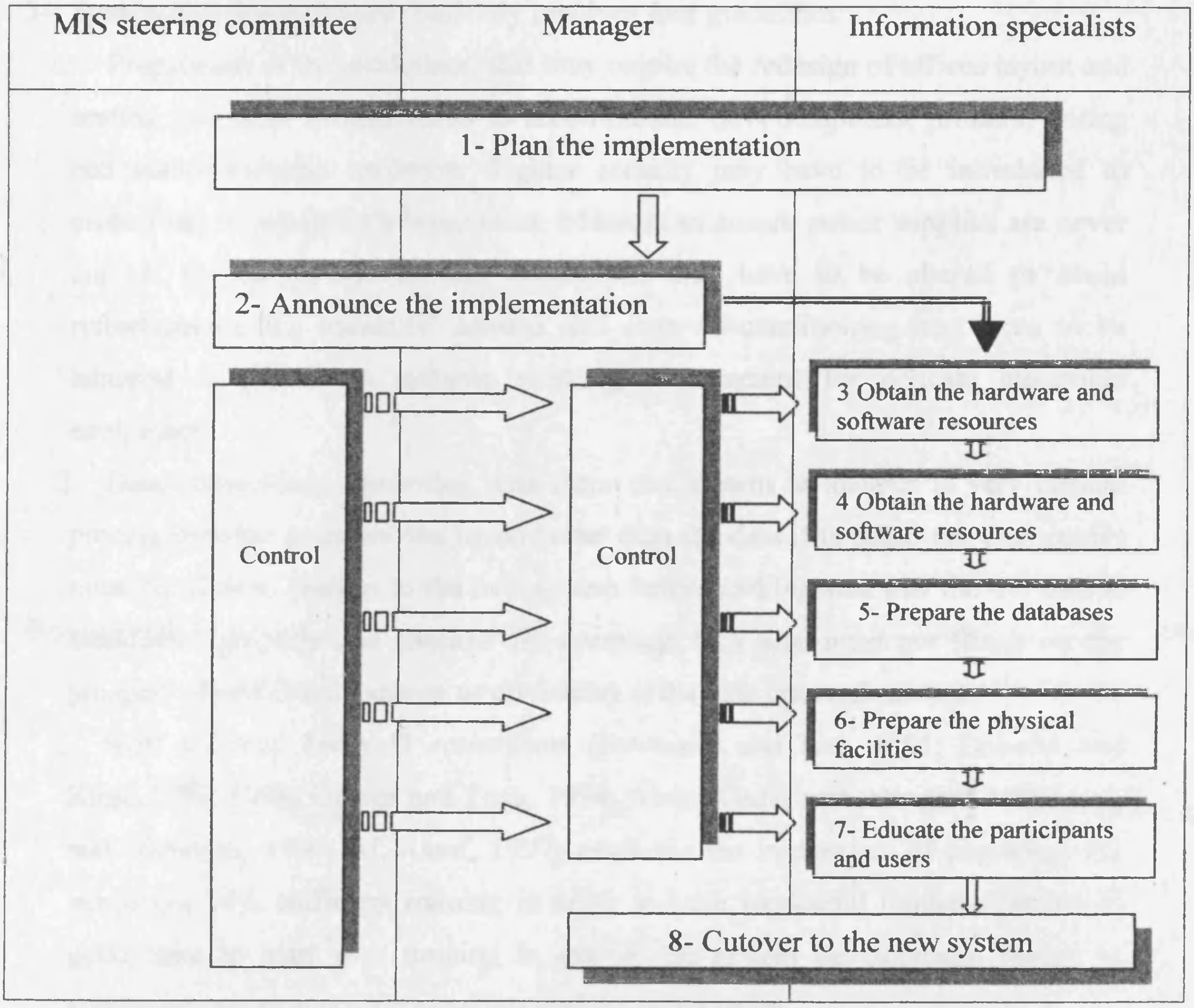
Barnatt (1994) asserts that planning to implement IT system should include conducting:

1-Feasibility study: this covers doing cost-benefit analysis to find out the total costs of implementing and running the system and to find out the tangible and intangible benefits that results from implementing the new system. The feasibility study must analyse all supporting functions presently being performed within the targeted areas (Frenzel, 1992). It should produce a report that is supposed to put the management in a position to make a decision on committing organisational resources to a new system. If a green light is given to proceed, a far more detailed, grass-root investigation will then take place. Doherty and King (1994) found that "incomplete feasibility studies" was one of the common factors in failed systems.

2-System study: this involves an analysis of the present system in order to ascertain new requirements and specifications. This enables the new system to capitalize on the merits of the old system and hopefully minimize its drawbacks.

3- **System design:** this is concerned with the process of planning how the new system will work and detail the methods to be used in fulfilling its specifications. Resulting from the system design will be a precise systems specification in terms of data structure, working practices, and the software and hardware necessary to run the new system. Martin and Powell (1992) directs the management and IT professionals to take in consideration the following factors when making systems design: information requirements and user preferences, performance and reliability requirements, the implementation timetable, maintenance characteristics, and even management style and organisational culture.

Figure 9.7
The Implementation Phase as Suggested by Parker and Case (1993)



4- **System development:** this involves the translation of a detailed new system specification into final, operation-ready software running on the appropriate hardware. During system development a lot of time and money is spent on program coding and compilation. Large projects involving computer networks and communications may also entail time-consuming and expensive hardware installation and frequent testing and error corrections.

Rainer and Watson (1995) asserts that IT systems should be developed in responses to a specific business need, such as a need to be more responsive to changing customer desires, to improve product quality, or to improve organisational communication. Systems that do not support business objectives are unlikely to succeed.

5- **System Implementation:** basically involves four guidelines:

- Preparation of the workplace: this may require the redesign of offices layout and seating and other arrangements to accommodate new computers, printers, wiring and communication hardware. Tighter security may have to be introduced to protect the organisation's investment. Measure to ensure power supplies are never cut off or interrupted, lighting installation may have to be altered to avoid reflections on the monitors' screens and even air-conditioning may have to be adjusted to provide a suitable working environment for delicate electronic equipment.
- Data conversion: converting data from one system to another is very critical process because a system can be no better than the data it is based on. Companies must not rush to convert to the new system before making sure that the old data is transferred properly and checked for accuracy; they also must not flinch on the prospect of additional expense or time delay at the data conversion stage.
- Staff training: Many IT researchers (Jarvenpaa and Ives, 1991; Doherty and King, 1994, 1998; Grover and Teng, 1994; Abdul-Gader and Alangari, 1995; Cox and Ghoneim; 1996; AL-Assaf, 1997) emphasis the importance of providing the workforce with sufficient training in order to have successful implementation. A good time to start user training is during the system development phase, so employees can gain off-job experience of the new system.
- Selecting a changeover strategy: During the changeover to the new system many unexpected problems may arise. Organisations must choose the safest changeover strategy otherwise they risk the failure of the adopted system. The strategy they choose should be based on the risk of failure versus the costs involved.

In general, as Barnatt points out the safer the strategy adopted the more it will cost. Barnatt list four main strategies for new system implementation:

- Direct cut-over: this is the most risky strategy because it if something goes wrong the organisation has no fall-back and must fix the problem to resume its business.
- Parellel running: This offers the safest means of switching between systems. Here both the old and the new systems are running side by side for a certain time to alleviate the risks should the new system fail. The new system is used as the real one and the old run as a back-up.
- Pilot running: here the system is run as a pilot in one department or division. Only part of the organisation is thus subjected to potential new system risks. Changes therefore can be enacted before the entire organisation engages in changeover to the new system which saves a lot of money and time delay.
- Phased conversion: using this strategy helps the organisation to build and install its systems in stages that do not affect the business. It occurs only when the particular modules of a new system can be isolated and run independent.

6-System review and maintenance: as soon as a new system installed and running, changes will be need, maintenance will be required, and expansion may be initiated. With rapid organisational growth and continual developments in IT and market demands and changes, some organisations will find it necessary to update, upgrade, expand and maintain their systems.

9.8 PROVIDE IT TRAINNING

Reference has been made earlier to the need for education and training. There are particular problems local to SA, such as, a shortage of trained personnel in the IT field, lack of managers trained in IT skills, and a general lack of IT literacy which are not, perhaps directly addressed by the guidelines. Therefore, for the guidelines to be successfully implemented in Saudi organisations these problems will need to be tackled first. For SA the application of the proposed guidelines should be preceded by a period of training and education to provided a sound foundation for the application of the guidelines in the Kingdom.

Training is an unavoidable cost, if organisation under-invest in training, the system as a whole is unlikely to function well until the users acquire sufficient experience, even if the mechanical elements of the system are well designed. In such circumstances, the organisation pays for the training in terms of overall system malfunction rather than directly.

Training may make the difference between system acceptance and failure. If people do not understand the new procedures they will be responsible for conducting, or if they are unsure about how the new system will affect their jobs, they will be more likely to sabotage its performance than to make it work (Schultheis and Sumner, 1995). Hence, it is important to construct the training programs for those who are or will be dealing with IT systems.

A study by Anderson Consulting reported that 87% of the 125 senior IT executives contacted from large American companies emphasised the importance of training and educating the workforce in the use of IT (Frenzel, 1992). Training should be given to all people likely to be associated with the new system (Alter 1992; Abdul-Gader and AL-angari, 1995; Schultheis and Sumner, 1995). According to Alter (1992) proper training not only informs the managers/users of the importance of their contribution but also indicates that they are an important integral part of the entire process. The success of IT systems depends on how well they perform their jobs. Training also means educating the managers/users of the overall purposes of the adopted systems such as:

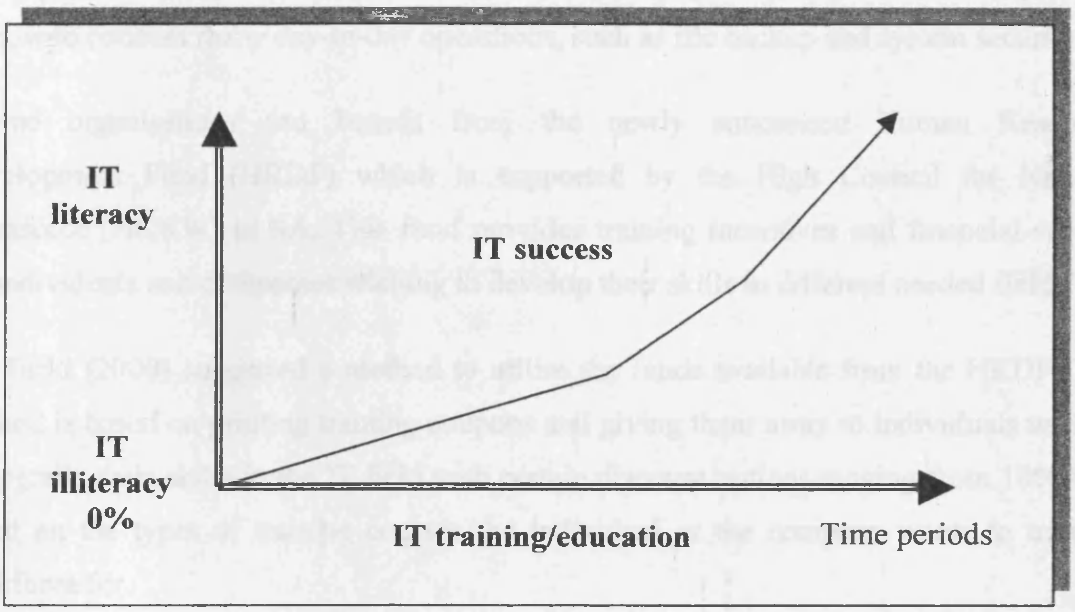
- what is it supposed to do?
- how is it done?
- is it required?
- who must carry it out?

A typical relationship between level of IT systems education/training and knowledge/literacy is shown in figure 9.8. This figure illustrates the expected relationship but is not backed up with any factual data derived from this investigation. It is intuitive representation of the rate of growth in IT literacy and success in relation to the length of time invested in giving sufficient IT training to the users in a given organisation. Note that in the present context education and training may be used interchangeably.

In general, studies (see for example, Bird, 1991; Abdul-Gader and AL-angari, 1995; Fitzgerald and Cater-Steel, 1995; Damon, 1999) report that training levels provided by the organisation are positively correlated with users' attitude towards the adopted systems and with the organisation's ability to retain its staff.

Figure 9.8

Expected Relationships between level of IT training/education and IT literacy/success



- How to apply this guideline?

To obtain user support, it would be necessary to provide training and education on the adopted systems by introducing related computer IT courses with hands-on exercises. Training as well as education is very important factor to increasing the level of IT literacy/knowledge and to provide users with IT appreciation and consequently success in using IT.

Because people are variable in terms of talent, training courses have to be designed according to the talents of the user. Training programs should have definite objectives, relevant, job-related materials, and effective measure of successful performance. Training technologies such as computer-based and virtual training can make it possible to train system users in multiple sites and at more convenient times, environments and places such as at home or at private office.

Managerial, supervisory, and clerical personnel all need training. Managers may need an orientation on how the system works, how its reports are to be used and interpreted, and how it will affect their business activities. Supervisory personnel need to understand the system, its functions, and its impact on the jobs of the people they supervise in various functional areas, such as order entry and accounts receivable. They should thoroughly be familiar with methods of data input, file maintenance, handling output, and troubleshooting. Clerical workers may be directly responsible for validating data input, maintaining files, and generating output documents. They need thorough training in these procedures. Procedures' manuals must be developed to give workers continuing guidance on how to conduct many day-to-day operations, such as file backup and system security.

Private organisations can benefit from the newly announced Human Resources Development Fund (HRDF) which is supported by the High Council for National Workforce (HCNW) in SA. This fund provides training incentives and financial support for individuals and companies wishing to develop their skills in different needed fields.

AL-Turki (2000) suggested a method to utilise the funds available from the HRDF. This method is based on printing training coupons and giving them away to individuals wishing to upgrade their skills in the IT field with certain discount options ranging from 10%-80% based on the types of training courses the individual or the company wants to train its workforce for.

