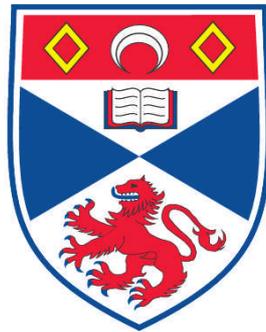


**THE IMPACT OF INFORMATION TECHNOLOGY ON  
ORGANISATIONS : THE CASE OF THE SAUDI PRIVATE SECTOR**

**Ahmed Abdullah Alshoaibi**

**A Thesis Submitted for the Degree of PhD  
at the  
University of St. Andrews**



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**THE IMPACT OF INFORMATION TECHNOLOGY  
ON ORGANISATIONS: THE CASE OF  
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**AHMED ABDULLAH ALSHOAIBI**

**A THESIS SUBMITTED FOR THE DEGREE  
OF DOCTOR OF PHILOSOPHY AT  
THE UNIVERSITY OF ST. ANDREWS**



**DEPARTMENT OF MANAGEMENT  
UNIVERSITY OF ST. ANDREWS**

**1998**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

*IN THE NAME OF ALLAH, MOST GRACIOUS, MOST MERCIFUL*

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(i) I, Ahmed Alshoaibi, hereby certify that this thesis, which is approximately 100,000 words in length, has been written by me, that it is the record of work carried out by me and that it has not been submitted in any previous application for a higher degree.

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## ABSTRACT

For several decades, researchers in the field of information technology and management have studied the impact of using computers and other information technology facilities on business organisations. In the 1960's and 1970's, information technology was widely employed by many firms mainly for achieving routine clerical and administrative activities such as processing data related to bookkeeping and accounting activities. The 1980's and 1990's have witnessed advancements in the technological field (along with other advancements) which have enhanced the economies of information technology and greatly expanded its applications.

Today, information technology has become not only a tool to process data and record transactions, but also a competitive weapon that can change an industry's structure. This observation was one of the motives for the present study. This study explores the impact of using information technology in developing countries by considering its application in the Saudi private sector. The study was examined from two major perspectives: 1) the impact; and 2) the implementation. The impact perspective focuses on the impact of using information technology on the organisations' strategy, structure, and people. The implementation perspective covers several issues including the information technology strategic planning, technical considerations, behavioural considerations, and the role of top management in the implementation process.

The sample under study was comprised from the top managers of the top 500 companies in Saudi Arabia in 1996. A total of 205 companies from 7 different business sectors in Saudi Arabia participated in the study. This represented more than a 41 percent response rate. The necessary data were collected through two methods: 1) mailed questionnaire, and 2) personal interviews. Based on the statistical analysis of the data, the study suggests that the use of information technology in the Saudi private sector is expected to have positive impacts on the strategy of business organisations. The data also suggests that information technology usage could induce many organisations to adopt smaller and flatter structures. Also it was found that information technology utilisation can lead toward a more decentralised decision-making

organisation. The results showed that a positive relationship exists between information technology usage and decentralisation in the private firms of Saudi Arabia.

The study also finds that respondents believe that the use of information technology in business organisations in Saudi Arabia can help to reduce the total number of the organisations' employees. This is particularly the case regarding unskilled workers. The study did not provide evidence to support the view that the use of information technology in business organisations would lead to the elimination of middle management. The study also did not provide evidence to support the hypothesis that information technology utilisation is dependent upon the size of the company. The data analysis showed that several technical and behavioural problems could effect the success of information technology in business organisations and the involvement and support of the top management is essential for success in the implementation process. The study concludes with recommendations for the Saudi government and suggestions of several topics to be carried out for future research to enable us to understand and use information technology as an important resource for business organisations in Saudi Arabia.

## ACKNOWLEDGEMENT

This thesis would not have happened without the incredible support and encouragement from my supervisor Professor Mo Malek, who became my guardian from the beginning of our joint work. I am extremely grateful for his guidance and advice through this difficult and long journey. The Value of his suggestions and sensitivity cannot be over emphasised.

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**Dedicated To**

**MY PARENTS,**

**MY WIFE, AND MY THREE CHILDREN,**

**(MOUNDHER, DALAL, AND MOHAMMED)**

**WITHOUT THEIR SUPPORT THIS WORK WOULD NOT HAVE BEEN POSSIBLE**

## TABLE OF CONTENTS

	Page
DECLARATION .....	i
COPYRIGHT .....	ii
ABSTRACT .....	iii
ACKNOWLEDGEMENT .....	v
DEDICATION .....	vii
TABLE OF CONTENTS .....	viii
LIST OF FIGURES .....	xiv
LIST OF TABLES .....	xv
LIST OF APPENDICES .....	xviii

### **CHAPTER ONE:**

#### **INTRODUCTION**

1.1	Overview .....	1
1.1.1	What is Information Technology? .....	2
1.1.2	Information Technology and Business Organisations .....	3
1.2	The Saudi Private Sector .....	6
1.3	The Motives of the Study .....	8
1.4	The Objectives of the Study .....	8
1.5	The Research Questions .....	9
1.6	The Research Theoretical Framework .....	11
1.7	Organisation of the Thesis .....	16

### **CHAPTER TWO:**

#### **THE LITERATURE REVIEW**

2.1	Introduction .....	18
2.2	The impact Perspective .....	18

2.2.1	Why Do Organisations Use Information Technology .....	19
2.2.2	The Impact of Information Technology on Organisations .....	26
2.2.2.1	Strategy .....	27
2.2.2.2	Structure .....	32
2.2.2.3	People .....	38
2.2.2.3.1	The Pessimists .....	38
2.2.2.3.2	The Optimists .....	41
2.3	The Implementation Perspective .....	42
2.3.1	Approach to IT Strategic Planning .....	44
2.3.2	Technical and Behavioural Considerations .....	46
2.3.3	The Role of Top Management .....	50

### **CHAPTER THREE: THE ENVIRONMENT WITHIN THE KINGDOM OF SAUDI ARABIA**

3.1	Introduction .....	53
3.2	General Background .....	53
3.2.1	A Historical Background .....	54
3.2.2	The Geographical Dimension .....	55
3.2.3	Demographic Considerations .....	57
3.2.3.1	Population .....	57
3.2.3.2	Labour Force .....	57
3.2.4	The Political and Legal System .....	59
3.3	The Economic Environment .....	61
3.3.1	The Five Year Development Plans .....	61
3.3.2	The Government Revenues and Expenditure .....	66
3.3.2.1	Oil and Non-Oil Revenues .....	67
3.3.2.2	Government Expenditure .....	67
3.3.3	Structure of the Economy .....	68
3.3.3.1	Oil Sector .....	68
3.3.3.2	Non-Oil Government Sector .....	71
3.3.3.3	Non-Oil Private Sector .....	72
3.3.4	The Private Sector Role in the National Economy .....	75

3.4	The Financial Environment .....	79
3.5	Communication & Information Technology Environment .....	82

## **CHAPTER FOUR:**

### **RESEARCH DESIGN AND METHODOLOGY**

4.1	Introduction .....	90
4.2	The Research Hypotheses .....	90
4.3	The Research Design .....	92
4.4	The Survey Methods .....	96
4.5	The Survey Instruments .....	97
4.5.1	The Instrument Development Process .....	97
4.5.1.1	The Survey Strategy .....	97
4.5.1.1.1	Communication Mode .....	97
4.5.1.1.2	Process Structure .....	98
4.5.1.1.3	Objective Disguise .....	100
4.5.1.2	Schedule Design .....	100
4.5.1.2.1	Determination of Information-Needed .....	100
4.5.1.2.2	Data Gathering Process Decision .....	101
4.5.1.2.2.1	Mail Questionnaire .....	101
4.5.1.2.2.2	Personal Interview .....	103
4.5.1.2.3	Instrument Drafting .....	106
4.5.1.2.4	Instrument Testing (Pilot Study).....	109
4.6	Factors Affecting Response Rate of Mail Questionnaire .....	110
4.7	Sampling Design .....	114
4.7.1	The Population .....	115
4.7.2	The Sampling Frame .....	116
4.7.3	The Sample .....	116
4.7.3.1	Probability Sampling .....	117
4.7.3.2	Non-Probability Sampling .....	117
4.7.3.2.1	Convenience Sampling .....	118
4.7.3.2.2	Purposive Sampling .....	118
4.8	Sample Size .....	120
4.9	Validity and Reliability .....	120

4.9.1	Validity .....	120
4.9.2	Reliability .....	122
4.10	Data Preparation and Analysis .....	124
4.10.1	Editing the Data .....	124
4.10.2	Handling Blank Responses .....	125
4.10.3	Coding .....	126
4.10.4	Data Entry .....	127
4.10.5	Data Analysis Techniques .....	127

## **CHAPTER FIVE:**

### **DATA ANALYSIS AND RESULTS**

5.1	Introduction .....	130
5.2	The Data Analysis Techniques .....	131
5.2.1	Descriptive Statistics .....	131
5.2.2	Inferential Statistics .....	132
5.2.2.1	The Normality Test .....	132
5.2.2.2	Parametric or Non-Parametric .....	133
5.2.2.3	Parametric Statistical Tests .....	134
5.2.2.3.1	The One Sample T-Test .....	135
5.2.2.3.2	The Two Independent-Samples T-Test .....	136
5.2.2.3.3	The Analysis of Variance: One Way ANOVA .....	136
5.2.2.3.4	Pearson Correlation Coefficient .....	137
5.2.2.3.5	Regression Analysis .....	137
5.2.2.4	Nonparametric Statistical Tests .....	138
5.2.2.4.1	The Wilcoxon Test .....	139
5.2.2.4.2	The Kruskal Wallis Test .....	140
5.2.2.4.3	The Chi-Square Test .....	140
5.3	The Quantitative Results .....	141
5.3.1	The Response Rate .....	141
5.3.2	Test of Responses' Representativeness .....	142
5.3.3	Evaluating the Non-Response Bias .....	143
5.3.4	The Early and Late Responses Bias Test .....	145
5.3.5	The Reliability Test .....	147

5.3.6	The Sample Descriptive Statistics .....	148
5.3.7	Use of Information Technology Facilities .....	150
5.3.7.1	Extent of Use .....	151
5.3.7.2	Length of Time Using Computers .....	154
5.3.7.3	Applications .....	155
5.3.8	The One Way ANOVA & Kruskal-Wallis Tests .....	156
5.3.8.1	Strategy .....	157
5.3.8.2	Structure .....	159
5.3.8.3	People .....	161
5.3.9	The Hypotheses Testing .....	163
5.3.9.1	Hypothesis One .....	164
5.3.9.2	Hypothesis Two .....	168
5.3.9.3	Hypothesis Three .....	169
5.3.9.4	Hypothesis Four .....	172
5.3.10	Results of Other Variables .....	174
5.3.10.1	The Use of IT and the Nationality of Managers .....	174
5.3.10.2	The Use of IT and Age of Managers .....	176
5.3.10.3	The Use of IT and the Organisation Ownership .....	178
5.3.10.4	The Use of IT and Training Programs .....	179
5.3.10.5	The Use of IT and the Company's Age .....	181
5.3.10.6	The Use of IT and the Company's Size .....	183
5.3.10.7	Top Management Attitude Towards IT .....	186
5.3.10.8	The Use of IT and the Firm's Communication & Procedures .....	187
5.3.10.9	IT and Employees Resistance .....	188
5.4	The Qualitative Results .....	191

**CHAPTER SIX:  
THE DISCUSSION**

6.1	Introduction .....	196
6.2	The Impact Perspective .....	197
6.2.1	Strategy .....	197
6.2.2	Structure .....	203
6.2.3	People .....	209

6.2.4	Contingency Factors .....	214
6.3	The Implementation Perspective .....	216
6.3.1	Approach to IT Strategic Planning .....	217
6.3.2	Technical and Behavioural Considerations .....	221
6.3.2.1	Technical Considerations .....	221
6.3.2.2	Behavioural Considerations .....	223
6.3.3	The Role of Top Management .....	227

## **CHAPTER SEVEN:**

### **SUMMARY AND RECOMMENDATIONS**

7.1	Limitations of the Study .....	231
7.2	Main Findings of the Study .....	233
7.2.1	The Impact Perspective .....	234
7.2.1.1	Strategy .....	234
7.2.1.2	Structure .....	235
7.2.1.3	People .....	236
7.2.2	The Implementation Perspective .....	237
7.2.3	Other Major Results .....	239
7.3	Implications for the Saudi Government (Policy Implications) .....	240
7.4	Directions for Further Research .....	242
<b>Bibliography .....</b>		<b>244</b>

## LIST OF FIGURES

	Page
Figure 1.1 Model of the Organisation .....	12
Figure 1.2 The Research Theoretical Framework .....	15
Figure 3.1 Map of the Kingdom of Saudi Arabia .....	56
Figure 3.2 The Government Revenues and Expenditure .....	66
Figure 5.1 The Relationship between the Use of IT and Business Growth .....	166
Figure 5.2 The Relationship between the Use of IT and the Decision Making Process .....	170
Figure 5.3 The Relationship between Manager's Usage of IT and Age .....	177
Figure 5.4 The Relationship between the Organisational Usage of IT and the Availability of Training Programs .....	180
Figure 5.5 The Relationship between IT Usage and the Firm's Age .....	181
Figure 5.6 The Relationship between IT Usage and the Firm's Size .....	184

## LIST OF TABLES

		Page
Table 3.1	Employment by Sector in the Fifth Development Plan .....	58
Table 3.2	Registered Private Companies and Establishments by Main Regions ...	74
Table 3.3	Major Indicators of Private Sector Development .....	76
Table 3.4	Commercial Banks Operating in Saudi Arabia .....	81
Table 4.1	Characteristics of the Interviewed Managers .....	105
Table 5.1	Characteristics of Parametric Statistical Tests & Models .....	134
Table 5.2	Characteristics of Non-Parametric Statistical Tests .....	139
Table 5.3	Selected and Participated Companies by Business Sectors .....	143
Table 5.4	Chi-Square Test for Responses Representativeness .....	143
Table 5.5	Test of None-Response Bias .....	145
Table 5.6	Early and Late Response Bias Test .....	146
Table 5.7	The Reliability Analysis .....	148
Table 5.8	The Sample Descriptive Statistics .....	149
Table 5.9	Numbers and Percentages of Organisations Using Specific IT Facilities .....	151
Table 5.10	Percentages of Organisations Using IT Facilities (By Sectors) .....	153
Table 5.11	Numbers and Percentages of Organisations Using Specific Software Packages .....	154
Table 5.12	Number of Organisations and Length of Time Using Computers .....	155
Table 5.13	Applications of Computers and Other IT Facilities .....	156
Table 5.14	One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and the Impact of IT on Strategy .....	158
Table 5.15	One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and the Impact of IT on Structure .....	160

Table 5.16	One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and the Impact of IT on People .....	162
Table 5.17	The One Sample T-Test for Use of IT and the Organisation's Strategy .....	165
Table 5.18	The Pearson Correlation Test for the Use of IT and Business Growth .....	167
Table 5.19	The One Sample T-Test for Use of IT and the Organisation's Structure .....	168
Table 5.20	Linear Regression Analysis for IT Usage and the Decision Making Process .....	171
Table 5.21	The One Sample T-Test for Use of IT and the Decision-Making Process .....	172
Table 5.22	The One Sample T-Test for Use of IT and Impact on Number of Employees .....	173
Table 5.23	The Two Independent-Samples T-Test results for Saudis and Non-Saudis with the Use of IT .....	175
Table 5.24	<i>Linear Regression Analysis for Manager's Usage of IT and Age .....</i>	<i>177</i>
Table 5.25	The Two Samples T-Test between Saudi and Joint/Foreigner Firms In Using IT .....	179
Table 5.26	The Pearson Correlation Test for the Use of IT and the Availability of Training Programs .....	180
Table 5.27	The ANOVA Test for IT Usage and the Age of the Company .....	182
Table 5.28	The Regression Analysis (Cubic Model) for the use of IT and the Age of the Company.....	183
Table 5.29	The ANOVA Test for IT Usage and the Size of the Company .....	185

Table 5.30	The Regression Analysis (Quadratic Model) for the use of IT and the Size of the Company.....	186
Table 5.31	The One Sample T-Test for Top management Attitude towards IT .....	187
Table 5.32	The One Sample T-Test for the Use of IT and the Organisations' Communication and Procedures .....	188
Table 5.33	The One Sample T-Test for Resistance towards IT .....	189
Table 5.34	Factors Cause Resistance of Using Information Technology .....	190
Table 5.35	Major Findings of Personal Interviews .....	192

## LIST OF APPENDICES

	Page
Appendix A: The Questionnaire Covering Letter (in English) .....	257
Appendix B: The Questionnaire Covering Letter (in Arabic) .....	258
Appendix C: Letter from the Saudi Cultural Attaché in the United Kingdom (in English) .....	259
Appendix D: Letter from the Saudi Cultural Attaché in the United Kingdom (in Arabic) .....	260
Appendix E: The Mailed Questionnaire .....	261
Appendix F: The First Follow up Letter .....	274
Appendix G: The Second Follow up Letter .....	275
Appendix H: The Third Follow up Letter .....	276

# CHAPTER ONE

## INTRODUCTION

### 1.1 Overview

**“A post-industrial society is based on services. What counts is not raw muscle power, or energy, but information”** observed the sociologist Daniel Bell in his comments on the developed world in 1973. Twenty-five years on, his statement is even more relevant to today’s society. Information has become an essential part of everyday life. We have to deal with information in everywhere: in manufacture, education, medicine, farming, entertainment, banking and many other fields. Information has become a valuable asset for most of the modern societies. Some writers have stated that the age we live in has turned out not to be the atomic age, nor the space age, but the information age (Carter, 1989).

The information age started at the end of the 19<sup>th</sup> Century and during the early years of this century with the progress in telecommunications. Inventions like the telegraph, telephone, radio, and the television opened new horizons for individuals and society at large, and provided people with information about distant events and new ideas. Many people believe that the primary driving force behind the information revolution is progress in microelectronic technology, particularly in the development of integrated circuits or “chips”. During and after the Second World War we can see the rise of electronics which brought a gradual replacement of mechanical equipment by smaller, more reliable and more versatile electronic equivalents. These inventions and the rise of the transistors and the microprocessor, one form of the microchip upon which

modern electronics is based, signalled the real breakthrough, and the “information revolution” had been started.

Since the early years of the 20<sup>th</sup> Century, the world has been experiencing a revolution known as information technology. Some consider it to be the most fascinating development since the industrial revolution around the mid-18<sup>th</sup> Century (Tom, 1991). This revolution is changing our daily lives - at home and at work, in shops and banks, in schools, colleges and universities. It is changing the way we think, communicate and behave. Today, we enjoy computing and communicating capabilities which were unimaginable in the 1960's. The advancement in chip, satellite, radio, and optical fibre technology have enabled millions of people around the world to communicate electronically regardless of national or international boundaries. This explosion in connectivity is the latest and the most important wave in the information revolution (Evans & Wurster, 1997).

### **1.1.1 What is Information Technology?**

Before we go any further and in order to understand the revolution that information technology has brought to our lives, it is very important to clarify and understand what the term information technology means. Daft (1997) has written a simple definition of information technology. He stated that:

**“Information technology can be defined as the hardware, software, telecommunications, database management, and other information-processing technologies used to store, process, and deliver information.” (p 684)**

Carter (1991) presented another definition. He wrote that information technology is:

**“...The use of modern technology to aid the capture, processing, storage, and retrieval, and communication of information, whether in the form of numerical data, text, sound, or image.” (p 8)**

Based on many definitions presented in the current literature and for the purpose of this research, the term information technology refers to the developed and the advanced technology which uses microprocessor-based machines: microcomputers, automated machines, telecommunication equipment to collect, process, store, generate, disseminate, rearrange and exploit of information.

### **1.1.2 Information Technology and Business Organisations**

In 1958, Leavitt and Whisler were the first to predict that the advent of computers would significantly change the structures and processes of most business corporations. In their famous article “Management in the 1980s” which was published in the Harvard Business Review, Leavitt and Whisler predicted that information technology would spread rapidly and it would have a great impact on business organisations (Leavitt & Whisler, 1958). They argued that the adoption of computers would allow top managers to perform different roles and jobs at the middle management level would become highly structured. Much more of the work for many middle managers would be programmed and this would lead to a reduction in their numbers. Leavitt and Whisler’s early predictions became the cornerstone for many studies that have been carried out in the last four decades.

Following Leavitt and Whisler's predictions, the presence of computers and other information technologies in business organisations started to grow at a rapid pace. In the 1960's and 1970's, the presence of information technology in business organisations typically took the form of specific computer application systems, such as account payable and financial reporting systems, which either automate specific operational procedures or support certain managerial processes. In the 1980's and particularly in the 1990's, the growing dependency on information technology in the workplace began to shape a new environment. In the new emerging environment, however, access to information technology facilities was not only for predetermined management activities but also for strategic and tactical purposes (Teng & Calhoun, 1996).

As they grow and change, organisations depend more and more on information technology for their survival (Feeny & Willcocks, 1998). Companies today implement and use information technology to find solutions to business problems, to improve management decision-making, enhance productivity and quality, and compete for new markets in our global and aggressive business environment. Porter and Millar (1985) stated that:

**“The importance of the information revolution is not in dispute. The question is not whether information technology will have a significant impact on a company's competitive position; rather the question is when and how this impact will strike. Companies that anticipate the power of information technology will be in control of events. Companies that do not respond will be forced to accept changes that others initiate and will find themselves at a severe competitive disadvantage.”**  
(p 16)

Today's organisations have become increasingly dependent on information technologies. By using these technologies, managers can now generate and access complex databases of customer and organisational information. They enable employees throughout the organisation to communicate internally and externally in ways previously not possible. At Hewlett-Packard, for example, 20 million internal and 70,000 external e-mail messages are sent every month (Stewart, 1994). Information technology has become an asset for today's organisations. It plays an important role in most aspects of a company's business, from the development of new products to the support of sales and services, from providing market intelligence to supplying tools for decision analysis. In addition, information technology has been found to be a major source of change for many organisations. There is widespread agreement among many researchers that information technology is the most important technology leading to structural change in the industrial economies. In the U.S.A, for example, more people are employed in the computer industry than in the automobile, automobile parts, steel, mining, and petroleum-refining industries combined (Due, 1995).

With the advent of global networks, many companies now use these networks to allow managers, engineers, and designers to interact around the world to discuss several matters related to their business. This has led to an enormous reduction in time and costs for producing goods and consequently higher revenues and profits for these companies. In recent times, the use of the Internet or what is known as the "Information Super Highway" has played a major role in the creation of many profitable new businesses. For example, Dell, the American personal computer manufacturer, is selling computers at the rate of over \$1 million a day using the World Wide Web (WWW) (King, 1998). Dell has achieved a cost advantage because of its direct sales

model, and the web sales channel helped to reduce costs and increase sales for that company. The marketing managers at GE Plastics, a \$6 billion subsidiary of General Electric Co., decided in 1995 to use something new in order to reach their customers around the world. They established a computer connection on the Internet for their customers. Today, over 12,000 times a month, customers and prospective clients from all over the world access their Internet database to inquire about GE Plastics products (O'Brien, 1996). These examples show that many firms in different industries are now rushing to use the Internet as a highly productive sales channel to reach customers all over the world. This new revolution in the use of information technology shows how significantly this technology is changing many aspects of today's business activities and many researchers believe these changes will accelerate over the coming years (Crane, 1997).

## **1.2 The Saudi Private Sector**

The focus of this thesis is on the impact of using information technology on business organisations in the Saudi private sector. The concept of the private sector is normally based on the criteria of private ownership of establishments that engage in various industrial, agricultural and commercial activities with the aim of realising profits. In Saudi Arabia the scope of the private sector can be extended to include some companies of mixed public and private ownership, which operate as joint stock companies according to the disciplines of the market. The Saudi private sector comprises of three major categories (Ministry of Planning, 1996). These categories include the following:

- 1- Commercial, industrial and service establishments registered in the Commercial Register, of which there were more than 391,000 by the end of 1993/1994; these establishments include 7,642 companies which have a different legal status, of which 98 are joint stock companies.
- 2- Retail outlets and small service facilities and workshops licensed by the municipalities, of which there were about 134,000 units in 1993; this group represents the smallest economic units in the private sector.
- 3- Agricultural holdings and related production units, which currently employ around 377,000 farmers and agricultural workers, including a substantial number of small farmers.

In the recent years, the private sector in Saudi Arabia has been given a great responsibility. The Saudi government has called on the private sector to cooperate with it and participate in raising efficiency and improving productivity in the kingdom's economy. This is due to the fact that the Saudi economy is facing great challenges because of the expenses of the Gulf War and the drop in oil prices on the *international* markets. One of the Government's plans is the privatisation program which was announced by the King in 1994. King Fahad pronounced the Government intentions to transfer several governmental ministries and agencies from public to the private sector. In December 1997, the Ministry of Posts and Telecommunications (MOPTT), which controls the kingdom's communication sector, was transferred to the private sector and became the first governmental ministry to be privatised. Under the new umbrella, many believe that the communication sector will flourish and more information services will become available throughout the country (Al-Riyadh, 1998). This move by the Saudi Government was seen by many experts as an appropriate measure to improve the

economic conditions in the country. The economic environment in Saudi Arabia and the role of the private sector in the economy will be discussed in more detail later in chapter three.

### **1.3 The Motives of the Study**

Several motives were behind the decision to conduct a research project of this type. These include the following:

- 1- The author's interest in this area of research.
- 2- The scarcity of similar studies in the developing countries in general and in Saudi Arabia in particular.
- 3- The growing dependency on information technologies by many business organisations in the Saudi private sector.

### **1.4 The Objectives of the Study**

To the best of the researcher's knowledge, this is the first time that such an investigation has been undertaken in Saudi Arabia. The researcher decided to carry out this research in order to achieve several objectives. These objectives include the following:

- 1- To explore the impact of using information technology on business organisations in Saudi Arabia. This will provide detailed findings on which valid, generalizable, national conclusions can be drawn.
- 2- To help managers working in the Saudi private sector understand what impact information technology has on their organisations.

3- To contribute to the literature of management on how information technology affects business organisations in the developing countries. There is a great need for empirical research in this area (Blanton, Watson, & Moody, 1992; Fiedler, Grover, & Teng, 1994) and further studies should be carried out since no similar studies have been conducted in the region. This will lead towards more understanding of the impact of information technology on organisations in developing countries such as Saudi Arabia.

The participated companies in this study were asked if they wish to receive a final report for the main findings of the study. More than 77 per cent indicated their desire to receive such report. This can provide an indication of the importance of the study because the Saudi private sector lacks from studies that focus on the impact of information technology on organisations. It is clear that more research in this area is needed and this study is considered to be an attempt to fill the gap which exists in the Saudi environment.

## **1.5 The Research Questions**

In order to achieve the objectives declared earlier, this study addressed one main question and several sub questions. The main research question is:

**What is the impact of using information technology on organisations in the Saudi private sector?**

The research's sub questions include the following:

- How does information technology affect the strategy of business organisations in Saudi Arabia?

- What impact does information technology have on the structure of business organisations in Saudi Arabia?
- What is the impact of using information technology on individuals working in business organisations in Saudi Arabia?
- How certain issues such as technical and behavioural problems influence the implementation process of information technology in business organisations?

Due to the limitation of existed literature regarding the impact of information technology in Saudi Arabia, and in order to achieve the research objectives, it was necessary to investigate issues related to the above questions on countries other than Saudi Arabia, which have long experience with these issues. In this regard, countries such as the USA, the UK, Japan, and other developed countries were focused on. In addition, the impact of information technology on the Saudi private sector was studied because the environments and the circumstances in countries outside Saudi Arabia may not follow the same patterns. It is important to mention here that the main emphasis in this study is on the impact of information technology on the Saudi private sector although we recognise its impact on individuals and on the Saudi society as a whole and this could be substantial with serious political implications for the government. This is because the social and political implications of using information technologies are beyond the scope of this study.