Another suggestion is to incorporate training into daily job functions or special projects. Experienced staff should be a training resource inside the organisation; these experienced individuals and especially technicians can guide newer and less experienced staff through solving difficult problems. This interaction provides training while performing normal work responsibilities.

Another important aspect of training programs is that if the organisation is going to be training for an extended period of time, it should plan to hire temporary staff to cover for the personnel who go on training courses. This way the work and the service provided by the organisation is less affected.

The newly developed Web-based training (WBT) which stress cost-savings can be used to train users. Adopting WBT can be extremely convenient and time-effective. WBT saving are multifaceted. One area of value is time; rather than blocking out entire days for training that requires travel to a remote location, WBT allows training to take place in the office or at home, and at a user's own pace.

WBT courses generally cost far less than the same course taught in a classroom setting. With WBT installed on the organisation Web server or Intranet, it can provide a continuous stream of training material to users at their desktops. WBT eliminates the substantial additional costs of travel, lodging, and meals for trainees. WBT also enables users to train individually or in small groups, eliminating the need to hire or find temporary help when an entire department is absent for training.

Another important factor is the kind of support needed for the WBT courses. Many vendors offer add-on administration features- usually for an extra price. Registration, testing, and score tracking can all be handled via the WBT program. Users' support- via email, chat room, or telephone mentoring- is also available.

9.8 SECURE TOP-MANAGEMENT SUPPORT

This key guideline is directed to the level of top-management's commitment and support to IT implementation. Top-management commitment and support is a key conditionwhich needs to be satisfied to ensure IT success. Top-management has a key role to play in obtaining support, commitment and cooperation from their employees in the development and implementation of IT systems. The Massachusetts Institute of Technology (MIT) management program has emphasised the importance of top-management involvement in developing and implementing IT. Without the understanding, active support and motivation of the top-management, the potential for IT to improve corporate performance will never be realised (Hoffman, 1994).

Many studies dating back to the 1960s show the importance of top-management role for the introduction of IT into an organisation. Igbaria, Zinatelli, Cragg and Cavaye (1997), who studied the personal computing acceptance factors for 358 users spread in 203 small firms in New Zealand, found that management support was the greatest influence on IT effectiveness in small firms.

Top-managers must take the lead and involve themselves actively in all phases of the system's development and implementation, as their attitudes have a strong influence on the success or failure of IT systems. Managers must be prepared for this role and for the changes in their own decision-making methods that a new IT system is certain to bring.

Edwards, Ward and Bytheway (1991) point out that the commitment of top-managers and their acceptance of responsibility for the management of IT resources is the key to create success environment and capture the benefits of IT systems. Top-management support is important because it is the responsibility of top-management to define the responsibilities of the user and the information systems builder and to adjudicate on differences, to allocate resources and to assign priorities where resources are insufficient. Hence, effort is needed to ensure true commitment rather than lip-promises.

The literature demonstrates a relationship between success or failure and management commitment to IT implementation. Senior management's commitment serves two purposes: first it ensure an adequate flow of resource and enforce positive organisational attitudes towards the implementation of IT systems (Sauer, 1993). Slevin, Steiman and Boone (1991) found top-management support to be essential for the application of IT systems because of the substantial amount of key managers' time is required to develop and implement these systems. They also found that top-management support is essential throughout the implementation process. Rainer and Watson (1995) listed top-executives support among the most crucial for system development and implementation.

Studies also show that IT systems fail or incur major problems due to the lack of management commitment during the planning and design phases (see for example, AL-Assaf, 1997; Cragg and King, 1993; Doherty and King, 1994, Jawad, 1994; Irwin, 1999; AL-Sudairi, 2000).

Emery (1990) in the "Editor's Comments Page" of MIS Quarterly illustrated the importance of management support and commitment for successful MIS with an example of how two different financial services companies set about developing an important system to provide online support of their principal transaction processing activities. The implementation tools, methodology, progamming language and the technical team in both companies were very similar. The only thing that differed in any substantial way was the management of the two companies. One of the companies achieved an outstanding success while the other failed completely, abandoning the implementation after spending a great deal of effort and time. The examination of the two companies shows just how important management support is to a project's success. The top-management of the successful company played an extremely important role throughout the entire process and was responsible for the choice of hardware vendor and implementation tools.

- How to apply this guideline

To ensure top-managers' commitment, the following specific issues must be addressed:

□ Enrole the key managers in the IT task force committee. As already noted in the discussion of the determination of corporate needs it is recommended that an IT team/steering committee/task force to be established by the adopting organisation with management representatives from the various users departments. The establishment of this organisational structure represents a first step to gaining management commitment to IT implementation in Saudi organisations.

□ Establish a free flow of effective communication between the managers and the system builders. In part the structure already described will provide a framework for effective communication.

□ A programme of IT education and training must be provided for the managers. In SA, despite the huge investment in IT systems and resources in recent years as was shown in chapter three and chapter five, there remains a serious need for a better understanding of IT at all levels of management. In the focus group meetings and in the personal interviews conducted by the researcher, it was widely recognised that in SA today many users and managers at all levels of management have not received the sufficient or necessary education and training to overcome their fear of computing and to help them make the most of the available IT resources.

□ Assure all managers and users that the new IT system will be implemented to improve the efficiency and productivity of the organisation and decision making process but without threatening any manager's authority. Managers will make the decisions, the adopted system will provide them with information to assist them in their decision making.

□ The SSM approach will encourage commitment; and since the SSM stages require iteration and backtracking until a problem is fully defined management commitment will be tested throughout all stages. Without management commitment, the *'system solvers'* may recommend an inappropriate system and, in one sense, using SSM to determine corporate needs will underline to top-managers the importance of their commitment to the implementation.

Ensuring management commitment will provide the following benefits to the adopting organisations:

□ Management acceptance of responsibility for the management of information resources.

□ The implementation of an IT systems directed to meeting the real needs of managers.

Massachusetts Institute of Technology management program has presented the following guidelines for the role of top-management:

□ Set policy regarding where to introduce IT and how to establish priorities for competing projects,

- Develop understanding of the capabilities and limitation of IT,
- Establish reasonable goals for IT systems.
- Exhibit a strong commitment to the successful introduction of IT, and
- Communicate the organisational IT strategy to all employees.

9.9 SECURE TECHNICAL/VENDOR SUPPORT

Rapid changes in the IT field gave rise to the need of deployment of external knowledge and expertise in the design and implementation of projects for which organinsation either did not have their own internal knowledge, time, or even because the required changes could not be effectively implemented internally due to complicated political and cultural history (Adamson, 1994).

For any organisation, the decision to adopt IT is not necessarily a simple one, and will not be the same for every new technology that arises. Likewise, choosing an IT vendor to develop and/or install the required systems is difficult because every vendor which get contacted for bidding or quotation will try to convince the organisation that it should contract its IT needs with this particular vendor. If the organisation pick incompetent vendor it may endanger the success of the implementation process. This means that organisations need to be selective and should develop in-house capability for evaluating new IT products and vendors or alternatively consultants need to be employed.

The whole situation is made more difficult by vendors' behaviour especially those who seek to push their products as hard as possible regardless of their suitability and/or benefits to the prospective organisations and may indulge in just about any behaviour iorder to obtain new clients.

According to Rick Friedman- an IT consultant, the level of trust in the relationship between client and IT service providers (consultants, suppliers and vendors) will determine the success of the project, more so than the technical discipline involved. Moreover, clearly setting the expectation with the client on what should be accomplished, and helping clients to envision the desired result, will ensure a positive relationship. Most importantly, Freeman says, consultants should act in an advisory role, allow clients to make decisions, and help them reach their goals. Cragg and King (1993) found that a consultant strongly influenced the IT growth at some of the firms they investigated. IT experts helped these organistation explore different IT applications and evaluate their benefits to the business.

The lack of specialised knowledge is apparent in the area of IT systems in many organisation especially Small and Medium Establishments (SMEs). Based on the findings of studies conducted as part of the System Efficiency Audit Development (SEAD- see Adamson, 1994)[1] IT consultancy project it was found:

1. The great majority of small owner-managers get their information about IT systems from IT suppliers.
2. Having purchased the system, small owner-managers tended to be satisfied with it.
3. None of the samples executed a cost/benefit analysis of the effects of changing manual systems. Some commented that diagnostic tools developed for use in large companies are not appropriate for use in small companies.
4. Small companies are less complex in terms of organisational structure, their social, political and technological environment. SME's organisational objectives are necessarily different from those of large companies.
5. SMEs in-house expertise tends to lag behind the rapid development in the area of IT.
6. There are large variations in the level, breadth of knowledge and expertise of new technology in SMEs.
7. Communication effectively is one of the key factors if consultants are to carry out successfully IT projects.

- How to apply this guideline?

A great majority of organisations get their information about IT systems from IT suppliers (Adamson, 1994). They also like to deal with one vendor for all IT needs and requirements unless it is impossible due to some organisational and technical reasons Therefore, depending on how well established and experienced they are, vendors can make or break the implementation process.

Ivana Adamson (1994) suggest adopting the following steps when considering vendor or consultants support:

1. Both the decision makers and the system users need to establish the main reasons for changing the present system before contacting a vendor for system's quotation or support. This should be followed by:

[1]an IT consultancy project developed by the Human Science and Advanced Technology (HUSAT) at the University of Loughbourgh and the Business Information Systems Group (BISG) at the University of Wolverhampton) to improve the uptake of new technology in small and medium establishments.

I) preparing detailed statement of user requirements, and
II) establis hing evaluation criteria.

2. A list of prospective vendors should be compiled, and an invitation to tender prepared.
3. Communicative interaction with the prospective vendors should take a question/answer format.

The researcher advise the chambers of Commerce and Industry in SA to establish speciallised units whose purpose is to provide technical advice and assistance to local organisations when they decide to adopt IT systems. The Chambers' authorities should establish a program similar to the SEAD, which was discussed in the previous sections, to guide private organisations on issues related to IT specifications, requirements, design, development and implementation. Such a program should provide:

- Impartial assistance with the specification requirements for private organisations during the selection and adoption of IT systems.
- To train user-representatives from private organisations on how to specify organisational IT needs and requirements.
- To develop training material on different IT systems such as Internet and Intranet applications (such as Web design, data mining, E-mail and E-commerce).
- To establish an IT expert teams from local universities and IT companies.
- To develop an interactive user-friendly computerised expert system that can be accessed by private companies to guide them with their IT systems needs.

The Chambers should also develop a method to evaluate IT service providers such as consultants, suppliers and vendors as what has been done for construction and service contractors; the Chambers then should:

1- Compile a list of all competent IT service providers and distribute this list to their members organisations.
2- Develop a computer-based expert system to guide and answer the technical and managerial questions relating to IT implementation issues. This system should be made available and be accessed virtually from any computer connected to the computer centre of the concerned Chamber or through the Internet.

By applying these suggestions, the Chambers of Commerce and Industry will have a practical and positive influence on the implementation of IT systems in private organisations in SA.

9.10 ADAPT IT SYSTEMS TO FIT LOCAL CULTURE & BUSINESS REQUIREMENTS (ARABISATION).

The culture requirements within the society and the organisation such as the national language and traditions might constitute barriers when implementing IT systems. This is true because most of IT systems have been developed for industrialised nations; and therefore more culturally customised applications will be required depending on the needs of the host countries.

Overcoming cultural barriers might be the most challenging task. Certainly preparing a more highly educated, technically skilled workforce is one way to overcome these barriers. But as important as taking in consideration the factors we discussed in the previous sections, IT systems must be presented in the language of the host country to suit the official business and the needs of the adopting organisations.

Dahlawi (1989) conducted a study to investigate the influence of having Arabised systems on the rate of system use among Saudi engineers and found that system use increased when systems where in Arabic. Sindi (1991) found that managers in SA are more inclined to use computers if the applications are in Arabic. These findings support the researcher's hypothesis that organisations in SA are more likely to succeed in implementing IT systems if these systems where available in Arabic. We have discussed in chapter three the importance of Arabising IT system in order to encourage and help private organisations in SA to implement these systems.

Now, small and large computer companies have realised that Arabic solutions are integral components of products offer. According to Ali (1995) language support for IT systems has become the norm rather than the exception. The achievement that resulted in a variety of standards and implementation methods, though few have emerged as dominant.

- **How to apply this Guideline**

Information technology systems should not be limited to English speakers only. Using any system in the user's mother tongue is always more productive. Additionally there are many cases where the use of Arabic is required by law, for example, in SA any business communications to the government have to be in Arabic.

Mohammed Khatib, a senior technical consultant at Oracle Middle East Office in Dubai, wrote in an article on "Multilingual Application Development" that as the scope of computer usage in the Middle East expands, organisations are requesting that computerisation solutions include support for both Arabic and English languages. This places the burden upon application developers who are responsible for delivering systems with support for multilingual (mostly Arabic/Latin) operations. Developers turn on to the hardware and software vendor to request native support for bilingual features in their respective products.

Khatib goes on to state that the basic challenges faced by bilingual application developer involving. Arabic application is identifying the various issues of application Arabisation to enable developers, determine which user-requirements they can support, which Arabisation features are automatically supply the software development tools and what remaining features they will have to implement in the application. It is essential that Arabic support gets incorporated as an integral part of any IT system to be sold in SA.

A computer system may be divided into two main environments with respect to Arabisation text and graphics. Arabic language support solution for each is recommended. Three different styles of Arabisation. 7-bit, 8-bit and 16-bit. Each has its advantages and disadvantages. For example for organisations wishing to implement Geographic Information System (GIS), Arabic language support is an important requirement. The minimum capabilities can be summarised as follows (AL-Ali, 1995):

- Ability to annotate maps and drawings with Arabic text.
- Full Arabic language support for database, allowing population and manipulation of bilingual records.
- Ability to associate bilingual database records with graphical entities, for use in spatial and attribute queries.

The discussion in this section has shown that IT suppliers must take in consideration the cultural and business requirements of their target market. This will benefit both the client organisations and the suppliers.