Within the above questions and after reviewing the relevant literature, four hypotheses related to the impact of information technology on private organisations were developed based on the comparison of Saudi Arabia with the other countries studied. After collecting the relevant data, the four hypotheses were statistically tested

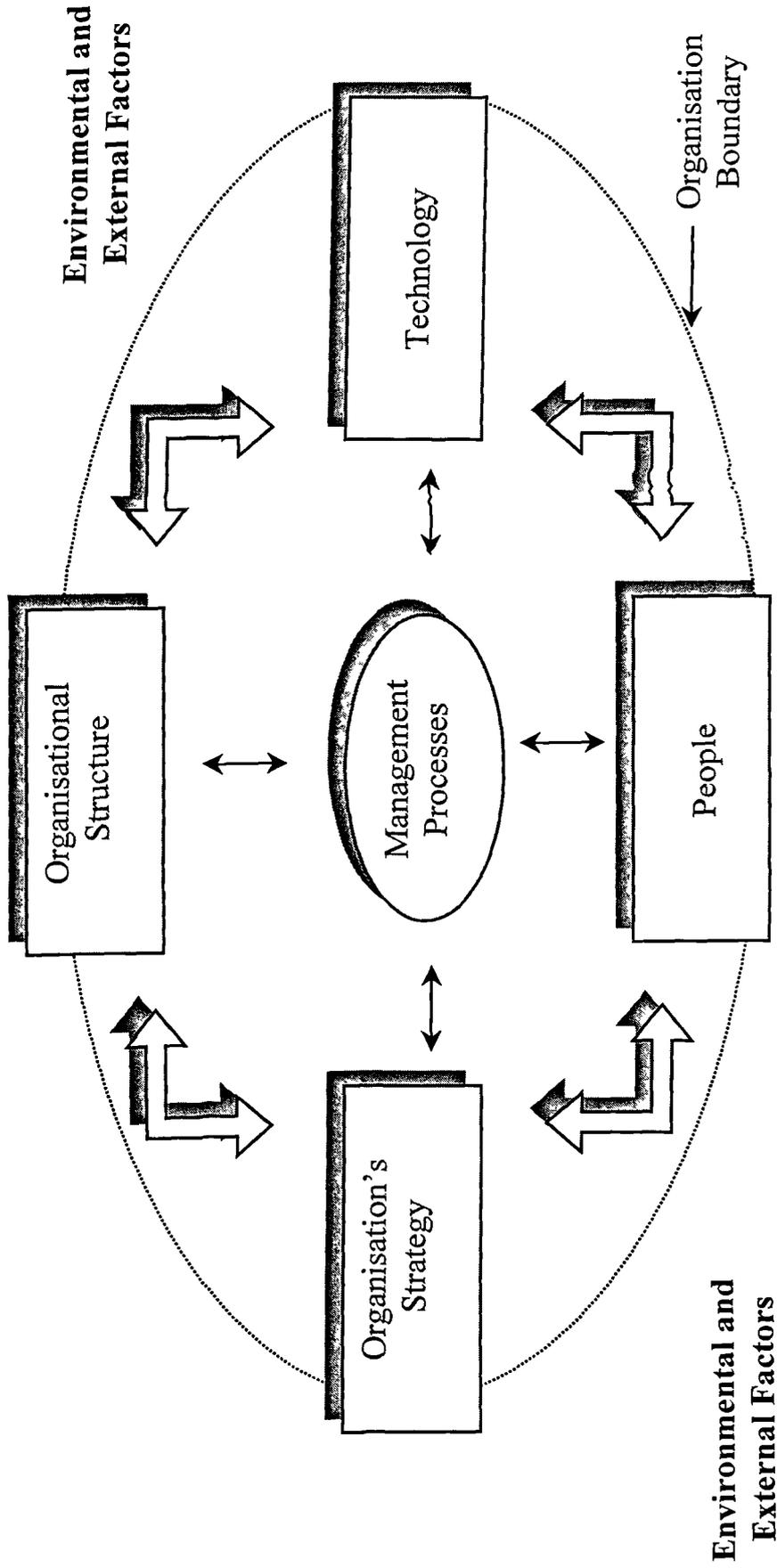
and analysed. The study's findings including the statistical results and the discussion will be presented in detail later in the thesis.

## **1.6 The Research Theoretical Framework**

The research theoretical framework used in this study is based on the model of the organisation shown in Figure 1.1. This model was initially developed in 1965 by the pioneering study of Harold Leavitt. He suggested that an organisation consists of four interrelated components: structure, task (strategy), people, and technology (Leavitt, 1965). Leavitt reported that *if any of the four components changes, the other three must also change*. In 1984, Rockart and Scott Morton added a fifth component to Leavitt's model and they called it "management processes" (see Figure 1.1). They placed management processes in the middle because as they wrote "**we see them as part of the glue that holds the organisation together**" (p 90). Today, researchers view any organisation as consisting of five basic behavioural and technological components (O'Brien, 1996; Scott Morton, 1995). These five components are including the following:

- 1- **Organisation's structure.** Refers to systems of communication, systems of authority, and systems of workflow.
- 2- **Organisation's strategy.** According to Chandler (1962) organisation's strategy can be defined as the establishment of the basic long-term objectives of an enterprise, and the adoption and commitment of resources to a course of action intended to obtain these corporate objectives.
- 3- **People.** Refers to individuals working in the organisation.
- 4- **Technology.** It can be defined as the tools, techniques, and actions used to transform organisational inputs into outputs (Daft, 1995).

Figure 1.1 Model of the Organisation



Source: H. J. Leavitt, "Applied Organizational Change in Industry," Handbook of Organizations (Chicago: Rand McNally, 1965), chapter 27; and MIT Management in the 1990's Research Program, M. S. Scot Morton, "The Corporation of the 1990's" (New York, Oxford University Press, 1991)

**5- Management processes.** According to Rockart and Scott Morton (1984), these include such processes as that by which the strategic plan is created, as well as for such functions as manufacturing and human resources.

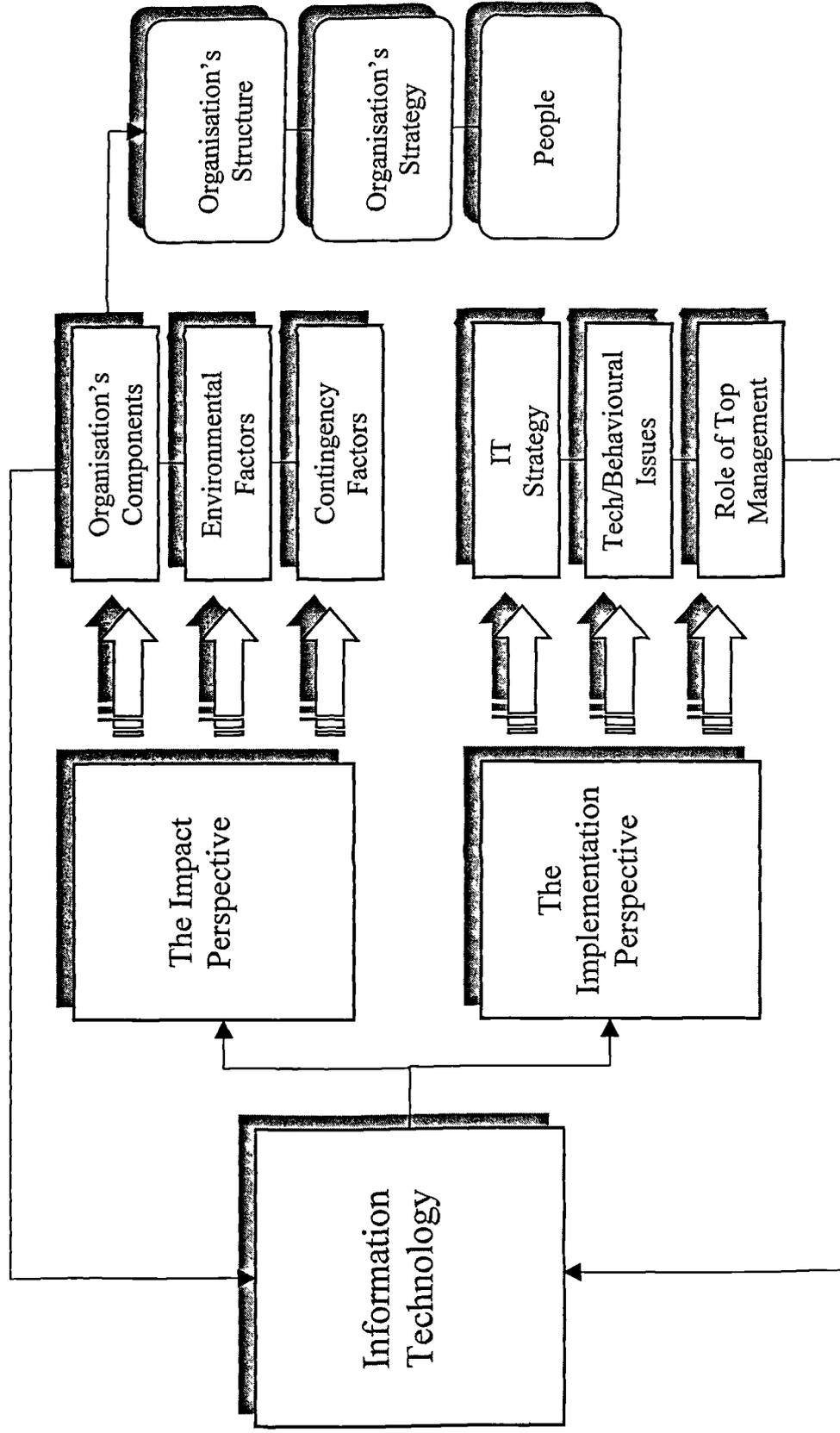
The above five components are highly interdependent, as indicated by arrows in Figure 1.1, so that change in any one usually results in compensatory change in others. Dynamic relationships are existed among the five elements and they interact with each other as the enterprise is subjected to influences from external and environmental factors. For example, marketplace competition, economic, technical, political, and social conditions could affect all five components of the organisation.

To explore the impact of information technology on organisations in the Saudi private sector, the research framework developed by Yap (1986) who studied the impact of information technology on the UK service sector was chosen for this research. Yap's framework was originally formulated based on Leavitt's model of the organisation. The framework is *studying the relationship between information technology, which is part of the technology component, and organisational characteristics*. Yap's framework was chosen for this study because it covers many critical issues that could lead us to a comprehensive understanding of the relationship between information technology and business organisations. This study focuses on the impact of information technology on three components of the organisation; strategy, structure, and people separately. Although the simultaneous nature of the relationship between these components is well understood, this study will not examine such relationship and it remains a task for the future research.

Furthermore, the study tries to explain the relationship between information technology and the environmental and contingency factors. On the other hand, the study did not examine the fourth component of the organisation, management processes, which was added by Rockart and Scott Morton (1984). This is due to the fact that the impact of information technology on management processes is considered to be a new issue for many organisations in Saudi Arabia; therefore meaningful results could not be obtained. In addition, the impact of information technology on management processes is still under extensive research in the West particularly in the US and the UK, and consolidated conclusions have not yet emerged. This shortcoming in the research's scope was reported in the limitations of this study (see chapter seven) and suggested as a subject for further research in the future.

This study examined the relationships between information technology and organisational characteristics. As Yap (1986) suggested, the relationships were tested from two main perspectives: the impact and the implementation (see Figure 1.2). The impact perspective is concerned with studying the impact of using information technology on the organisation's components (structure, strategy, and people), the environmental factors (competition, economical, political etc.) and the contingency factors (firm size, business sector etc.). The implementation perspective focuses on issues related to the implementation and use of information technology in organisations. Such issues include approaches to information technology strategy planning, technical and behavioural considerations, and the role of the top management in the implementation process.

Figure 1.2 The Research Theoretical Framework



## **1.7 Organisation of the Thesis**

Chapter 2 presents a review of some of the published literature relevant to the role of information technology in business organisations. Several issues related to the scope of the research were covered and reviewed in depth using current literature. Chapter 3 introduces the reader to the environment within the Kingdom of Saudi Arabia. This chapter begins by briefly describing the social, political and legal systems in the country. The chapter then moves on to describe the economic environment and the role of the private sector in the development process. In addition, this chapter covers the information technology and communication environments in Saudi Arabia. The likely future development of information technology in the country is also described. Chapter 4 describes the research design and methodology used in this thesis. The chapter starts by outlining the research hypotheses and then moves on to discuss the design of the study. Several methodological issues such as the data collection methods, the instrument design, and the sampling techniques adopted are discussed. The two approaches used to collect the necessary data (quantitative and qualitative) are discussed in more depth in this chapter. Chapter 5 presents the data analysis and the main quantitative and qualitative results obtained. It begins by introducing the reader to the statistical procedures used. Then, the chapter moves on to present the results of the response rate, the representativeness of the responses, the early and late responses bias test, the descriptive statistics, and the results of the reliability test. The chapter also includes the results of the hypotheses testing and the results obtained through the personal interviews which were carried out. Chapter 6 was dedicated to discussing the results reached through both the quantitative and qualitative approaches. The chapter clarifies the results and presents explanations of the major findings and compares them with other conclusions reached by other studies. Finally, chapter 7 presents the summary and

recommendations of the study. The chapter discusses the limitations of the study, summarises the main findings related to the study's two perspectives, provides some recommendations for the Saudi government, and suggests some directions for further research in the future.

## **CHAPTER TWO**

### **THE LITERATURE REVIEW**

#### **2.1 Introduction**

The main objective of this research is to explore the impact of information technology on business organisations in the Saudi private sector. The use of information technology in business organisations has been discussed and studied in the west by many scholars and researchers from many perspectives (see, for example, Bakos & Kemerer, 1992; Fitzgerald, 1998; Malone & Crowston, 1994; Markus & Robey, 1988; Taylor & Todd, 1995). To achieve the objectives of this research, the following chapter will review a selection of the research published in the literature relating to two perspectives: the impact and the implementation. In the first section of this chapter we will discuss some of the published research covering the impact of information technology. Furthermore, we will highlight selected research on the factors affecting the use of information technology, and also on the impact of information technology on strategy, structure, and people as they constitute the components of the organisation. In the second section, we will review some of the published research related to the implementation perspective.

#### **2.2 The Impact Perspective**

For several decades, researchers in the field of information technology and management have studied the impact of using computers and other information technology facilities on business organisations. Many of the studies that were conducted tried to identify the relationships between the use of these technologies and the major characteristics of the organisation. There were many issues related to the impact of

information technology. In the first subsection of this chapter we will review the main conclusions that have emerged from the literature on organisational characteristics which affect the use of information technology, while the second subsection will review some of the published studies related to the impact of using information technology on business firms.

### **2.2.1 Why Do Organisations Use Information Technology?**

What are the motives that drive and sometimes force many business organisations to invest in and exploit information technology? By answering the above question, we will be able to identify the factors behind the decisions which led many organisations to invest in information technology. By doing this, we will be able to identify the organisational characteristics which classify and distinguish those organisations that take advantage of information technology from those that do not.

In the 1960's and 1970's, information technology was widely employed by many firms mainly for achieving routine clerical and administrative activities such as processing data related to bookkeeping and accounting activities (Bird & Lehrman, 1993). It was used as a monitor of the firm's internal and external environment; in other words, as a support factor for the other organisational system components (Blili & Raymond, 1993). However, the cost, the distribution, and the fact that information technology was generally applied to only simple tasks in its early stages discouraged its application to strategic uses in areas such as enhancing the organisation's position against competitors, moving into new markets, and providing managers with better information for effective decision making. The advancement in the technological field along with other advancements have enhanced the economies of information technology

and greatly expanded its applications (Bird & Lehrman, 1993). Today, information technology can offer organisations more impressive help. Information technology has become not only a tool to process data and record transactions, but also a competitive weapon that can change an industry's structure.

Organisations in the 1990's are heavily committed to investments in information technology and communications technology because of the fact that they are acutely aware of the need to use it and exploit it effectively for business advantages (Galliers, Merali, & Spearing, 1994). Galliers, et al. suggested that because of the rapid pace of technological advances and the impact of information technology on the changing competitive environment, organisations are forced to critically evaluate their management of information and technology resources in order to achieve their strategic objectives. Robey and Azevedo, (1994) pointed out that according to many research projects and studies, many organisations use information technology to achieve faster and more accurate flows of information and to overcome the constraints of time and place. The goals of achieving greater organisational effectiveness and improving the organisation's functions and processes has attracted organisations to invest heavily, and to use and exploit the new technologies.

Business in the 1990's is totally different to the way it has been in the past. Business is moving towards services rather than the production of goods. For example, the United States economy in 1995 has some 22 percent of its workforce engaged in manufacturing and 78 percent on services (Scott Morton, 1995). With aggressive competition, a changing environment, and global marketplaces, firms need to be highly flexible and responsive to the rapid change in the markets and technologies. They have

to adopt the latest innovations to survive and prosper in a complex, harsh, and uncertain business environment (Baskerville & Smithson, 1995). Even though small businesses suffer from resource poverty, as suggested by Raymond, Bergeron, Gingras and Rivard (1989), which is caused by various conditions such as operating in a highly competitive environment, inadequate funding, lack of professional expertise and staff training facilities, there is an increase in the usage of information technology within small businesses which can be attributed to two things. Firstly, the dramatic drop in the cost of technology, and secondly, the advances in technology that have made information technology more user-friendly (see, for example; Magal & Lewis, 1995; Naylor & Williams, 1994; Thong & Yap, 1995). Other reasons for the increasing use of information technology by small businesses have been identified in a study carried out by Magal and Lewis (1995). They have shown that the recognition by small firms that technology can help them in solving their business problems, meeting requirements, the magic surrounding technology and the perception that it can work wonders, are factors leading small firms to invest, adapt, and implement information technology in their business activities.

According to many authors, information technology has become a real strategic tool (Child, 1987), a new tool in the competitive race (Ives & Learmonth, 1984), and enables the organisations to achieve a sustained competitive edge (Porter & Millar, 1985). Many studies suggested that the strategic use of information technology within the broader corporate framework is seen as the key to the future. Organisations are increasingly using information technology to gain competitive advantages (Breath & Ives, 1986), to develop solutions to business problems, to improve both the efficiency and effectiveness of the decision-making process (Attewell & Rule, 1984; Molloy &

Schwenk, 1995), to enhance productivity and quality, to achieve dynamic stability (Boynton, 1993), and compete for new markets. Information technology may be used to help firms produce at lower cost, differentiate themselves from their competitors, identify and concentrate on a particular market segment, and raise entry barriers.(Naylor & Williams, 1994; Porter & Millar, 1985). A greater significance is the fact that large American and Japanese multinationals firms such as IBM, GM, AT&T and Mitsubishi, have invested and capitalised on information technology to reduce internal and external co-ordination cost through networking, create and acquire economies of scale of operations, and increase the degree of scope of firm activities. Kraemer and Dedrick (1994) pointed out:

**“Unlike a new technology for steel or chemical production, IT can be applied in virtually every economic sector, from automobiles to insurance to aerospace. Its application can make production more efficient, enhance existing products and create new products and services. IT can reduce the cost to business by obtaining and processing information on markets, suppliers and competition, thus improving organizational efficiency and responsiveness. In addition, the IT industry itself can be a source of economic growth and jobs.” (p 1921)**

The Massachusetts Institute of Technology group in 1991 concluded that information technology is the platform on which success can be built but organisational factors are crucial to realising the benefits of automation and ‘informating’ process (Scott Morton, 1991; Zuboff, 1988). Information technology can be considered to be a series of innovations. Even though the innovations provide the work organisation with new and different ways of solving problems and enhancing performance, there is still a great deal of research to be done and discussion among researchers and organisational

theorists on how innovations should be implemented and managed and how they affect organisations on different levels.

During the last four decades, several studies identified significant factors that are frequently found to be associated with the adoption of information technology. One of those significant factors is the size of the organisation. One can say that the reason why size is found to be important in many studies is that size is an element which can be easily measured and is therefore included in many studies (Rogers, 1983). In the research field of studying the relationship between the structural dimensions of an organisation and its adoption and use of information systems technologies, Steiner and Teixeira (1990) considered a firm's size as the most frequently investigated structural characteristic. According to these authors this is partly because it is assumed that managers are very conscious of the economic and strategic incentives that favour the adoption and use of information systems technology by large organisations. Another reason is that increasing size leads to more complexity in communications and co-ordination, and therefore greater motives to apply and invest in information technology (Galbraith, 1977).

Harris and Katz (1991) reported that most of the organisational studies that have used the organisation size as a correlate of information technology adoption can be categorised into three types: (1) studies that investigated the relationship between firm size and whether computers were adopted; (2) studies that investigated the relationship between firm size and the number of operations computerised and; (3) studies that investigated the correlation between firm size and the ratio of information technology expenses to total operating expenses. Harris and Katz (1991) pointed out that most of

these studies concluded by showing the existence of a direct positive relationship between the firm's size and the adoption of information systems technologies. Moch and Morse (1977) and Kimberly and Evanisko (1981) concluded their studies with a positive correlation between hospital size and the number of computerised applications adopted. Computerised functions in eight areas were investigated: accounting, admissions, discharges, personnel records, payroll, medical records, research, and patient care. The first study used the number of patients admissions as a measure of the organisation's size, while the latter study used the number of hospital beds as the size measure.

The correlation between firm size and the ratio of information technology to total operating expense in the US life insurance industry has been studied and investigated by Harris and Katz (1991). For the purpose of their study, they used the ratio of information technology costs to total operating costs as a measure and dependent variable. Some of the key variables they used are: premium income, log of premium income, information technology spending, and log of information technology spending. In their study, Harris and Katz found that there is no positive relationship between firm size and the degree of information technology investment intensity. They also noted that large insurers on the average were not leaders in realising the full economic benefits of information technology. They suggested that firms should link the investments in information technology with the firm's strategy, the structure of the organisation, the measurement and control system, the reward system, and the characteristics of the technology. Many researchers have cautioned that while increasing the level of investment in information technology is important, the way this technology is used and managed to achieve the productivity and economic growth is even more

important. In the meanwhile, other organisational characteristics such as centralisation-decentralisation, formalisation, and complexity have been identified and investigated by researchers to give an understanding of the relationship between them and the adoption of information technology.

Gremillion (1984) has also investigated the relationship between the organisation's size and the use of information technology. He analysed the relationship between organisational size and the use of computers in the *US National Forest System*. He studied 66 of approximately 130 administrative units and used several measures of organisational size such as budget, number of employees, acreage and timber harvest. The conclusion of his study showed that there is no correlation between organisational size and the use of computer information systems. Many researchers believe that Gremillion's finding ought to be qualified. The reason behind this is that he gathered qualitative data on five administrative units that were located in the same region and were similar in size, but they were completely different in their use of computer systems. He concluded his study by reporting that in all cases the discrepancy in the intensiveness of computer use depends upon the presence or absence of key individuals. The presence of key individuals in some administrative units can promote computer use within these units. The role key individuals play in this context is similar to the role of champions in promoting and supporting technological innovations within organisations. Howell and Higgins (1990) found that the presence of a champion in an organisation is strongly correlated with the success of technological innovations.

We can conclude here that studies showed that several factors have become the promoters and the driving force to exploit and adopt advanced information technology.

These factors include the need to gain competitive advantages and to develop solutions to business problems. The desire to improve both the efficiency and effectiveness of the decision-making process and to enhance the productivity and quality of their business. The need to gain more fast, accurate flows of information and to overcome the constraints of time and place. And finally, the need to achieve dynamic stability and prosperity in a harsh complex environment, differentiate themselves from their competitors, compete for new markets and raise entry barriers for those markets. Information technology studies have identified specific organisational characteristics which affect the adoption of information technology. These characteristics include firm size, business sector, centralisation-decentralisation, formalisation, complexity, and the presence of “champions” in the organisation.

### **2.2.2 The Impact of Information Technology on Organisations**

With the rising importance of information technology during the 1980's and 1990's, numerous studies covering several issues can be found in the literature regarding the impact of information technology on organisations. For example, Morris and Westbrook (1996) discussed the impact of information technology on the retail financial services. Culpan (1995) focused on the impact of information technology on the attitudes of end-users. Other studies include, the impact of information technology on managers, the impact of information technology on the public sector and the governmental agencies. To review all these issues is beyond the scope of this dissertation. Therefore, we will include in the next sections and subsections only certain studies which focus on the impact of information technology on selected aspects of strategy, structure, and people which are the components of the organisation.

### **2.2.2.1 Strategy**

The linking of information technology applications to business strategy has for a number of years been identified as an essential element for successful organisations (Fitzgerald, 1998). It is widely accepted among many authors and researchers in the organisational field that information technology has a significant effect on the performance of the organisation's activities. For example, information technology applications can be used to improve the level of efficiency of administrative functions in an organisation and to enhance the effectiveness of managerial activities. These applications also can be used as tools to impose better organisation on tasks and to provide better information to managers. Zuboff (1988) pointed out that information technology applications are strongly altering the way in which production operations are carried out in a variety of industries. Some organisations are using information technology to create and acquire a competitive advantage. (Bhattacharjee & Hirschheim, 1997; Morris & Westbrook, 1996; Porter & Millar, 1985).

The administrative side of an organisation's activities are the targets for information technology to enhance efficiency and increase productivity. The goal in this side of the business is to reduce the cost per unit of output. How much output can be produced with as few inputs as possible is the "name of the game". Productivity improvement is very important, but at the same time we have to be aware of the limitations of assessing the impact of information technology on performance because it is very difficult to define or measure productivity for an office or information task. Productivity is calculated by dividing all outputs by all inputs. Unfortunately, measuring or even identifying all the related inputs and outputs is often a very difficult task to do and almost impossible to achieve. As a result, there are a number of different

productivity measurements each with different strengths and weaknesses (Panko, 1991). Furthermore, there is an ambiguity among scholars as they attempt to define what efficiency is. The definition of the term efficiency has led to diverse discussion in the literature. Confusion results from the two linguistically related terms effectiveness and efficiency. Whereas effectiveness can be interpreted as the efficient accomplishment of a task, efficiency is connected with the attainment of the economic goal, in the sense of an optimum ratio between cost and profit. This distinction is based on the American differentiation by which efficiency is defined as “doing things right” and effectiveness as “doing the right things”. Many European management scholars do not make the differentiation, they use the terms as synonyms (Ruhli & Sauter-Sachs, 1993).

The adoption of information technology applications for increasing and improving the effectiveness of organisations are oriented to the managerial and experienced staff rather than to the administrative staff. Many researchers and authors have written about the wide range of established and emerging technologies that offered advantages such as increased speed, greater productivity, and a convenience of operation (Culpan, 1995). Specific examples of these technologies include mainframe computers, minicomputers, executive information systems, groupware, voice messaging, on-line transaction processing systems, electronic mail, teleconferencing, object linking and embedding, artificial intelligence, various software tools for supporting analysis and decision-making, and finally the Internet.

There is a great deal of agreement among researchers that quantifying the impact of information technology on the performance of organisations is a very difficult process. There is no accepted measure among researchers and scholars for management

productivity. Productivity indicators based on overall production costs (output per unit of labour or relative to total factor inputs) are well-known to include arbitrary and possibly inflated cost elements, administrative costs, research and development costs, and maintenance expenditures among the firm's (or plant's) various products, divisions, or departments (Kaplan, 1983). Direct physical measures of output and inputs provide an alternative metric that permit process-specific comparisons of manufacturing performance associated with alternative technological choices and organisational designs (Mitchell & Stone, 1992). Other techniques to measure productivity are the time-based measures for key production operations. They are commonly used by industrial engineers and production managers to plan schedules, to estimate costs, and to monitor machine utilisation rates in batch manufacturing processes such as machining (Kelley, 1994). According to Panko (1991), one measure of office productivity is "output per hour". This measure can be calculated by dividing units of output by the number of hours worked to produce them.

Besides its impact on efficiency and effectiveness, the strategic significance of information technology has been covered by many researchers ( see, for example, Jelassi, 1993; Morris & Westbrook, 1996; Venkatraman, Henderson, & Oldach, 1993). Newman and Kozar (1994) have discussed how the use of information technology, if adapted and managed wisely, has increased and enhanced the productivity of a large organisation. They explained how the state-of-the-art multimedia system which is named "MEDUSA" for Zale Corporation (US), the world's largest jewellery retailer, managed to allow the company's expert geologists to increase their productivity by 600 percent, and increase Zale's recovery from damaged merchandise by millions of dollars. The development of the MEDUSA system was based on a need to manage the

elimination of an unusable inventory from *Zale's Corporation's* 1500 stores and recover as much revenue as possible from its final disposition. The tangible and intangible results after using this system were impressive.

A useful framework for analysing the strategic significance of information technology has been provided by Porter and Millar (1985). They introduced the concept value chain which explains how and why the technology is changing the way organisations work from inside as well as changing the relationship between organisations and their suppliers, customers and competitors. Watanabe and Arao (1995) discussed how the Japanese Omron Corporation successfully deployed information technology to help managers to use and share information instantly through a creative information system. The system also has encouraged the company to create an innovate corporate culture with improved creativity and superior ideas. There are many cases that indicate how information technology has the power to improve the performance of organisations. However, we should be very careful in interpreting such findings because of the high degree of selectivity involved in collecting evidence, especially as the literature tends to mainly report the success stories.

Despite the remarkable improvements in the computing power in recent years, the empirical research on the economic impacts of information technology does not show a consistent pattern of enhanced productivity through information technology investment. This has been named as the "IT productivity paradox" (Brynjolfsson, 1993), and many researchers today are paying significant attention to resolve this issue. It is true that not all the stories reported in the literature are successful. Some of the researchers reported some cases that reflect the failure to improve the overall

productivity of the organisation. A study carried out by Robson (1993) shows that a significant number of companies have not achieved the expected business benefits from information technology. Kettinger, Grover, Guha, and Segars (1994) suggested that the introduction of strategic information technology has not always resulted in an improved competitive position and there is no evidence of strong productivity gains from information technology investments. Clearly more research is needed to address the relationship between the adoption of a “strategic system” and positive return on a firm’s bottom line. Roach (1989) in a series of publications, has found similar results to Kettinger et al. (1994) for the relationship between information technology and productivity. Roach pointed out that the average production worker in manufacturing and agriculture had many times the capital investment of the average office worker. Empirical studies including large and small organisations have never been able to demonstrate fully the impact of information technology on organisational productivity (Raymond, Pare, & Bergeron, 1995). Brynjolfsson (1993) classified potential reasons for the generally disappointing results of information technology impacts studies into four categories: (1) mismeasurement of outputs and inputs, (2) time lags due to learning and adjustment, (3) redistribution and dissipation of information technology generated profits, and (4) mismanagement of information and technology. It is clear that further research should be conducted to gain more understanding of the relationship between information technology and productivity.

In summary, some researchers reported a successful impact of information technology on the productivity of some organisations. There are a variety of ways to evaluate the impact of information technology on the performance of an organisation. Because there are difficulties in evaluating the impact of information technology on the

performance of an organisation, we can see a number of different productivity measurements each with different strengths and weaknesses. Several studies have found no significant relationship between the use of information technology and performance and suggested that further research and studies in this field should be conducted.

#### **2.2.2.2 Structure**

In this subsection we will discuss two aspects of the impact of information technology on organisational structure. The first aspect is concerned with the effect on the decision-making process, while the second is concerned with the effect of information technology on the organisation's form.