9.11 TESTING MANAGEMENT REACTION TO THE PROPOSED GUIDELINES

The purpose of this section is to discuss the results of the survey of management and IT professionals reactions to the proposed guidelines. A second short questionnaire was distributed to those who participated in the Gulf Internet 2000 symposium which was held in the Chamber of Commerce and Industry in the Eastern province of SA between 18-22 of November 2000. In this symposium, the researcher presented a paper titled "Is Saudi Arabia Ready for E-Commerce?" in which the Saudi IT infrastructure was analysed to assess the readiness of Saudi organisations and their ability to implement E-Commerce (copy of the questionnaire is found in the Appendix section).

Thirty IT academics and professionals participated in the testing survey. They stated their reactions to the proposed guidelines. An organisation hierarchy (position types) was provided in this survey in order to allow participants to classify their management level. Of the respondents 55% classified themselves as top management, 15% as middle management and 30% as academics. None was from below these management levels. To simplify the statistical analysis procedure and for the purpose of the proposed implementation guidelines, it was decided again to classify the responses on a scale which measures respondents level of agreement. The scale used is 1= complete disagreement, 2= little agreement and finally, 3= strong agreement. Table 9.1 shows the level of agreement with the proposed guidelines.

Respondents were asked to indicate the extent to which each of the proposed key guideline should be used to implement IT systems. Table 9.1 shows that the majority of the respondents strongly agreed with the proposed guidelines.

The respondents were also asked to indicate the importance of each of the proposed guidelines on a scale from 1 to 8 by entering '1' as the first important. '2' as the second and so on. It was found in the study that the majority of the respondents (70%) indentified determining organisational IT needs as the first key guideline. Securing top-management support was identified as the second key guideline with a 55% response rate. Involving system users was placed third with a response rate of 52%, while providing IT training during implementation with a response rate of 49% was placed fourth. The rest of the guidelines with response rates of 45%, 43% 40% and 37% were ranked fifth, sixth, seventh and eighth respectively. Table 9.2 shows the importance preference of the proposed guidelines.

additions suggested by 3 (10%) of respondents were of no relevance to the proposed guidelines.

When the respondents were asked if they would like to replace (or delete) any of the proposed guidelines, twenty-five (83%) replied with "No" and five (17%) "do not know".

Table 9.3 Respondents' View on the Proposed Guidelines

Questions	Yes	NO	Do not know
Would you agree with the proposed guidelines for IT systems implementation ?	28 (93%)	0%	2 (7%)
Would you suggest any additions to the proposed guidelines?	3 (10%)	27 (90%)	0%
Would you replace or delete any of the proposed guidelines ?	0%	25 (83%)	5 (17%)

In the last question of this testing survey the respondents were given the opportunity to make further comments regarding IT implementation. Nine (30%) participants took this opportunity and emphysised the importance of having an adequate national IT infrastructure (telecommunication lines, laws and skilled workforce) to enable private organisations to implement certain types of IT systems such as Internet and Intranet applications (Electronic Data Interchange, Electronic Mail and Electronic Commerce).

9.12 How to Apply the guidelines?

The proposed implementation guidelines can be applied using systematic approach to increase the chances of success when implementing IT systems. The approach can be summerised in four main steps:

Step One: forming an implementation team compromising of key players, who will be actively involved in the designing, developing and or implementing the required systems, from the user departments and headed by a senior member of the management. Make sure the group of people involved has the right skills and knowledge to contribute positively and are able to manage, support, and use the system. Also, recognise that the team involved in IT implementation consists of individuals that need time and management to bring them together.

Step Two: defining success in a measurable form. This can be done by asking each key player to prioritise and operationalise the success measures identified in chapter five (Table 4.4) until the whole team reach an agreement.

Step Three: following and fulfilling the requirements of each of the eight guidelines defined and discussed in this chapter.

Step Four: ensuring that the organisation adopt the following implementation principles:

1- Clarifying the organisation's business/strategic aims. The management must make sure that business and strategic objectives of the organisation are defined and understood at all levels.

2- Integrating IT and business plans. IT planning can not be done in isolation. The role of IT is to support the business function; therefore, the strategies must be integrated. The strategies should be documented , and written in a style which is understandable at all levels.

3- Setting a realistic implementation scope. The scope of the implementation must be achievable within the constraints of the available resources and the expected benefits must be me.

4- Selecting suppliers carefully. The organisation must make sure that the supplier it selects can deliver what it promised. This can be done by analysing the technical capability, experience, human resources and reputation of the selected supplier. The organisation should also develop a good working relation with the supplier to ensure smooth transition through the stages of IT implementation.

5- Using proven technology. Whenever possible, the organisation should buy IT system which is both established and proven; in other words, the organisation should not buy untried and unproven technology.

6- Aiming for user-friendly systems. The best system designed to meet all user requirements is destined to be a failure if the users find it too complicated to use.

7- Thinking beyond the present requirements. The organisation should adopt systems which is capable of adapting to future requirements beyond its original specifications. This includes future expandability of hardware, enahancement of software or ability to integrate with other systems.

8- Buy rather than develop. Whenever possible, buy tested off-the-shelf software rather than develop something totally new.

9- Providing training and convincing the users to accept IT. Training people to use the system is a fundamental in ensuring that the implemented systems will be accepted and used. Also the users must be convinced of the value of the system and motivated to use it.

10- Being structured. The organisation should follow a recognised set of procedures (methodology) for managing the progress of the implementation process. However, the organisation should in the same time be flexible to accommodate for its internal and external circumstances and requirements.

9.13 SUMMARY

This chapter has been concerned with defining and presenting the key guidelines necessary for the successful implementation of IT systems. The key guidelines for successful implementation have been discussed in the light of their contribution and importance. In order to reap maximum advantage from the adoption of IT systems in an organisation it has been stressed that the determination of organisational needs is the first step to be taken. Having determined corporate needs, the next step is to do accurate cost assessment of IT implementation. This is very critical otherwise failure can happen easily when unexpected costs occur; this should include assessing the intangible and tangible benefits of the systems.

Management commitment and support has been found to be an important condition for the successful implementation of IT systems. Users' involvement and co-operation have a direct bearing on system success. It is important to involve the users in the implementation of the system they are going to use so as to generate a sense of system ownership.

The proposed guidelines address human, organisational and technical aspects, directly, in the determination of organisational needs, system costs, planning, vendor's support, management commitment, user involvement as well as providing them with sufficient training and adapting the technology to the local culture requirements.

Although all the eight key guidelines are regarded as essential to the successful implementation of IT systems in private organisations in SA, they can be easily used and can benefit any organisation in similar environments. It is suggested that the proposals set out in this chapter for the application of the guidelines to the Saudi private organisations will result in the implementation of IT systems which will satisfy the objectives set in chapter one and demonstrate the effectiveness of the guidelines in practice.

The next chapter presents an overall summary of the study, its implications, contributions and recommendations based on the findings of this research. Limitations of the study and suggestions for future researches are also presented in the following chapter.

بسم الله الرحمن الرحيم

CHAPTER TEN
SUMMARY OF THE MAIN FINDINGS, RECOMMENDATIONS AND CONCLUSION

The last chapter tested and presented the proposed implementation guidelines. This chapter summarises the major points about this study and its findings and explores some of their implications. The chapter is divided into seven sections. The first section presents an overview about the research. The second section summarises the major findings of the research. The third section highlights the research contribution. The fourth section discusses implications for the Saudi government and the private sector. The fifth section presents some suggestions for future research. The sixth section highlights some of the limitations of the research. The seventh section presents the conclusions.

10.1 OVERVIEW

The main issue of this study was to investigate the experience of Saudi private organisations with IT systems and identify and examine the factors that influence this experience. In particular, the objectives of the study were:

1- to identify and empirically investigate the main factors that entice Saudi private organisations to adopt IT systems;

2- to identify the characteristics which distinguish private organisations in SA which adopt IT systems and discuss how these characteristics facilitate or hinder the implementation process;

3- to identify the characteristics that distinguish top-managers of private organisations in SA and investigate how these characteristics facilitate or hinder the implementation process;

4- to document the general aspects of the Saudi IT environment;

5- to suggest implementation guidelines to help organisations wishing to implement IT systems;

6- to make a contribution to the management and information systems literature on the experience of private organisations with IT in the developing countries.

To accomplish the study objectives, a research methodology was used which included literature search, interviews, focus group meetings, mini-case studies and a questionnaire survey which was directed at top-managers at the sample organisations.

For the questionnaire survey, a sample of 500 organisations was drawn from the membership of the Chamber of Commerce and Industry in the Eastern Province of SA. Before collecting the data from participating organisations, the researcher, using the interview and the focus group method, sought the views of more than thirty IT experts and managers in SA on a number of IT implementation issues.

The study focused on identifying and investigating the eighteen (top-management, organisational and system) factors that are thought to influence the implementation of IT systems. After this review it was decided that the research should focus on the experience of private organisation with IT instead of having a mixed sample from both the public and private sectors. Analysis of the historical development and the environment of IT in Saudi Arabia were presented in chapters two and three. The Chamber of Commerce and Industry in the Eastern Province of SA assisted the researcher to reach the sample organisations. Envelopes and labels were prepared and questionnaires were sent by the postal services at the Chamber. Although the sample organisations were operating in the Eastern Province of SA, they represent local, national and international business establishments, which either have their headquarters or branches in other provinces and cities throughout the Kingdome.

The survey instrument sought a demographic profile (age, nationality, education level, IT knowledge level, and personal use of computers) of the top-management in the sample organisations. It also sought organisational characteristics (size, business type, ownership type, geographical scope, number of branches) and systems characteristics such as ease of use, usefulness, cost, and language used. 170 organisations responded to the survey making the response rate reach 34%, which is considered a very satisfactory response for a country like SA where such research tools are still uncommon. Detailed presentation of the questionnaire survey and data analysis were presented in chapters six, seven and eight.

10.2 MAIN RESEARCH FINDINGS

10.2.1 Findings in Relation to the Research Objectives

After analysing the data, several results were thoroughly and carefully discussed and considerable findings emerged. The findings from this study can help to develop strategies and guidelines for IT acquisition and successful implementation. The main findings will be presented in relation to the objectives of the research.

a. To identify and empirically investigate the main factors that entice Saudi private organisations to adopt IT systems

The responses from both the exploratory study and the questionnaire survey revealed that Saudi organisations adopt IT systems to achieve certain objectives; among them and ranked in importance as follows:

a. to replace manual operations;
b. to improve and facilitate decision-making;
c. to improve product and service quality;
d. to overcome competition.

These factors were cited as the greatest influence on Saudi private organisations to adopt IT systems. These organisations believe that adopting IT systems will improve internal and external communications, improve the quality of work they do, increase control over work, increase productivity and reduce costs of running the business.

Another aim of this study was to know why some Saudi organisation don't adopt IT systems. This study has revealed that those private organisations which didn't adopt IT systems attributed their decisions to:

a. Prohibitive costs and lack of financial resources;
b. Current ways of running business are sufficient;
c. Business is too small;
d. Lack of management awareness of IT potentials;
e. Lack of vendor support.

b. To identify the characteristics which distinguish private organisations in SA which adopt IT systems and discuss how these characteristics facilitate or hinder the implementation process

It was found from the survey that there are some characteristics that distinguish IT adopting organisations in SA. Among these the size of the organization, their ownership, geographical scope or the spread of organizations can be mentioned. For example, larger organisations tend to adopt IT systems more than smaller organisations. In this study all of the thirty-two large organisations were using IT systems while three of the sixty-two medium organisations didn't adopt IT systems and fifteen of the fifty-eight small organisations didn't. Also, large organisations computerised more departments and functions than medium and small ones. Majority of the adopting organisations were completely Saudi owned; however, joint-ventures were all computerised. Another characteristic tested in the survey is the geographical scope or spread of the organisation (local, national, or international). It was found that local organisations are less adopting of IT systems than national and international organisations.

c. To identify the characteristics that distinguish top-managers of Saudi private organisations which adopt IT systems and how these characteristics facilitate or hinder the implementation process.

After identifying the characteristics of the organization, this objective aimed at finding the characteristics of the managers and the impact of those characteristics on the IT implementation process. These characteristics are the age of the top managers, the nationality of the managers and their education.

The study revealed that organisations which are run by younger managers are more inclined to adopt IT systems. Twenty-three (13.5% of the sample) organisations run by managers aged 30 years or less adopted IT systems while only one (.8%) organisation didn't adopt in this category. In the over fifty years or older category we find that 7 out of 20 organisations run by managers of this age didn't adopt IT systems. This confirm the research hypothesis that the younger the owner or the manager running the business, the more likelihood that the organisation adopts IT systems.

In addition, it was found by empirical tests that organisations run by non-Saudi managers are using IT systems more than those run by Saudi managers. Sixteen out of the 114 organisations run by Saudi managers did not adopt IT systems while it was only two out of 54 organisations run by non-Saudi did not adopt IT systems. Also, it was found from the survey that the more educated the owner or the manager running the business, the more likely that the organisation use IT systems. IT knowledge of the owner or the manager also plays an important role in predicting whether the organisation is using or willing to adopt new IT systems. This was proven by performing the appropriate chi-squared tests to check these relationships. All these characteristics were tested in chapter eight.

d. To document the general aspects of the Saudi IT environment

The extensive readings from the literature during the first phase of this study helped the researcher to reach a clear understanding about IT environment in SA. Chapters two and three discussed the main issues and factors that influence the Saudi IT environment. Some of these factors include Arabisation of IT systems, availability of telecommunication infrastructure, education and training facilities and IT planning and policies. The following points highlight some of these issues.

The historical introduction of IT in Saudi Arabia

Computerisation in SA can be dated back to the 1940s, when the Oil Company Aramco installed the first computing machines in the Kingdom. Public organisations own about 80% of the mainframes and about 60% of the personal computers in the Kingdom. Saudi Arabia makes up about 40% of the IT market in the Middle East; which makes it to be the biggest IT market in this region. Until now about 1,500, 000 Personal Computers have been imported to SA and the total spending on IT (hardware, software, services and staff) in 1998 was about 14 billion Saudi Riyals (about 2.5 billion Sterling Pounds).

IT infrastructure

It is clear from the literature about IT in the Kingdom that the government did not develop a national IT strategy. This has affected IT development and growth in both the public and private sector. The national telecommunication infrastructure is affecting the ability of both the public and private sectors to broaden and update their use of IT systems to more advanced systems such as the Internet and Intranet. A national high-speed network is needed to help Saudi public and private organisations exchange data and implement new data transfer applications and transactions. Such a network would allow private organisations to implement systems such as EDI and E-commerce and accelerate access to their suppliers and clients inside and outside SA. It would also allow governmental organisations to implement virtual government applications.

Development of IT Skills

At least for the foreseeable future, Saudi colleges and universities are not able to cope with the increasing demand for IT professionals by the public and private sectors.

The majority of private IT training centres do not offer advanced and more specialised computer training courses like programming in Java and C/C++, HTML, software engineering, Intranet/Internet, web design, database and client server applications or IT management. Instead, most private training centres in SA provide introductory training courses that teach use of such basic applications as the Window-based packages Word, Access, Power-Point and Excel. The Saudi IT environment needs more personnel possessing the skills and knowledge to develop, install, run and maintain a wide range of IT systems.

Employees in the IT centres/departments in most Saudi public and private organisations do not have enough knowledge to allow them to design and develop systems to manage the huge volume of data which these organisations process. In most cases, these organisations turn to external IT experts and vendors for assistance. This is one of the main factors that push Saudi organisations into outsourcing most of their IT functions to IT vendors and suppliers.

Majority of the workforce employed by Saudi IT vendors are expatriates. This means that Saudi nationals, who work in the IT field, will always have less expertise because they do not have the opportunity to have the necessary training and experience from designing, developing and installing IT systems in SA.

e. To suggest implementation guidelines to help organisations wishing to implement IT systems

After studying various aspects of IT management and implementation in SA together with extensive literature review, the study aims to make a contribution to the management and information systems literature on the experience of private organisations with IT in the developing countries. Detailed suggested guidelines for the implementation of IT systems can be found under the section 10.2.2.2 (On the Application of the Proposed Implementation Guidelines) and more general and country specific recommendations can be found under the section 10.4.1 (Implications For The Saudi Government).

vi. To make a contribution to the management and information systems literature on the experience of private organizations with the developing countries

The presented findings of this study together with its recommendations are the main contribution of this study, and the details are presented in the following sections.

10.2.2 General Findings about Saudi IT Environment

10.2.2.1 Findings from the survey:

1. Organisations whose top-managers are young, educated and experienced in computers are more inclined to implement IT systems. Top-managers, possibly due to their age, are less inclined. In other words, the study noticed that organisations run by older mangers are also less likely to adopt IT systems.

2. There is no difference between organisations which are managed by Saudi or non-Saudi managers in their implementation of IT systems. This is in contrast to the research hypothesis which stated that private organisations in SA which are managed by non-Saudi managers are more likely to succeed in implementing IT systems. However, organisations which are managed by non-Saudi reported using more IT systems and applications than those managed by Saudi nationals.

3. Organisations in the manufacturing industry are using advanced IT systems (for example Computer-aided manufacturing and Computer-aided design) more than their counterparts in the service industry.

4. Private organisations in SA are more inclined to implement IT systems if they are of a large size, being national or international, and jointly owned (foreign and Saudi).

5. Arabised IT systems are used more in the service industry than in the manufacturing industry.

6. It appears that implementing IT systems in the Saudi private sector is driven by several motives. The main reasons which the participants stated for implementing IT systems in their organisations were:

- to replace manual operations;
- to improve and facilitate decision-making;
- to improve product and service quality;
- to overcome competition.

7. The success or failure of organisations in their implementation efforts is largely dependent on adopting certain management practices such as IT planning and providing training programs.

8. Top-management commitment and support is widely regarded as the key factor for successful implementation. The study found that most organisations reported positive role for the management in the implementation. Management support was the highest and the most frequently reported factor as a key to successful implementation. The results of this study also show that the more training is provided to users the higher the success level reported by Saudi organisations.

10. The study provides evidence to support the view that a small percentage of private organisations in SA use IT systems to reduce the total number of the staff.

11. The study suggests that adopting an IT strategy/plan is essential for implementation success.

12. The study also shows that private organisations face resistance but this resistance is not strong enough to cause major problems. Service organisations felt and reported resistance more than their counterparts in manufacturing. Lack of management support, lack of training, fear of losing job, lack of vendor support and language barriers are the main causes of resistance.

13. Forty two (24.7%) of the respondents reported that their organisations face some competition and one hundred thirteen (66.5%) reported extreme competition in their business environment. This has led many organisations to implement IT to overcome this competition.

10.2.2.2 Findings from testing the suggested implementation guidelines

A test was carried out to assess the suggested implementation guidelines. This procedure allowed the researcher to meet Saudi IT professionals and academics and seek their opinions on the eight key guidelines suggested in this study. Thirty individuals participated in this test. Twenty eight (93%) of them indicated a positive attitude towards the proposed guidelines.

Further, when given the opportunity to suggest any additional guideline to those proposed, twenty-seven (90%) of respondents made no additions but agreed with the researcher's proposals. The additions suggested by three (10%) of the respondents, were of no relevance to the proposed guidelines. When the participants were asked if they would like to replace (or delete) any of the proposed guidelines. Twenty-five (83%) replied with "No" and five (17%) "do not know".

In the last question of this testing survey the respondents were given the opportunity to make further comments regarding IT implementation. Nine (30%) participants took this opportunity and emphasised the importance of having an adequate national IT infrastructure (telecommunication lines, laws and a skilled workforce) to enable private organisations to implement certain types of IT systems such as the Internet and Intranet systems (Electronic Data Interchange, Electronic Mail and Electronic Commerce).

The majority when asked to evaluate the key guidelines in the order in which they considered them to be the most useful, ranked the key guidelines in the following order:

1- Determining the organisational IT needs;

2- Securing top-management support;

3- Assessing total costs of the implementation;

4- Securing vendor/technical support;

5- Providing IT training;

6- Practicing IT planning;

7- Involving system users;

8- Adapting IT systems to fit local culture (Arabisation and Islamisation).

The major findings of the survey support and reinforce the validity of the proposed guidelines, a view supported by the IT professionals and academics consulted. Several individuals stressed the fact that implementing strategic IT systems in SA is hindered by the inadequacy of the national IT infrastructure.

On the Application of the Proposed Implementation Guidelines

In chapter 9, the researcher proposed and tested the guidelines, which can be applied using a systematic approach to increase the chances of successful implementation. The approach can be summarised in four main steps:

Step One: forming an implementation team headed by a senior member of the management compromising key players, who will be actively involved in designing, developing and implementing the required systems. For the user departments, making those involved has the right skills and knowledge to contribute positively and are able to manage, support, and use the system. Also, recognising that the team involved in IT implementation consists of individuals who need time and management to bring them together.

Step Two: defining success in a measurable form. This can be done by asking each key player to prioritise and implement the success measures identified in chapter five (Table 5.4) until the whole team reaches an agreement.

Step Three: following and fulfilling the requirements of each of the eight guidelines defined and discussed in chapter 10.

Step Four: ensuring that the organisation adopts the following implementation principles:

1- Clarifying the organisation's business/strategic aims. The management must make sure that the business and strategic objectives of the organisation are defined and understood at all levels.

2- Integrating IT and business plans. IT planning cannot be done in isolation. The role of IT is to support the business function; therefore, strategies must be integrated.

The strategies should be documented, and written in a style that is understandable at all levels.

3- Setting a realistic implementation scope. The scope of the implementation must be achievable within the constraints of the available resources and the expected benefits must be measurable.

4- Selecting suppliers carefully. The organisation must make sure that the supplier it selects can deliver what it promised. This can be done by analysing the supplier's technical capability, experience, human resources and reputation. The organisation should also develop a good working relation with the supplier to ensure a smooth transition throughout the stages of IT implementation.

5- Using proven technology. Whenever possible, the organisation should buy an IT system which is both established and proven; in other words, the organisation should not buy untried and unproven technology.

6- Aiming for user-friendly systems. The best system designed to meet all user requirements is destined to be a failure if the users find it too complicated.

7- Thinking beyond the present requirements. The organisation should adopt systems, which are capable of adaption to future requirements beyond its original specifications. This includes future expandability of hardware, enhancement of software or ability to integrate with other systems.

8- Buying rather than developing. Whenever possible, buy tested off-the-shelf software rather than develop something totally new.

9- Providing training and convincing the users to accept IT. Training people to use the system is a fundamental in ensuring that the implemented system will be accepted and used. Also the users must be convinced of the value of the system and motivated to use it.

10- Being structured. The organisation should follow a recognised set of procedures (methodology) for managing the progress of the implementation process. However, the organisation should at the same time be flexible enough to accommodate for its internal and external circumstances and requirements.

General comments about the proposed implementation guidelines

The proposed guidelines have so far been tested in theory only and found to be acceptable among IT managers and professionals in SA. It is recommended that these guidelines now be tested in practice in different business sectors, and the results be fully evaluated to assess the effectiveness of the guidelines. It was also suggested that the proposed guidelines might be equally applicable in public and non-profit organisations. Therefore, a second practical test could involve the application of the guidelines in such organisations. Another possible application for the proposed guidelines could be as diagnostic tool. The suggestion is that the proposed guidelines would be employed to determine the cause of failure in a situation where IT has been implemented; but does not appear to be fully used effectively.

10.2.2.3 General Trends

Other aspects of the experience of Saudi private organisations with IT as revealed by this study are summarised as follow:

- Large Saudi private organisations tended to be more computerised than their small and medium counterparts;
- Implementation of IT systems was more apparent among organisations in the manufacturing industry than in their service counterparts in the service;
- Joint-venture organisations in Saudi Arabia tend to be all computerised compared to pure Saudi organisations;
- Although low vendor support was reported, many organisations have managed their implementation using their own IT expertise;
- Arabic systems are mostly used in small organisations;
- Many private organisations prefer their systems to be capable of handling both Arabic and English;
- Arabic was not a big factor in the implementation of IT systems in medium and large organisations;
- Having adopted IT, the organisation's top-management tends to be satisfied with it.

10.3 THE RESEARCH CONTRIBUTION

The present research is concerned with the experience of Saudi private organisations with IT systems and the factors that influence their decisions to implement these systems. The major contribution of this research is its documentation of the IT environment in SA, the illumination of Saudi private organisations' experience with IT systems and the provision of guidelines' consisting of a set of 8 key elements designed to facilitate the implementation of IT systems.

The study is of significance because it presents for the first time Saudi private organisations experience with IT systems. In addition, it provides implementation guidelines, which can be used by organisations to enhance the chance of succeeding in implementing IT systems. IT is supposed to help organisations in their efforts to overcome competition, expand business, reduce costs and increase profits. The study also shows organisations the importance of adopting modern management tools and practices in order to be efficient and successful in business and industry. This, in turn, will help the Saudi economy diversify, expand and to great new source of income for the Kingdom, which still depends on oil as the main income source.

Although the individual key elements are discussed in a variety of contexts in the literature, the proposed guidelines are unique in combining all the key elements together. Although the study has focused on the private organisation environment, there is no reason why the guidelines should not be applicable in other types of organisations whether public or non-profit. The proposed guidelines are independent of the Saudi environment and are expected to be equally effective in similar environments and in other countries.

The study also shows the key factors and issues that have to be dealt with to have successful implementation. This will guide the management in setting priorities and carrying out the most important steps when they decide to implement IT systems. Vendors can use the results of the study to understand how Saudi private organisations decide to implement IT and what procedures they follow. This will help them to know the best way to approach users and what sales and marketing strategies to use. The issues raised, discussed and tested in this research are supported by findings from previous work of AL-Turki and Tang (1998), AL-Shuaibi (1998), AL-Mushayt (2000) and AL-Sudairy (2000).

The study has far reaching importance for top-management in SA which is facing increased competition in the domestic and international marketplace, especially after the globalisation of businesses and services. As these organisations look for opportunities to expand their businesses and increase their market share, they need to have the tools and information, which will enable them to be more successful. The research supports the need for such information if Saudi private organisations wish to be more efficient, more productive and able to participate more aggressively in the regional and global business environments. It is for this reason that the researcher recommends the proposed implementation guidelines to help organisations to succeed in implementing IT systems.

The research has also shown the benefits of using both qualitative and quantitative approaches. Furthermore, dividing the influencing factors into three broad groups has been empirically examined and been proven to be a useful tool in the interpretation of the received data. This has allowed the researcher to paint a richer picture of the Saudi IT environment and the different factors that influence the implementation of IT in this environment.

The research has far reaching implications for the implementation of IT systems in developing countries. The knowledge and experience personally gained has enabled the researcher to contribute academically to several IT conferences, symposiums and workshops which were held in different countries (see the personal data about the researcher in the first page of the thesis).

Both the users and the providers of IT services can use the results of this study. The adopting organisations can use the proposed guidelines to prepare the work environment for the adoption of IT by training users and involving them throughout the implementation period. The proposed guidelines can also be used to gain top-management commitment and secure vendor support.

In addition, the researcher plans to make Arabic and English copies of the summary of the findings and recommendations of this study available to the chambers of commerce and industry throughout SA. Private organisations, both users and IT service providers, in SA can then have access to the copies and use these findings and recommendations to enhance the chance of success in implementing IT systems in the Saudi private business environment. The researcher also plans to establish an IT consultancy office to help organisations in implementing and managing systems.

10.4 IMPLICATIONS AND RECOMMENDATIONS

10.4.1 Implications for the Saudi Government

Based on the findings of the research, the IT situation in SA in general, and in the Saudi private sector in particular requires concentrated efforts and planning from both the government and the private sector in order to create a suitable IT environment. This is very important now that the business world is completely changing from full national business protectionism to full open-market globalisation. This is very clear because the Kingdom is preparing now to sign the World Trade Organisation Agreement. Saudi private organisations need to understand the impact that this will have on their businesses and for their future survival.