The relationship between the centralisation-decentralisation dimension and the implementation of information technology in organisations has been predicted by Leavitt and Whisler (1958). They predicted almost four decades ago that because information technology would make centralisation much easier, companies would re-centralise. They stated:

**“We believe that information technology will spread rapidly. One important reason for expecting fast changes in current practices is that information technology will make centralization much easier... Information technology should make recentralization possible. It may also obviate other major reasons for decentralization... Speed and flexibility will be possible despite large size, and top executives will be less dependent on subordinates because there will be fewer “experience” and judgement areas in which the junior men have more working knowledge.” (p 43)**

Today, centralisation-decentralisation is one of the most frequent issues of the organisational literature, and has been debated extensively. Some authors report that after its introduction, information technology leads to greater decentralisation (Foster & Flynn, 1984), while others report that it leads to more centralisation (Kraemer, 1991). Some empirical studies suggested that there is no inherent relationship between computerisation and decision authority structure; that is, decision authority structure is determined by factors other than computerisation (Buchanan & Boddy, 1983; Carter, 1984). Some other studies noted that the introduction of information technology leads to centralisation and decentralisation at the same time (Dawson & Mclaughlin, 1986; Gurbaxani & Whang, 1991). It decentralises the decision-making process with tighter supervision and control (Bird & Lehrman, 1993).

Information technology increases access to information within organisations. Employees at the lower levels of the organisation now have the chance to access much more information than in the past. Managers are able to permit and provide more information to subordinates, thereby allowing them to make more routine decisions lower in the hierarchy. They can now watch and track their subordinates behaviour and performance almost instantly and intervene when necessary. Coordinating between superiors and subordinates became easier, faster, and more efficient than before. With the use of information technology, coordinating activities became more effective and both time and distance effects can shrink to near zero (Scott Morton, 1991). On the other hand, superiors still have the power and control the setting of goals and strategic decisions, keeping them up in the hierarchy. As a result one notes that there is a speeding up and decentralising of the operational decisions but still there is control and centralisation of the strategic decisions (Bird & Lehrman, 1993). A good example of this

technique is the introduction of an expert system in General Electric's maintenance area which increased the power of decentralised units because they became less dependent on the company's headquarters. On the other hand, the expert system was used as means of increasing control and centralisation by the top management (Turban et al., 1996).

Formalised organisations are those in which more management techniques such as inventory control, quality control, project management and financial analysis are applied (Raymond et al., 1995). It has been found that various applications of information technology can lead to greater formalisation by requiring formal representations of the object systems and decision processes that are to be supported (Grover, Teng, & Fiedler, 1993). On the other hand, Keen (1991) suggests that information technology can lead to less organisational complexity by eliminating delay, administrative intermediaries and redundant procedures and steps in transactions and by bettering and improving access to information. An excellent example of the successful adaptation of information technology is the case of Citibank's transformation of its credit analysis system. Employees in the bank's credit department used to carry out their tasks on paper but after using advanced information systems the time employees spent recruiting new business have improved from nine percent to 43 percent. As a result, profits increased by over 750 percent over a two-year period (Grover et al., 1993).

The implementation of information technology within organisations has a significant impact on the organisational form. Most of the studies conducted in this area showed that information technology deployment is the critical enabler of organisational restructuring and the main reason behind the emergence of new organisational forms (Carroll, 1994; Scott Morton, 1991; Baskerville & Smithson, 1995). In the US, for

example, the 1980's and the 1990's witnessed a strong movement towards downsizing among large business organisations such as IBM, AT&T, and many others. The public sector has also followed the same path through the US Department of Defence consolidation and base-closing activities and with the Clinton administration call for sweeping consolidation and downsizing within federal government agencies. Even small-size firms like UCAR carbon have witnessed similar movement (Stebbins et. al, 1995). Based in Clarksville, Tennessee, UCAR carbon was suffered by high pricing and outmoded production methods. The company hired Anderson Consulting in 1991 to help it re-engineer. Within Anderson, information technology is considered the engine that drives re-engineering. With expert advice from Anderson, the company eliminated assembly lines and formed new worker teams in manufacturing, order processing and other mainstream areas. Now, one employee with a workstation connected to a network can respond to a customer's request for price quotes within minutes, in lieu of time-consuming information gathering from affected departments. Workers on the assembly line can access vital order information on the same network using workstations. All the changes were made possible by new information and communication systems that Anderson designed (Business Week, 1993).

Several factors cause this shift to smaller organisations rather than large ones. The aggressive global competition, the shift to a services rather than manufacturing economy, the advancement in technologies, particularly information technology, the customer demands, and financial and economic pressures are the main forces behind this movement. Organisations, particularly large ones, started to rethink and search for solutions and ways of reducing costs, increasing overall performance, and achieving stability and growth in this new harsh business environment. Management theorists

rushed to offer alternative solutions as organisations started to break down rigid hierarchies and get rid of unproductive workers. Downsizing, right sizing, outsourcing, re-engineering became the solutions for many organisations. Since the 1980's, and continuing in the 1990's, all these movements have swept through many organisations throughout the world as strategic tools to reduce costs. In many cases, it would appear that the focus is on reacting to the threat or cleaning up inefficient processes (Scott Morton, 1995).

Brynjolfsson (1994) reported that information technology will result in reduced integration and smaller firms. He also concluded that it leads to better informed workers who need incentives, enables more flexibility and less lock-in the use of physical assets, and allows direct co-ordination among agents, reducing the need for centralised co-ordination. Many researchers believe that the three old basic of organisational forms: the functional, the divisional or the matrix are not successfully meeting the needs of the information age and change should be made because everything is changing around us. Some authors noted that even changing and modifying the old forms has failed. According to Hoffman (1994), old hierarchical organisational form is dying after a century and a half of success because it cannot meet the needs of the 1990's. As a result, new organisational forms have emerged. Most of these new forms rely extensively on the effective use of advanced information technology.

One of the new organisational forms is the spider's web or the networked organisation (Scott Morton, 1995). The networked organisation is a smaller organisation with an extremely flat structure, a high level of communication and information distribution between individuals and groups, fewer managerial levels, a larger span of

control, fewer line managers, less experts (because of expert systems), and fewer retrained and empowered workers each doing a greater amount of work than before. An example of this is the reorganisation of Bank of America in 1985 and Citibank Corporation in 1991 and the recent IBM reorganisation, each of which resulted in a smaller organisation, larger span of control, and a much flatter structure (Turban et al., 1996). The Massachusetts Institute of Technology (MIT) management program has identified seven key attributes of the networked organisation: shared goals, shared expertise, shared work, shared decision making, shared timing and issue prioritisation, shared responsibilities, accountability and trust, and shared recognition and reward. This form of organisation is particularly relevant for services, organisations or any other knowledge intensive type of business. As this is an increasing sector of Western economies, it is likely to become an even more prevalent form (Scott Morton, 1995).

In summary, the relationship between information technology and the decision-making process has been studied by researchers for the last four decades. Some earlier studies showed that using information technology in organisations leads to decentralisation of decision making. More recent studies show that information technology leads to centralisation and decentralisation in the same organisation at the same time and it is still difficult to establish a clear conclusion. Research shows that information technology applications can lead to more formalisation and less organisational complexity. Moreover, information technology is the critical enabler of organisational restructuring and the powerful force behind the emergence of new organisational forms such as the “spider’s web or the networked organisation”.

### **2.2.2.3 People**

The issue which has perhaps caused most controversy and concern with regard to the impact of information technology has been its effect on employment at the organisational level. Two distinct views have emerged: that information technology will lead to job loss and more unemployment; and that, by itself, information technology will increase the level of employment and will create more jobs. By and large, most of what has been written falls into one of these two camps: the pessimists; and the optimists.

In their famous article “Management in the 1980s”, Leavitt and Whisler (1958) were amongst the first pioneers who conjectured that information technology would have a great impact on employment, especially on the middle management level of organisations. They predicted that jobs in middle management would become highly structured and much more of the work would be programmed, covered by sets of operating rules governing the day-to-day decisions that are made. As a result of that and with the top management having better control over information, innovating, planning, and other “creative” functions, middle managers would be eliminated and other specialists called “operations researchers” or “organisational analysts” would take their places. Leavitt and Whisler reported that certain classes of middle management jobs would move downward in status and rewards while other classes would move upward into the top management group.

#### **2.2.2.3.1 The Pessimists**

During the 1980’s and still continuing in the 1990’s, the downsizing phenomenon became the most recommended strategic solution for most medium and large size organisations throughout the world (Stebbins, Sena, & Shani, 1995). This

phenomenon affected two major elements of the organisation: (1) people (employees) and (2) structure (organisation form). According to many authors who focused more on large organisations, several factors can explain why the trend to reduce the size of organisations occurs and what forces produced it. Several studies and research projects pointed out that economic recession, slow economic growth, increased international competition, lower costs and advancement in information technology were the main factors leading to downsizing. Even with economic recovery, this movement is still continuing according to the *Business Week*'s cover story "The Pain of Downsizing". It claims that "despite the economic recovery, massive downsizing continues at one brand-name behemoth after another" (Business Week, 1994, pp. 60-69).

The widespread phenomenon of downsizing became a necessary and effective strategy to reduce labour and costs for many organisations (Bahrami, 1992; Dewitt, 1998; Vollmann & Brazas, 1993). The massive deployment of information technology has been the major explanation offered for this development (Carroll, 1994). According to Tomaska (1987), organisational downsizing is in part a response to the bulge in organisational pyramids. The bulge is referring to middle managers and staff members. Top managers have come to the conclusion that their organisations have too many employees in relation to their competitors and believe this represents inefficiency and restricts the flow of information. As a result, top managers seek to downsize and replace people by installing new computer software and other information technologies. Drucker (1988) predicted that information-based organisations would threaten the status and opportunities of middle management. He stated:

**"...management levels and the number of managers can be sharply cut. It turns out that whole layers of management**

**neither make decisions nor lead ... instead their main, if only function, is to serve as relays, human boosters for the faint, unfocused signals that pass for communication in the traditional, pre-information organizations.” (p 46)**

As a result of this movement, many organisations have become smaller in size and a large number of white-collar employees, particularly middle managers, have lost their jobs. In the United States, the size of the average business organisation has declined by roughly 30-40% from 1960 to 1989 (Carroll, 1994). More than 85% of Fortune 1000 firms downsized their white-collar workforce between 1987 and 1991, affecting more than five million jobs. In 1990 alone, more than 50% were downsized. Almost a million American managers with salaries exceeding \$40,000 lost their jobs in 1990, and more than half took pay cuts of 30-50% to get new jobs. IBM alone reduced its employee numbers by 33,000 from 1986 to 1990 (Vollmann & Brazas, 1993). Moreover, American companies announced 615,186 layoffs during 1993 alone and 319,000 job cuts in the first seven months of 1994. While middle managers make up only five to eight percent of the work force, they have suffered 17 percent of the job losses between 1989 and 1991 (Dougherty & Bowman, 1995).

In 1993 layoffs were also taking place in Europe. In 1993, 3,000 jobs were lost at BMW, 20,000 jobs at Daimler Benz and 10,000 at Volkswagen. Ford of Europe announced 2,100 layoffs in Britain, British Aerospace 2,500. Europe's largest steel maker, France's Group Usinor Sacilor announced 8,000 job cuts. It became a tragedy for many employees and as some authors said: “downsizing aims to cut costs by cutting heads” (Vollmann & Brazas, 1993).

### **2.2.2.3.2 The Optimists**

On the other hand, some researchers reported a different story, an optimistic one. They pointed out that information technology, instead of leading to downsizing and subsequently causing job loss, actually increases employment and creates new jobs. Osterman (1986) found that information technology investment can lead to an increase in the number of clerks and managers employed after several years. He listed several means by which information technology can affect clerical employment. Firstly, computers can replace clerks. Secondly, information technology may create new jobs such as data entry clerks. Thirdly, the implementation and use of information technology can lead the organisation to more efficiency, more productivity, and more demand for its products and thus can increase the firm's level of employment. Berndt and Morrison (1991) found that information technology was on balance a complement, not a substitute for labour, especially white collar labour. There is no doubt that many people have been displaced by computers and many other information technologies, but at the same time many more have gained employment due to information technology. The increase in productivity provided by information technology leads to lower costs and prices for products and services. Computers encourage competition, which leads to further decline in prices. Lower prices means higher demand which, in turn, creates more jobs. The computer industry itself has created millions of new jobs.(Turban, McLean, & Wetherbe, 1996).

The Massachusetts Institute of Technology (MIT) management program concluded that the relationship between technology and employment has two effects: (1) the aggregate level and (2) the firm level. On the aggregate level, overall employment will increase and the fears of a growth in unemployment are not justified. On the

organisational level, some companies may experience employment decline while others are adding to their staff. The impact of this on the labour force depends on the effectiveness of labour market institutions in matching workers with jobs. The Massachusetts Institute of Technology (MIT) management program shows that several research efforts have been carried out to measure technology's impact on the level of employment but they found that the subject is very complex (Osterman, 1991).

In summary, there are different views on the impact of information technology on the level of employment. Many organisations used information technology to downsize. They became smaller with less employees than before. The result was the loss of jobs for millions of people around the world. Other cases reported that information technology leads to more efficiency, more productivity, higher demand for products and thus indirectly increases the total level of employment. Finally, on the industrial level, overall employment will increase and the fears of a growth in unemployment are not justified. On the organisational level, some companies may experience employment decline while others are growing. Current evidence seems to suggest that information technology displaces more jobs than it creates.

### **2.3 The Implementation Perspective**

In order to maximise the benefits from investing in information technology, organisations must understand how to manage their implementation processes. According to McKersie and Walton (1991), information technology implementation consists of three broad subtasks: designing the information technology system and the organisation that will operate it, developing enabling human resources policies, and managing the implementation process. A major concern in such efforts is the

recognition by management of the critical issues to be raised and solved throughout the implementation processes. Leavitt and Whisler (1958) speculated that the introduction of information technology into an organisation involves organisational change. Organisational change happens because of internal and external pressures such as competition, advancement in technology, and customer demands. The kinds of changes that have to take place if an organisation is to successfully compete through the decade of the 1990's require a challenging degree of organisational "re-engineering" (McKersie & Walton, 1991).

The implementation of information technology to an organisation will create changes in all areas of that organisation and these changes need to be well managed if that technology is to be successful. From a technological diffusion perspective, Cooper and Zmud (1990) have defined information technology implementation as an organisational effort directed toward diffusing appropriate information technology within a user community. Because the implementation is a complex contingent process, today's top-level management faces an imminent and critical problem in dealing with adapting to the organisational changes that information technology is generating (Sankar, 1991). The problem for most executives is that managing change is unlike any other managerial task they have ever faced. As one top manager at a large corporation pointed out, when it comes to handling even the most complex operational problem, he has all the skills he needs, but when it comes to managing change, the model he uses for operational issues doesn't work (Duck, 1993). The implementation research suggested that there are a variety of factors which affect the success or failure of information technology, including organisational context, technical factors, human factors, and attitudes and the decision style of management. In this section, we will discuss a

selection of the published research in this field, addressing some issues related to the implementation and management of information technology. These issues are: approaches to information technology strategic planning, technical and behavioural considerations, and the role of top management.

### **2.3.1 Approach to IT Strategic Planning**

Research in the field of the development of information technology management showed that organisations go through several stages of growth as they adapt and implement technology. Gibson and Nolan (1974) developed what is called the stage hypothesis which explains the various stages that organisations pass through as they become computerised. They identified four stages: initiation, expansion, formalisation, and maturity. In his article “Managing the Crisis in Data Processing”, Richard Nolan (1979) later developed a model which expanded the number of identified stages from four to six. These six stages are: initiation, contagion, control, integration, data administration, maturity. A major implication of Nolan’s model is that management should evolve as information technology is assimilated into an organisation. His work forms a significant basis for understanding the introduction and assimilation of new technologies into organisations. His model is an important management concept because it provides insight into the technology adoption processes. More than that, the stages-of-growth concept is useful because this phenomenon can be observed at several different levels within an industry or within an organisation and because the model provides predictability for the organisation managers as they can observe the technology adoption process occurring. (Frenzel, 1992).

Kwon and Zmud (1987) developed another information technology implementation model based on the organisational change, innovation, and technological diffusion literature. Based on Lewin's change model, they proposed a stage model for the implementation of information technology which consisted of six stages: initiation, adoption, adaptation, acceptance, routinization, and infusion. Even though their model and all other sequential stage models largely contributed to enhance our understanding for the implementation processes, some studies suggest that such models may not depict the actual implementation process and it may be more appropriate for technologies which are borrowed or adapted rather than custom made (Cooper & Zmud, 1990).

In the 1990's, information technology strategic planning systematically became a part of overall organisation strategy because well-planned use of information technology is critical for success. This goal can be achieved only when strategic plans for information technology are integrated with the strategic plans of the company (Hoffman, 1994). Today, setting information technology strategy is a very important issue for the managers of most organisations. In 1991, the Index group Inc., an international consulting group based in Cambridge, Massachusetts specialising in information technology, studied data which was obtained by surveying 394 information system (IS) executives at large American corporations for the top ten management issues. Aligning IS and corporate goals and IS strategic planning ranked highly in this study. Alignment refers to the idea that the requirements of the particular information technology system are matched by the capabilities of the organisation (McKersie & Walton, 1991).

A number of studies suggested some frameworks for the development of an information technology strategy. Keen (1984) emphasised the importance of a vision in which he explained why changes are to take place. Some elements of a company vision are: the need to serve all stakeholders, the requirements of empowered employees, and the need for quick responses to business change. The development and deployment of an information architecture is an essential part of information technology strategy as Hoffman (1994) stated:

**“Without an orderly and consistent framework within which to implement and manage information systems, a chaos will ensue that will make it impossible to respond to changing needs or to gather the cross-functional information that empowered workers need. Information architecture (strategy) provides that framework.” (p 47)**

### **2.3.2 Technical and Behavioural Considerations**

The success of information technology planning process is governed by how well the accompanying change is managed. The extent of the change will depend on a number of factors including the information technology base of the organisation, the skills and abilities of organisational members and the attitude of both management and employees (Peppard, 1993). Studies shows that the change occurring with the introduction of information technology into an organisation, if not managed positively, can give rise to several problems.

Several issues influence the effective implementation of information technology. Behavioural issues that involve the attitudes, values and behavioural patterns of organisational members is one of those significant considerations that face today's

organisations. Sankar (1991) pointed out that attitudes toward computer technology are one of the components of the psychological climate within the organisation that determine how users react or behave when confronted by the need to interact with some aspect of an information system, whether it be the technology itself or those who implement it. Resistance to change is probably one of the greatest issues that affect the implementation process. The introduction of information technology to an organisation requires people to change the ways in which they do their jobs. Most people resist changes because they are comfortable with their current ways of doing things and they are afraid and unsure about how the new situation will work out (Hoffman, 1994). Beatty and Gordon (1988) pointed 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 do not use it see the reverse. As a result, it is in the self-interest of some groups to resist the introduction of new technology or, at least, to ensure its failure. Keen (1981) identified one of the primary causes of social inertia. He found that information is not only an intellectual commodity but also a political resource that can affect the interests of particular groups in the organisation who will resist the implementation of information technology.

Zuboff (1988) has described the revolutionary changes in jobs and control processes within organisations that take full advantage of information technology. She called those kinds of organisations the “informed” organisation. In the 1990’s and with the global market environment, aggressive competition and an increasing trend to the extensive use of information technology, many issues should be considered by a company’s managers during the implementation process. These include re-engineering, job design, expectations from technology, user skills, empowerment, education, and

training. Some researchers in the field of information technology have addressed new problems and new issues. Turban et al. (1996) discussed ethical issues such as information privacy for individuals, accuracy of information collected and processed, property or ownership and value of information, and accessibility to information. Because of the complexity of such issues, many companies and professional organisations develop their own codes of ethics which can be described as a collection of principles intended as a guide for the members of the company.

Beatty and Gordon (1988) conducted a study to identify the barriers to the implementation of CAD/CAM systems. In their study, they interviewed more than 200 managers and operating-level employees and identified three barriers to successful implementation of CAD/CAM systems. Those barriers fall into three categories: 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 subdivided, planning, measurement, and reward systems. The human barriers include the psychological factors that arise in most periods of change such as the uncertain outcomes associated with the change process, and the strong resistance to the new technology. The technical barriers are factors in the technology itself such as design weaknesses or lack of incompatibility of the system. Hoffman (1994) pointed out that building any new information system is risky because it might not be completed on time, within budget, or with the required functionality. The system size is also another issue which must be considered as information technology strategy is reviewed. This clearly suggests that structural, technical, and behavioural issues play a significant role during the deployment and implementation of information technology.

Different frameworks and methodologies have been developed by some researchers to ease the implementation process of information technology into firms. Davenport (1994) suggested that changing the company's information culture is the best way to the successful information technology implementation. Changing company's information culture required altering the basic behaviours, attitudes, values, management expectations, and incentives that relate to information. Davenport (1994) added that changing the information culture is a task which is not as simple as some managers believe but it is the hardest one to carry out. Some authors stressed the need to create a vision that helps planners co-ordinate the organisational structure and the information technology systems (Mische & Bennis, 1996). Others stressed the presence of a champion who can facilitate the change. Benjamin and Levinson (1993) pointed out that it is risky to attempt complex change without a champion. They added that the champion can provide advocacy for funding and other key resources, influence critical stakeholder groups, and provide coaching and counselling on stakeholder and resource issues as needed.

One of the ways to reduce the resistance to change following the introduction of information technology is to attempt to change people's attitudes about the changes that are going on within the organisation (Peppard, 1993). The motivation of users and support of other stakeholders such as their managers and union officials have always been necessary to avoid resistance to either the information technology itself or organisational changes required to fully utilise the new technology (McKersie & Walton, 1991).

Turban et al. (1996), suggested that the unique processes of information management function include strategic information planning, system building and maintenance, change management, system operation, and information management advisory services. Peppard (1993) suggested an integrated approach to managing change during the implementation of information technology. Organisations who wish to manage change effectively do so through people. He noted the critical and central role of people in the linkage between strategy, organisation, business processes and technology. He offered three general types of strategies to deal with changes occurring with the introduction of information technology into an organisation. A rational persuasion strategy or a top down approach, where rational arguments are used to persuade employees of the necessity for change, forced coercion strategy which entails making direct threats if the change is not accepted, and a shared power strategy which allows the involvement of employees in the taking of key decisions.

### **2.3.3 The Role of Top Management**

The top management involvement during the implementation of information technology into an organisation is a very important step in order to reach the targeted objectives of using information technology in the organisation. Top management involvement is necessary during the developing and planning stages of the information technology strategy and through the implementation process. Many studies dating back to the 1960's shows the importance of the senior management role for the introduction of information technology into an organisation. McCosh (1985) pointed out that top management commitment is a must in order to achieve successful introduction of information technology. Igarria, Zinatelli, Cragg, and Cavaye (1997) who studied the personal computing acceptance factors for 358 users spread across 203 small firms in

New Zealand, found that management support was the greatest influence on information system effectiveness in small firms. It is true that top management could work either as a driving or restraining force in the use of information technology. Without the understanding, active support and motivation of the top management, the potential for information technology to improve corporate performance will never be realised (Hoffman, 1994). The Massachusetts Institute of Technology (MIT) management program has emphasised the importance of top management involvement in developing and implementing information technology. The program suggested that top management should provide a clear vision of the organisation it wants and describe the steps to the realisation of that vision. This program has presented the following guidelines for the role of top management:

- Set policy regarding where to introduce information technology and how to establish priorities for competing projects,
- Develop understanding of the capabilities and limitation of information technology,
- Establish reasonable goals for information technology systems,
- Exhibit a strong commitment to the successful introduction of information technology,
- Communicate the corporate information technology strategy to all employees.

To summarise, top management support is an essential step towards successful information technology implementation in business organisations. It is the role of top management to up draw information technology strategies, aligning information technology planning with that of the enterprise, and facilitating organisational learning and use of information technology within the organisation. Moreover, top management

has a significant role in solving technical and behavioural obstacles that can hinder the effective use of the information technology. Without involvement and support from the organisation's top management, information technology objectives will not be achieved and a valuable strategic weapon will not be effectively used.

# **CHAPTER THREE**

## **THE ENVIRONMENT WITHIN THE KINGDOM OF**

### **SAUDI ARABIA**

#### **3.1 Introduction**

The main objective of this research is to understand the impact of information technology on organisations in the Saudi private sector, in order to achieve this, it is very important that we shed some light on the general environment of that country. Today, the world is looking at Saudi Arabia as an important country which plays a significant role in global political and economic issues. Its significance derives from many factors, these are political, strategic, religious, and economic. The Kingdom is currently the world's largest oil exporter and its huge oil reserves indicate that it will play an important role in the oil market for a long time to come, at least for the first decades of the next century. This chapter will provide the reader with a better understanding of the Kingdom of Saudi Arabia. The chapter consists of three main sections. The first section will provide general background information about Saudi Arabia. The second section will talk more about the Saudi economy in general and the private sector in particular. The final section will give details of the present situation of the Saudi information technology environment.

#### **3.2 General Background**

This section consists of four subsections. These subsections will enable the reader, to form at least a simple picture of how the Kingdom of Saudi Arabia looks from inside. In the first subsection, we will give a brief historical background of Saudi Arabia. In the second subsection, we will talk about the important geographical location

of the country. The third subsection will discuss the demographics of Saudi Arabia, whilst the last subsection discusses the Saudi political and legal system.

### **3.2.1 A Historical Background**

The Kingdom of Saudi Arabia was formed and officially proclaimed fully sovereign on September 22, 1932 by King Abdul-Aziz Ibn Saud. The formation of the kingdom was the culmination of almost two centuries of conflict within the Arab peninsula (Presley, 1984). These conflicts were born out of the determination by the Saud family to purify the Islamic faith and to reassert that “there is no God but Allah and Mohammed, peace be upon him, the prophet of Allah”. At that time, King Abdul-Aziz succeeded in integrating the various tribes, formerly divided within the region, into the new national political structure of the Kingdom (El Mallakh & El Mallakh, 1982). King Abdul-Aziz devised a brilliant plan to settle the nomad tribes. Abdul-Aziz devised a two-stage plan called the Hijra Plan (an agricultural oasis settlement) for settling the Bedouins. First, he sent preachers to various tribes, teaching them the essence of Islam and encouraging them to engage in agricultural labour. Secondly, he settled the Bedouins in agricultural settlements established according to the Islamic teaching. The first of these projects was a success, and was followed by many others in different parts of the region. By doing so, he reasoned that a great service would be accomplished to the people and a strong union would result. Once the Bedouins were settled, some differences that had developed between warring factions would be minimised or eliminated. This became the central focus of his long-range planning (Rashid & Shaheen, 1992). Indeed it was Islam that had led to the emergence of Saudi Arabia and it was the tie of faith rather than anything else which enabled King Abdul-Aziz to found the kingdom (Al-Farsy, 1985).

King Abdul-Aziz died in 1953 after a successful and continuous struggle, which led to a cultural development. He has since been succeeded by several of his sons. Saud reigned from 1953 to 1964, Faisal from 1964 until 1975; Khalid from 1975 until his death in 1982 when King Fahad bin Abdul-Aziz became the King of Saudi Arabia.

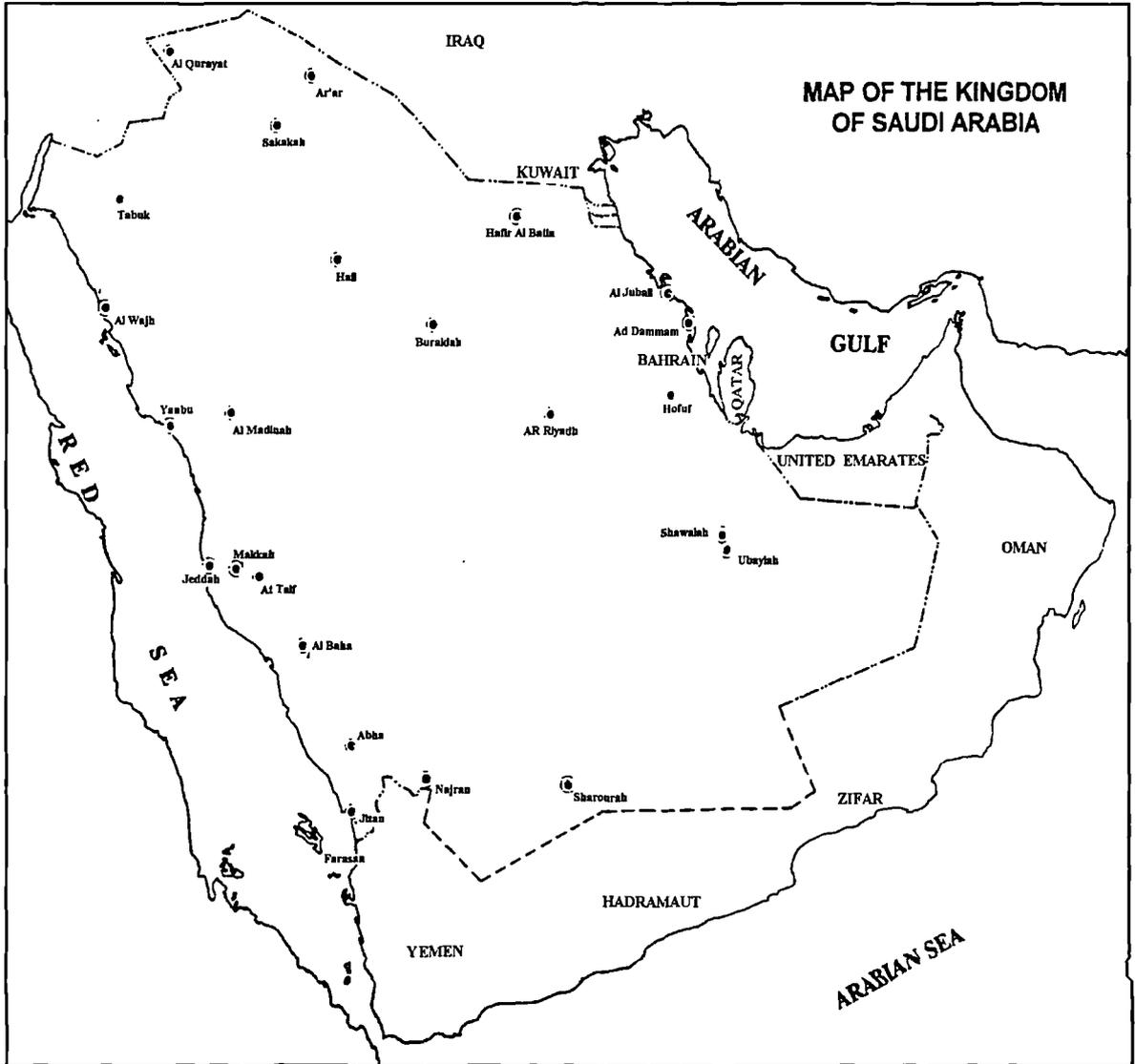
### **3.2.2 The Geographical Dimension**

Saudi Arabia is a large country. It encompasses about four-fifths of the Arabian Peninsula with a total of 2,240,000 square kilometres (see figure 3.1). The Kingdom's area is just over a million square miles, one-third the size of the United States of America. Aside from the country's religious and economic significance, the potential importance of Saudi Arabia's geographical position is quickly apparent: it is strategically located between Africa and mainland Asia, lies close to the Suez Canal and has the frontiers on both the Red Sea and the Arabian Gulf.

Saudi Arabia's latitude dictates that its climate is very hot. There is, however, remarkable variation in the climate among the various regions of the Kingdom. The north and the central regions of the country enjoy a continental climate: summers are quite hot; winters quite cold, and all seasons are dry. On the coasts the humidity can be high but the seasonal variations in temperature are moderate. The mountainous regions of the south-west enjoy a distinctly milder climate than the rest of the country, as well as a great deal more rainfall. Indeed, this is the only region, which receives an appreciable amount of rainfall. A notable result of the scarcity of rainfall is that the Kingdom contains no permanent rivers or bodies of water (Johany, Berne, & Mixon, 1986).

**Figure 3.1**

**Map of the Kingdom of Saudi Arabia**



Source: Ministry of Planning, Sixth Development Plan, 1415-1420 (1995-2000), 1996. (pp 35)

### **3.2.3 Demographic Considerations**

#### **3.2.3.1 Population**

According to the primary results of the general census in the Kingdom of Saudi Arabia on September 27 1992, the total population of the country was 16,929,294; of this total 12,304,835 (72.7%) were recorded as Saudi citizens and 4,624,459 (27.3%) as non-Saudi residents (Business Monitor International, 1995). The proportion of non-Saudis to Saudis is decreasing, falling from 39 percent in 1986 to 27.3 percent in 1992. Further, estimates based upon the population of Riyadh indicate that 56 percent of the Saudi population is under the age of 20. An additional 22 percent is aged 21-29. There is no doubt that the country's population growth rate is extremely high. The World Bank estimates the population growth rate of a round 3.3% until the end of the century. The national forecast for the year 2000, based on an annual population growth rate of 3.2 percent, is 23.1 million, of whom 6.2 million will be non-Saudis. The growth rate in 1995 stood at over 3.6 percent (Business Monitor International, 1995).

#### **3.2.3.2 Labour Force**

The total labour force in Saudi Arabia increased by 818,300 workers during the Fifth Plan period (1990-1995), from 6,049,400 in 1989/1990 to 6,867,700 workers at the end of 1995, or at an average annual rate of 2.6 percent. The number of the Saudi workers rose by 402,700 in the same period, from 1,981,500 in 1989/1990 to 2,384,200 in 1994/1995 or at an average annual rate of 3.8 percent. As a result the Saudi share of the total employment figure also increased from 32.8 percent to 34.7 percent. Table 3.1 shows the employment trends by sector in the Fifth Plan period. The largest increase occurred in the community and personal services sector, where additional 326,000 workers were employed. Other sectors witnessed increases in the number of employees.

The construction sector 144,000, the trade sector 114,800, the government services 106,500 and other manufacturing 69,100 (Ministry of Planning, 1996).

**TABLE 3.1**  
**Employment by Sector in the Fifth Development Plan**  
**(in thousands)**

	<b>1409/1410</b> <b>(1989/1990)</b>	<b>1414/1415</b> <b>(1994/1995)</b>	<b>Change</b>
<b>Producing Sectors</b>	<b>1,874.8</b>	<b>2,088.9</b>	<b>214.1</b>
Agriculture, Forestry, Fishing	393.2	377.2	(16.0)
Other Mining, Quarrying	3.7	4.4	0.7
<b>Manufacturing</b>	<b>494.7</b>	<b>566.9</b>	<b>72.2</b>
Petroleum Refining	15.2	16.8	1.6
Petrochemicals	6.5	8.0	1.5
Other Manufacturing	473.0	542.1	69.1
Electricity, Gas, Water	66.5	79.7	13.2
Construction	916.7	1,060.7	144.0
<b>Service Sectors</b>	<b>3,414.8</b>	<b>3,906.4</b>	<b>491.6</b>
Trade, Restaurants, Hotels	921.9	1,036.7	114.8
Transport, Communication	274.9	319.9	45.0
Finance, Insurance, Real Estate, And Business Services	324.6	330.2	5.6
Community and Personal Services	1,893.4	2,219.6	326.2
<b>Government Services</b>	<b>711.2</b>	<b>817.7</b>	<b>106.5</b>
<b>Non-Oil Sectors</b>	<b>6,000.8</b>	<b>6,813.0</b>	<b>812.2</b>
Crude Oil and Natural Gas	48.6	54.7	6.1
<b>Total</b>	<b>6,049.4</b>	<b>6,867.7</b>	<b>818.3</b>

Source : Ministry of Planning, The Sixth Development Plan (1995-2000) 1996, p.80.

The Kingdom depends upon a large number of immigrant labourers from North Africa, South Asia or the Far East. The government's current five-year plan (The Sixth Plan) projects 65,990 Saudis joining the manpower market by the year 2000. The government has undertaken a programme of "Saudisation" aimed at employing more Saudis in the public and private sectors. The programme aims to replace expatriates with 319,500 Saudis. In addition, the government hopes to create 340,400 new jobs during this same period (Ministry of Planning, 1996).

### **3.2.4 The Political and Legal System**

Monarchy is the political system in Saudi Arabia. The King, who is in charge of the Council of Ministers (Majlis Al-Wuzara), heads the government. In the final days of King Abdul-Aziz's reign (1953), the Council of Ministers was created as a cornerstone for significant changes in all areas of national life in Saudi Arabia (Al-Farsy, 1990). The Council of Ministers is the most powerful body of all the agencies and organised offices of the government of Saudi Arabia. It derives its power directly from the King and it can examine almost any matter in the Kingdom from the government's annual budget, defence expenditure and economic, regional and industrial policies. Final approval of the Council's decisions rests with the King who is also responsible for selecting the members of the Council. On August 2, 1995 and as a major change in the government, the Custodian of the two Holy Mosques, King Fahad, issued 18 changes in the Council of Ministers that included 15 new ministers most of whom are very well educated in Europe and the United States of America.

Early in 1992, a document entitled "The Basic Government System" was issued. This document is the cornerstone for the current political and legal system of modern

Saudi Arabia. The first article of this document states that the Kingdom of Saudi Arabia is a fully sovereign Arab, Islamic State. Its religion is Islam, its constitution is the Holy Quran and the Sunna of the Prophet Mohammed (peace be upon him), its official language is Arabic and Riyadh is the capital of the state.

Also in 1992, two major governmental changes took place. The first was the formation of Al-Shura Council which is made up of 60 members, among them scholars, experts and experienced individuals, who are selected by the King to study and discuss different economic, political and social issues and then offer the government advice on these matters. The second, was the establishment of the new provincial system. This system aims at upgrading the level of administrative work and development in all parts of the Kingdom. It was this system that also identified the responsibility of the new Provincial Council in each region to study all relevant aspects and proposals to upgrade the level of services in the region. The Kingdom of Saudi Arabia is now divided into fourteen provinces each of with its own ruler called Amir.

Any firm wishing to do business in any country in the world should be aware of the local laws within which they will operate, but this is more important in the case of Saudi Arabia where the existence of Islamic laws and procedures make the legal system unique (Najjar, 1995). The most important aspect of the Saudi legal system is that it is based on the Sharia (Islamic Law). The Sharia derives from the Holy Koran, the Sunnah (which are mainly deeds and utterances of the Prophet Mohammed, peace be upon him), the consensus of legal scholars, and legal analogy. Most activities and matters within the country ranging from civil, property, and matrimonial claims to criminal charges will be ruled by Islamic Law. Saudi Law will govern many contracts and agreements, many

disputes will fall under Saudi jurisdiction, and in many instances foreign firms will find it more practical to approach the Saudi courts to settle their conflicts. Hence, it is very important that foreign firms in Saudi Arabia appreciate the basics of the legal system which they may turn to for the resolution of their disputes.

### **3.3 The Economic Environment**

The main discussion in this part of this chapter will look at the Saudi economic environment from different perspectives. The focus here will be on five sections. The first section will survey the five-year Development plans that can be considered the cornerstone of the Saudi economy since the 1970's. Such a survey of these plans provides a valuable insight into the guiding principles which have governed national development in the Saudi economy. The second section will talk briefly about the kingdom's revenues and expenditures and highlight the major objectives of the government's fiscal policy. The third section will discuss the Saudi economic structure and the segments that makeup this economy. The role of the Saudi private sector in the development of the country's economy will be discussed in the fourth section. Finally, the fifth section will talk about the financial environment in Saudi Arabia taking into consideration; the major Saudi banks and the Saudi stock market.

#### **3.3.1 The Five Year Development Plans**

For the past twenty-five years the economic development of Saudi Arabia has been broadly governed by five-year economic plans. This five-year planning phenomenon started in Saudi Arabia in 1970. The development plans have considered every aspect of the Kingdom's economy, identifying its infra-structure, agricultural, industrial and commercial needs, and formulating strategies, which are all compatible

with each other, to achieve defined national goals (Al-Farsy, 1990). The government's driving force behind the economy has been oil revenues, out of which the essential infrastructure for economical maturity has derived. The first development plan (1970-1975) laid the foundation for the Kingdom's rapid transformation into a modern industrialised nation, by focusing upon the provision of a basic infra-structure and government services, and the establishment and expansion of supporting institutions. From today's perspective it was modest in scale, with government expenditure amounting to SR 78 billion. This was funded mainly by higher revenues resulting from the oil price increase from \$1.80 per barrel to around \$10.70 over the duration of the plan (Ministry of Planning, 1995). The government placed special emphasis on the expansion of water supplies and electricity generation. In the transport sector, road construction, airports and sea port development projects were implemented. The oil sector was expanded and a new refinery was constructed in Riyadh. Many new schools and hospitals were built. Social programs, including social insurance, were revised and broadened. The capabilities of government agencies were strengthened. The private sector was also encouraged to expand, especially in agriculture and manufacturing.

In the second development plan period (1975-1980), rapid economic and population growth generated a dramatic increase in the demand for infrastructure, services and housing. At the same time, rapidly rising oil revenues enabled these needs to be met and led to the creation of jobs in both government and private sectors. Government expenditure reached SR 658 billion in the second plan, an increase of more than eight-fold over the first plan (Ministry of Planning, 1995). The focus of government expenditure in this plan was upon the provision of a physical infrastructure to support the Kingdom's rapid development and to overcome barriers to economic

growth; these included the “bottlenecks” that occurred in the transportation system and shortages in housing, water supplies, electricity and ports. The plan also aimed at expanding social services, especially in education, health and social security. The private sector concentrated primarily on the construction and trade sectors. To assist in achieving the objectives of economic development and diversification, the government created many major institutions; including the specialised credit funds, the Saudi Ports Authority, SABIC (Saudi Arabian Basic Industries Corporation), the Ministry of Industry and Electricity, and the Royal Commission for Jubail and Yanbu, whose mission was to develop two large, new industrial cities.

The third development plan (1980-1985), with many large projects already underway, concentrated on the completion of those major infra-structural projects that provided the foundation for a more diversified economy, and on meeting the rapidly increasing demand for improved educational, health and social services. The volatility of oil revenues re-affirmed the need for the private sector to expand and for the economy to become less dependent on government activity and the oil sector. The government encouraged economic diversification through large public sector investments in capital-intensive industries linked to the Kingdom’s petroleum resources. In the private sector, manufacturing industries became more prominent and agriculture emerged as a high growth sector in response to government incentives and funding. The rapid pace of economic development required a large number of foreign workers, thus highlighting the need to develop Saudi human resources and gradually reduce the reliance on expatriate labour.

During the fourth development plan (1985-1990), the government development priorities were to continue the diversification of the economy by encouraging the growth of the private non-oil sector and to expand government services to meet social needs. The virtual completion of most of the country's physical infrastructure enabled the government to shift its expenditure priorities towards other important areas and needs. The government concentrated more in this plan upon qualitative development and improvements in economic performance. Human resources development, health and social development accounted for more than half of the total expenditure during the fourth plan.

The fifth development plan (1990-1995) enhanced and broadened the main objectives of the previous development plans. At the same time, through appropriate regulatory policies and support measures, it gave the highest priority to the private sector's role in accelerating the process of economic diversification. Another aspect that gave the fifth plan its own unique features was the increase in new long-term initiatives. Other priorities included the acceleration of the Saudiization process through strengthening the capabilities of the labour force and the improvement of health, education and a wide variety of other social services. The fifth plan emphasised the importance of private sector expansion and the need to improve its competitive position in world markets. It also stressed the need for a greater private sector role in economic activities (such as the utilities and transport sectors) where the government had traditionally been the main provider of services. Other important development initiatives included measures to improve the technological base in many economic sectors, and the introduction and development of innovative technologies that are uniquely suited to Saudi needs.

The Iraqi invasion of Kuwait leading to the subsequent outbreak of the Gulf War, and the continuing fluctuations in the oil, gas, petrochemical markets, posed enormous organisational and financial challenges to the Saudi economy in the early years of this plan, forcing the government to modify its expenditure priorities. The Gulf crisis and its aftermath not only caused major changes in the composition of supply; it also severely affected the demand side of the economy. In 1990/91 and 1991/92, there was a surge in demand for both government consumption and investment expenditure, which induced more private consumption. The rapid increase of government investment in the early years of the plan was offset by a reduction in private investment, which had to be expected in such an uncertain environment. During the adjustment period after the Kuwait liberation war, the government reduced its expenditure to pre-war levels, while the private sector, regaining confidence, increased investment considerably, particularly in real estate. This period was therefore characterised by huge fluctuations in domestic demand.

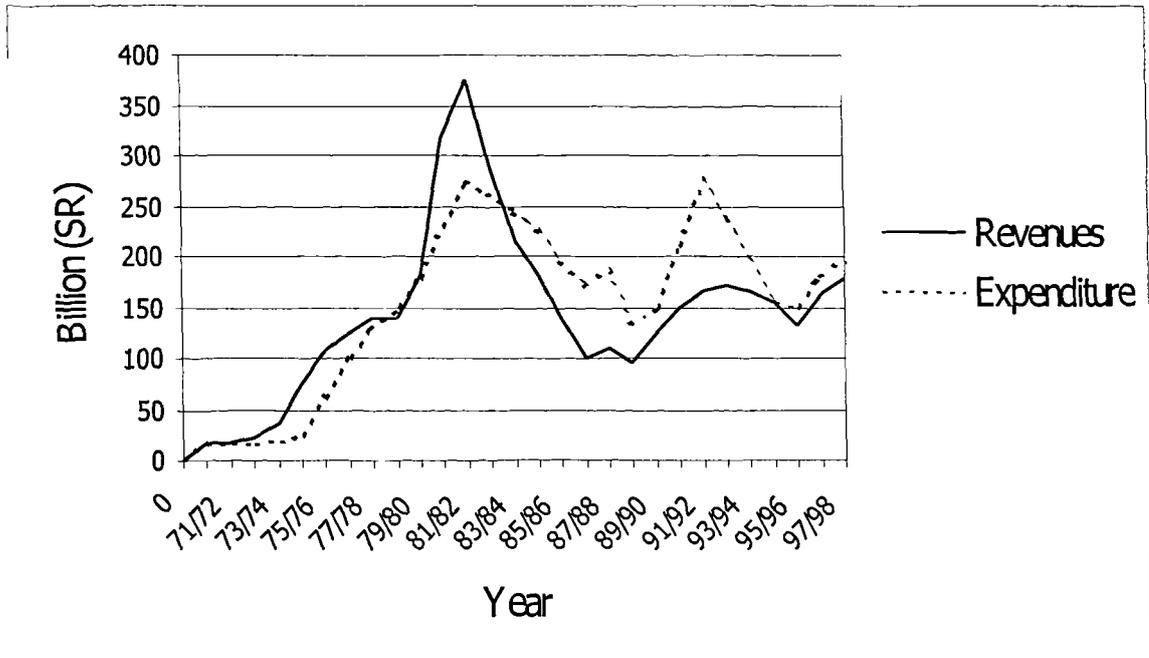
The sixth development plan (1995-2000) will continue to enhance and broaden the main objectives of the previous development plans and will meet the kingdom's development needs through: maximising the private sector's contribution in the provision of jobs; diversifying the economy to lessen its dependence on oil revenues; building a new physical infra-structure to meet the needs of the growing population; achieving a growth rate that is commensurate with the expansion of job opportunities for the Saudi labour force; improving social services, such as education and health; raising per capita incomes; and maintaining a balanced budget over the plan period (Ministry of Planning, 1996).

### 3.3.2 The Government Revenues and Expenditure

Since 1983/1984, government expenditure in meeting development needs under successive budgets have exceeded revenues (see Figure 3.2). To finance these budget deficits, the government used its reserves built up during the period 1973-1981. In addition, from 1988 onwards, the governments resorted to new methods of deficit financing through domestic borrowing by issuing of development bonds, while public sector companies raised funds on the international capital markets (Ministry of Planning, 1996). The unusual circumstances of the Fifth Plan period caused government expenditure to exceed revenues by a considerable margin. At the same time, the kingdom cannot continue to use its foreign exchange reserves as a fiscal stabilisation mechanism to finance budget deficits.

**FIGURE 3.2**

**The Government Revenues and Expenditure  
(At current prices)**



Sources: 1- Ministry of Planning, The Sixth Development Plan (1995-2000).

2- SAMA (1997). The Saudi Arabian Monetary Agency, The Annual Report, No. 33, 1418h – 1997.

### **3.3.2.1 Oil and Non-Oil Revenues**

In the first year of the fifth plan (1991), the kingdom responded to the cutback in world oil supplies (due to the Gulf War) by raising its crude oil production. As a result, the oil revenue position changed dramatically. Although the initial production increase was sustained, falling oil prices led to a decline in revenues in the last two years of the plan.

Non-oil revenues, on the other hand, showed a downward trend in the early years of the fifth plan, as the draw-down in reserves reduced the flow of investment income from abroad. With the recovery of economic activity after the war, non-oil revenues began to rise again. On December 31 1997, the government announced the forecasted revenues for 1998 at SR178 bn, 8 percent more than projected for 1997, despite uncertainty in the oil markets worldwide. King Fahad did not indicate 1998 projections for oil revenues alone, but Saudi and foreign analysts agreed these, which traditionally comprise 75 percent of the total, were probably based on an average price of \$14-\$15 per barrel, down from \$16-\$17 in 1997 (Allen, 1997).

### **3.3.2.2 Government Expenditure**

Government expenditure, which had reached a minimum level in the fourth year of the fourth plan (1988/1989), rose moderately in the final year of that plan period (1989/1990). There followed a dramatic increase in expenditure in response to the Gulf crisis, so that in the second year of the fifth plan (1991/1992) government expenditure rose to its highest level in ten years. On December 31 1997, the government announced a SR15bn (£2.4bn) rise in expenditure to SR196bn, 8 percent more than projected for 1997 but 6 percent less than actually spent (Allen, 1997). The war had caused a

substantial disruption in the government's planned revenues and expenditure. As a result, a fiscal policy aimed at rationalising government expenditure was adopted (Ministry of Planning, 1996). The major objectives of the government's fiscal policy are:

- To achieve a positive GDP growth rate, thereby increasing the nation's wealth, and to create new job opportunities.
- To maintain living standards by keeping inflation as low as possible and below the rate of economic growth.
- To direct government expenditures towards the expansion and diversification of the economic base and improvements in public services.

### **3.3.3 Structure of the Economy**

#### **3.3.3.1 Oil Sector**

Oil was discovered in commercial quantities in March of 1938, but World War II interrupted the development of the petroleum industry. In the period that immediately followed the end of the War, production increased rapidly. Total output rose more than three-fold from 60 million barrels during 1946 to 200 million barrels during 1950 (Al-Farsy, 1990). The Saudi government began developing its oil resources when the California Arabian Standard Oil Company (Casoc) was granted concessionary rights over an area exceeding 1 million square kilometers in Alhassa region (Eastern Province). The original concession agreement, which came into force on 29 May 1933, was to last for a period of 60 years, during which time Casoc was to have exclusive right over all phases of oil exploration and production. The agreement was subsequently revised three times, and now provides for a 66-year concession from the original date. In January 1944 the name of this company was changed to the Arabian American Oil

Company (Aramco). More agreements were established between the Saudi Government and different companies. In 1949 the government signed a contract with the Getty Oil Company for a period of 60 years. Its concession area covers a part of the Saudi-Kuwait 'neutral zone'. Getty's production is relatively small but it accounted for approximately 20 percent of the company's worldwide production during the 1980's. In 1957 the government also signed an agreement with the Arabian Oil Company (AOC). Its concession area is offshore and, like Getty's, is in the former neutral zone. Eighty percent of AOC's stock is held by Japanese investors. The Saudi government and the Kuwaiti government each hold 10 percent of the ownership.

In the 1980's, the Saudi government acquired the total shares of Aramco, and the company became fully owned by the state. Today, the Saudi Arabian Oil Company or Saudi Aramco is the pre-eminent force in the kingdom's oil and petrochemical industries and should be considered the world's largest fully integrated oil company. Saudi Aramco is a giant in the global energy scene. The company is responsible for the largest energy reserves in the world (usually estimated to constitute a quarter of the world's proven oil reserves). The kingdom's proven oil reserves are usually cited as being around 260bn barrels (bn. bls). The US Geological Survey (USGS) cites a figure of 258.6 bn bls for the end of 1992, while the Oil and Gas Journal (O&GJ) cites a figure of 261.2bn bls for the end of 1993. BP gives a figure of 261.2bn bls at the end of 1994 in its statistical review of world energy (Business Monitor International, 1995). Today, Aramco is responsible for a quarter of the world's international physical trade in oil, and for an eighth of actual world output. It is also the world's largest exporter of liquid petroleum gases and one of the world's largest producers of natural gas liquids.

In most countries the bulk of the government's revenues derive from various taxes on citizens and on corporations in the private sector of the economy. In Saudi Arabia, the case is different because most of the government's revenues come from oil. The taxation system within the kingdom is different than in other countries. The Saudi citizens and expatriates working in Saudi Arabia pay two types of taxation. First, the Zakat, which is 2.5% annual obligatory property tax paid only by Moslems, and second the taxes paid by all individuals and corporations living and operating in the country for utilities and customs duties.

As mentioned earlier, most of the Saudi Government revenues come from the sale of petroleum and since the end of the World War II, oil has been the source of revenues for both the private and public sectors. The overall performance of the Saudi economy can be accurately measured by the growth of the government budget - the vehicle through which oil revenues reach every segment of the economy - which increased from \$103 million in fiscal year 1947-1948 to almost \$73,000 million (Saudi riyal 245 billion) for the fiscal year 1980-1981 which is the highest revenue figure for the Saudi Government up until now. In 1992, and with the oil prices fluctuation, the Saudi oil revenues reached SR127.027 billion (Ministry of Planning, 1995). Saudi Arabia leads the Gulf Co-operation Countries in petroleum refining, with a daily production of 1,615,000 barrels per day in 1993 (nearly 80 million tonnes a year). The petroleum industry, which includes domestic and export refineries, accounts for an estimated 40 percent of Saudi value-added manufacturing. Saudi exports of refined petroleum were worth \$6.6 billion in 1993 and accounted for 70 percent of Saudi Arabia's manufactured exports (Business Monitor International, 1995).

### 3.3.3.2 Non-Oil Government Sector

This sector mainly consists of 20 governmental ministries and several other government agencies, offices, authorities, and departments. Oil revenues have made the government the driving force behind the country's economy and, out of those oil revenues, the government has provided the essential infrastructure without which the economy could not mature. At the same time, it should be understood that Saudi Arabia operates a market economy based upon free enterprise and competition in which enterprises can grow and prosper (Al-Farsy, 1990). *The Saudi government believes that the main objective behind this planning has been to provide an appropriate conceptual, practical and organisational framework for the development process, with all its economic, social and institutional dimensions. In the economic field, there was an early determination by the government to construct a national physical infra-structure of the highest quality (particularly with respect to industry, agriculture, ports, roads, communication systems and electricity) and to start the industrialisation effort with large public investments in basic industries, while extending a comprehensive system of support to agriculture.*

The development plans carried out by the Saudi government have always considered the desires, aspirations and capabilities of the Saudi Arabian people. Free education has been created and expanded to promote quality of opportunity in attaining the skills required for sustained development. An elaborate system of free health and social welfare services has been established, giving protection to the old and disabled and those on limited income. The institutional framework needed for economic and social development were created by establishing new ministers and agencies and by upgrading the existing administrative bodies, thus facilitating expansion in the absorbent

capacity of the kingdom's economy and greater economic efficiency. What has happened over the past two decades reflects the government's acceptance and commitment to the industrialisation and infrastructure development within the kingdom.

### **3.3.3.3 Non-Oil Private Sector**

The attempt to identify what is the private sector in Saudi Arabia is not as straightforward as it is in many other countries. It is complicated by two important features: by the operation of a great number of private foreign-owned and controlled companies working in the country, the majority of which are in joint venture agreements with domestic companies, and secondly by the partial involvement of the government in many industries, making the division between public and private sectors difficult to define (Presley, 1984).

The concept of the private sector is normally based on the criteria of private ownership of establishments that engage in various industrial, agricultural and commercial activities with the aim of realising profits. In Saudi Arabia the scope of the private sector can be extended to include some companies of mixed public and private ownership which operate as joint stock companies according to the disciplines of the market. For example, the Saudi Arabian Basic Industries Corporation (SABIC), the Saudi Arabian Fertiliser Company (SAFCO), the Saudi Arabian Public Transport Company (SAPTCO), the Saudi Consulting House (SCH), cement companies: Saudi, Yamama, Qassim, Yanbu, Eastern region, the Saudi Ceramic Company, some commercial banks such as Riyadh Bank and Saudi Investment Bank and Sea Transport Company all have considerable private sector ownership. The private sector's ownership

in these companies ranges from 30 percent in the case of SABIC to 99 percent of the Saudi Cement Company (Achievements of the Developments Plans, 1995).

The private sector of Saudi Arabia's economy is established along a free trade policy (Johany et al, 1986). Even though there is little restriction by the government on the day-to-day economic activities of individuals, the government still influences the private sector a great deal by its economic activities and is still eager to see the private sector assume increasing responsibility for the country's economic development. The most direct effect of government is via government expenditures for investment and consumption goods and services. There are three major categories of economic unit that comprise the Saudi private sector:

- 1- Commercial, industrial and service establishments registered in the Commercial Register, of which there were more than 391,000 by the end of 1993/1994. Table 3.2 shows the distribution of these Saudi establishments by the kingdom's regions. These establishments include 7,642 companies that have a different legal status, of which 98 are joint stock companies.

- 2- Retail outlets and small service facilities and workshops licensed by the municipalities, of which there were about 134,000 units in 1993; this group represents the smallest economic units in the private sector.

- 3- Agricultural holdings and related production units, which currently employ around 377,000 farmers and agricultural workers, including a substantial number of small farmers (Ministry of Planning, 1996).

In 1994 the statistics from Ministry of Industry and Electricity indicate that small-scale industries, with capital of less than SR 10 million, account for about 65

**TABLE 3.2**  
**Registered Private Companies and Establishments**  
**By Main Regions**

<b>Regions</b>	<b>1399 (1979)</b>	<b>1405 (1985)</b>	<b>1410 (1990)</b>	<b>1414 (1994)</b>
Central	34,963	56,471	76,989	130,761
Eastern	10,182	27,430	38,952	58,595
Northern	9,492	18,541	25,101	36,935
Western	20,271	62,417	88,600	135,972
Southern	3,862	12,620	18,995	29,304
<b>Total</b>	<b>78,770</b>	<b>177,479</b>	<b>248,637</b>	<b>391,567</b>

Source: Ministry of Planning, The Sixth Development Plan (1995-2000), p.148.

percent of the total number of licensed and operating factories. Medium-scale industries with an investment of between SR 10 million and SR 100 million account for 24 percent, while the large-scale industries with investments of over SR 100 million account for 11 percent of the total number of operating factories.

The number of establishments in the Saudi manufacturing sector has grown from 473 in 1975 to 2,238 in May 1995. As a result, the value of industrial investment jumped from \$9.9 billion to \$39.7 over the same period. Manufacturing represented 8.5 percent of Saudi Arabian GDP at current 1993 prices (Ministry of Planning, 1996). Non-oil industrial sales in 1994 stood at \$18.1 billion, while industrial exports were valued at \$3 billion. Annual private investment in the economy rose from \$8.7 billion in 1989, before the Gulf War to \$14.6 billion in 1992 and \$16.1 billion in 1993. From 1991-1993, more than \$10 billion was invested in new ventures. This is roughly equivalent to the total gross fixed capital formation over the previous ten years. The Saudi economy

typically achieves a gross fixed capital formation of 20 percent of GDP (Ministry of Planning, 1996).