Therefore, the researcher recommends the Saudi government and the private sector to consider the following suggestions:

On IT infrastructure:

As the economy becomes more globalised and information based. The demand for information infrastructure will grow. This is necessary in order to play a full part in international business and trade. Availability of information professionals is the most important element in such infrastructure. It is possible that the lack of appropriately trained individuals will prove to be greater constraint on national economic development than deficiencies in technology. Therefore the government should:

- develop and implement the long-waited national IT plan to guide the development and implementation of modern and advanced IT systems. Such a plan will encourage and guide the use of modern management tools and technologies and allow Saudi private companies to participate more in the development and advancement of the national economy. It also will encourage and help Saudi companies to gain their proper position in the global market.

- expand the current or build new telecommunication systems that are capable of carrying all kind of data at higher speed than currently available. Building such an infrastructure would mean that Saudi private organisations could implement systems that require faster speed and wider bandwidth for example the Intranet and Internet systems and will help them catch up with their counterparts in other countries. Telecommunication facilities and services should be made available to all schools, hospitals, houses and public and private buildings. This will encourage Saudi organisations from all sectors and individuals to invent and use new ways of using the technology and in doing business.

- the government must develop both short-term and long-term policies and assistance programs to encourage both public and private organisations to adopt and utilise IT systems in their functions and businesses. This can be achieved by reducing bureaucracy, by implementing transparent procedures and by providing financial assistance and technical help.

- the government should terminate the monopoly on the telecommunication services provision in the Kingdom and allow more private companies to enter this big market. Nor should the government give monopoly rights to any single company in the field of IT to, for example, provide specialised services such as EDI and E-commerce. In most cases, monopoly is associated with higher prices, lower quality and slower services.

- the government should develop the necessary legislation, regulations and security measures to guide and protect company and personal information when using such IT applications as electronic transactions and making on-line payments.

On preparing skilled workforce (awareness, education and training)

Having IT systems themselves are not enough to utilize them in the utmost manner. The qualifications and skills of the users are as important as the systems. Therefore, the government should envisage these and work towards this end. The recommendations, thus, would be:

- ☐ government authorities such as the King Abdulaziz City for Science and Technology (KACST), the Chambers of Commerce and Industry all over SA and the different ministries and universities that interact directly with the private sector, should develop IT awareness programs. These programs can take the form of presentations, seminars and workshops to present modern management practices and technologies to increase awareness and know-how among Saudi private organisations.

- ☐ a specialised and competent committee of Saudi academics and IT professionals should be formed to re-evaluate the current IT educational and training curriculum in Saudi schools and universities to develop more practical programs to increase IT knowledge and experience among Saudi graduates. Also, computer labs should be set up and equipped with user-friendly software and multimedia learning packages. These labs must be made available to students to gain real experience instead of relying on theoretical teaching.

- ☐ the government, with the cooperation of the private sector, should establish more advanced and well-equipped IT training centres and colleges to produce highly skilled nation-wide workforce. This will help in the development and use of IT systems in the Saudi economy.

- ☐ the government should increase its current programs that encourage private organisations to employ, sponsor and train Saudi nationals in general, and in the IT field in particular. In this way a national skilled workforce can be created.

- ☐ the government should encourage and support the establishment of IT companies that produce IT related products and services. This is one way to diverse the economy and to create job opportunities for Saudi individuals and to increase the national income.

10.4.2 Implications for the Private Sector

The researcher advises the Chambers of Commerce and Industry in SA, which has the strongest link with the private sector, to establish specialised units whose purpose is to provide technical advice and assistance to local organisations when they consider adopting IT systems. The Chambers' authorities should establish a program to guide private organisations on issues related to IT specifications, requirements, design, development and implementation. Such a program should:

- provide impartial assistance on the specification requirements for private organisations during the selection and adoption of IT systems;
- train user-representatives from private organisations on how to specify organisational IT needs and requirements;
- develop training material on different IT systems such as the Internet and Intranet applications (such as Web design, data mining, E-mail and E-commerce);
- establish IT expert teams from local universities and IT companies;
- develop an interactive user-friendly computerised expert system that can be accessed by private companies to guide them with their IT systems needs.

The Chambers should also develop a method for evaluating IT service providers such as consultants, suppliers and vendors as has been done for construction and service contractors. The Chambers then should:

- compile a list of all competent IT service providers and distribute this list to their members organisations; and
- develop a computer-based expert system to guide and answer the technical and managerial questions relating to IT implementation issues. This system should be made available and be accessed virtually from any computer connected to the computer centre of the concerned Chamber or through the Internet.

Saudi private organisations must take the IT issue more seriously and adopt modern management thinking, practices and tools. They must realise the need for a reliable source of information on which they can depend when making decisions. They need to be more computer-oriented and to consider IT as a vehicle for future success. They should also hire more qualified staff to run their IT resources because less qualified personnel will not be able to run advanced IT systems, and may even damage the adopted systems and consequently cost organisation more than hiring qualified but more expensive staff. In other words, salary should not take precedence over qualifications.

Private organisations need to pay more attention to career development and training programs for their staff. IT staff should be trained properly and continuously to be able to provide a better services and secure environment that can protect organisation knowledge from any unauthorised intruders. Furthermore, such training will enable them to integrate new IT systems smoothly with other existing systems. Users should be trained not only how to use the adopted systems, but on how these systems can help them do their work faster, easier and better. This also will show that the employing organisation cares for its staff and wants to keep its skills up-to-date. This in turn will help in retaining the skilled workforce. By applying these suggestions, the Saudi authorities will exert a practical and positive influence on the implementation of IT systems in private organisations in SA.

10.5 LIMITATION OF RESEARCH

The scope of the study was restricted to Saudi private organisations in the Eastern Province of SA. The primary data was limited to responses from a questionnaire obtained from 170 private sector managers representing and giving information about their organisations' experience with IT implementation. The analysis is based on their interpretation of the questionnaire and responses thereto and the researcher's interpretation of their responses. The majority of managers in SA are reluctant to respond to questionnaires primarily due to cultural factors, which stress the undesirability of disclosing personal or organisation information to outsiders (AL-Qahtany, 1996). However, because the majority of these organisations agreed to participate in this research, it is believed that their top-managers responded to the questionnaire to the best of their ability in an honest and credible manner.

Additional information regarding the participating organisations, such as the precise sectors to which they belong, their size (based on financial income levels) or specific systems they use would have benefited the study. The potential benefit, however, is not viewed as being significant as this was not the main objective of the study. The data collected, both primary and secondary, provides a valuable resource on IT implementation experiences in the Saudi private sector which, until recently, had not been explored. This study contributes significantly to the theoretical and practical understanding of what is required, and what has to be done before or after making decisions to implement IT systems in order to be successful in utilising these systems.

Although the study has shown a correlation between the variables investigated, we cannot prove a cause and effect relationship because in real business, there are many other factors that might influence IT implementation and its success. Beside, a study of cause and effect needs time and there is a further need to control certain variables under study in one time and releasing them in other time to assess the real influence that is necessary to assess cause and effect relationships. A longitudinal study is needed to investigate such issues.

Moreover, it is important to note that this study is cross-sectional and descriptive in nature. Data in cross-sectional format is captured at a single point in time. This has inherent shortcomings which may be embedded in the data. Therefore, alternative methods of data collection, for example comprehensive case studies, instead of the mini-case studies done in this research, could be used in the future in order to obtain more detailed information. Comprehensive case studies could also be conducted to further validate the categorisation of organisational and managerial issues involved in IT implementation.

The research is further limited by the fact that the organisations which participated were from the three highest classes (premier, first and second) of the Chamber of Commerce and industry business membership. Therefore, the experience of the smaller and the less organised organisations in the other two classes (third and fourth) of membership is not reported here. This represents a good opportunity for future research to investigate other sectors and other types of organisations in the Saudi economy. The researcher was further limited by time and financial constraints, which prevented him from reaching a bigger sample size or organisations in other parts of SA. One other major limitation was the reliance on statistical frequencies and tests of significance in the data analysis.

10.6 RECOMMENDATION FOR FUTURE RESEARCH

The study concentrated on Saudi private organisations, the conclusions that can be drawn may not be generalised to public sector organisation, therefore, this is an area worth future investigation and comparison then can be made between private and public organisations. Future research could be also extended to include other private organisations in the Gulf states and from other Arab countries. The experiences of private organisations in many industries of the Saudi private sector have still not been investigated and this fact warrants further research in a systematic rigorous manner. This section discusses some of the opportunities, which remain for future research.

Owing to the difficulty of performing cross-sectional studies of IT application (due to the difficulty of controlling every aspect of the implementation process) it is recommended that longitudinal and case studies in different industries be conducted. These studies would involve the identification of organisations which are about to adopt IT systems for the first time, or are in the early phases of adopting of such systems. This would allow the identification and analysis of the factors that influence the decision to implement these systems in organisations which already are or are not using IT systems. Then, over time, subsequent strategic decisions could be identified and analysed to determine the effects of IT on these decisions. By studying implementation decisions over time within organisations, it may be possible to identify those factors which lead to the use or non-use of IT.

The proposed guidelines have so far been tested in theory only and found to be acceptable among IT managers and professionals in SA. It is recommended that the guidelines now be tested in practice in specific business sectors, and the results be fully evaluated to assess the effectiveness of the guidelines.

In addition, it is hoped that this work has a number of implications that can be applied to future research in the field of IT, for example:

1 cultural adaptation of IT systems (Arabisation and Islamisation[1]);
2 evaluating IT planning and training programs provided by or to the private sector in SA;
3 evaluating IT investment (for example size and types of technology) in the Saudi private and public sectors;
4 studying the impact of IT implementation on Saudi organisations' structure, strategy, people, management processes and other technologies used;
5 conducting a comparative study between public and private organisations in their use of IT systems;
6 conducting future research about the experience of specific sectors in the Saudi private and public economy;
7 comparing the patterns and extent of IT systems usage between Saudi and non-Saudi managers. This kind of work will present important and rich information about the type of and extent to which Saudi managers use IT systems in comparison to their foreign counterparts;
8 studying Saudi managerial attitudes towards the implementation of specific types of IT systems (for example E-mail and E-commerce);

[1]Islamisaiton is the adaptation or production of current or future systems, ideas and/or processes to fulfill Muslims' needs.

9 future research should involve the use of non-traditional research methods like using the Internet to reach the target sample and/or assessing the use of Internet systems by Saudi organisations.

Lastly, it is hoped that this attempt to investigate the Saudi private organisations' experiences with IT systems will stimulate further much needed research in this subject area. The need is particularly pressing in developing countries like SA, where the management in many different sectors still does not adopt modern management techniques and tools (Ministry of Finance, 1996). Avenues for further research in this promising area of inquiry have been mentioned in the hope that they will be pursued.

10.7 CONCLUSION

The objectives of this research, the main outcomes of the study, a comparison of the findings with the current literature on IT systems implementation and the presentation of the suggested implementation guidelines have been discussed in detail in the preceding chapters. There can be no doubt that succeeding in implementing IT systems is an important and major issue in the management of modern organisations. The experience of Saudi private organisations with IT has been explored and presented in this thesis to the best efforts and knowledge of the researcher.

The findings support the findings of other researchers in SA (Yavas and Younis, 1992; Abdul-Gader and AL-Angari, 1995; AL-Shoaibi, 1998; AL-Sudairy, 2000). Saudi organisations, whether they are managed by Saudi or non-Saudi managers, recognise the importance of implementing IT systems. However, they acknowledge that such decisions are not simple matter and that cost implications cannot be ignored. They also recognise the importance of a careful preparation of the workforce and the work environment in order to promote a successful implementation.

Concerning other factors, such as the characteristics of the top-managers, this study found some common ground with the literature but also highlighted significant differences concerning other factors. While, for example, the Arabic language was found in Sindi (1991) as unimportant to managers in SA when using IT systems; this study found that about 40% of the sample organisations prefer to use Arabised IT systems, and 47% prefer to use both Arabic and English systems, while 13% prefer to use English systems only.

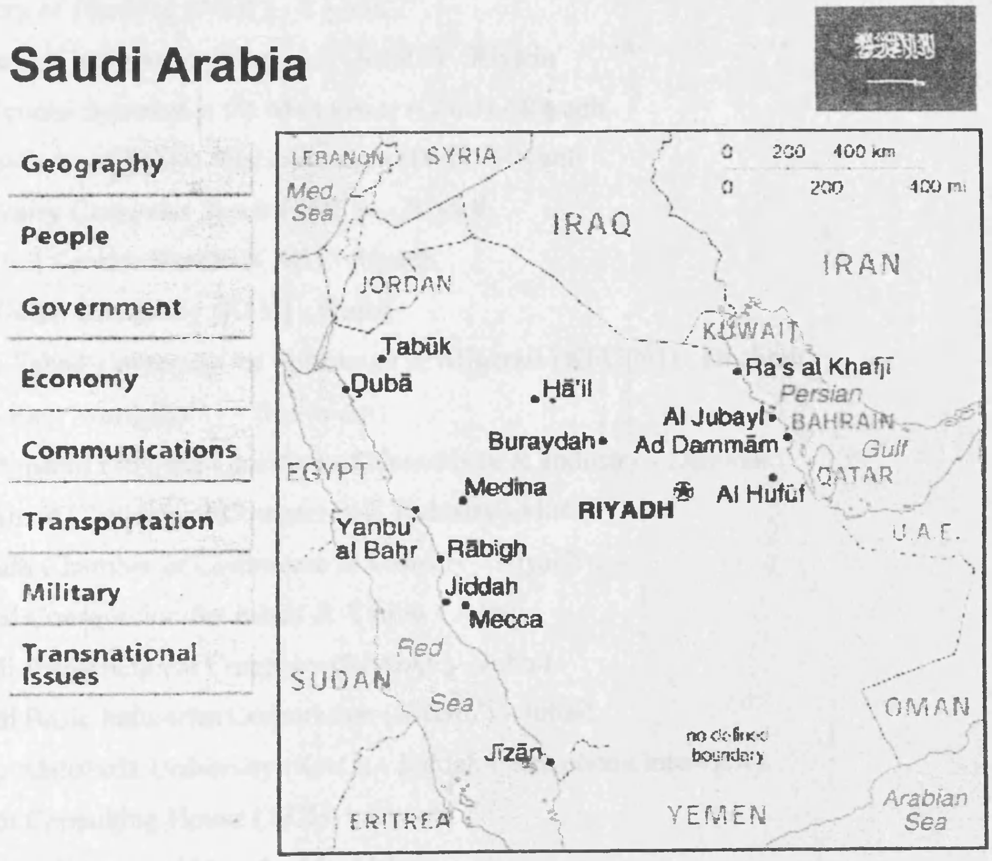
While the findings of this research have differed to some extent, and have contradicted some previous findings about the Saudi IT environment, it has to be pointed out that there can be little doubt regarding the validity of the findings of the present research. The sample base, while restricted to the Eastern Province of SA, encompassed local, national and international organisations which have headquarters or branches in this province. The response rate was 34% (170 valid questionnaires were received) from the sample of 500 top-managers coming from a very diverse personal backgrounds. As a consequence, the views of such a diverse group, with its wealth of management and IT experience, cannot be dismissed out of hand.