### **3.3.4 The Private Sector Role in the National Economy**

Since the completion of the economy infrastructure by the end of the fourth plan, the government started to reinforce the theme of greater private sector involvement in the development process. The fifth development plan witnessed a clear declaration by the government that more involvement and contribution by the private sector was required in the development process. That plan called for the large-scale mobilisation of financial resources into autonomous private sector investment in the domestic economy. Thus, the longer term development of the Saudi economy is becoming increasingly dependent on the ability and willingness of the private sector, with appropriate government support, to recognise and grasp emerging opportunities to engage in new and more complex economic activities for which the return on investment may be longer and may carry more risk than earlier “safe” investments in real estate and trading activities.

In 1989, the Saudi private sector accounted for SR2.9bn (US\$770mn) in exports. Since then the figure has risen constantly. In 1993, private sector exports reached SR5.0bn. Of this figure, 47% went to the GCC countries, 25% went to Arab and Islamic countries, 14% to Asia, 9% to Europe, and 5% went to the United States, Africa and Australia (Business Monitor International, 1995).

Over the fifth plan period (1990-1995), and especially after the Gulf War, the private sector consolidated its role as an active and key factor in the economic growth

process. By this time, private investment had gained a momentum covering most sectors of the national economy, and had exceeded earlier expectations. During the fifth plan period the private investment rose from SR 28 billion in the first year of the plan (1990/1991) to more than SR 46 billion in the last year of the plan (1994/1995), at an average annual growth rate of 13 percent. The number of new private companies registered in the Commercial Register Office reached 1,534 and more than 100,000 new private establishments have been registered. With a capital of around SR 6 billion, 17 new stock companies have been established bringing the total number of stock companies to 98 with a capital of about SR 53.9 billion. As shown in Table 3.3, the private sector's contribution to GDP rose from 21 percent in 1975/1976 to 45 percent in the last year of the fifth plan (1994/1995), while its contribution to non-oil GDP reached about 72 percent in 1994/1995 (Ministry of Planning, 1995).

A key focus of the sixth plan is on privatisation and other initiatives for the private sector, to provide some facilities and services that have traditionally been supplied by the government. The Saudi Government declared its planned privatisation

**TABLE 3.3**  
**Major Indicators of Private Sector Development**

	<b>1975/1976</b>	<b>1994/1995</b>
Number of Operating Companies	1,437	7,643
Invested Capital ( SR Billion )	7.0	108.7
Contribution to GDP ( % )	21.0	45.0
Contribution to fixed Capital Formation ( % )	34.0	67.0
Employment in the Private Sector ( Million )	1.7	6.0

Source: Ministry of Planning, The Sixth Development Plan, 1996 p.149

policy in several occasions. In a major speech in May 1994, King Fahad declared “The State intends - and I have expressed this to the Council of Ministers - to release government ownership in many productive and profitable state-owned entities to allow private participation in these firms.”

In particular, the Government has highlighted three industries for privatisation: telecommunications, in the shape of Saudi Telecom; the national airlines, Saudia; and those parts of the petrochemical industry dominated by SABIC and its associated ventures in which the government has a stake in worth some \$2 billion (Business Monitor International, 1995). Some observers believe that in addition to these industries, the government will reduce its stake in other industries such as electricity, banking, real estate, cement and agriculture. Other possibilities for privatisation include the Saudi ports authority and, as a result of a review of insurance operations, the National Company for Co-operative Insurance.

Thus, the private sector is expected to play an increasing role in financing, building and operating key facilities in the fields of basic infra-structure, economic and social services, thereby reducing the financial burden of the government. A wide range of privatisation methods may be employed; from the selling of stock in public companies so that a majority of ownership becomes privately held, to a variety of configurations for build/operate/transfer schemes. Such privatisation initiatives will open up new opportunities for many Saudis to invest in, benefit from, and participate in the future development of the country. Strong encouragement will be given to the private sector to expand in domestic and international markets, especially in the Gulf

Countries (GCC)<sup>1</sup> and other trade areas. Expanding domestic markets and the emergence of privatisation opportunities are expected to attract the private investment that is needed to generate growth in the national economy. Another key focus of the sixth plan period will be the replacement of non-Saudi manpower by Saudis (refer to as “Saudiization”). This will be achieved by the provision of appropriate training programmes to improve the skills and capabilities of Saudis in various occupations, and by appropriate steps to implement related policies.

The stock companies, considered the kingdom’s large private sector establishments, occupy an important position in the national economy because of their strengths in many areas such as the enormous financial resources available for investment, the use of modern management techniques and the use of advanced technologies. Also, the growing strengths of the private sector are evident in the emergence of new types of industrial development companies that have been formed in recent years to provide venture capital for large investment projects in the manufacturing sector, such as the National Industrialisation Company. The significance of these new development companies lies in their readiness to invest as partners in large and medium-scale production projects, thereby sharing and reducing the associated long term investment risks, while performing a role in such projects previously played by the government.

Confidence in the private sector’s future growth outlook is also based on evidence of a decline in the private sector’s former reliance on government expenditure. In this regard, private sector investments continued to grow steadily despite the

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<sup>1</sup> GCC countries are Bahrain, Kuwait, Qatar, Oman, Saudi Arabia, and United Arab Emirates.

considerable decline in government expenditures in 1985/1986, 1993/1994 and 1994/1995.

### **3.4 The Financial Environment**

The major domestic money market institution in Saudi Arabia is the commercial banking system. Daily operating control over the banking system is provided by the Ministry of Finance and National Economy, and the Saudi Arabian Monetary Agency (SAMA), which was established in 1952, through the authority granted by the Banking Control Law of 1966 which established reserve and housekeeping controls over the commercial banks.

The first branch of a foreign commercial bank, Netherlands Trading Society, today called Al-Bank Al-Saudi Al-Hollandi, was established in 1927, concentrating on import and export finance through the port city of Jeddah (Abdeen & Shook, 1984). Subsequently, other Arab and local banks opened offices or were established in the kingdom. These banks were initially unpopular because of the social and religious stigma attached to paying and receiving interest which is totally forbidden in Islam. In 1973, with the increased flow of oil revenues and the infusion of new capital into the commercial banking system from many sources, and with the implementation of the first development plan the expansion of banking services, was necessitated.

In July 1976 a decision had been made by the Council of Ministers to effect Saudi ownership, or Saudization, of the kingdom's commercial banks. This decision was based on several motives. A primary reason stated for Saudization was that the branches of the foreign banks in Saudi Arabia were functioning within policies drawn

up by their foreign parent banks. These policies, which were not always in harmony with the kingdom's development plans, resulted in a banking system which financed mainly foreign trade and gave no priority to long-term loans essential to the economic growth of the country. Furthermore, the foreign banks were concentrated in the largest cities of the kingdom, Jiddah, Riyadh , and Dammam, and were not allowed to increase their capital base in order to provide banking services for the smaller rural towns and villages. Also, as a result of the rapid development of the country, and the fact that the foreign banks were not properly regulated by the Saudi Arabian Monetary Agency (SAMA), the high profits earned were mostly transferred outside the kingdom.

The decision towards Saudization, which was taken by the Saudi government, has caused the foreign commercial banks to be grouped into new banks and converted to almost 100 percent Saudi-owned banks in some cases. Several advantages emanated from the Saudization of the foreign owned banks. Firstly, the competition between the banks increased and became very aggressive, and as a result the public received a better banking service at a lower cost than before. Secondly, the country's new wealth had been spread among its citizens whilst previously it had accumulated in foreign banks. Thirdly, Saudi nationals were provided with an opportunity to work in and manage these banks. Fourthly, and most importantly, the Saudized banks have been able to increase their capital base as well as the number of their branches in the country where previously they were prevented from opening new branches in the kingdom or increasing their capital (Abdeen & Shook, 1984).

As shown in Table 3.4, the total number of commercial banks reached 12 banks with 1200 branches through out the kingdom by the end of the first quarter of 1995. The

total bank deposits increased from SR 143.7 billion in the first year of the fifth plan (1990/1991) to about 184 billion by the end of the first quarter of the last year of the plan (1994/1995). The total share capital increased from SR 17.4 billion in 1990/1991 to about SR 33 billion at the beginning of 1994/1995; thus, the ratio of share capital to deposits rose from 12 percent in 1990/1991 to 18 percent at the beginning of 1994/1995 (Ministry of Planning, 1996).

**TABLE 3.4**

**Commercial Banks Operating in Saudi Arabia**

	<b>Name of Bank</b>	<b>Head Office</b>	<b>Number of Branches</b>
1	Al-Rajhi Banking Investment Co.	Riyadh	349
2	The National Commercial Bank	Jeddah	246
3	Riyadh Bank	Riyadh	177
4	The Arab National Bank	Riyadh	126
5	Saudi Cairo Bank	Jeddah	60
6	Saudi British Bank	Riyadh	60
7	Al-Bank Al-Saudi Al-Franci	Riyadh	59
8	Saudi American Bank	Riyadh	45
9	Al-Bank Al-Saudi Al-Holandi	Riyadh	38
10	United Saudi Commercial Bank	Riyadh	17
11	Bank Al-Jazira	Jeddah	13
12	Saudi Investment Bank	Riyadh	10

Source: SAMA (1995). The Saudi Arabian Monetary Agency, Money and Banking Statistics, p.60.

The Saudi stock market, which is considered to be one of the most active stock markets in the Middle East, is another major money market institution in the kingdom.

The stock market in the country has grown rapidly in recent years. More Saudi citizens are now involved in buying and selling stocks as well as other daily activities in the Saudi financial market. The number of shares traded rose from less than 15 million in 1988/1989 to more than 60 million in 1993/1994. The value of transactions over this period increased from about SR 760 million to over SR 17 billion (Business Monitor International, 1995).

### **3.5 Communication & Information Technology Environment**

Since the introductory stages of the Saudi Government's enormous development plans, Saudi Arabia utilised available resources and accessible tools to carry out these plans and to achieve the objectives that have been programmed for the progress of the country and the growth of the economy. Lack of education among Saudi people and the shortage of skilled manpower, especially in the early stages of the five-year development plans, were real challenges to the government. Building schools, universities, training centres, and importing different types of technology are some of the measures that the government used to meet these challenges.

Saudi Arabia is one of the developing countries which has recognised earlier than others that technology is a very important tool for the success of the development process. In order to fulfil its responsibility towards the planning and development for science and technology, the government established King Abdul-Aziz City for Science and Technology (KACST) in 1977. The main objective of establishing KACST was to support a wide range of scientific and technological research activities. It was charged with forming the national science and technology policies in Saudi Arabia, and with

promoting and co-ordinating research activities between scientific institutions, universities, and research centres (Siddiqui, 1997).

Since the introduction of the five-year development plans, solid progress occurred in the field of communication and information technology. The ministry of Posts, Telecommunications & Telegraph (PTT) established a communications network using microwave, digital and corresponding axial cables and optical fibre cables technology to link the Kingdom with neighbouring countries. The network contributed to undertaking telephonic and telegraphic communications and the transfer of information services from one place to another. Currently, there are three domestic satellite stations, with a capacity of 400 communication circuits, operating in Riyadh, Jiddah, and Bani Malik. The Kingdom also has seven "A-level" international stations, with a total capacity of 3,533 circuits for handling 90 percent of international calls, operating through satellites in the Pacific Ocean and the primary satellite of the Indian Ocean area (SAMA, 1996).

During the fifth plan period, substantial progress was made in the overall performance and productivity of the telecommunications service. Revenues from the telephone service rose from around SR 4 billion at the end of the fourth plan (1985-1990) to about SR 6 billion at the end of the fifth plan (1990-1995) (Ministry of Planning, 1995). The number of working telephone lines rose to about 1.53 million over the fifth plan period, an increase of about 372,000 lines, or almost 32 percent. A new radio paging service was introduced in 1992 and the number of new subscribers rose to around 167,000 by the end of the fifth plan period. The number of specialised point-to-point lines—used mainly for data communications—rose from about 30,700 lines in

1989-1990 to around 49,000 in 1994-1995. The packet-switched public data network called "Alwaseet" installed at the end of the fourth plan has developed steadily, and now provides around 3,000 active data services (Ministry of Planning, 1995).

During the fourth and fifth plan periods (1985-1995), there has been a growing demand for basic telephone services, mobile telephones, and other new information technologies. In addition, the demand has been growing for the introduction and application of new information technologies such as an integrated services digital network (ISDN), digital mobile communications, broad band digital leased circuits, video conferencing and electronic mail. As a result, the Saudi Arabian Ministry of Posts, Telecommunications & Telegraph (PTT) signed a contract in August 1994 with the giant American telecommunications company AT&T to expand and modernise the Kingdom of Saudi Arabia's telecommunications infrastructure. The contract is valued at more than \$4 billion, the largest in telecommunications history outside the United States. The project, known as the Telephone Expansion Project-6 (TEP-6), calls for the provision of a fully digital communications network including 1.5 million digital lines, 200,000 GSM lines, thousands of associated network components for switching, transmission, network management, fibre-optics, wireless, civil works and training projects (SAMA, 1996). Targeted for completion by the beginning of next decade, the new network will double the current capacity of Saudi Arabia's existing facilities, providing new local, toll, and international services to the entire kingdom and will be considered as a key element in the kingdom's push for continued social and economical growth.

Over the past two decades, telecommunications and other information technology services in Saudi Arabia have made a significant contribution to economic and social development, through the provision of a wide range of communication services: telephones, mobile phones, paging systems, networks, leased circuits, telex, data links, both within the large surface area covered by Saudi Arabia and with the outside world. In recent years, commercial establishments and manufacturing and financial sectors have come to rely more and more on information technologies for the collection, storage, processing and distribution of information in their efforts to raise productivity, to control costs, to manage decentralised units, to reach customers and to promote new products.

The adaptation of modern management systems by the rapidly developing oil and private sectors led the government authorities to encourage the introduction of the latest available technology one of which is information technology. (El Magzoub & Alabdulaaly, 1992). It became clear that one of the concerns to the Saudi government is to maximise the use of information technology in the country. This has included planning both for more information services and for computer training at all educational levels (Jifri & Meadows, 1996). Computer utilisation is growing very fast in the country. Demand for computerised applications is increasing rapidly in the oil sector, private sector, and in the academic institutions. In 1989, there were about 80,000 personal computers operating in Saudi Arabia, putting the kingdom in second place after Brazil in the developing world (O'Sullivan, 1989). The demand for computers was estimated at SR. 2,000 million in that year. In 1996, the estimated number of personal computers imported to the country was 134,800 units and the kingdom has spent SR.

12,717 million on hardware, software, staff, and other computer services (Al-Turki & Tang, 1998).

Major networks are operating in the country to provide fast, accurate, and secure communication between their prospective users. The ministry of interior has its own network called "SAMIS" which has been developed and established for governmental purposes. Universities, research centres, and academic institutions all over the country are linked through the KACST communication network (KACST-NET) with the Gulf Network (GULFNET) (Al-Tasan, 1992). Established in 1985, GULFNET is the first academic computer network in the Arab world established to provide the exchange of data, information, and electronic mail messages between scientists and researchers in the Arabian Gulf Countries (GCC). Saudi Arabia is connected through KACST with several international networks such as BITNET (USA), NETNORTH (Canada), EARN (European Academic and Research Network), and DFN (Germany) (Siddiqui, 1997).

In addition, many of the companies based in the kingdom have invested vast sums installing some of the most up-to-date networks in the world at a similar level as in Western Europe (Computer News Middle East, October 1996). Saudi Aramco, one of the largest oil companies in the world, has its own advanced computer network which provides the company with fast communication and accurate information distribution among its users. The company is using different computer systems in many applications in the field of oil exploration, production, transportation as well as other managerial applications such as payroll and finance (Al-Abdulatif, 1992). "Saudia", the official airline in the country, has its own reservation network called "Airlines Reservations System". This network serves all "Saudia" offices around the world and most travel

agencies throughout the country. The Saudi Arabian Monetary Agency “SAMA” together with all major banks operating in the country and other Saudi financial institutions rely heavily on a network called the “Saudi Network” which facilitates the sharing and exchange of information between these financial institutions. Banks and other business organisations are now providing their customers with “state-of-the-art” technologies. Teller machines (ATM) and Point of Sale (POS) devices are widely used and distributed throughout malls, stores, and supermarkets in the country. Most of the major banks in Saudi Arabia are now providing 24-hour on-line banking services where customers can perform most of their financial transactions through the phone.

Recognising the enormous benefits of using the Internet as an information source, the Saudi Government announced in 1997 its approval for providing the Internet locally in the country. The Government has at the same time authorised King Abdul-Aziz City for Science and Technology (KACST) to prepare the organisational procedures for the introduction of the Internet into the kingdom and to make it available to research establishments, academic institutions, and to both public and private organisations (Siddiqui, 1997). Few Saudi governmental, academic, and private organisations had access to the Internet before the Saudi Government’s decision. The Internet was however available to private firms and individuals through a connection with Internet Service Providers (ISP) located in neighbouring Gulf countries such as Bahrain and United Arab Emirates. Local access to the Internet in Saudi Arabia has been delayed by worries about material considered to be offensive. The Saudi Government has ordered KACST to prevent objectionable material that could be considered against the country’s religious and moral values from entering the kingdom through the Internet. Many academics and businessmen believe that the legalisation of

local access to the Internet will boost regional business on the Internet besides providing a wealth of information from all over the world. As a Saudi official pointed out, the number of Internet users in Saudi Arabia will equal the number of the Internet users in all the Arab countries and the local business activities through the Internet will reach up to 500 million SR with a 400 percent annual growth rate (Al-Riyadh, 1998).

In summary, Saudi Arabia has passed through a remarkable change since its formation by King Abdul-Aziz in 1932. With the discovery of oil and with government revenues reaching their highest levels in the 1970's and 1980's, the country has followed a number of comprehensive five-year development plans that have reshaped many aspects of Saudi society. Since the beginning of the first five-year development plan in 1970, the Government started to provide a strong foundation for future development. In the economic field, there was an early determination by the Government to construct a national physical infrastructure of the highest quality, particularly with respect to industry, agriculture, ports, roads, electricity and communication. With the drop in oil prices in the mid 1980's and 1990's and the expense of the Gulf War, the Government started to urge the private sector to play an important role in the national economy, encouraging it to reach a point where the country can prosper economically without depending on oil as the major source of money. The last five years have witnessed an enormous growth in the private sector's role in the development of the country. The contribution to the national economy by this sector became a major issue to the government officials and planners. The use of technology, and particularly information technology, by the private sector helped this sector considerably in achieving this importance. Personal computer systems, mainframes, computer networks, digital telephone lines and fax machines, and the

Internet have been used by universities, research centres, banks and companies in Saudi Arabia.

# **CHAPTER FOUR**

## **RESEARCH DESIGN AND METHODOLOGY**

### **4.1 Introduction**

It is widely accepted now that information technology is becoming increasingly important in organisations (Allen & Scott-Morton, 1994). The literature reviewed in chapter two shows that the use of information technology in organisations involves many complex organisational issues. Despite the large number of studies reported in the literature, our understanding of these issues is still limited. Because of the complexity of many issues related to the use of information technology in organisations, many studies suggested that more research is needed in this area (see, for example, Kettinger, Grover, Guha, & Segars, 1994; Raymond, Pare, & Bergeron, 1995; Roach, 1989).

Our aim here is to increase our understanding of the relationship between this fast progressing technology and the organisational issues involved with it. In this research, we try to explore the impact of information technology on business organisations. The Saudi private sector was focused on. The research aims to contribute to the pool of knowledge by carrying out empirical studies using well-established methodologies. In this chapter we will present the research hypotheses that were developed based on the literature review. We will also discuss the research design applied, and the research methodology that has been used in this study.

### **4.2 The Research Hypotheses**

The main objective of this research is to explore the impact of information technology on organisations in the Saudi private sector. As discussed in chapter one, this

study focuses on the impact of information technology on three components of the organisation; strategy, structure, and people. The study tries to explore the relationship between each of these three components and information technology separately. The focus of the discussion in the literature review is to determine the effects of using information technology in organisations from two perspectives: the impact and the implementation. Based on the literature review which was carried out in chapter two and after describing the Saudi environment in chapter three, the researcher in this study has developed the following four hypotheses:

- H<sub>1</sub> Information technology utilisation can lead to positive impacts on the strategy of business organisations in Saudi Arabia.**
  
- H<sub>2</sub> Information technology utilisation can lead to changes in the organisational structure of firms in the Saudi private sector.**
  
- H<sub>3</sub> The use of information technology by firms in the Saudi private sector can lead to:**
  - A- Decentralised decision-making organisations**
  - B- More centralised decision-making at the strategic level.**
  - C- More decentralised decision-making at the executive (daily routine) level.**
  
- H<sub>4</sub> The use of information technology in firms operating in the Saudi private sector can lead to a direct negative impact on the number of employees.**

The next sections will present the design of this research and will discuss the methodology which was implemented in order to achieve the objectives of this study.

### 4.3 The Research Design

Because of the complexity of the topic, researchers have presented several definitions for research design. Even though their definitions differ, researchers agree on the essential conditions for research design. First, the design is a plan for selecting the sources and types of information used to answer the research question. Second, it is a framework for specifying the relationship among the study's variables. Third, it is a blueprint that outlines each procedure from the hypothesis to the analysis of data (Cooper & Emory, 1995). *The design provides answers for such questions as: What techniques will be used to gather data? What kind of sampling will be used? How will time and cost constraints be dealt with? No simple classification system is available to define all the variations between definitions for what is a research design.*

According to Cooper and Emory (1995), eight different perspectives can be used to classify research designs:

- 1- The degree to which the research problem has been crystallised (the study may be either exploratory or formal).
- 2- The method of data collection (studies may be observational or survey).
- 3- The power of the researcher to produce effects in the variables under study (the two major types of research are the experimental and the ex post facto).
- 4- The purpose of the study (research studies may be descriptive or causal).
- 5- The time dimension (research may be cross-sectional or longitudinal).
- 6- The topical scope—breadth and depth—of the study (a case or statistical study).
- 7- The research environment (most business research is conducted in a field setting, although laboratory research is not unusual; simulation is another category).

8- The subject's perceptions of the research (do they perceive deviations from their everyday routines).

In order to classify the design of this research, we will discuss now the relationship between this study and the above eight perspectives.

**- Degree of Problem Crystallisation.** As mentioned above, the study may be either exploratory or formal. The exploratory study is undertaken when we do not know much about the situation, or when we have no information on how similar problems or research issues have been solved in the past. Extensive preliminary work has to be done to gain familiarity with the phenomena in the situation, and to understand what is happening before we can develop a model and set up a rigorous design for complete investigation. Exploratory studies are thus important for obtaining a good grasp of the phenomena of interest and for advancing knowledge through good theory building (Sekaran, 1992). The immediate purpose of the exploration is usually to develop hypothesis or questions for further research. The formal study begins where the exploration leaves off. It begins with a hypothesis or question and involves precise procedures and data source specifications. The main goal of a formal research design is to test the hypothesis or answer the research questions. This study can be considered to be both an exploratory study in the first section and a formal study in the second section. It is exploratory study because, initially we do not know much about the situation which exists. No similar studies, to the best knowledge of the researcher, have been conducted in the Saudi business environment. The researcher, after completing extensive preliminary work, became familiar with the phenomena in the situation. The research question has been defined for further research and several hypotheses have been developed for testing. At this stage, the research developed into a formal study.

- **Method of Data Collection.** Studies may be observational or survey. In observational studies the researcher inspects the activities of a subject or the nature of some material without attempting to obtain responses from anyone. In survey studies the researcher questions the subjects and collects their responses by personal or impersonal means. Those means include: personal interviews, telephone interviews, self-administered questionnaires, mailed questionnaires, or a combination of these. This study is considered a survey study because it used a combination of personal and impersonal techniques to collect the data.

- **Research Control of Variables.** In terms of the researcher's ability to manipulate variables, researchers differentiate between experimental and ex post facto designs. In an experiment study, the researcher tries to control and/or manipulate certain variables in the study so as to study the effects of such control or manipulation. In the ex post facto studies, the researcher has no control over the variables in the sense of being able to manipulate them. The researcher in this case reported what has happened or what is happening. Controlling or manipulating the variables would have introduced bias to the study. The researcher in this study did not control or manipulate the study's variables. As a result, this study is considered as ex post facto study.

- **The Purpose of the Study.** Studies can be either descriptive or casual. The main objective of a descriptive studies is to learn the who, what, when, where, and how of a topic (Cooper & Emory, 1995). The causal study is aiming to find out why. It is done when it is necessary to establish a definitive "cause - effect" relationship. This research is considered as a descriptive study because it is aiming to learn the who, what, when, where, and how of a topic and to explore and describe the characteristics of variables in a situation.

- **The Time Dimension.** Research may be cross-sectional studies or longitudinal. In cross-sectional studies data is gathered just once, perhaps over a period of days or weeks or months, in order to answer a research question (Sekaran, 1992). Longitudinal studies are repeated over an extended period of time in order to answer a research question. Because this study has been carried out at one point in time, it is considered to be a cross-sectional study.

- **The Topical Scope.** Studies can be either statistical studies or case studies. Statistical studies are designed for breadth rather than depth. They attempt to capture a population's characteristics by making inferences from a sample's characteristics. Hypotheses are tested quantitatively. Case studies place more emphasis on a full contextual analysis of fewer events or conditions and their interrelations. This study is considered to be a statistical study because many variables should be tested and quantitative data must be analysed. Several hypotheses have been developed and statistically tested.

- **The Research Environment.** Studies can be classified as field studies or laboratory studies. Field studies occur under actual environmental conditions. Laboratory studies are usually conducted under simulated or artificial conditions. This study has been conducted under actual environmental conditions, therefore it is considered as a field study.

- **Subjects' Perceptions.** The usefulness of a design may be reduced when people in the study perceive that research is being conducted (Cooper & Emory, 1995). When subjects believe that something out of the ordinary is happening, they may behave less naturally. The participants in this study were aware of the study's objectives. They were

told what the study was trying to achieve. The researcher does not believe that this action has an effect on the results of this study.

#### **4.4 The Survey Methods**

Data collection is an essential part of any research design. Research designs can be classified, as we have discussed earlier, by the communication method used to gather primary source data. Researchers can observe conditions, events, people, or processes. Or they can question or survey people about various topics (Cooper & Emory, 1995). The characteristics and applications of the survey methods are varied. In deciding which survey method is best suited for the research, the researcher must determine which criteria are the most significant in relation to the research objective. By comparing the research objectives with the strengths and weaknesses of each method, it is possible to choose one that is optimally suited to the researcher's needs. In addition, the conditions under which the research is conducted usually play an essential role in determining which method will be most suitable to obtain the necessary data needed within the time and cost available (Emory,1985).

There are several data collection methods in survey studies. These methods include personal interviews, telephone interviews, self-administered questionnaires, mailed questionnaires, or a combination of these. Each of these methods has its own advantages and disadvantages. The most commonly used instruments for data collection are questionnaires and interviews (Clover & Balsley, 1984). The following sections will discuss process by which the survey instruments were chosen and which instruments

that were used in this study, demonstrating the theoretical and practical advantages and disadvantages of each method.

## **4.5 The Survey Instruments**

### **4.5.1 The Instrument Development Process**

Before he or she starts collecting the data, the researcher should be aware of the instruments that he or she is going to use, how it is going to be developed, designed, controlled and implemented. According to Cooper and Emory (1995) the instrument development process contains two significant stages: (1) the survey strategy, (2) the schedule design. Both stages will now be discussed.

#### **4.5.1.1 The Survey Strategy**

Once the researcher sets the main research question, a survey strategy becomes a must. It contains three questions that must be answered by the researcher:

- 1- What communication mode will be used?
- 2- How much structure should be placed on the question-and-answer processes?
- 3- Should the questioning approach be disguised and, if so, to what degree?

Those questions will now be discussed.

##### **4.5.1.1.1 Communication Mode**

As mentioned earlier, data can be collected in survey studies by several methods. Personal interviews, telephone interviews, mail questionnaires, self-administered questionnaires, electronic questionnaires or a combination of these methods. Each method has its own advantages and disadvantages. By comparing the research objectives with the strengths and weaknesses of each method, it is possible to choose one that is

optimally suited the researcher's needs. It is the researcher's responsibility to decide on the appropriate method for his study. For the purpose of this study, it has been decided to use both mail questionnaires and personal interviews as instruments to collect the primary data. The first approach, the questionnaire, is an instrument which was chosen to collect the quantitative data. The second approach is the personal interview which was used as an instrument to collect the qualitative part of the data. The questionnaire was chosen to study the use of information technology from the impact perspective, where the personal interview was chosen to study the use of information technology from the implementation perspective. The questionnaire, relying on data abstracted from a large number of organisations, can be seen as a study at the aggregate level where the personal interview can be regarded as a study at a more detailed level.

#### **4.5.1.1.2 Process Structure**

Questions in questionnaires and personal interviews can be classified into two types: (1) structured questions, often called closed-ended questions, (2) unstructured questions, or open-ended questions. In closed-ended questions, respondents are offered a set of answers and asked to choose the one that most closely matches their views and opinions. Structured questions are easy to ask and quick to answer, they require no writing by either the respondent or the interviewer, and their analysis is straightforward. The major drawback in structured questions is that they may introduce bias, either by forcing the respondent to choose from given alternatives or by offering the respondent alternatives that might not have otherwise come to mind. On the other hand, unstructured questions do not have a limited set of responses. They do not force the respondent to pick from a list of answers. Respondents can express their ideas, opinions,

and thoughts freely in their own words. However, unstructured questions are difficult to answer and still more difficult to analyse (Frankfort-Nachmias & Nachmias, 1996).

In this study, the researcher has used both types of questions; structured and unstructured. The questionnaire has been designed mainly with structured questions. Most of the responses were also structured. This study is a large survey and structured questions are generally preferable in large surveys. They reduce the variability of responses, make fewer demands on interviewer skills, are less costly to administer, and are much easier to code and analyse (Cooper & Emory, 1995). In order to overcome the disadvantages of using structured questions, the researcher has provided empty spaces after many closed-ended questions to give respondents the chance to express their thoughts freely. On the other hand, the researcher used the unstructured questions during the in-depth interviews. Six executive managers have been contacted for in-depth interviews. Issues relevant to the impact of information technology have been discussed with those managers. The in-depth interview encourages respondents to share as much information as possible in an unconstrained environment with a minimum of prompts and guiding questions from the researcher.

Because of its suitability in achieving the study's objectives, Likert scale has been used in designing the response structure for most of the questionnaire's questions. With this scale the respondent is asked to answer each statement by choosing one of five agreement choices (six-point scale is also used). The numbers on the scale indicate the value to be assigned to each possible answer with 1 indicating the least favourable degree and 5 the most favourable.

#### **4.5.1.1.3 Objective Disguise**

In designing the survey instrument, The researcher must give considerable attention to whether the purpose of the study should be disguised. A disguised question is designed to hide its true purpose. To shield the research sponsorship, some researchers use some degree of disguise in designing the survey questions (Cooper & Emory, 1995). The researcher in this study did not disguise the purpose of the study, the research objectives, or the type of information he wished to obtain from the respondents. The questions were direct and it was made clear what specific information was being sought. It is the researcher's belief that hiding the research objectives is a risky technique which can lead to the loss of the respondent's co-operation.

#### **4.5.1.2 Schedule Design**

The second stage in the instrument development process is the schedule design which is a successful approach in developing surveys. It consisted of four major steps:

- 1- Determination of information-needed.
- 2- Data gathering process decision.
- 3- Instrument drafting.
- 4- Instrument testing.

These steps will now be discussed.

##### **4.5.1.2.1 Determination of Information-Needed**

The researcher must be sure that he or she understand the full dimensions of the research subject and important variables that are likely to influence the problem situation must not be left out of the study. The researcher should be knowledgeable about the problem area. In many studies, an exploratory investigation is necessary to

accomplish this task. After determining the research question, many researchers start their studies by conducting a comprehensive literature survey in order to provide the foundation for developing a comprehensive theoretical framework from which an hypothesis can be developed for testing (Sekaran, 1992).

This study started with a comprehensive literature review about the impact of information technology on organisations. The researcher determined what relevant of information was needed for the study. Primary and secondary data was gathered through the study. Different methods were used to collect the data needed for the study. Questionnaires, interviews, and telephone interviews were used to collect the primary data. Periodicals, textbooks, CD-ROM databases, on-line databases, Saudi governmental publications, computers, and the Internet were used as sources of secondary data.

#### **4.5.1.2.2 Data Gathering Process Decision**

At this stage the researcher has to decide how to gather the data. In this study, the mail questionnaire and the personal interview have been selected as instruments to collect the primary data. Telephone interviews have also been used to gather some data in order to test the non-response bias (non-response bias test will be discussed in the next chapter). The mail questionnaire and the personal interview will be discussed in the following sub-sections.

##### **4.5.1.2.2.1 Mail Questionnaire**

The mail questionnaire is an impersonal survey method. It can be defined as a preformulated written set of questions to which respondents record their answers,

usually within rather closely defined alternatives (Sekaran, 1992). There are many advantages and disadvantages of using mail questionnaires. The advantages of using mail questionnaires are as follows:

- ◆ The cost of mail questionnaires is low compared to other methods.
- ◆ Biasing error is reduced because respondents are not influenced by interviewer characteristics or techniques.
- ◆ Mail questionnaires provide a high degree of anonymity for respondents. This is especially important when sensitive issues are involved.
- ◆ Respondents can complete the questionnaire at their own convenience. Respondents have freedom to express their point of view, have time to think about their answers and/or consult other sources.
- ◆ A wide geographical area can be covered in the survey at low cost. Data can be gathered from a sample that is widely dispersed geographically.

The disadvantages of using mail questionnaires are:

- ◆ Questionnaires require simple, easily understood questions and instructions.
- ◆ Questionnaires do not offer researchers the opportunity to probe for additional information or to clarify answers.
- ◆ Researchers cannot control who fills out the questionnaire.
- ◆ Response rates are low.

As mentioned earlier, it has been decided to use the mail questionnaire in order to gather the primary data related to the impact perspective. The mail questionnaire is used in this study because it has considerable advantages over other survey methods. Even though other survey methods such as telephone interviews or personally

administered questionnaires can obtain data in a shorter period of time and achieve a higher response rate, the main disadvantage of using both these methods is the high cost both in time and money. The advantages of using mail questionnaires in this study can be summarised as follows: firstly, the questionnaires have been sent to a large sample (the sampling technique will be discussed later in this chapter). The sample for this study is the managers of the top 500 companies in the Saudi private sector. Secondly, this sample is widely dispersed geographically hence those companies are located in different cities and towns across Saudi Arabia which is a large country as discussed in chapter three. Another value in using mail questionnaires in this study is that the respondents are the top 500 executives in the Saudi major corporations who might be inaccessible or difficult to reach in any other way. Finally, the mail questionnaire is used widely in the literature and in other similar studies related to the impact of information technology on organisations (see, for example, Abdul-Gader & Kozar, 1995; Igbaria et al., 1997; Lubbe, Parker, & Hoard, 1995; Raymond et al., 1995).

#### **4.5.1.2.2.2 Personal Interview**

The personal interview is a face-to-face interpersonal role situation in which an interviewer asks respondents questions designed to obtain answers pertinent to the research hypotheses (Frankfort-Nachmias & Nachmias, 1996). The researcher needs to establish a rapport with the respondents and motivate them to give responses relatively free from bias by allaying whatever suspicions, fears, anxieties, and concerns they may have about the research and its consequences. The researcher must be sincere, pleasant, and non-evaluative. According to Sekaran (1992), **“broad questions must be asked first then narrow the questions to specific areas, ask questions in an unbiased way, and clarify and help respondents to think through difficult issues”** (p 196). The

researcher must write or record responses immediately, they should not be trusted to memory and later recall.

There are many advantages and disadvantages to using personal interviews. The advantages of using personal interviews are as follows:

- ◆ Flexibility. To clarify unclear questions, clarify doubts, rearrange the order of questions.
- ◆ A good opportunity to establish rapport with the interviewees.
- ◆ Helps the researcher explore and understand complex issues.
- ◆ Allows control of the interview situation.
- ◆ Has a high response rate.
- ◆ Allows collection of additional information.

The disadvantages of using personal interviews are:

- ◆ Higher cost.
- ◆ Interviewer bias. The interviewer personal influence and bias could affect the interview.
- ◆ Lack of anonymity. The interview lacks the anonymity of the mail questionnaire. Thus, respondents may feel threatened or intimidated by the interviewer, especially if a respondent is defensive about the topic or some of the questions.

In this study, personal interview was chosen to collect data related to the implementation perspective. The researcher decided to use the personal interview to meet some of the top managers in order to raise and discuss in detail issues related to the impact of information technology on the Saudi organisations. Ten companies were contacted for in-depth interview and six agreed to participate. Table 4.1 shows the major

**Table 4.1**

**Characteristics of the Interviewed Managers**

	<b>Position of Interviewee</b>	<b>Nationality of Interviewee</b>	<b>Type of Business</b>	<b>Firm's Ownership</b>	<b>No. of Employees</b>	<b>Annual Sales (SR)</b>
1	Vice President	Saudi	Commercial Bank	Joint venture	850	268,630,000
2	General Manager	Saudi	Plastic Manufacturer	Saudi	432	61,514,000
3	General Manager	Saudi	Building & Construction	Saudi	1,165	113,450,000
4	GM Assistant	Non-Saudi	Trade in Foodstuff	Saudi	314	47,000,000
5	GM Assistant	Saudi	Insurance Company	Saudi	72	57,500,000
6	General Manager	Non-Saudi	Trade in Computers Equipment	Saudi	94	28,000,000

characteristics of the six interviewed companies. Issues relevant to how information technology was applied in actual situations and the impact of information technology on the operations of those companies were discussed. Each interview lasted for about one hour. In addition to its advantages, the personal interview has been used in this study because it overcomes the problem of validity and reliability. The personal interview technique provides more valid and reliable data than other survey methods (validity and reliability will be discussed later in this chapter). The personal interview approach is appropriate as it provides the opportunities to examine in greater detail than is possible in a questionnaire the interaction between information technology and other components of the organisation. Even though personal interviews is a good technique to obtain more valid data, it must be mentioned here that conducting personal interviews in Saudi Arabia is quite difficult particularly if you are interviewing top managers. Most of the time those managers are busy and it is very difficult to arrange meeting with them for an hour or so without delay or interrupting. This could limit the data that could be collected by this method. In addition and as we have discussed in chapter three, Saudi Arabia is a large country and big companies are scattered all over the kingdom. In order to approach these big companies for interviews, it will require the researcher to travel to many provinces and this is costly in both time and money.

#### **4.5.1.2.3 Instrument Drafting**

Survey instruments such as questionnaires and interviews normally include three types of questions. The most important of these are the measurement questions. It is the target data: facts, attitudes, preferences, and expectations about the central topic. The second type of question concern the respondent's characteristics needed for classification and analysis. This includes gender, age, family situation, household

income, social class, and attitudes toward topics associated with the research subject. The third type of question is administrative. This includes the respondent's identification, interviewer identification, date, place, and conditions of the interview (Cooper & Emory, 1995). Question construction is the foundation of all questionnaires. The questionnaire must translate the research objectives into specific questions; answers to such questions will provide the data for hypothesis testing. The questions must also motivate the respondent to provide the information being sought. Careful attention should be given to formulating questions. Questions must be carefully constructed and ordered to obtain accurate data. Attention must be given to each question's content, wording, structure, format, and order (Frankfort-Nachmias & Nachmias, 1996). Instructions on how to answer each question should be also included. Questionnaires must start with straightforward, easy-to-complete questions and move on to the more complex topics. Questions that are more interesting, easier to answer, and less threatening are usually placed early in the questionnaire to encourage respondents and to obtain their co-operation.

According to the above guidelines, the researcher in this study has developed the questionnaire. The questionnaire was developed with full instructions, simple wording, clear content, and an easy response structure. There were thirty seven questions, printed on 13 pages in both languages English and Arabic. All were closed-ended questions.

The questionnaire was divided into three parts (see Appendix E). The first part contained questions related to the respondent's characteristics (Q1-Q6). The second part was devoted to questions about the organisation that the respondent worked for (Q7-Q14). The third part, which was the most important part of the questionnaire, contained

the measurement questions for this study. It consisted of questions regarding the use and impact of information technology in the participated organisations (Q15-Q37). After finishing the first draft of the questionnaire, the researcher decided to translate it from English to Arabic. The Arabic language department and the English language department at King Faisal University (where the researcher works) were contacted at this stage. Both departments were very helpful in assisting the researcher to translate the questionnaire correctly. Some Arabic language mistakes were thus avoided in this stage.

The questionnaire was presented in one document including both English and Arabic translations. There were two reasons for this decision, (1) the Arabic language is the only official language in Saudi Arabia, (2) there is a large number of top managers in Saudi Arabia who are non Arabic-speakers. The official headed paper of King Faisal University, the researcher's employer, was used to write the covering letter in Arabic and English. In this covering letter, the researcher introduced himself to the respondent and explained the topic of the research. The covering letter also contained information such as the purpose of the study, how and why the respondent had been selected, and an appeal to the respondent for participation by filling out and returning the questionnaire. The researcher emphasised the importance of the study to the Saudi private sector. The researcher's address, telephone and fax numbers were clearly stated in the covering letter. At the end of the questionnaire, the researcher included a half page space for the respondent to add notes, remarks, or questions if they had any.

As an inducement to respond, participating organisations were offered a free copy of a summary report presenting the findings of the study. Another effective method which was successfully used to increase participation was an official letter obtained

from the Saudi Cultural Attaché in the United Kingdom requesting Saudi companies to help the researcher in conducting the research in Saudi Arabia and collecting the necessary data. This letter was also included with the questionnaire.

#### **4.5.1.2.4 Instrument Testing (Pilot Study)**

Instrument testing detects weaknesses in the instruments. All data-gathering instruments must be tested to see how long it takes recipients to complete them, to check that all questions and instructions are clear and to enable the researcher to remove any items which do not yield valuable data. This testing stage should be conducted once the researcher drafted the data gathering instrument. The purpose of testing is to remove any possible confusion from the instrument so that respondents in the main study will experience no difficulties in completing it and so the researcher can carry out the analysis stage with no difficulties (Bell, 1996). Usually at least two or three drafts are developed before reaching the final draft. Colleagues, friends and actual respondents can offer a great help in this stage.

When the first draft of the questionnaire had been written the researcher has asked five of his colleagues at King Faisal University to fill it in. Valuable feedback was received. For further evaluation and refining, the researcher decided to take the instrument to the actual field and perform another test. A pilot study was also conducted at this stage. Fifteen companies in six different business sectors were contacted and asked to respond to the questionnaire. The results of this stage led to the correction of a few questions. The remarks which were made were very important for enhancing the language and the wording for some questions. The wording, format, and order of certain questions were modified.

Finally, the pilot study was completed to test the interview questions. Three interviews had been also conducted with three Saudi managers. Two of them were top executives for two major industrial companies and the third one was a senior manager for the information technology division in a large financial institution. The results from this stage were valuable and helped in many ways to avoid mistakes. Several questions were re-phrased because they were ambiguous and difficult to answer.

#### **4.6 Factors Affecting Response Rate of Mail Questionnaire**

One big disadvantage of using mail questionnaires as an instrument for gathering data is that questionnaires have a low response rate (Sekaran, 1992). Mail questionnaires with a return rate of about 30% are often considered satisfactory (Cooper & Emory, 1995). In Saudi Arabia where this study was conducted, a response rate of 15% is considered normal (Alarfaj, 1996). Many studies have shown that better-educated people and those more interested in the research's topic tend to respond to mail questionnaires. In order to improve the return rates, researchers use various techniques and strategies. These strategies can help to overcome the difficulty of securing an acceptable response rate to mail questionnaires and increase the response rate. The researcher in this study used most of the following strategies in order to obtain an acceptable response rate:

**1- Questionnaire Length.** Keeping the questionnaire as short as possible will all help to increase return rates of mail questionnaires (Kanuk & Berenson, 1975). Because a long questionnaire could deter the recipient from responding, the researcher in this study designed the questionnaire to be as short as possible.

**2- Survey Sponsorship.** The sponsorship of a questionnaire has a significant effect on respondents, often motivating them to fill it out and return it (Frankfort-Nachmias & Nachmias, 1996). Therefore, researchers must include information on sponsorship, usually in the cover letter accompanying the questionnaire. In this study, King Faisal University (KFU) has been mentioned as a sponsor. The official paper for KFU has been used to write the covering letter. Another official letter has been acquired from the Saudi Cultural Attaché in the United Kingdom (see Appendix C and D). The researcher believes that these methods helped a lot to obtain a good response rate in this study.

**3- Follow-up.** It is one of the most important mechanisms in raising the response rate. In recent years, researchers have improved data collection with mail surveys greatly by applying a technique called the Total Design Method (TDM) (Frankfort-Nachmias & Nachmias, 1996). This method is a step-by-step procedure that consisted of two parts: questionnaire construction and survey implementation. The TDM procedure focuses primarily on follow-up. The follow-up strategy in this method is to send a reminder postcard to respondents who have not replied one week after the first mailing. At the end of the third week of the original mailing, a second follow-up letter with a new questionnaire and a return envelop should be sent to respondents who have not replied. After seven weeks, a third letter including a questionnaire must be sent by certified mail to all respondents who have not responded. The researcher in this study applied the TDM follow-up strategy to motivate individuals who have not responded. Three follow up letters were sent to the respondents (see Appendixes F, G, and H). With anonymity promised, a numbering system was devised earlier to know who has replied and who has not. The follow-up process could not be applied without this system. The follow-up

strategy resulted of receiving 56 questionnaires which equivalent to 27.3 percent out of the total number of questionnaires that have been received in this study.

**4- Return Envelops.** Studies suggested that the inclusion of a stamped, return envelope does encourage response because it simplifies questionnaire return (Emory, 1985). Questionnaires that are not accompanied by a post-paid return envelope obtain few responses. It is unreasonable to expect the respondent not only to fill the questionnaire but also to find an envelope and then go to the post office to have it weighed and stamped. In this study, a stamped, self-addressed return envelope was included with each questionnaire.

**5- Postage.** Studies show no significant advantage for first class over third class, for commemorative stamps over ordinary postage, or stamped mail over metered mail. In this study, first class mail has been used for mailing the questionnaires. All questionnaires have been sent through the post office at King Faisal University, the researcher's employer.

**6- Personalisation.** Personalisation of the mailing has no advantages in terms of improved response rates. The use of a personally typed cover letter with a titled signature proved to be somewhat effective in most but not all cases (Cooper & Emory, 1995). In this study the envelope and the covering letter were addressed personally to the top executive manager of each company.

**7- Cover Letters.** An important factor to be considered in designing the questionnaire is the covering letter. The covering letter must succeed in persuading individuals to respond by filling out the questionnaire and posting it back. It should therefore include information such as: the sponsor of the study, the purpose of the study, its importance, and an assurance that the respondent's answers will be held in total confidence. In this study, two covering letters in English and Arabic were sent including with the questionnaire (see Appendixes A and B). The researcher introduced himself to the respondent, explained the topic of the research, the purpose of the study, how and why the respondent had been selected, and made an appeal to the respondent for participation by filling out and returning the questionnaire.

**8- Anonymity.** Even though evidence showed that the promise of anonymity to respondents has no significant effect on response rate, a total anonymity has been provided to the participators in this study.

**9- Size, Reproduction, and Colour.** Studies show no significant difference in response rates regarding the effect of questionnaire size, colour, and method of reproduction.

**10- Money Incentives.** A widely used method to increase response rate is to offer the respondent a reward such as a prize or a nominal sum of money. Larger sums bring in added response, but at a cost that may exceed the value of the added information (Cooper & Emory, 1995). Money has not been used as an incentive technique in this

study. As an alternative inducement to respond, participating organisations were offered a free copy of a summary report presenting the findings of the study.

**11- Deadline Dates.** Many studies found that setting deadlines dates for the questionnaire did not increase the return rate. This study did not use a deadline date as a technique to improve the response rate.

**12- Timing of Mailing.** *The timing of mailing proved to be an effective factor which affected the return rate of mail questionnaires. Because summer and holidays produce the lowest response rate, it is not recommended to mail questionnaires during those times (Frankfort-Nachmias & Nachmias, 1996). Questionnaires in this study were mailed during February and March 1997. This period is a good time to conduct research in Saudi Arabia especially if the sample is the top managers. Most of top managers in Saudi Arabia are in the country at this time. Generally, top managers in Saudi Arabia take their vacation and leave the country in the summer because of the hot dry weather in most parts of the country.*

#### **4.7 Sampling Design**

The selection of the units to which the data relate is an important phase in the collection of the data in surveys. This selection process is called sampling. Sampling is the process of selecting a sufficient number of elements from the population so that by studying the sample, and understanding the properties or characteristics of the sample subjects, we will be able to generalise the properties or characteristics for the whole population (Sekaran, 1992). There are several reasons why researchers use a sample

rather than collecting data from the entire population. Firstly, it would be impossible, impractical, and extremely expensive to collect data from all the potential units of analysis covered by the research problem. Secondly, studying a sample rather than the entire population is also sometimes likely to lead to more reliable results, mostly because there will be less fatigue, and hence fewer errors in collecting data, especially when there are too many elements involved. Thirdly, researchers using sampling techniques can obtain results much more quickly than they could studying the entire population. Because of the speed of execution with the usage of sampling, the time between the recognition of a need for information and the availability of that information will be minimised (Emory, 1985).

#### **4.7.1 The Population**

Population refers to the total collection of elements about which we wish to make some inferences (Cooper & Emory, 1995). It is the entire group of people, events, or things of interest that the researcher wishes to investigate and study. In this study, the researcher's objective is to understand the impact of information technology on organisations in the Saudi private sector. Based on that objective, all organisations in the Saudi private sector regardless of their size, ownership, or business sector are considered as the population for this study. The concept of the private sector is normally based on the criteria of private ownership of establishments which engage in various industrial, agricultural and commercial activities with the aim of realising profits. In Saudi Arabia the scope of the private sector can be extended to include some companies of mixed public and private ownership which operate as joint stock companies according to the disciplines of the market.

### **4.7.2 The Sampling Frame**

The sampling frame is comprised of a complete listing of elements or units from which the sample is to be drawn. The sampling frame, ideally, should include all the sampling elements or units in the population. In practice, such a physical list rarely exists; researchers usually rely on a substitute list (Frankfort-Nachmias & Nachmias, 1996). The sampling frame in smaller-scale studies, rather than large national studies which include counting the population for a whole country, may be based on telephone directories, city directories, or membership lists of private and public organisations. Because the accuracy of a sample depends mostly on the sampling frame, the researcher must ensure that there is a high degree of correspondence between a sampling frame and the entire population. In this study, the 1996 top 1000 Saudi companies directory was used as the sampling frame. The directory was published in 1996 by the International Information and Trading Services Company (IIT) based in Al Khobar in the eastern province of the country. This directory was considered the most accurate and up-to-date listing for the top 1000 company in Saudi Arabia at the time this study was conducted. In this directory, the top 1000 Saudi companies were selected, classified, and ranked based on the sales turnover of each company. Valuable information such as full mailing addresses, telephone and fax numbers, owners, directors, senior executives, business sector, activities, agencies, branches, sister companies, brief history, and financial data is included.

### **4.7.3 The Sample**

A sample is a subset of the population. It comprises some members selected from the population. Some, but not all, elements of the population would form the sample (Emory, 1985). The primary factor for any sample to be accurate is that it must

be as representative as possible of the population from which it is drawn. A sample is considered to be representative if the analyses made using the researcher's sampling units produce results similar to those that would be obtained had the researcher analysed the entire population (Bryman, 1989). Researchers have identified two major types of sampling designs: probability and non-probability sampling. Those sampling designs will be discussed next.

#### **4.7.3.1 Probability Sampling**

Probability sampling means that all the elements in the population have the same probability or chance of being included in the sample (Frankfort-Nachmias & Nachmias, 1996). 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. Probability sampling can be either unrestricted or restricted in nature. In the unrestricted probability sampling, known as simple random sampling, every element in the population has a known and equal chance of being selected in the sample. On the other hand, restricted sampling has several complex probability sampling designs. The five most common complex probability sampling designs are: systematic sampling, stratified random sampling, cluster sampling, area sampling, and double sampling (Sekaran, 1992).

#### **4.7.3.2 Non-Probability Sampling**

Non-probability sampling has no assurance that every element has some chance of being included in the sample. In other words, the elements do not have a known or predetermined chance to be selected in the sample (Cooper & Emory, 1995). There are several reasons which drive researchers to use non-probability sampling over probability

sampling even though probability sampling has more advantages. Firstly, if the objective of the research is not a true cross section of the population. In other words, if there is no need or desire to generalise the findings of the study to the population (Sekaran, 1992). A second important reason for choosing non-probability over probability sampling is that probability sampling is costly in both time and money. Probability sampling requires more planning and repeated call-backs to assure that each selected element of the sample is contacted. All these activities are expensive and require sufficient financial resources. Thirdly, if the total population may not be available then non-probability sampling might be the only feasible alternative to the researcher (Cooper & Emory, 1995). Non-probability sampling designs can fit into two categories, convenience sampling and purposive sampling. Those sampling designs will be discussed next.

#### **4.7.3.2.1 Convenience Sampling**

Convenience sampling refers to selecting whatever sampling units are conveniently available (Frankfort-Nachmias & Nachmias, 1996). It means gathering information from members of the population who are conveniently available to provide this information. It is considered the least reliable design but normally the cheapest and easiest to conduct.

#### **4.7.3.2.2 Purposive Sampling**

Purposive sampling refers to selecting a sample which meets certain criteria. In this type of sampling, the researcher selects sampling units subjectively in an attempt to obtain a sample that appears to be representative of the population (Frankfort-Nachmias & Nachmias, 1996). Two major types of purposive sampling are judgement sampling

and quota sampling. **Judgement sampling** involves the choice of subjects who are in the best position to provide the information required (Sekaran, 1992). Researchers use a judgement sampling design when a limited category of people have the information that is sought. It is the only viable sampling method for obtaining the type of information that is required. People holding high positions, presidents, and vice-presidents who have the experience and expert knowledge are a good example of judgement sampling if the researcher is seeking information relevant to the macro level of work organisations. **Quota sampling** refers to the selection of a sample based on relevant characteristics that describe the dimensions of the entire population. If a sample has the same distribution on these particular variables, then one can reason that it is likely to be representative of the population with regard to other variables on which we have not controlled (Emory, 1985).

A non-probability sampling design has been adopted for this research. A decision has been made to choose the top 500 Saudi companies to comprise the sample for this study. Judgement sampling is the sampling strategy which has been used to select this study sample. There were several reasons for this decision: Firstly, the top managers of the top 500 Saudi companies are very well educated, have expert knowledge, and are able to provide the type of information that is required for this research. Secondly, an up-to date list for the whole population of this study, which is all of the organisations in the Saudi private sector, is not available. Thirdly, an accurate and updated directory for the top 1000 Saudi companies is available and that directory has been used as the sample frame. Fourthly, The top 500 Saudi companies are more likely to be familiar with information technology applications and its impact on organisations than other companies. The researcher believes that the top 500 Saudi companies is a

representative sample for the entire population in this study which is all business organisations in the Saudi private sector.

#### **4.8 Sample Size**

Unless the sample size is adequate for the desired level of precision and confidence, no sampling design can be useful to the researcher in meeting the objective of the study (Sekaran, 1992). Thus, neither too large nor too small sample sizes help research projects. According to Roscoe (1975), sample sizes larger than 30 and less than 500 are appropriate for most research. In this study, the top 500 Saudi companies has formed the study sample.

#### **4.9 Validity and Reliability**

Whatever procedure for collecting data is selected, it should always be examined critically to assess to what extent it is likely to be valid and reliable. We have to ensure that the measures we have decided to use are reasonably good. Validity and reliability concerns are evident in any study but are particularly difficult to address in qualitative studies (Blanton, Watson, & Moody, 1992). Because this study combines qualitative and quantitative techniques, care was taken in the design of the study to ensure that validity and reliability were properly addressed during both data collection and data analysis. Those two criteria will be discussed in more details in the following sub-sections.

##### **4.9.1 Validity**

Researchers use validity to test how well an instrument that is developed measures the particular concept it is supposed to measure. In other words validity is

concerned with whether we are measuring the right concept or not. It is the ability of a research instrument to measure what it is purported to measure (Cooper & Emory, 1995). There are several types of validity tests that can be used by researchers to test how good the measures are including content validity, criterion-related validity, and construct validity. **Content validity** ensures that the measure includes an adequate and representative set of items that would tap the research subject (Sekaran,1992). The researcher can determine content validity through careful definition of the research topic, the items to be scaled, and the scale to be used. This logical process is somewhat intuitive and is unique to each research designer (Emory, 1985). **Criterion-related validity** is established when the measure differentiates individuals on a criterion it is expected to predict (Cooper & Emory, 1995). This can be done by establishing concurrent validity or predictive validity. Concurrent validity is established when the scale discriminates against individuals who are known to be different; that is, they should score differently on the test. Predictive validity is the ability of the test or measure to differentiate among individuals as to a future criterion. **Construct validity** is established by relating a measuring instrument to a general theoretical framework in order to determine whether the instrument is tied to the concepts and the theoretical assumptions which the researcher is employing (Frankfort-Nachmias & Nachmias, 1996).

In this study, the researcher believes that validity has been achieved and that the instruments used have a good degree of validity. Several techniques have been used to accomplish this goal:

- 1- The study instruments, the questionnaires and the interviews, have fully covered the topic of the research. Based on the literature survey which has been accomplished in an

earlier stage of this study, the important aspects of the study have been brought to light and comprehensively covered in both the questionnaire and the interview.

2- The instrument's questions were constructed clearly, directly, and in an unbiased style. Spaces were given at the end of many questions for the respondents to add notes and remarks of their own.

3- The questionnaire was tested and revised. Five of the researcher's colleagues at King Faisal University were asked to answer the questionnaire. Some questions were modified in this stage.

4- For further evaluation and refining, the researcher decided to take the instrument to the actual field and perform another test. A pilot study was also conducted. Fifteen companies, selected from the same population in six different business sectors, were contacted and asked to respond to the questionnaire. Valuable feedback was received and some questions were modified.

5- Personal interviews were held with top managers of six companies. Issues relevant to the impact of information technology were discussed with those managers. This technique was used as a second data-gathering instrument which contributed to the validity of this study.

6- The results from the questionnaires were very similar to the results obtained from interviews and this indicates a strong degree of validity.

7- The results of this study are consistent with the findings of other studies (see, for example, Culpan, 1995; Kelly, 1994; Yap, 1986).

#### **4.9.2 Reliability**

Reliability refers to the stability and consistency with which the instrument is measuring the concept and helps to assess the "goodness" of a measure (Sekaran, 1992).

In other words reliability is the extent to which a test or procedure produces similar results under constant conditions on all occasions (Bell, 1996). Reliability is a contributor to validity and is a necessary but not sufficient condition of validity. Reliable instruments are robust; they work well at different times under different conditions. This distinction of time and condition is the basis for frequently used perspectives on reliability-stability, equivalence, and internal consistency (Cooper & Emory, 1995). According to Frankfort-Nachmias and Nachmias (1996), there are three common ways of estimating reliability: the test-retest reliability, the parallel-form reliability, and the split-half reliability. The researcher in **the test-retest method** administers the measuring instrument to the same group of people at two different times, and computes 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 a different score on one measurement from the score that person obtained on another measurement. In **the parallel-forms reliability**, researchers need to develop two parallel versions of a measuring instrument. Both forms should be administered to the same group of people, and then the two sets of measures 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.