In evaluation of this research, it has been descriptive and exploratory rather than confirmatory. As a consequence many questions remain unanswered and many issues need further investigation. Nevertheless, it is believed that the research is useful for a number of reasons. As indicated above, Saudi organisations, despite the financial wealth available to them when compared to many organisations in the advanced countries, still lag behind in the use of advanced IT systems like the Internet and Intranet systems (E-mail and E-Commerce). This is what motivated the researcher to conduct this study to find out the causes of this failure; and this in itself a kind of academic contribution to the general knowledge and IT field.

The Appendix Section

Map of Saudi Arabia

Source: www.arab.net



Organisations Visited During The Exploratory Study In Saudi Arabia

1- King Saud University (KSU) - Riyadh

2- King Abdulaziz City for Science and Technology (KACST) - Riyadh

3- Ministry of Planning (MOP) - Riyadh

4- Ministry of Industry & Electricity (MOIE) - Riyadh

5- The General Secretariat for Manpower (GSM) - Riyadh

6- The Institute of Public Administration (IPA) - Riyadh

7- AL-Jeraisy Computer Services (JCS) - Riyadh

8- The Civil Service Bureau (CSB) - Riyadh

9- King Faisal University (KFU) - Hufof

10- King Fahad University for Petroleum & Minerals (KFUPM) - Dhahran

11- Dammam Municipality - Dammam

12- The Eastern Province Chamber of Commerce & Industry - Dammam

13- Al-Ahssa Chamber of Commerce & Industry - Hufof

14- Riyadh Chamber of Commerce & Industry - Riyadh

15- Royal Commission for Jubail & Yanbu - Jubail

16- Saudi Petrochemical Company (SADAF) - Jubail

17- Saudi Basic Industries Corporation (SABIC) - Jubail

18- King Abdulaziz University (KAU) - Jeddah (Telephone interview).

19- Saudi Consulting House (SCH) - Riyadh

20- The Saudi National Guard - AL-Ahassa.

21- Hussain AL-Ali Group of Establishments - AL-Ahassa.

22- AL-hussain & AL-Afaliq Company - AL-Ahassa.

23- AL-Kifah Group of Establishments - AL-Ahassa.

24- AL-Ahssa Industrial City Administration - AL-Ahassa.

25- Dammam's First Industrial City Administration - Dammam.

26- AL-Yasseen Agricultural Company - AL-Ahassa.

27- Naji Bu-Sroor Group of Establishments - AL-Ahassa.

28- Saudi Ceramic Company - AL-Ahassa.

29- Abdul-Aziz AL-Maghlouth Establishment - AL-Ahassa.

30- Nasser Bin Zaraa Establishment.

List Of IT Academics & Professionals Interviewed

Name	Organisation
Dr. Abdulla Abdul-Gader	Vice Rector-King Fahd University for Petroleum and Minerals (KFUPM)- Dhahran - Saudi Arabia (SA)
Dr. Abdulla AL-Mosa	Manager-King Abdulaziz City for Science & Technology (KACST)-Riyadh- SA
Dr. Ahmed AL-AbdulKader	Assistant Research Professor-King Abdulaziz City for Science & Technology -Riyadh- SA
Dr. Abdulla Salama	Dean-College of Computer and Information Sciences - King Saud University (KSU) - Riyadh - SA
Dr. Sami Al-Wakeel	Director of Information Centre-KSU
MR. Omar Ghawanny	Administration Director-KSU- Riyadh
Dr. Abdulrahman Oray'ni	President-Saudi Computer Society- Riyadh - SA
Dr. Mohammed Al-Tayyeb	Administrator-Technology Planning Div.-Saudi ARAMCO-Dhahran - SA
MR. Mishari Balghonaim	Director, Research Department - Riyadh Chamber of Commerce - SA
MR. Abdulla Al-Nuaim	Director- Information Centre - Riyadh Chamber of Commerce - SA
Mr. Ibrahim El-Gari	Manager-Industrial Information Dept-Saudi Consulting House - RIYADH-SA
Dr. Adel Al-Alwi	Dean- Business Administration College - U. of Bahrain-Manama - Bahrain
Mr. Abdulla Al-Qahtani	Manager - Information Department - Eastern Province Chamber of Commerce - Dammam - SA
Mr. Abdulaziz Al-Quaiz	Director - Information Centre - Public Administration Institute - RIYADH - SA
Mr. Fuad Hamdan	General Manager - Jeraisy Computer Services- RIYADH - SA
Dr. Ihsan Bu-Hulaiga	Director - Industrial Data Bank Dept. - Gulf Organisation For Industrial Consulting- Doha - Qatar
Mr. Abdul-Aziz Al-Ayaf	General Secretary - Al-Ahssa Chamber of Commerce & Industry
Dr. Mesaid Al-Hedaithy	Director General-Islamic Studies & Research Centre, Ministry of Islamic Affairs, Endowments, Da'wah and Guidance, Riyadh, SA
Mr. Abdullah AL-Gahtani	Director General - Royal Commission For Jubail and Yanbu, Jubail
Mr. Ali Aluqaily	Manager- Systems Development & Maintenance Dept., Royal Commission For Jubail and Yanbu, Jubail
Mr. Mohammed Al-Hamdan	Director- Information Centre - Saudi Specifications & Standards, Riyadh.

Appendix 2.2 (continued)
List Of IT Academics & Professionals Interviewed

Name	Organisation
Dr. Hussain Sindi	Assistant Professor - College of Computer Science & Engineering -King Abdul - Aziz University-Jeddah, SA
Mr. Abdul-Aziz Khunain	Administrative - Information Centre - Civil Service Bureau-Riyadh, SA.
Mr. Khalid AL-Gadhi	Director- Computer & Information Centre, Ministry of Industry & Electricity - Riyadh, SA
Dr. Mohammed AbuL-Hamayel	Director - Information Technology Centre - KFUPM - Dhahran, SA
Dr. Talal AL-Maghrabi	Assisstant Director - Information Technology Centre - KFUPM - Dhahran, SA
Dr. Alaa Deen M. Hafiz	Computer & Information Systems Dept. - College of Management Sciences & Planning - King Faisal U. Hufof
Mr. Abdullah AL-Nashwan	Director - Information Centre-King Faisal University - Hufof, SA
Dr. Ibrahim AL-Jabri	Assistant Professor - KFUPM, Dhahran, SA
Mr. AbdulAziz AL-Afaliq	Owner and Chief Executive Officer of AL-Hussain & AL-Afaliq group of Companies, AL-Ahssa.
Mr. Ibrahim AL-Afaliq	Manager- AL-Hussain & AL-Afaliq group of Companies, AL-Ahssa.
MR. Abdul-Fatah Mohammed	IT manager - AL-Hussain & AL-Afaliq group of Companies, AL-Ahssa.
Naji Bu-Sroor	Owner and Executive Manager - Naji Bu-Sroor group of establishments - AL-Ahssa
Turki AL-Turki	Assisstant Manager - Saudi France Bank, Hufof
Ali AL-Haji	Administrator - King Faisal University, Hufof
Mr. Ziyad Mugharbel	Manager - Computer & Information Centre, Dammam Municipality
Wael Al-Dulaijan	GIS project manager, Dammam Municipality
Fayez AL-Sennan	Manager- Information Technology Centre- Saudi Petrochemical Company (SADAF), Jubail
Saeed Tunbell	Senior Systems Analyst- Information Technology Centre- Saudi Petrochemical Company, Jubail
Emad AL-Muaibed	Senior Systems Analyst- AL-Jubail Petrochemical Company (Kemya), Jubail
Mahbub Kamal	Systems Analyst II - Eastern Petrochemical Company (Sharq), Jubail
AbdulKareem AL-Heji	Systems Analyst II - Eastern Petrochemical Company (Sharq), Jubail
Ibrahim AL-Thabit	Manager- Dammam First Industrial City, Dammam
Mr. Abdul-Ra'auf AL-Ismail	Bank Manger- Saudi American Bank, Hufof

A picture was taken during a presentation delivered by the researcher for the research purpose in AL-Ahsssa Chamber of Commerce and Industry

A translated transcription of part of an interview

A short translation of one part of an interview conducted with an IT manager in a medium size private organization is printed at the end. This translated transcription was the result of an interview with an IT manager in a medium size private organisation. It covers questions and answers related to IT strategy and the availability of IT plan and their importance to the success of implementation.

The following is a short transcription (translated from Arabic) of a question directed by the researcher to one of the interviewees regarding the availability and the importance of having an IT implementation strategy.

Issue- regarding the availability of an IT implementation strategy

(**R**= Researcher, ***I***= Interviewee):

R: Does your organisation have an IT implementation strategy or guidelines?

I: Yes

R: Is this strategy or guidelines in written form?

I: Yes

R: Can you please elaborate on the development of your organisation's IT strategy/guidelines such as its importance and who developed it and who is in charge of implementing this strategy.

I: It was one of the first functions carried out after creating an IT department in our organisation. The management was aware of the importance of having a plan to define the organisation's needs and requirements from IT systems and how these systems can be used to improve the management of our business. The proposed IT strategy was developed by a team representing the IT department and the other departments in the organisation. We had one representative from each of the departments, which will be using these systems or will be affected by the computerisation of our functions.

This team was given the responsibility of developing a comprehensive IT strategy covering:

- *studying the organisation's needs and requirements from IT systems.*
- *developing implementation stages so as not to disturb the business.*
- *developing different choices of hardware that suit our business and functions.*
- *developing different choices of software that suit our business and functions.*
- *developing a list of qualified IT vendors with information on their specialties.*

- *proposing training programs for the management and staff.*
- *developing a list of staff who will be trained to use the systems.*
- *proposing employment suggestions for more IT skilled staff if needed.*
- *proposing suggestions about whether to contract IT vendors to maintain and upgrade the adopted systems in the future or develop our own IT expertise.*

The proposed strategy was developed to be flexible so as to accommodate any necessary changes that take place inside the organisation. It took the team about two months to develop this strategy after which it was presented to the management to approve it or suggest any changes. The manugement was happy with the proposed IT plan and ordered me (the newly appointed IT manager) to start contacting IT companies for their proposals and bids for computerising our business.

R: I feel you are happy with your organisation's IT strategy, is this correct?

I: sure because as an IT professional I feel it is very important to have some kind of guidelines or plan on how to do your job. This way everything becomes clear and doing the job become very easy especially for IT people inside the organisation who are considered as IT service providers for the other departments in the organisation. Any thing goes wrong we will be blamed if we don't do our job correct. Having an IT plan helps us greatly to accomplish successful IT implementation and help us greatly to get the most out of the adopted systems. In addition having an IT plan or strategy reduces the risk of failure. Through this plan we started our computerisation efforts by studying our organisation's needs and requirements from IT systems and this in itself made our job easier as IT professionals.

الغرفة التجارية الصناعية بالأحساء

AL-AHSA CHAMBER OF COMMERCE & INDUSTRY

دعـــــــوة

سعادة المدير العام   المحترم

السلام عليكم ورحمه الله وبركاته

يسرنا دعوتكم لحضور محاضرة

أهميه أستخدام الحاسب الآلي في المنشآت الخاصه

والتي يلقيها الاستاذ صالح محمد التركي في تمام الساعه السادسه والنصف من مساء يوم الأحد ٢٠ جمادالأولى ١٤١٨هـ الموافق ٢١ سبتمبر ١٩٩٧م بمبنى الغرفة .

أملين تنبيه الدعوة وفي حالـه أرتبـاطكم المسبق فأننا نرحب بمسؤل الحاسب الآلي بمنشئتكم .

وتقبلوا خالص التحيه والتقدير

الامين العام

عبدالعزيز خالد العياف

الاحساء - شارع الغرفة التجارية الصناعية - ص.ب ١٥١٩ - الهفوف ٣١٩٨٢ - المملكة العربية السعودية - ت ٥٨٥٠٦٥٦ (٠٣) - ٥٨٢٠٤٥٨ - فاكس ٥٨٧٥٢٧٤
Al-Ahsa - Chamber of Commerce St. - P.O.Box 1519 - Al-Hofuf 31982 - Saudi Arabia - Tel (03)5850656 - 5820458 - Fax 5875274

is44

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة الصناعة والكهرباء
المدينة الصناعية الأولى بالدمام

الرقم ٦٨/ص خ
التاريخ ٤/٦/١٤١٨هـ
المرفقات ....

الأخوة مدراء المصانع بالمدينة الصناعية الأولى بالدمام المحترمين

السلام عليكم ورحمة الله وبركاته

يسر إدارة المدينة الصناعية دعوة مسئول الحاسب الآلي لديكم لحضور حلقة نقاش بعنوان « **أهمية استخدام الحاسب الآلي في المصانع السعودية والعوامل المؤثرة في نجاح أستخدامه** » والتي يعدها الاستاذ/ صالح محمد التركي المحاضر بكلية العلوم الإدارية والتخطيط بجامعة الملك فيصل وذلك في يوم الاربعاء القادم ١٤١٨/٦/٧هـ والموافق ١٩٩٧/١٠/٨م في تمام الساعة العاشرة صباحاً بمبنى إدارة المدينة الصناعية.