All these methods are not always feasible or necessary, and there are disadvantages and problems associated with all three (Bell, 1996). In general, the researcher can improve reliability if external sources of variation are minimized and the conditions under which the measurement occurs are standardised. Researchers can improve equivalence by broadening the sample of items used. This can be done by

adding similar questions to the questionnaire (Cooper & Emory, 1995). This strategy has been implemented in this study. The researcher constructed some of the questionnaire's questions so as to elicit similar answers if the instrument is reliable. Examples of this strategy can be seen in this study as follows: answer for question 5 should be consistent with answer for question 15, answer for question 21 should be consistent with answer for question 29, answer for question 22 should be consistent with answer for question 24, answer for question 22 should be consistent with answer for question 26, and finally answers for questions 29j and 29k should be consistent with answer for question number 32.

#### **4.10 Data Preparation and Analysis**

Once the data begin to flow in, the researcher's attention was turned to data analysis. The next step was to analyse the data so that the research hypotheses could be tested. During the research design stage, researchers should have decided how to analyse the data. Unfortunately, many researchers wait until the analysis stage to decide what to do. This results in the late discovery that some data will not be collected, will be collected in the wrong form, or will exhibit unanticipated characteristics. After collecting the data, researchers must undertake several steps in order to obtain meaningful results from the analysis stage. These steps include: data editing, handling blank responses, coding, data entry, data analysis (Frankfort-Nachmias & Nachmias, 1996). The following sections will discuss these steps in more detail.

##### **4.10.1 Editing the Data**

The first step in analysis is to edit the raw data. When data come from interviews, observations and questionnaires containing open-ended questions, editing

becomes an essential step. Editing detects errors and omissions, corrects them where possible, and certifies that minimum data quality standards are achieved. For example, if a respondent has no children, all questions relating to children must be coded NA (“no answer”) or left blank. Also, an error is indicated if a respondent reporting his/her age as 5 years old also responds that he/she has two children. The main purpose of data editing is to assure that data are (1) accurate, (2) consistent with other information, (3) uniformly entered, (4) complete, and (5) arranged to simplify coding and tabulation (Cooper & Emory, 1995). However researchers should also be aware of any unjustified editing which can introduce a bias in the data thus affecting the results of the study.

The researcher in this study followed the rules mentioned above and applied editing wherever necessary. Every questionnaire received was dated and read thoroughly twice, once by the researcher and a second time by one of his colleagues. Answers were reviewed and checked for accuracy, completion, and consistency. Detected errors or suspicious answers, if found, were marked with a distinctive colour and a note will be written alongside. If a proper answer could be reached by reading the other information in the questionnaire, editing was carried out. Otherwise, the respondent was contacted in order to obtain the correct information before the data was entered. Finally, the data obtained through the interviews was rewritten, organised and stored in the computer.

#### **4.10.2 Handling Blank Responses**

The researcher should not expect all parts of his questionnaire to be answered by the respondents. Some respondents do not answer every item in the questionnaire. Questions may have been left blank because the respondent did not understand the question, was not willing to answer, or was simply not interested enough to respond to

the entire questionnaire. 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 that particular item. Another way of handling this problem is to allow the computer to ignore the blank responses when the analyses are done. 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 (Sekaran, 1992). The researcher in this study decided to apply the latter technique to deal with blank responses. A missing data code, which was 99, was programmed into the statistical software that was used in this study in order to ignore blank responses in the analysis. Coding will be discussed next.

#### **4.10.3 Coding**

Coding involves assigning numbers or other symbols to answers so the responses can be grouped into a limited number of classes or categories. Coding helps the researcher to reduce several thousand replies to a few categories containing the critical information needed for analysis. Instead of entering the word male or female in response to a question that asks for the respondent's gender, the codes "M" or "F" could be used. Another way is to give the code 1 for male and 2 for female or 0 and 1. Coding can be done by letters, numbers, or a combination of both. In coding, categories are the partitioning of a set. Four rules guide the establishment of category sets. The categories should be: appropriate to the research problem and purpose, exhaustive, mutually exclusive, derived from one classification principle. In this study, the Statistical Package for the Social Sciences (SPSS) version 7.5 and Minitab version 11 were both used in the data analysis. The research variables were coded into formats for

both SPSS and Minitab. The variables were also given unique names such as age, edu, and sector. This step helped in setting up the computer program to analyse the data.

#### **4.10.4 Data Entry**

Data entry converts information gathered by secondary or primary methods to a medium for viewing and manipulating. Computers now became the primary tool for viewing and analysing data. Researchers use computers to store, process, access, and analyse data sets more quickly and easily. Several means can be used to enter data into computers including: scanning, bar codes, or simply using the computer keyboard. Researchers can enter the data through data entry forms. Databases, spreadsheets, statistical packages, or any entry form designed with computer editor can facilitate this process. Researchers must be very careful at this stage because entry mistakes can occur. Because the results obtained from data analyses can only be as good as the raw data entered, care should be taken to minimise errors at this stage. In this study, the researcher used Microsoft Excel version 7.0 to enter the data. An entry form was designed under Microsoft excel to enter data from the questionnaires. Each questionnaire received was first checked for errors and omissions then answers were entered manually into the computer on the following day. After completing the data entry stage, an Excel file was transferred into SPSS and Minitab files. The data became ready for analysis. The next section will discuss briefly the data analysis techniques that were used in this research.

#### **4.10.5 Data Analysis Techniques**

The field of statistics involves methods for describing and analysing data and for making decisions or inferences about phenomena represented by the data. Methods in

the first category are referred to as descriptive statistics; methods in the second category are called inferential statistics (Huck & Cormier, 1996). **Descriptive statistics** enable the researcher to summarise and organise data in an effective and meaningful way. They provide tools for describing collections of statistical observations and reducing information to an understandable form. **Inferential statistics** allow the researcher to make decisions or inferences by interpreting data patterns. Researchers use inferential statistics to determine whether an expected pattern designated by the theory and hypotheses is actually found in the observations. Inferential statistics can be categorised as **parametric or nonparametric**. Tests that require the assumption of normality, or any other specific distribution, are called parametric tests (Iman & Conover, 1989). Parametric statistics can be used when data are collected on an interval, ratio, or even ordinal scale. Nonparametric statistics, on the other hand, makes no explicit assumption regarding the normality of distribution in the population and is used when the data are collected on a nominal or ordinal scale (Sekaran, 1992). Frequencies, mean, median, standard deviation, level of significance, T-test, ANOVA, correlation and regression are some of the terms and tests that are commonly used in statistics.

To summarise, both descriptive and inferential statistics have been used extensively in this study. Descriptive statistics such as frequency tables, percentages, histogram and bar charts have been obtained for personal data and classification variables in the study. The researcher lists the categories of the variables and counts the number of observations in order to examine the pattern of response to each variable. Measures for central tendencies and dispersion such as the mean, median, variance, and the standard deviation have been obtained and used. In the inferential statistics, both parametric and nonparametric tests have been used in order to compare the results from

these two types of statistical tests. This decision has been made to increase the accuracy of the analysis results and then the study findings. In parametric tests, the one sample T-test and the regression analysis were used to test the research's hypotheses while the ANOVA test was used to test the differences between the sample groups. In the nonparametric tests, the Wilcoxon test and Kruskal-Wallis test were used as similar tests to the T-test and the ANOVA test. The Pearson Correlation Coefficient, and the Chi square test were also used in this study. All the statistical procedures mentioned above were found to be effective in achieving the main objectives of this study. The results of these tests and the data analysis will be discussed in the next chapter.

# **CHAPTER FIVE**

## **DATA ANALYSIS AND RESULTS**

### **5.1 Introduction**

The last chapter focused on the research methodology used in this study. The data collection methods, including data preparation and data analysis techniques, were introduced. This chapter will present the data analysis techniques that were used in the study and the results which were obtained. The researcher wishes to express his sincere gratitude to expert statisticians Mr. Donald Sinclair and Mr. Paul Gardner for their advice on the appropriate statistical techniques. This chapter consists of three major parts. The first part will describe the data analysis techniques that were used in this study. The second part will focus on the quantitative results of the data that was gathered through the mailed questionnaires. The third part of this chapter will discuss the qualitative results of the data, which was gathered through the personal interviews. These parts will be discussed in more detail next.

It is very important to mention here that this study is measuring the current management opinions and perceptions to the impact of using information technology on business organisations in Saudi Arabia. The study measures management perceptions and therefore it may not correspond with the reality within the respondent's organisation. However, the results of the study should not be underestimated since the management's intuition and perceptions is considered a valid source of information and the managers perceptions are based on the environments within their respected organisations.

## **5.2 The Data Analysis Techniques**

An important reason why the use of statistics has increased in importance in recent years is that methods and techniques have been devised to aid the decision-making process in business and other social sciences. This often involves making forecasts, estimates, or conclusions about some large set of data. The field of statistics involves methods for describing and analysing data and for making decisions or inferences about phenomena represented by the data. Methods in the first category are referred to as descriptive statistics; methods in the second category are called inferential statistics. Both descriptive and inferential statistics help researchers develop explanations for complex phenomena that deal with relationships between variables. Statistics provides the tool to analyse, represent, and interpret those relationships. In the following sub sections we will explain both categories of statistics; descriptive and inferential, and we will define some of the major statistical techniques that were used in this study.

### **5.2.1 Descriptive Statistics**

Descriptive statistics is confined to the presentation of information in an understandable form. Descriptive statistics enable the researcher to summarise and organise data in an effective and meaningful way (Bancroft & O'Sullivan, 1993). They provide tools for describing collections of statistical observations and reducing information to an understandable form. Data presented in tables of frequencies, measures of central tendencies and dispersions, diagrams, and graphs are examples of descriptive statistics.

## 5.2.2 Inferential Statistics

The term inferential statistics is used to label the portion of statistics dealing with the principles and techniques that allow researchers to generalise their findings beyond the actual data sets obtained (Huck & Cormier, 1996). Inferential statistics are used when tentative conclusions about a population are drawn on the basis of data contained in a representative sample (Kvanli, Guynes, & Pavur, 1996). This type of statistics allows the researcher to make decisions or inferences by interpreting data patterns. Researchers use inferential statistics to determine whether an expected pattern designated by the theory and hypotheses is actually found in the observations. Under inferential statistics, researchers identified two general classes of significance tests; **parametric** and **non-parametric**. Before we discuss both types of these statistical tests, we will discuss the normal distribution test which was carried out in this study and why both parametric and non-parametric were used in this study.

### 5.2.2.1 The Normality Test

After completing the data entry stage, the data was checked for normality. As one of the most useful and frequently used tests for distribution, the normal distribution test was carried out in this study in order to decide which statistical tests were applicable. The normal distribution is found particularly useful when considering samples from a large population. The normal distribution is symmetrical, bell shaped, and can be completely defined by values of the mean and standard deviation. The mean ( $\mu$ ) defines the centre of the distribution, and the standard deviation ( $\sigma$ ) defines its spread (Thomas, 1997). By using SPSS and Minitab, the normality test was performed in this study to produce visual normal probability plots for all the variables. Because this study obtained a high response (205 questionnaires), the results of the normality test

showed normal probability plots for all the cases. “In a normal probability plot, each observed value is paired with its expected value from the normal distribution. (The expected value from the normal distribution is based on the number of cases in the sample and the rank order of the case in the sample.)” (Norusis, 1993, p. 189).

#### **5.2.2.2 Parametric or Non-Parametric**

Many researchers face great difficulties when it comes to select a statistical test. According to Cooper and Emory (1995), several questions should be considered when researchers attempt to choose a particular test. Those questions include the following:

- 1- Does the test involve one sample, two samples, or  $k$  samples?
- 2- If two samples or  $k$  samples are involved, are the individual cases independent or related?
- 3- Is the measurement scale nominal, ordinal, interval, or ratio?
- 4- What is the sample size?
- 5- If there are several samples, are they of equal size?

The answers for the above questions can lead the researcher to select the appropriate test which can be applied the most to his/her data. The results obtained from the normality test and after considering the measurement used in the questionnaire, the researcher in this study was convinced to apply the parametric tests. In the same time and as mentioned in the previous chapter, non-parametric statistical tests were also used to see if there are differences in the results of both tests. This technique was used based on an expert advice which was sought from an experienced statistician. This could achieve more validity in the results of the statistical techniques that were used. Both parametric

and non parametric statistical techniques that were used in this study will be discussed next.

### 5.2.2.3 Parametric Statistical Tests

A parametric test is a statistical test based on several assumptions about the distribution of the population from which the sample was drawn. Among the most important ones are the assumptions that (1) the sample is drawn at random, (2) the variables are measured on at least an interval, ratio, or ordinal scale, and (3) the population from which the sample is drawn is normally distributed (Kinnear & Gray, 1994; Sekaran, 1992). Table 5.1 shows the most important characteristics of parametric statistical tests. Many researchers suggest that parametric tests are robust and more powerful than non-parametric if their assumptions are met (Cooper & Emory, 1995; Norusis, 1997). The z-test, one sample t-test, paired samples t-test, analysis of variance (ANOVA), and Pearson correlation are some examples of parametric tests. In this study, the researcher used some of the parametric statistics which have been found to be

**Table 5.1**

#### **Characteristics of Parametric Statistical Tests & Models**

	<b>Characteristics</b>
Examples: The T test, the Pearson coefficient of correlation (r), the ANOVA test, and the Regression models.	<ul style="list-style-type: none"> <li>- Robust</li> <li>- Many of these tests rely on the assumption that the data are sampled from a normally distributed population.</li> <li>- Can be used on interval, ratio, or ordinal scale.</li> <li>- More powerful than Non-Parametric tests.</li> </ul>

suitable to analyse the data in this research. The t-test, the analysis of variance (ANOVA), and the regression models are the main parametric statistics that were used the most. All of these parametric statistics including with other tests will be discussed in the following sub sections.

#### **5.2.2.3.1 The One Sample T-Test**

The purpose of hypothesis testing is to help draw conclusions about population parameters based on results observed in a random sample. A one-sample *t* test is used to test the null hypothesis that a sample comes from a population with a particular mean (Norusis, 1997). The null hypothesis ( $H_0$ ) is a statement that no difference exists between the parameter and the statistic being compared to it. At the end of the hypothesis testing procedure, the researcher will do one of the two things with the null hypothesis ( $H_0$ ). One option is for the researcher to take the position that the null hypothesis is probably false. This only happens if the p value  $< .05$ . In this case, the researcher must reject the null hypothesis ( $H_0$ ). The other option available to the researcher is to refrain from asserting that  $H_0$  is probably false and that can only be reached when the p value  $> .05$ . In this case, the researcher fails to reject the null hypothesis. In this study, the researcher used the one sample *t*-test to test some of the research hypotheses that were discussed in Chapter Four. Hypotheses one, two, and four were tested using the one sample *t* test. The hypotheses in this study were tested at 5% significance level. The major findings of these tests will be discussed later in this chapter.

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<sup>1</sup>The p-value  $\alpha$  is the level of significant of the test. The most common level is .05, although .01 is also widely used. Other p-value levels such as .10, .025, or .001 are sometimes chosen. The exact level chosen is largely determined by how much  $\alpha$  risk one is willing to accept and the effect that this choice has on  $\beta$  risk. The larger the  $\alpha$ , the lower the  $\beta$ .

#### **5.2.2.3.2 The Two Independent-Samples T-Test**

The independent-samples *t*-test procedure compares means for two groups of cases. The test evaluates the differences between the means of the two independent groups. With an independent samples *t* test, each case must have a score in two variables, the grouping variable and the test variable. The *t* test evaluates whether the mean value of the test variable for one group differs significantly from the mean value of the test variable for the second group (Norusis, 1997). In this study, the researcher used the two samples *t*-test to perform the non-response bias test and the early and late response bias test. In addition, this test was used to test some of the study variables which will be discussed later in this chapter.

#### **5.2.2.3.3 The Analysis of Variance: One Way ANOVA**

The One Way ANOVA procedure has been developed to test for differences in the means of several groups (Berenson & Levine, 1992). The One Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent). The factor divides individuals into two or more groups or levels, while the dependent variable differentiates individuals on some quantitative dimension. In this test, each individual or case must have scores in two variables: a factor and dependent variable. The ANOVA *F*-test evaluates whether the group means on the dependent variable differ significantly from each other (Green, Salkind, & Akey; 1997). The researcher in this test wants to test the null hypothesis that several independent population means are equal. In this study, the one way ANOVA procedure was used to compare the differences between the study's groups and to test some variables. The results of the ANOVA test will be discussed later in this chapter.

#### 5.2.2.3.4 Pearson Correlation Coefficient

Usually symbolised as  $r$ , the Pearson correlation coefficient is so frequently used to show the degree of linear relationship between two variables. The  $r$  value can range between  $-1$  and  $+1$ . The two extremes represent a perfect linear relationship between the two variables. If the  $y$  values tend to increase as  $x$  increases,  $r$  will be positive; if the  $y$  values decrease as  $x$  increases,  $r$  will be negative. When  $r$  equal to zero that means there is no linear relationship between  $y$  and  $x$  (Mayer & Sykes, 1996). In this study, the Pearson correlation coefficient was applied in testing hypothesis one. Other variables were also tested using this technique.

#### 5.2.2.3.5 Regression Analysis

The Regression Analysis is the estimation of the linear relationship between a dependent variable and one or more independent variables (SPSS, 1996). Several regression models are available that can be used to determine relationships between dependent and independent variables. The linear regression model, a very popular model used when a linear relationship exists between the dependent and independent variables, can be defined as a method of describing the relationship between two or more variables by calculating a “best fitting” straight line on a graph. The line averages or summarises the relationship. The result is a regression line, which can also be expressed in a regression equation. The equation  $Y = a + bX + e$ .  $Y$  is the dependent variable;  $X$  is the independent variable;  $b$  is the slope or regression coefficient;  $a$  is the intercept; and  $e$  is the error term (Vogt, 1993). The linear regression equation means that the function describing the relation between  $X$  and  $Y$  is that of a straight line (Green, Salkind, & Akey, 1997). Researchers commonly display the observations of  $X$  and  $Y$  and the

regression line connecting them in the form of graph. Two intersecting axes represent the variables  $X$  and  $Y$ . Each observation is entered as a dot at the point where the  $X$  and  $Y$  scores intersect. The linear regression analysis was used in this study to test hypothesis three and other variables which will be discussed later in this chapter.

In addition to the linear regression, the Curve Estimation procedure was used in this study to produce curve estimation regression statistics. Two major models under this procedure were used; the **quadratic** and the **cubic**. The quadratic model can be used to model a series which “takes off” or a series which dampens (SPSS, 1996), and its equation is:

$$Y = b_0 + (b_1 * t) + (b_2 * t^{**2})$$

While the Cubic model, can be defined by the following equation:

$$Y = b_0 + (b_1 * t) + (b_2 * t^{**2}) + (b_3 * t^{**3})$$

The above models were used in this study to test several variables which will be discussed later in this chapter.

#### **5.2.2.4 Nonparametric Statistical Tests**

Nonparametric tests, called distribution-free tests, are those tests that make no explicit assumptions regarding the distribution of the data. They are useful for problems that include one or more variables measured on a nominal or ordinal scale (Sekaran, 1992). The major advantage generally attributed to non-parametric tests is that they do not rely on any very seriously restrictive assumptions as to whether or not the distribution of the variable in the population is normal. However, the major disadvantage generally attributed to non-parametric tests is their lower power relative to the corresponding parametric tests (Howell, 1992). They are less likely to find a true

difference when it exists than the tests based on the assumption of normality. That is because non-parametric tests ignore some of the available information (Norusis, 1997). However, researchers in many situations need procedures that require less stringent assumptions about the data. Non-parametric tests are the alternative for them. Table 5.2 shows the most important characteristics of non-parametric statistical tests. Several non-parametric tests are available to researchers. The sign test, McNemar's test, chi-square test, Wilcoxon test, Mann-Whitney test, Kruskal Wallis test, and the Run test are examples of the non-parametric tests. From those tests, the researcher in this study has used the Wilcoxon test, the Kruskal Wallis test, and the chi-square test. Those three tests will be explained next.

**Table 5.2**

**Characteristics of Non-Parametric Statistical Tests**

	<b>Characteristics</b>
Examples: the sign test, the Wilcoxon test, the Chi square test, and the Kruskal Wallis test.	<ul style="list-style-type: none"> <li>- Do not require the assumption that the data are sampled from a normally distributed population.</li> <li>- Can be used on nominal or ordinal scale.</li> <li>- Weaker and fewer than Parametric tests.</li> </ul>

**5.2.2.4.1 The Wilcoxon Test**

The one sample Wilcoxon signed-rank test is a similar test to the t-test in the parametric test category. This test is slightly less powerful than the *t*-test if the population is normal, while it may be considerably more powerful for other populations (Minitab, 1996). The Wilcoxon test was used in this study along with the one sample *t* test to test

hypotheses one, two, four, and other variables related to the impact of information technology on business firms in Saudi Arabia.

#### **5.2.2.4.2 The Kruskal Wallis Test**

In those situations where a researcher wishes to use a non-parametric statistical test to compare medians for three or more groups, the Kruskal Wallis test is typically used to analyse the data. The Kruskal Wallis test is a non-parametric test equivalent to one-way ANOVA. It tests whether there are *differences among groups within the same* population (Huck & Cormier, 1996). Like many other non-parametric procedures, the assumption of normal populations is not necessary for the Kruskal Wallis test. This test is useful when the data consists of rankings (ordinal data) within each sample (Kvanli, Guynes, & Pavur, 1996). In this study, the Kruskal Wallis test along with the one way ANOVA test was used to compare the differences between the study's groups.

#### **5.2.2.4.3 The Chi-Square Test**

The Chi-Square test ( $\chi^2$ ) is probably the most widely used non-parametric test of significant (Cooper & Emory, 1995). By using this techniques we test for significant differences between the observed distribution of data among categories and the expected distribution based upon the null hypothesis. The chi-square test of homogeneity was used in this study to test the response representativeness in the participated sample. This was achieved by comparing the frequencies of the respondents with those who did not respond.

### **5.3 The Quantitative Results**

This section is the core of this chapter. Here, we will discuss the most important quantitative results for this study. This section mainly consists of nine sub-sections. The first sub-section will discuss the response rate to the mail questionnaires. The second sub-section will focus on how the representativeness of the response has been tested. The third sub-section will discuss several issues related to the non-response bias and how it was tested. The fourth sub-section will discuss the late and early response bias test. The reliability test results will be discussed in the fifth sub-section. The sixth sub-section will deal with the sample descriptive statistics. The seventh sub-section will discuss the use of information technology in the sample. The one way ANOVA and the Kruskal Wallis tests will be discussed in the eighth subsection. Finally, the ninth subsection will focus on the results of the hypotheses testing.

#### **5.3.1 The Response Rate**

The response rate can be defined as the percentage of respondents in the sample who return completed questionnaires. The question of what constitutes an acceptable response rate cannot be answered easily because social scientists do not agree on a standard for a minimum response rate (Frankfort-Nachmias & Nachmias, 1996). Some researchers believe that a 30% or even 20% response rate is quite good for postal questionnaires (Bancroft & O'Sullivan, 1993). It is the researcher's responsibility to obtain the highest response rate he/she can and to encourage more people to return completed questionnaires. In order to maximise the response rate, many investigators have devised several strategies and techniques. Some of these strategies and techniques were discussed in the previous chapter.

In this study, 500 questionnaires were sent to the general managers of the top 500 Saudi companies. A total of 205 completed questionnaires were received, representing a response rate of 41.75%. Out of the total number of completed questionnaires, 150 questionnaires were received in the first two weeks. The follow-up strategy resulted in the receipt of 55 completed questionnaires which is equivalent to 26.82% of the total number of questionnaires that were returned in this study. Only nine questionnaires were returned as undelivered which gives a 1.8% undelivered rate.

### **5.3.2 Test of Responses' Representativeness**

The 205 returned questionnaires were inspected for representativeness of the selected sample of 500 firms. A breakdown of the total number of business sectors selected as well as the number and percentage of participation by type of industry is presented in Table 5.3. The numbers in table 5.3 show that there are similarities in the distribution of most business sectors between the selected sample (500 firms) and the participating sample (205 firms). Except for a slight difference in the diversified sector, no strong bias by type of industry was detected in the participating sample. In order to verify this conclusion, a chi-square homogenates test was conducted to test the null hypothesis that there is no statistically significant difference between business sectors in the participating sample. The results of this test are shown in Table 5.4. The degrees of freedom ( $df = N-1$ ). Hence there were seven groups in the original sample then  $df = 6$ . The results indicate that the test is non-significant. The computed chi square statistics for the sample was 5.014, and the p value was .542. Therefore, the null hypothesis could not be rejected. These results indicate that the sample proportions are very similar to each other.

**Table 5.3**

**Selected and Participating Companies by Business Sectors**

<b>Business Sector</b>		<b>Selected</b>	<b>Participated</b>
Trading	N	109	44
	%	21.8%	21.5%
Oil & Industry	N	97	42
	%	19.4%	20.5%
Services	N	84	36
	%	16.8%	17.6%
Diversified	N	101	34
	%	20.2%	16.6%
Contracting	N	62	29
	%	12.4%	14.1%
Finance	N	21	11
	%	4.2%	5.4%
Agriculture	N	26	9
	%	5.2%	4.4%
<b>Total</b>		500	205
		100.0%	100.0%

**Table 5.4**

**Chi-square Test for Responses Representativeness**

**Test Statistics**

	<b>Business Sectors of Organisations</b>
Chi-Square <sup>a</sup>	5.014
Df	6
Sig. (P value)	.542

a. 0 cells (.0%) have expected frequencies less than 5.  
The minimum expected cell frequency is 9.0.

**5.3.3 Evaluating the Non-Response Bias**

It is almost inevitable that when surveying a human population that there will be some non-response (Curwin & Slater, 1988). According to Frankfort-Nachmias and Nachmias (1996), several studies have shown that mail questionnaires addressed to the general population are likely to result in an upward bias in education: people with better

education tend to respond more quickly to mail questionnaires. Several reasons could cause no response once the respondents are identified. Some of those reasons could be one or more of the following:

- 1- Change of address.
- 2- Unsuitability for the study.
- 3- Those who are away during the period of the survey.
- 4- Non co-operative respondents.

Despite the investigator's efforts to maximise the response rate and reduce the non-response rate to the minimum level, non-response is still a serious problem because non-respondents may differ considerably from respondents. This may lead to biased results from the questionnaires that are returned and may limit the investigator's ability to make generalisations about the entire population (Bancroft & O'Sullivan, 1993).

The researcher in this study, in order to ensure that the survey did not suffer from non-response bias, selected at random 45 firms from those who did not respond to the questionnaire. The sample was contacted and interviewed via the telephone. Six main questions, combined in three groups, related to the impact of information technology were asked. The first group of questions related to the impact of information technology on the strategy of the organisation (v29e and v29f). The second group of questions was concerned with the impact of information technology on the organisation's structure (v29k and v31). The third and last group of questions covered the impact of information technology on the people or the individuals working in the organisation (v29j and v32). Each interview lasted for approximately 25 minutes. The responses to the six questions were entered into the computer and compared with the responses for the 205

respondents who filled in and returned their questionnaires. SPSS and Minitab were used to find out if there is any difference between the two groups. The two independent-samples *T*-test was applied to test the null hypothesis that there is no difference between the means of the population from which the two groups were chosen. The results of the test, shown in Table 5.5, indicated that there are similarities between the two groups. Table 5.5 shows the mean, the standard deviation, the *t* value, and the *p* value for both groups. The *p* values for the tested six variables indicated that the null hypothesis could not be rejected and there are no differences between the respondents and the non-respondents groups. Thus, non-response bias was not a major concern in this study.

**Table 5.5**  
**Test of Non-Response Bias**

Variables		Mean		Std. Deviation		<i>T</i>	Sig. ( <i>P</i> value)
		Respondents ( <i>N</i> =205)	Non-respondents ( <i>N</i> =45)	Respondents ( <i>N</i> =205)	Non-respondents ( <i>N</i> =45)		
<b>Impact on Strategy</b>	Q.29e	4.348	4.289	0.696	0.843	0.439	0.662
	Q.29f	4.361	4.289	0.732	0.869	0.518	0.607
<b>Impact on Structure</b>	Q.29k	3.346	3.377	1.073	1.050	-0.180	0.858
	Q.31	4.102	4.044	0.910	0.976	0.365	0.716
<b>Impact on People</b>	Q.29j	3.544	3.577	1.124	1.157	-0.177	0.860
	Q.32	2.852	2.777	1.006	1.063	0.433	0.666

#### 5.3.4 The Early and Late Responses Bias Test

Although the follow-up technique is an effective method to increase the response rate, one of its limitations is that the quality of the responses decline with successive

mailing (Frankfort-Nachmias & Nachmias, 1996). Individuals who do not respond the first time might be less likely to take the study seriously and thus may return incomplete questionnaires, or their answers may be unreliable. According to Fowler (1989), researchers can examine bias due to this reason by comparing the responses of people who reply early with the responses of people who return the questionnaire after one or more follow-up steps are taken. In this study, the two independent-samples *T*-test was used to compare early respondents (before the follow-up) with late respondents (after the follow-up) and to test the null hypothesis that there is no difference between the two groups. The same six questions (29e, 29f, 29j, 29k, 31, 32) used earlier with the non-response bias test were also used here. Again, the results of the test, shown in Table 5.6, indicated that there are similarities between the two groups. Table 5.6 shows the mean,

**Table 5.6**

**Early and Late Response Bias Test**

Variables		Mean		Std. Deviation		<i>T</i>	Sig. (P value)
		Early Respondents (N=149)	Late Respondents (N=56)	Early Respondents (N=149)	Late Respondents (N=56)		
<b>Impact on Strategy</b>	Q.29e	4.38	4.27	.67	.76	.889	.376
	Q.29f	4.41	4.23	.73	.74	1.539	.127
<b>Impact on Structure</b>	Q.29k	3.39	3.22	1.08	1.05	1.055	.294
	Q.31	4.05	4.23	.92	.87	-1.284	.202
<b>Impact on People</b>	Q.29j	3.58	3.45	1.09	1.21	.657	.513
	Q.32	2.90	2.73	1.02	.96	1.084	.281

the standard deviation, the  $t$  value, and the  $p$  value for both groups. Hence the  $p$  values for the tested six variables are larger than 5% then, the null hypothesis that there are no differences between early respondents and late respondents could not be rejected. Thus, the early and late response bias was not a major issue in this study.