وتقبلوا خالص تحياتي،،،

مدير المدينة الصناعية الأولى بالدمام

إبراهيم بن عثمان الثابت

المسعود

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة الصناعة والكهرباء
المدينة الصناعية الأولى بالدمام

الرقم ٦٨٨/٤٠٤٢
التاريخ ٦/٦/١٤١٨هـ
المرفقات ....

سعادة الإستاذ/ صالح محمد التركي المحترم

كلية العلوم الادارية والتخطيط - جامعة الملك فيصل بالاحساء

السلام عليكم ورحمة الله وبركاته

إشارة الى خطابكم رقم (بدون) بتاريخ ١٩٩٧/٩/٢٤م بخصوص رغبتكم في الالتقاء مع بعض مدراء ومسؤولي المصانع بالمدينة الصناعية الأولى بالدمام.

نفيدكم بأنه قد تم توجية الدعوة لمجموعة من المصانع وعددها (٦٤) مصنعاً لحضور حلقة النقاش حول « **أهمية استخدام الحاسب الآلي في المصانع السعودية والعوامل المؤثرة في نجاح استخدامه** » وذلك في الساعة العاشرة من صباحاً من يوم الأربعاء بتاريخ ١٤١٨/٦/٧هـ.

مع تمنياتنا لكم بالتوفيق والنجاح.

وتقبلوا خالص تحياتي،،،

مدير المدينة الصناعية الأولى بالدمام

إبراهيم بن عثمان الثابت

المسعود

العنوان : وزارة الصناعة والكهرباء ، الملز ، طريق عمر بن الخطاب ، شمال محطة القطار - الرياض - الرمز البريدي ١١١٢٧ - هاتف ٤٧٧٦٦٦٦

الرقم: ١٢/٥١/٧٧٦

التاريخ: ٢٠ / ٢ / ١٤١٨هـ

المرفقات: ١ استبيانه

سعادة / المدير العام ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ ‏ المحترم

السلام عليكم ورحمة الله وبركاته

يقوم الباحث صالح التركي من كلية العلوم الإدارية والتخطيط بجامعة الملك فيصل بعمل دراسة ميدانية عن ((*مدي استخدام أنظمة تقنية المعلومات الحاسب الآلي وأنظمة المعلومات في مؤسسات وشركات القطاع الخاص بالمملكة :عوامل النجاح والمعوقات*))كأحد متطلبات دراسة الدكتوراه وقد تقدم الباحث صالح التركي للغرفة يطلب المساعدة في توزيع الاستبانه المرفقة والتي تشتمل على عدد من الاسئله التي نأمل تعبئتها بأي من اللغتين العربيـة أو الإنجليزيـة ومـن ثم إرسالها له مباشرة علي عنوانه المرفق في مقدمة الاستبانه أو الظرف المرفق .

نأمل التعاون في تعبئه الاستبانه.

شاكرين لكم تعاونكم سلفا ،،،،،

الأمين العام

حمدان السريحي

بسم الله الرحمن الرحيم

KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
KING FAISAL UNIVERSITY

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك فيصل

الرقم : .... التاريخ : .... المرفقات : ....

الموضوع : ....

تعـــــــريف

تشهد عمادة الدراسات العليا بجامعة الملك فيصل بأن السيد/صالح محمــــــد التركي يعمل محاضرا بكلية العلوم الادارية والتخطيط بالجامعة وهو مبتعـث حاليا لدراسة الدكتوراه في نظم المعلومات والحاسب الالي ، وحيث أنه يحتـاج الى بعض المعلومات التي تخص البحث والذي يقوم به في المملكة العربيـــة السعودية .

لذا نأمل منكم التعاون معه وتزويده بالمعلومات التي يحتاجها .

والله الموفـق ،،،

عميد الدراسات العليــا

د. فهد بن ناصر الملحم

٣٢/٢٥٢

عمادة الدراسات العليا
جامعة الملك فيصل
DEANSHIP OF GRADUATE STUDIES

الدمام ✉ ١٩٨٢ — تلكس ٨٧١٣٠٢ فيصل اس جي — ☎ ٨٥٧٧٠٠٠ | الاحساء ✉ ٤٠٠ — تلكس ٨٦١٠٢٩ فيصل اس جي — ☎ ٥٨٠٠٠٠٠

Dammam ✉ 1982 Telex 870020 Faisal S. J. ☎ 8577000 | Al-Ahsa ✉ 400 Telex 861028 Faisal S. J. ☎ 5800000

KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
KING FAISAL UNIVERSITY

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك فيصل

الرقم : .... التاريخ : 8 November 1997 .... المرفقات : ....

His Excellency:
The Chief Executive Officer / The General Manager, or
The Director/Officer of the IT Centre/Department at:______________________

I am currently conducting Ph. D. study to asses the rate of Information Technology (IT) systems' adoption and the degree of their implementation success in private business organisations in Saudi Arabia. The other aim of the objective of this study is to identify and investigate the factors that motivate or inhibit these organisations during the implementation of these systems.

Information Technology systems are referred to in this study to include any information systems that involve the use of computer and telecommunication systems which organisations use to generate, access, process and disseminate information for their business and organisational functions.

This questionnaire was sent to you because of the importance of your participation and input to this research; your participation will provide valuable information from which management in the Saudi private sector can gain more knowledge about how to make the implementation of IT systems more successful in the Saudi private business environment.

This questionnaire consists of 50 questions and will take approximately 45 minutes to complete. Therefore I appreciate the time you will give to complete it. Furthermore, if you have any comment or like to discuses any issue related to the subject matter in this research, please do not hesitate to contact me. I assure you that information supplied in this questionnaire will be kept confidential and will be used for the academic and scientific research purpose only.

General Instructions

1- Questionnaire is to be filled by the Chief executive officer/general manager/president of your organisation or the director/manager of the information technology centre/department if available within your organisation.

2- Tick the appropriate boxes or use (√) to mark your answers to all of the questions in this questionnaire.

3- There are two versions of this questionnaire (Arabic and English), please fill the one you prefer and feel more comfortable with.

4- You are kindly requested to return the completed questionnaire promptly to the researcher's address in Saudi Arabia which is listed below before March 1, 1998.

Researcher: Saleh M. AL-Turki
King Faisal University - Saudi Arabia
P.O Box 1760 Hufof 31982
Tel. Fax 03-5800215 Email SMA9@LE.AC.UK

Research supervisor: Dr. Nelson K. Tang
University of Leicester-Management Centre
Leicester, LE1 7RH, United Kingdom
TeL.44-116-252-5634 Email NKHT1@LE.AC.UK

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جامعة الملك فيصل

الرقم : .... التاريخ : .... المرفقات : ....

٨ نوفمبر ١٩٩٧

سعادة: رئيس مجلس إدارة / مدير عام / مدير أو مسؤول خدمات الحاسب الآلي بشركة/ مؤسسة________________

أقوم حالياً بعمل دراسة لدرجة الدكتوراه لتقييم مدى انتشار استخدام الحاسب الآلي و أنظمة تقنية المعلومات و درجة نجاح تطبيقها في مؤسسات و شركات القطاع الخاص بالمملكة العربية السعودية. الهدف الآخر لهذه الدراسة هو التعرف على و دراسة العوامل التي تحفز أو تعوق هذه المنظمات عندما تقرر استخدام الحاسب الآلي و أثناء عملية تطبيق هذه الأنظمة.

يقصد بأنظمة تقنية المعلومات في هذه الدراسة بأنها كل أنظمة المعلومات التي تستخدم فيها المنظمة أجهزة و برامج الحاسب الآلي و أنظمة الإتصالات الحديثة لإنتاج و معالجة و تداول المعلومات في مجال أعمالها.

و لقد تم إرسال هذه الإستبانه إليك لأهمية مشاركتك في هذه الدراسة. أن مشاركتك بالرأي ستثري و تقدم معلومات مهمة جداً يمكن أن تستفيد منها الإدارة في منظمتك و المنظمات الأخرى بعد نشر نتائج هذا البحث و ذلك لزيادة المعرفة و الوعي عن أهمية أنظمة تقنية المعلومات للشركات و المؤسسات السعودية. و بالتالي تحسين فرص نجاح عملية إدخال و استخدام الحاسب الآلي في القطاع الخاص السعودي.

تتكون هذه الإستبانه من ٥٠ سؤالاً و ستستغرق عملية الإجابة عليها ما يقارب ٤٥ دقيقة. فإذا كانت لديك أي ملاحظات أو ترغب في مناقشة أي نقطة في موضوع هذا البحث فلا تتردد في الإتصال بي. و أحب أن أؤكد لك بأن المعلومات التي ستضعها في هذه الإستبانه ستعامل بسرية تامة و لن تستخدم إلا لغرض البحث العلمي و الآكاديمي.

تعليمات هامة:

١- يرجى تعبئة الإستبانه من قبل رئيس مجلس الإدارة / المدير العام/ أو مدير مركز المعلومات أو مسؤول خدمات الحاسب الآلي إذا توفر ذلك في منظمتكم.

٢- هناك نسخة إنجليزية و أخرى عربية من هذه الإستبانه؛ أستخدم النسخة التي تجدها أسهل لك.

٣- استخدم الرمز " √ " للإجابة على الأسئلة في هذه الإستبانه.

٤- أرجو إرسال الإستبانه بعد تعبئتها إلى عنوان الباحث المطبوع على الظرف المرفق مع الإستبانه قبل ١ مارس ١٩٩٨م.

الباحث/ صالح محمد التركي
جامعة الملك فيصل ص.ب ١٧٦٠ الهفوف ٣١٩٨٢
المملكة العربية السعودية
هاتف/ فاكس ٠٣٥٨٠٠٢١٥ نداء آلي ٦٧٤٧ ١٩٩٥
بريد إلكتروني sma9@le.ac.uk

المشرف على البحث/ الدكتور نيلسون تانج
جامعة لستر
المملكة المتحدة
هاتف ٠٠٤٤١١٦٢٥٢٥٦٣٤
بريد إلكتروني nkht1@le.ac.uk

Part I : The Respondent's Information and Characteristics
(The Arabic version of this questionnaire is printed in the back)

Name of the respondent (optional): ______________________

Name of organisation (optional) : ______________________

Address (optional) : ______________________

Telephone: ______________ **Fax:** ____________

For the following questions use the ' √ ' symbol to give your answer.

Q1. What is your position in your organisation?

1- ( ) Business Owner 2- ( ) Chief Executive Officer/General Manager
3- ( ) IT Services Director 4- ( ) Other __________Managerial level__________

Q2. What is your Nationality 1- ( ) Saudi 2- ( ) Non-Saudi

Q3. What is your age range? .... years

1- Less than 30 years		2- Between 31-40 years	
3- Between 41-50 years		4- Over 50 years	

Q4. What is your highest education level?

1-High-school or less		2- Bachelor degree		3-Master or Ph. degree	

Q5. What is your English level?

1- **Fluent:** I read, write, understand and speak fluently.	
0- **Weak** I have problems in using English in general.	

Q6. What is your computer knowledge level?

1- Good: I can operate computers and software packages without need to have assistance from professional people.	
0- Weak: I have little knowledge about computers; hence, I cannot operate computers or use software packages without assistance.	

Q7. Do you personally use IT systems in your job? 0- NO ( ) 1- Yes ( )

Q8. How many years of experience do you have with computers and IT systems:

1 No previous experience	2 Less than 1 year	3 Between 1 and 5 years	4 Between 6 and 10 years	5 More than 10 years

Part II: Questions about the Organisation's and IT Systems Characteristics

Please use '√' to tick the appropriate boxes for your answers to the following questions

Q9. How do you evaluate the following statements regarding top-management support:

1- Top-management support for IT implementation in your organisation
1( )None 2( )Weak 3( )Strong

2- Top-management attendance of IT projects meetings in your organisation
1( ) None 2( )Little 3( )Frequent

3- Top-management involvement in monitoring the implementation process
1( ) None 2( )Little 3( )High

Q10. Based on the estimated number of employees, what is the size of your organisation?

1- Small (1-100 employees)		2- Medium (101-500 employees)		3- Large (over 500 employees)	

Q11. Place an ' √ ' next to the industry and business type that best describes your organisation business:

1- Manufacturing Industry ( )
11- ( ) Food & Beverages
12- ( ) Textile, Clothing & Leather
13- ( ) Wood Products & Furniture
14- ( ) Paper, Printing & Publishing
15- ( ) Chemical & Plastic Products
16- ( ) Ceramic, Chinaware, Glass & Building Material
17- ( ) Metal Products
18- ( ) Other Manufacturing_______________

2- Service Industry ( )
21- ( ) Agriculture
22- ( ) Banking & Finance
23- ( ) Education
24- ( ) Health Care
25- ( ) Hotels and Lodging
26- ( ) Contracting
27- ( ) Trade
28- ( ) Other Services__________

Q12. How is your organisation owned?

1- Saudi 100%		2- Joint-venture (Saudi and Foreign)		**3- Foreign 100%**	

Q13. What is your organisation's geographical scope*?

1-Local**		2-National***		3-International****	

* Organisational geographical scope is the spread of an organisation's business to different cities and provinces in the Kingdom and into international markets.

** 1- Local organisation is an organisation that is based and operates in Saudi Arabia in one province only regardless if it has branches within this province or not.

*** 2- National organisation is an organisation that has branches in different cities and provinces in Saudi Arabia.

***** 3-International organisation is an organisation that has branches or agents inside and outside Saudi Arabia.

Q14. How many branches does your organisation have in addition to your headquarters (main centre)?

1-( ) None (only one main centre) 2-( ) Between 1 and 5 branches

3-( ) Between 6 and 10 branches 4-( ) More than 10 branches

Q15. How much competition is there in the industry in which your organisation do business?

1- No competition at all	2- Some competition	3-Extreme Competition

Q16. Does your organisation currently use IT systems to run its business and functions?

0- NO ( ) **1- Yes ( )**

If your answer to question 16 was "NO" please go to question 48

Q17. When did your organisation start using computers and IT systems?

1- Before 1980	2- Between 1980-1985	3- Between 1986-1990	4- Between 1991-1997

Q18. Rank the following reasons according to their importance in your organisation's decision to implement IT systems. (Computerisation motives)

Reason	1 Not important at all	2 Little Important	3 Very Important	4 The most important
1- To replace manual operations				
2- To improve and facilitate decision-making				
3- To expand business				
4- To overcome competition				
5- To improve workers' efficiency and productivity				
6- To improve communications with suppliers and/or clients				
7- To improve product and service quality				
8- To do like competitors who adopted IT systems				
9- To give prestige and good image to the organisation				
10- To reduce the number of workers				

Q19. Please tick '√' the box that best describes the degree to which you agree with the following statements regarding organisational and national IT infrastructure* and their influence on the implementation process at your organisation:

Availability of IT infrastructure	1 Strongly Disagree	2 Disagree Somewhat	3 Neutral	4 Agree Somewhat	5 Strongly Agree
1- Implementation of IT systems was possible due to the availability of IT infrastructure					

*** IT infrastructure includes hardware, software, and skilled human resources.**

Q20. Does the management of your organisation practice IT planning when it decides to implement IT systems?

0- NO ( ) 1- Yes ( )

Q21. How do you evaluate your organisation efforts in IT planning?

1- Low ( ) 2- Medium ( ) 3- High ( )

Q22. Does your organisation provide IT training for its staff:

0- NO ( ) 1- Yes ( )

Q23. Does your organisation have the following training programmes?

	0- NO	1- Yes
1- Operating computers	( )	( )
2- Data entry	( )	( )
3- Operating systems and applications programming	( )	( )
4- Database and spreadsheets	( )	( )
5- Systems analysis and design	( )	( )
6- Networking and telecommunications	( )	( )
7- Maintenance	( )	( )
8- Other training programmes:____________________	( )	( )

Q24 How do you evaluate IT trainning level at your organisation?

1- Low ( ) 2- Medium ( ) 3- High ( )

Q25. How do you evaluate IT vendors' support level provided to your organisation:

1- Low ( ) 2- Medium ( ) 3- High ( )

Q26. How do you evaluate the following statements regarding IT systems' characteristics

	1 Strongly Disagree	2 Disagree Somewhat	3 Neutral	4 Agree Somewhat	5 Strongly Agree
1- Perceived ease of use of IT systems encouraged management to implement these systems					
2- Perceived benefits of IT systems encouraged management to implement these systems					
3- High costs of IT systems are considered big obstacles to implementing these systems					
4- Availability of IT systems in Arabic encouraged management to implement these systems					

Part III: The Organisation's Procedures During the Implementation Process.

Tick "√" the box that best describes your answer

Q27. What procedures did your organisation follow before it adopts IT systems? (mark all that applies)

Procedure	0-NO	1-Yes
1- Conducts a comprehensive requirements and feasibility study (planning).		
2- Visits several IT suppliers to learn about the available products and systems		
3- Invites several IT suppliers to present their products and systems at the organisation and obtain technical information		
4- Seeks advice from IT specialists		
5- Other actions:		

Q28. What actions did your organisation take after it decided to implement IT systems?
Tick all the boxes that reflect the actions taken by your organisation.

Actions	0- NO	1-Yes
1- Hired new employees with IT skills		
2- Trained existing employees		
3- Signed operation and maintenance contract with IT vendors		
4- Established an IT department/centre		
5- Bought ready-made software packages		
6- Requested customised applications		
7- Changed organisational procedures and/or structures		
8- Other actions:		

Q29. Please tick the box that best describes the importance of each of the following factors in your management's decision to implement IT systems. Use:
1=Not important 2= Little important 3=Very important 4- Most important

Factor	1	2	3	4
1- There is a need to use IT systems in the organisation's business				
2- Ease of use				
3- IT systems benefits in the organisation's business				
4- Cost of implementing IT systems				
5- Availability of IT systems in Arabic				
6- Availability IT vendor's support				
7- Availability of organisational and national infrastructure				
8- Availability of adequate training programmes				
9- Top-management support				
10- Other factors: ______________________________				

Part IV: The Organisation's IT Environment and Extent of Assimilation

Q30. Which of the following departments and/or functions if available in your organisation are computerised:
- Use 0 (zero) if the department/function is not available in your organisation.
- Use 1 (one) if IT systems are not used in the department or function in your organisation.
- Use 2 (two) if IT systems are used in the department or function in your organisation.

1-( ) Accounting
2-( ) Engineering
3-( ) Finance
4-( ) Personnel
5-( ) Marketing
6-( ) Manufacturing/Production
7-( ) Purchasing
8-( ) Sales
9-( ) Information Technology
10-( ) Warehouses/Inventory
11-( ) Training
12-( ) Public Relations
13-( ) Security & Safety
14-( ) Communications
15-( ) Quality Control
16-( ) Research & Development
17-( ) Other departments: ______________________

(For researcher use only) :

A- number of departments/functions available in the organisation ______

B- number of departments/functions using IT systems in the organisation ______

C- Assmilation percentage = B/A = ___________

Q31. What percentage of your organisation's departments and functions are computerised?

1-( ) up to 50% 2-( ) more than 50%

Q32. Does your organisation use the following IT applications? (degree of infusion)

Application	0- NO	1- Yes
1- Accounting (accounts receivable, payable, general ledger, ... etc.)		
2- Internet services (electronic mail, e-commerce)		
3- Word Processing		
4- Spreadsheets		
5- Statistics		
6- Projects Management		
7- Database Management		
8- Graphics Preparation		
9- Desktop Publishing		
10- Computer-Aided Manufacturing/Production		
11- Computer-Aided Design		
12- Other Applications:		

Software Infrastructure (based on number of applications adopted):
1- Low (1-4 applications) 2- Medium (5-8 applications) 3- High (more than 8 applications)

Q33. Does your organisation have an Information Technology (IT) Department/Centre?

0- NO ( ) 1- Yes ( )

Q34. What types of computers does your organisation currently use? (mark all types available).

	Type	Yes/No	Number of Units
1	Mainframe computers		
2	Minicomputers		
3	Micro/Personal computers (PCs)		
4	Labtops/ Portable computers		
	Total number of computers		

Hardware Infrastructure:
1-Low (1-20 machines)   2- Medium (21-50 machines) 3- High (over 50 machines)

Q35. What are the functions and the number of employees who use IT systems in your organisation?

(Please write down the number of employees)

Function	Saudis	Non-Saudi
1- Data entry specialists		
2- Operation and maintenance engineers and technicians		
3- Systems analysts/designers		
4- Programmers		
5- Networking and telecommunication specialists		
6- Others:		
Totals		
Total Number of people		

Skilled Human Resources Infrastructure: 1- Low ( ) 2- Medium ( ) 3- High ( )
1-10 staff 11-30 over 30

Q36. Does your organisation specify an annual budget for its IT services?

0- No ( ) 1- Yes ( )

Q37. Do you feel there is resistance to use IT systems in your organisation?

0- ( ) No 1-( ) Yes

Q38. Based on your experience and judgement, rank the following as factors that might lead to resistance or failure to use IT systems in Saudi private organisations?

(rank them from 1 to 8 while 1 being the highest cause for resistance and 8 the lowest cause)

Factor	Its rank
1- Lack of Arabic IT systems	
2- Perceived difficulty or complex IT systems	
3- Lack of top-management support	
4- Employees' fear of losing their jobs	
5- Lack of users' involvement in the decisions to implement IT systems	
6- Lack of sufficient training programmes	
7- Lack of IT vendors' support	
8- Lack of tangible incentives to users (e.g. financial rewards or promotions)	

Q39. Which language is used for administration and official business in your organisation?

1-( ) Arabic 2-( ) English 3-( ) Both Arabic and English 4-( ) Other language:_______

Q40. Does your organisation currently use Arabised IT systems? 0- NO ( ) 1- Yes ( )

Q41. What percentage of IT systems used in your organisation are in Arabic?
1-( ) 0% (No Arabic systems are used) 2-( ) Between 1% and 25% 3-( ) Between 26% and 50%
4-( ) Between 51% and 75% 5-( ) More than 75% (most or all of our IT systems are in Arabic)

Q42. In which language do you prefer to have your organisation's IT systems?
1- Arabic ( ) 2- English ( ) 3- Both ( )

Part V: Questions About Organisational Awareness and Attitudes Towards IT systems

Q43. Please use '√' to tick the box that best describes the degree to which you agree with the following:

	1 Strongly Disagree	2 Disagree Somewhat	3 Neutral	4 Agree Somewhat	5 Strongly Agree
1- Top-management considers IT systems to be a critical factor for the organisation success					
2- Top-management considers IT systems to be a strategic investment					

Q44. Tick the boxes that best describe your satisfaction with the following IT resources in your organisation. Use 1= not satisfied at all, 2= satisfied, 3= very satisfied
1) Computers (i.e. the Hardware) 1-( ) 2-( ) 3-( )
2) Software 1-( ) 2-( ) 3-( )
3) Staff operating IT systems 1-( ) 2-( ) 3-( )
4) IT systems' contribution to management 1-( ) 2-( ) 3-( )

Q45. Please tick the most appropriate answers to the following: Using IT systems has:
(1=Strongly disagree 2= Dissagree 3= Agree 4=Strongly agree)
1- Improved quality of work 1-( ) 2-( ) 3-( ) 4-( )
2- Increased Control over work 1-( ) 2-( ) 3-( ) 4-( )
3- Increased Productivity 1-( ) 2-( ) 3-( ) 4-( )
4- Improved Communication 1-( ) 2-( ) 3-( ) 4-( )
5- Reduced costs of running business 1-( ) 2-( ) 3-( ) 4-( )

Q46. How much, in your view, IT systems are needed in your organisation?
1- Not needed ( ) 2- Little needed ( ) 3- Extremely needed ( )

Q47. Does your organisation plan to expand its IT facilities?
A- Software Applications (for example Internet and Intranet systems)
0- NO ( ) 1- Yes ( )
B- Hardware (for example computers, printers .... etc.)
0- NO ( ) 1- Yes ( )

Q48. If your organisation is not using IT systems, what are the reasons?

Because:	1 Strongly disagree	2 Disagree somewhat	3 Neutral	4 Agree somewhat	5 Strongly Agree
1- Business is too small to use IT					
2- Current way of doing business is sufficient					
3- Lack of IT qualified staff					
4- Lack of financial resources					
5- Lack of Arabised IT systems					
6- Lack of qualified IT vendors					
7- Lack of IT infrastructure					
8- Lack of management's awareness					
9- Previous bad experience with IT					
10- Fear of computers					
11- The high costs of IT systems					
12- Other reasons:					

Q49. If your organisation currently is not using IT systems, does it plan to implement them in the future?

0- NO ( ) 1- Yes ( )

Q50. If you answered Yes to question 49, how soon does your organisation plan to implement IT systems?

1- Within a year	
2- Within the next two years	
3- Within 3-5 years	
4- Do not know	

If you have any comments you wish to make, please write them in the space below. (use extra pages if you need)

____

____

____

____

- Would you like to receive a summary of the findings of this study?

0-( ) NO 1-( ) Yes

If your answer is Yes, write down your name and address in the first page of this questionnaire.

I would greatly appreciate it if, after completion, you would return the questionnaire to me in the enclosed addressed envelope before 1.3.1998. Please accept my grateful thanks.

Copy of the questionnaire used to test the proposed IT implementation guidelines

November 19, 2000

Dear Participants:
I am a Ph.D candidate at Leicester University, UK conducting a study to investigate the factors which influence IT implementation in the Saudi private sector. One of the objectives of the study is to provide implementation guidelines to help private organisations in their Information Technology (IT) Systems implementation efforts.

I would very much appreciate your participation in evaluating the suggested implementation guidelines.

Name: ______________________________

Organisation:____________________________

Email: ______________________________

Q1. Please indicate your organisational/managerial position by ticking X in the appropriate brackets:

1-( ) Top-management

2-( ) Middle-management

3-( ) Academic

4-( ) Others (Please write it)________________

For the following question use:
1 = complete disagreement, 2= little Agreement, 3= strong Agreement

Q2. Please indicate the level of your agreement for each of the following implementation guidelines as it should be taken in consideration when any organisation decide to adopt IT systems?

1- determine organisational IT needs	1-( )	2-( )	3-( )
2- secure top-management support	1-( )	2-( )	3-( )
3- assess total costs	1-( )	2-( )	3-( )
4- secure IT technical/vendor support	1-( )	2-( )	3-( )
5- provide IT training	1-( )	2-( )	3-( )
6- practice IT planning	1-( )	2-( )	3-( )
7- involve system users	1-( )	2-( )	3-( )
8- adapt IT systems to local culture	1-( )	2-( )	3-( )

Q3. Which of the following implementation guidelines would you consider to be the most important? (Please indicate preference in order by ranking them from 1 to 8 while entering 1 to indicate the most important and 8 as the last preference).

1- determine organisational IT needs ( )
2- secure top-management support ( )
3- assess total costs ( )
4- secure technical/vendor support ( )
5- provide IT training ( )
6- practice IT planning ( )
7- involve system users ( )
8- adapt IT systems to local culture ( )

Q4. Would you agree with the proposed implementation guidelines?

1- Do not know ( ) 2- No ( ) 3- Yes ( )

Q5. Would you suggest any addition to the proposed guidelines?

1-No ( ) 2- Yes ( ) if yes please write it down____________________

Q6. Would you replace (or delete) any of the proposed guidelines

1- Do not know ( ) 2- No ( ) 3- Yes ( )

Q7 Do you have any further comments which you would like to make regarding the proposed IT systems implementation guidelines?

1-No ( ) 2- Yes ( ) if yes please write it down____________________

Thank your for your participation

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