### 5.3.5 The Reliability Test

In the previous chapter, both validity and reliability in this study were introduced, explained, and discussed in detail. Both concepts have been considered with great care during the execution of this study. In this section, the researcher will deal only with the measure of reliability and will explain how reliability was tested in this research. Reliability refers to the stability and consistency with which the instrument is measuring the concept and helps to assess the “goodness” of a measure (Sekaran, 1992). It also refers to the question of whether we can trust the answers that people give us - even when their misstatements are honest ones (Babbie & Halley, 1995).

A reliable measuring instrument behaves similarly: the test yields similar results when different people administer it and when alternative forms are used. Even when the conditions for making the measurement change, the results of the test should not. We can determine the reliability of a measure by testing both consistency and stability (Norusis, 1993). In this study, the **Cronbach’s alpha**, one of the most commonly used reliability coefficients (Sekaran, 1992), was used to test how well the items in the questionnaire are positively correlated to one another. Alpha ( $\alpha$ ) ranges in value from zero (no internal consistency) to one (complete internal consistency). The closer Cronbach’s alpha is to one, the higher the internal consistency reliability. A value of no less than .70 is suggested to be an acceptable level of internal consistency (Nunnally,

1978). SPSS was used to run the test and the results are shown in Table 5.7 As we can see, the coefficient alpha value for our test is .7793. According to the quick rule suggested by Nunnally (1978), this value indicates that our scale is quite reliable.

**TABLE 5.7**  
**THE RELIABILITY ANALYSIS - SCALE (ALPHA)**

<b>Reliability Coefficients</b>	
<b>N of Cases = 194.0</b>	<b>N of Items = 23</b>
<b>Alpha = .7793</b>	

### 5.3.6 The Sample Descriptive Statistics

Table 5.8 shows the descriptive statistics for the study sample. Frequencies, percentages, valid percentages and cumulative percentages are presented. As can be seen, one hundred and five (51.2 percent) of the respondents are between the age of thirty-six and forty five years old. Only eight (3.9 percent) of the respondents are over the age of fifty-five. One hundred and forty managers (68.3 percent) are Saudis while sixty-five managers are non-Saudis. The table shows that 8.8 percent had less than a bachelor degree, 65.4 percent of the respondents had a bachelor degree, 21 percent had a masters degree, and 4.4 percent had doctorate degrees. Out of the total number of the respondents, eighty-three managers specialised in business management (not shown in the table) while forty-five managers specialised in engineering. The rest of the respondents specialised in different fields such as accounting, computing, and other majors. These figures indicate that the respondents have a good educational background. One hundred and sixty-six managers (81 percent) held positions in the top management

**Table 5.8****The Sample Descriptive Statistics**

		<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
<b>Age</b>	36-45 Years	105	51.2	51.2	51.2
	46-55 Years	59	28.8	28.8	80.0
	25-35 Years	32	15.6	15.6	95.6
	Over than 55	8	3.9	3.9	99.5
	Less than 25	1	.5	.5	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Nationality</b>	Saudi	140	68.3	68.3	68.3
	Non-Saudi	65	31.7	31.7	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Education</b>	Bachelor	134	65.4	65.4	65.4
	Master	43	21.0	21.0	86.3
	Less than Bachelor	18	8.8	8.8	95.1
	Ph.D.	9	4.4	4.4	99.5
	Other	1	.5	.5	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Managerial Level</b>	Top Manag.	166	81.0	81.0	81.0
	Middle Manag.	36	17.6	17.6	98.5
	Lower Manag.	3	1.5	1.5	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Business Sector</b>	Trading	44	21.5	21.5	21.5
	Oil & Industry	42	20.5	20.5	42.0
	Services	36	17.6	17.6	59.5
	Diversified	34	16.6	16.6	76.1
	Contracting	29	14.1	14.1	90.2
	Finance	11	5.4	5.4	95.6
	Agriculture	9	4.4	4.4	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Ownership</b>	Saudi 100%	166	81.0	81.0	81.0
	Joint Venture	38	18.5	18.5	99.5
	Foreigner 100%	1	.5	.5	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Time in Business</b>	More than 20 Years	108	52.7	52.7	52.7
	16-20 Years	60	29.3	29.3	82.0
	11-15 Years	25	12.2	12.2	94.1
	5-10 Years	9	4.4	4.4	98.5
	Less than 5 Years	3	1.5	1.5	100.0
	<b>Total</b>	205	100.0	100.0	
<b>Number of Employees</b>	Between 101-500	87	42.4	42.4	42.4
	More than 1000	60	29.3	29.3	71.7
	Between 501-1000	38	18.5	18.5	90.2
	Between 51-100	13	6.3	6.3	96.6
	Between 20-50	5	2.4	2.4	99.0
	Less than 20	2	1.0	1.0	100.0
	<b>Total</b>	205	100.0	100.0	

of their firms. This figure indicates that greater validity would be achieved hence their responses would provide the researcher with valuable information that related to the impact of information technology on their organisations. The respondents to the mail questionnaire were widely diffused amongst seven business sectors. The results showed that the greatest number of managers in the sample came from the trading sector (21.5 percent), followed by the oil & industry sector (20.5 percent), then the services sector (17.6 percent). Only nine firms (4.4 percent) came from the agriculture sector. This is an acceptable number because Saudi Arabia is not an agricultural country and its land is mostly dominated by desert. One hundred and sixty-six firms (81 percent) out of the sample are Saudi owned companies while thirty-eight firms (18.5 percent) are joint ventures. Only one company working in the contracting sector is completely foreign. More than half of the total number of the participating firms has operated in the business for more than twenty years. One hundred and eight firms (52.7 percent) with more than 20 years in business dominate the sample. Sixty firms (29.3 percent) in the sample have existed for between sixteen and twenty years. Only three firms (1.5 percent) had less than five years in business. This indicates that the age of the company is positively correlated with the top 500 company's list in Saudi Arabia. Finally, eighty-seven firms (42.4 percent) employed more than one hundred and less than five hundred people. Sixty firms (29.3 percent) were operating with more than one thousand employees. Only two companies (1.0 percent) in the sample had less than twenty employees. Both of these two companies were operating in the service sector.

### **5.3.7 Use of Information Technology Facilities**

This section shows the findings regarding the use of specific information technologies and the applications of computer systems that were available in the

participating sample during the execution of this study. Three factors are discussed in the following sub-sections: extent of use, length of use, and computer applications that companies are using in their daily activities.

### 5.3.7.1 Extent of Use

Table 5.9 shows the percentage of the sample using information technology facilities such as computers, advanced office equipment and telecommunications facilities. The data relates to the whole sample and is presented in descending order

**Table 5.9**  
**Numbers and Percentages of Organisations**  
**Using Specific IT Facilities**

<b>IT Facilities</b>	<b>Number</b>	<b>Percentage</b>
Telephone	205	100%
Fax	205	100%
Personal Computers	204	99.5%
Word Processors	192	93.7%
Paging System	190	92.7%
GSM Telephones	185	90.2%
LAN	167	81.5%
Telex	153	74.6%
Mainframe Computers	122	59.5%
CAD	121	59.0%
E-Mail	97	47.3%
Computerised Production Systems	79	38.5%
The Internet	66	32.2%
Expert Systems	51	24.9%
Microfilm / Microfiche	49	23.9%
CAM	40	19.5%
Factory Automation (Robotics)	24	11.7%

based on the usage of each technology. As can be seen, all of the organisations in the participating sample used certain office equipment. For example, telephones and fax machines were used by 100 percent of the sample. Personal computers were used by 99.5

percent. The majority of the sample has used other information technology and communication facilities such as word processors, paging systems, and GSM telephones. Telex is still used in many organisations. 74.6 percent of the sample are still using the telex machines although the demand on the telex services in Saudi Arabia has declined dramatically in recent years because of other more advanced technologies. Larger machines such as mainframe computers were used in almost 60 percent of the sample. It is also true that advanced information technologies were more widely used in the oil & industry sector and the finance sector than in the other five sectors, though in a number of cases there was little difference between the sectors (see Table 5.10). Although the Internet is not permitted from local sources yet, the electronic mail (E-mail) and the Internet were used in 47.3 percent and 32.2 percent of the sample respectively. Most of the individuals and private organisations in the country who use the Internet subscribe with Internet service providers (ISP) located outside Saudi Arabia, particularly those from neighbouring countries such as Bahrain, Kuwait, and United Arab Emirates. Some advanced facilities were less commonly used in our sample. Facilities such as computer-aided manufacturing (CAM) and factory automation (robotics) were used in a smaller proportion of the organisations in the sample. By observing the figures in Table 5.10 we can see that some sectors have higher percentage in using specific applications which are not common to be used in those business sectors. For example, the high usage of CAD in Agriculture, Finance, Service, and trading sectors. In addition, the high usage of CAM in the Agriculture sector and the use of Computerised production Systems in the Service and the Finance sector. This may be the case of misinterpretation by some of the respondents in response to this question. Finally, the sample was asked to indicate if specific software was available in

**Table 5.10**  
**Percentages of Organisations Using IT Facilities**  
**(By Sectors)**

IT Facilities	Agriculture	Contracting	Finance	Oil & Industry	Services	Trading	Diversified
Telephone	100%	100%	100%	100%	100%	100%	100%
Fax	100%	100%	100%	100%	100%	100%	100%
Personal Computers	100%	97%	100%	100%	100%	100%	100%
Word Processors	78%	90%	100%	98%	97%	89%	97%
Paging System	78%	97%	91%	90%	92%	98%	91%
GSM Telephones	78%	93%	100%	86%	89%	98%	85%
LAN	89%	76%	91%	76%	83%	86%	79%
Telex	44%	83%	91%	86%	69%	68%	71%
Mainframe Computers	56%	48%	55%	76%	53%	57%	62%
CAD	89%	79%	55%	69%	53%	43%	50%
E-Mail	33%	38%	64%	48%	53%	52%	41%
Computerised Production Systems	44%	21%	64%	76%	28%	18%	35%
The Internet	33%	21%	45%	33%	33%	30%	38%
Expert Systems	22%	17%	36%	43%	19%	14%	26%
Microfilm / Microfiche	11%	24%	27%	29%	19%	23%	26%
CAM	56%	7%	9%	38%	11%	7%	26%
Factory Automation (Robotics)	11%	7%	18%	29%	8%	2%	9%

their organisations. Table 5.11 shows the numbers and percentages of organisations that were using some software packages that can support decision making and other daily business activities. As can be seen, accounting software was used by almost all organisations in the sample 90.7 percent of the sample had been using database packages. Other software packages such as managerial software, statistical packages, and spreadsheets were also used by a high percentage of organisations.

**Table 5.11**  
**Numbers and Percentages of Organisations Using  
 Specific Software Packages**

Software	Number	Percentage
Accounting Software	201	98.0%
Databases	186	90.7%
Managerial Software	183	89.3%
Statistical and Data Analysis Packages	170	82.9%
Spreadsheets	164	80.0%

### **5.3.7.2 Length of Time Using Computers**

Table 5.12 shows data related to when computers were first used in the organisations. The number of organisations in each sector is presented in the table. As can be seen, 18.5 percent of the sample had been using computers earlier than 1980's. More organisations in the services and the trading sectors had been using computers than organisations in other sectors. The majority of the participating sample, 63.9 percent, had used computers between 1980 and 1990. Two factors can explain this high percentage. First, the 1980's were a boom period for the Saudi economy because of the high oil revenues. We can see that the oil & industry sector had the highest use of computers and other information technology between 1980 and 1990. Second, during the 1980's there was a huge technology revolution, particularly in computer technology, accompanied by a big drop in prices. This led many organisations in the Saudi private sector to take advantage of the power that computers can offer. 16.1 percent of the sample had been using computers since the beginning of 1990's. In addition to that, the participating sample was asked if they had a computer or information technology

**Table 5.12**

**Number of Organisations and length of Time Using Computers**

<b>Sectors</b>	<b>Earlier Than 1980</b>	<b>1980-1990</b>	<b>1991-1995</b>	<b>Less Than 2Years</b>	<b>Total</b>
Agriculture	-	9	-	-	9
Contracting	5	20	3	1	29
Finance	4	5	2	-	11
Oil & Industry	5	31	6	-	42
Services	10	18	7	1	36
Trading	10	25	9	-	44
Diversified	4	23	6	1	34
<b>Total</b>	<b>38 (18.5%)</b>	<b>131 (63.9%)</b>	<b>33 (16.1%)</b>	<b>3 (1.5%)</b>	<b>205 (100%)</b>

department in their organisation. Almost 84 percent of the sample reported that they have information technology departments in their organisations. 74.1 percent of the sample reported that their organisations allocate adequate annual budgets to cover information technology activities. Forty seven percent of the sample reported that these budgets could be between 1 percent and 5 percent of the annual company's budget. All these figures show us that the sample has considerable experience of dealing with information technologies, particularly computers.

**5.3.7.3 Applications**

Table 5.13 shows the percentages of computer and information technology users applying their systems for specific purposes. The most common application was for word processing, followed by payroll and handling credit and debit accounts. Using computers and other information technology facilities in stock control and keeping

**Table 5.13**

**Applications of Computers and Other IT Facilities**

<b>Applications</b>	<b>Number</b>	<b>Percentage</b>
Word Processing	202	98.5%
Payroll	198	96.6%
Credit and Debit Accounts	194	94.6%
Stock Control	184	89.8%
Personnel Records	176	85.9%
Client Records	176	85.9%
Billing	171	83.4%
Financial Planning	161	79.3%
Sales Analysis	162	79.0%
Cash Control	156	76.5%
Pricing	153	74.6%
Drawing and Designing	108	52.7%
Project Control	103	50.2%
Production Planning	86	42.0%
Electronic Mail (E-mail)	77	37.6%

personnel records was observed in 89.8 percent and 85.9 percent of the sample respectively. Just over half of the organisations in the sample were utilising their computers for drawing/designing and project control. Smaller proportions of the organisations used computers and other information technology facilities for production planning and electronic mail (E-mail). However, the data reported in Table 5.13 and in Table 5.9 suggest that there are some anomalies in the usage of the Word processing and the E-mail. This may be the result of misinterpretation or misunderstanding by some of the respondents to the questions.

**5.3.8 The One Way ANOVA & Kruskal-Wallis Tests**

The one-way analysis of variance test (ANOVA) and the Kruskal-Wallis test were used in this study to analyse if there are statistically significant differences in the responses of the study's sample based on the demographic variables; age

(v1),nationality (v2), education (v3), business sector (v7), ownership (v8), age of the organisation (v9), and size of the organisation based on the number of employees (v10). The responses to the three main impacts of information technology: impact on strategy, impact on structure and impact on people were analysed. The one way ANOVA and Kruskal-Wallis test results for these three impacts based on the demographic variables will be shown and discussed in the following sub-sections.

### **5.3.8.1 Strategy**

Table 5.14 shows the results of the one way ANOVA and the Kruskal-Wallis tests for variables related to the impact of information technology on the organisation's strategy. Both tests were carried out at 5 percent significant level. Based on the test results presented in Table 5.14, there were no significant differences between most of the groups in response to most of the variables related to the impact of information technology on strategy. Differences were detected (bolded figures) in the nationality group. It seems that there were differences between Saudi and Non-Saudi managers towards variables 29c (IT can provide better services to customers) and 29f (IT can improve overall productivity). By observing the means for variable 29c for both Saudi and Non-Saudi managers, Saudi managers have achieved higher mean (4.61) than Non-Saudi managers (4.43). It seems that Non-Saudi managers are less in agreement that the use of information technology can provide a better service to customers. For variable 29f, the mean for Saudi managers is 4.43 while the mean for the Non-Saudis is 4.22. Again, Saudi managers are in grater agreement than Non-Saudis in that information technology can improve the overall productivity of the organisation. Differences were also detected between business sectors (bolded figures) towards variables 29a (IT can save money) and variable 29h (IT can increased competitiveness).

**Table 5.14**

**One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and Impact of IT on Strategy**

Variables	Age		Nationality		Education		Sector		Ownership		Age of Organisation		Size	
	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW
V21	.605	.412	.435	.528	.247	.284	.189	.159	.880	.752	.431	.408	.673	.641
V29a	.197	.467	.387	.322	.599	.613	.018	.035	.304	.748	.444	.525	.868	.954
V29b	.724	.546	.197	.350	.546	.280	.209	.399	.151	.094	.545	.475	.906	.961
V29c	.764	.509	.043	.043	.842	.773	.462	.294	.700	.958	.547	.572	.810	.668
V29e	.546	.712	.226	.215	.405	.302	.302	.097	.243	.063	.735	.884	.669	.617
V29f	.315	.191	.052	.031	.924	.842	.165	.136	.615	.463	.556	.885	.991	.948
V29g	.367	.403	.248	.091	.828	.706	.123	.052	.984	.869	.360	.397	.402	.251
V29h	.527	.445	.446	.313	.765	.723	.010	.005	.569	.763	.316	.727	.925	.915
V29I	.433	.289	.156	.153	.988	.928	.276	.230	.889	.769	.182	.466	.807	.732

\* A= One way ANOVA Test \* KW= Kruskal-Wallis Test

By looking at the means for variable 29a with business sectors, the agriculture and the diversified sectors achieved the highest two means in the group while the contracting and the trading sectors had the lowest means. Finally, the agriculture and the finance sectors achieved the highest two means in the sample towards variable 29h while the oil & industry and the contracting sectors scored the lowest two means. It seems that both the agriculture and the contracting sectors have totally different perceptions about the last two variables.

#### **5.3.8.2 Structure**

Table 5.15 shows the results of the one way ANOVA and the Kruskal-Wallis tests for variables related to the impact of information technology on the organisation's structure. Both tests were carried out at 5 percent significant level. Based on the test results presented in Table 5.15, we can say that no significant differences were detected between groups in response to most of the variables related to the impact of information technology on structure (significant p values shown in bolded figures). A difference between age groups was detected towards variable 30 by the Kruskal Wallis test (the p value was .037) but the one way ANOVA scored no difference between the same groups (the p value was .070). By observing the means at the age groups with variable 30, it appeared that managers aged over 55 years achieved 4.50 as a mean, while managers aged between 36 to 45 and managers aged between 46 to 55 achieved means of 3.73 and 3.86 respectively. It seems that older managers aged over 55 years are more in agreement than the rest in claiming that information technology can lead to more centralisation of decision-making at the strategic levels.

**Table 5.15**

**One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and Impact of IT on Structure**

Variables	Age		Nationality		Education		Sector		Ownership		Age of Organisation		Size	
	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW
V28	.522	.495	.954	.940	.211	.312	.886	.854	.057	.111	.901	.941	.363	.379
V29d	.481	.790	.262	.188	.661	.653	.502	.349	.786	.436	.295	.235	.455	.211
V29k	.754	.693	.622	.682	.197	.124	.177	.213	.717	.743	.074	.060	.878	.774
V30	.070	.037	.290	.320	.167	.067	.394	.272	.418	.513	.858	.676	.483	.443
V31	.447	.558	.475	.517	.189	.078	.127	.136	.078	.072	.065	.035	.903	.893

\* A= One way ANOVA Test \* KW= Kruskal-Wallis Test

Another difference was also detected between groups in age of the organisation towards variable 31. Again, the difference was detected by the Kruskal Wallis test (the p value was .035) and not by the one way ANOVA which scored .065 as a p value. By comparing the means for companies, it appeared that companies which have been in business for longer time are less in agreement that information technology can cause the decision making process to become decentralised at the daily routine level. Companies with more than 20 years in business achieved a lower mean (4.09) compared to new companies with less than 5 years in business and companies which have existed for between 5-10 years. New companies with less than 5 years in business have achieved the highest mean in the group (4.67). The lowest mean in the group was scored by companies with 11 to 15 years in business. *These companies achieved 3.68 as a mean.*

### **5.3.8.3 People**

Table 5.16 shows the results of the one way ANOVA and the Kruskal-Wallis tests for variables related to the impact of information technology on people. Both tests were carried out at 5 percent significant level. Based on the test results presented in Table 5.16, we can say that no significant differences were detected between groups in response to most of the variables related to the impact of information technology on people (significant p values shown in bolded figures). A difference between business sectors was detected towards variable 29j (IT can reduce the total number of workforce). Both tests, the Kruskal Wallis and the one way ANOVA, have scored the same p value (.001) for variable 29j. By observing the means for business sectors, it appeared that the agriculture sector is most in agreement with the statement that the use of information technology can lead to a reduction in workforce. The agriculture sector scored 4.33 as the highest mean in the group. The diversified sector came second with an average of

**Table 5.16**

**One Way ANOVA and Kruskal-Wallis Test for Demographic Variables and Impact of IT on People**

Variables	Age		Nationality		Education		Sector		Ownership		Age of Organisation		Size	
	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW	A	KW
V29j	.801	.683	.396	.429	.611	.594	.001	.001	.558	.629	.527	.586	.186	.157
V32	.122	.130	.817	.689	.503	.501	.525	.547	.690	.661	.615	.555	.237	.184
V33	.620	.677	.454	.382	.104	.071	.362	.409	.186	.153	.507	.580	.581	.536
V34	.225	.207	.950	.786	.572	.595	.477	.612	.934	.892	.041	.045	.102	.125
V36	.866	.874	.257	.225	.753	.707	.965	.956	.322	.313	.029	.030	.656	.655

\* A= One way ANOVA Test \* KW= Kruskal- Wallis Test

4.00. The mean for the finance sector was 3.73 followed by the contracting sector with a mean of 3.69. With means of 3.23 and 3.05, the trading sector and the oil & industry sector were the lowest two sectors in agreement that the use of information technology can reduce the number of the employees. Differences were also detected between groups in age of the organisation (shown in bolded figures in Table 5.16) towards variable 34 (resistance to the use of IT by firm's employees) and variables 36 (IT will balance shortages of skilled labour in Saudi Arabia). Both the one way ANOVA and the Kruskal Wallis tests detected the differences. By comparing the means for variable 34, it appeared that new companies with less than 5 years in business have the highest average of resistance to the use of information technology within their organisation. The mean for those companies was 2.67. On the other hand, the mean for companies with 16 to 20 years in business was 1.63 while the mean for companies with more than 20 years was 1.98. It seems that companies with a longer time in business have lower resistance to the use of information technology than new companies. Finally, the means for variable 36 (information technology will balance shortages of skilled labour for Saudi organisations in the future) was compared between the groups. Companies with 16 to 20 years in business have the highest mean (3.56) while companies with less than 5 years in business have the lowest mean (3.00) in the group. Companies with new experience in business have shown lower agreement than the rest of the group that information technology will balance shortages of skilled labour for Saudi organisations in the future.

### **5.3.9 The Hypotheses Testing**

In the previous chapter, it was mentioned that based on the literature review carried out at the early stages of the study, four hypotheses were developed. Those hypotheses were developed in order to find some answers and to explore the impact of

information technology on organisations in the Saudi private sector. The results of testing these four hypotheses, of course, will offer insight into how business organisations in Saudi Arabia could be affected by the use of information technology. This section will focus on the results of the statistical testing for these hypotheses. By using both SPSS and Minitab, several types of statistical tests were carried out. The linear regression model, the one sample *T* test, and the Pearson correlation test were used to analyse the data and to test the significance of these hypotheses. The results of all these statistical tests will be discussed in the sub-sections which follow.

#### **5.3.9.1 Hypothesis One:**

**Information technology utilisation can lead to positive impacts on the strategies of business organisations in Saudi Arabia.**

In order to test this hypothesis, several variables were tested and analysed. The one sample *t*-test was used to test these variables. The main objective of this procedure is to test the null hypothesis that the use of information technology has no positive impacts on the strategies of organisations in Saudi Arabia. Table 5.17 shows the results of the test. The results for all of the tested variables were significant and the null hypotheses for all of the tested variables were rejected. The results for information technology usefulness (v21) suggest that introducing computers and information technology into business organisations in Saudi Arabia can be useful to those organisations. The results also show that information technology can play a significant roll in saving money by reducing labour costs (v29a), can reduce the time for jobs to be done (v29b), can provide better service to customers (v29c), and can assist top managers and executives in setting strategies and future plans (v29e). In addition, Table 5.17

**Table 5.17**

**The One Sample T-Test  
For Use of IT and the Organisation's Strategy\***

	<b>Mean</b>	<b>Std. Deviation</b>	<b>T</b>	<b>Sig. (P value)</b>
V21	4.83	.40	65.10	0.000
V29a	3.99	.93	15.27	0.000
V29b	4.51	.62	35.19	0.000
V29c	4.56	.60	36.84	0.000
V29e	4.35	.70	27.67	0.000
V29f	4.36	.73	26.62	0.000
V29g	4.05	.84	17.93	0.000
V29h	4.08	.86	17.99	0.000
V29I	4.27	.68	26.72	0.000

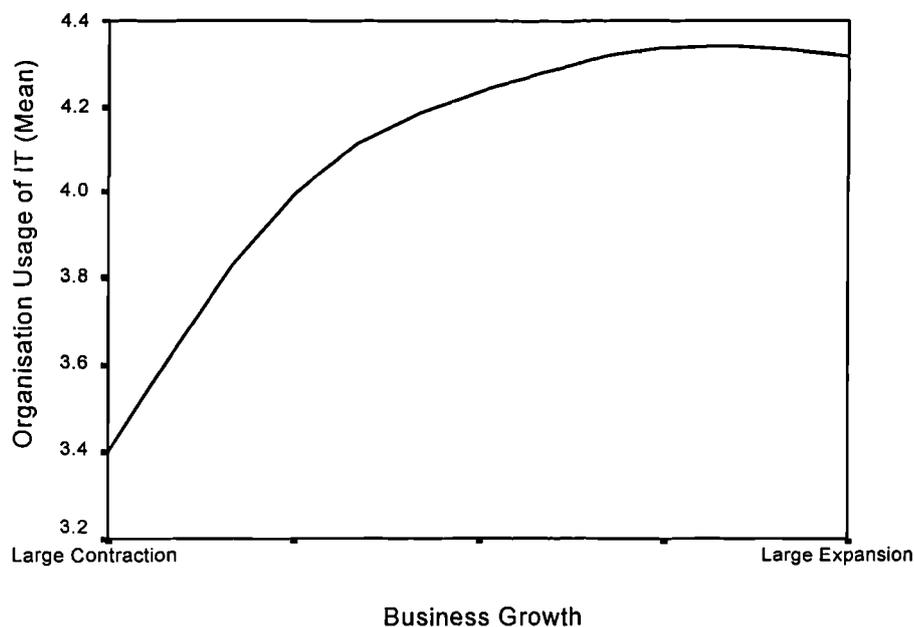
\* Willcoxon test (Non-parametric) was carried out and similar results were obtained for all of the variables

shows that information technology usage within organisations can improve the overall productivity (v29f), and increase profitability (v29g). With more than 77 percent of the participated sample operating in a highly competitive market, companies agreed that the use of information technology can be used as a tool in increasing competitiveness (v29h). Companies in the oil & industry sector and the finance sector believe most strongly that they are ahead of their main competitors in using advanced information technologies (v27). The results for information technology and growth (v29i) suggest that introducing computers and information technology into business organisations in Saudi Arabia can help organisations to grow. Based on the results of the *p* values for all the variables tested, we can conclude by rejecting the null hypothesis that the use of

information technology has no positive impacts on business organisations in Saudi Arabia. It seems that the use of information technology can provide positive strategically impacts on organisations working in the Saudi private sector. Therefore, hypothesis one was substantiated.

In addition to the results obtained by testing  $v_{29i}$ , more tests were performed in order to reach more corroboration about the relationship between the use of information technology and business growth in the Saudi private sector. Figure 5.1 was created to show the relationship between variable 13 (use of IT) and variable 11 (Business Growth). As can be seen in Figure 5.1, there is a positive relationship exists between information technology usage and business growth. We can see that when the information technology usage increases, the rate of growth also increases. 79.5 percent of the participating companies are undergoing some degree of expansion particularly in

**Figure 5.1**  
**The Relationship between the Use of IT and  
Business Growth (Mean)**



the oil & industry sector. Companies that are experiencing small or large expansions have higher mean of information technology usage than the others. In order to examine the relationship between the two variables, the Pearson Correlation test was carried out as one sided. The objective of the test was to test the null hypothesis that no relationship between the use of information technology and business growth. The alternative hypothesis was that the increased use of information technology will go along with the increased of business growth. As can be seen in Table 5.18 which shows the results of the Pearson test, the correlation coefficient between variable 11 and variable 13 is 0.135 and the one-sided significant level (p value) is .028. The one sided test was carried out because we obtained a significant result of testing variables 29i and because of the expected advantages that information technology can provide. Since 2.8% is smaller than 5%, our test significance level, we can reject the null hypothesis that both variables are not correlated. These statistical results can show us that variable 11 (business growth) and variable 13 (use of IT) is positively correlated and this can be considered as a support for the result obtained by testing variable 29i. In other words, the results suggest that business growth in the Saudi private sector is expected to be accompanied positively with the use of information technology.

**Table 5.18**  
**The Pearson Correlation Test**  
**For the Use of IT and Business Growth**

Variables	Pearson Correlation Coefficient	Sig. Level (P) Value
V11	.135	.028*
V13		

\* Correlation is significant at the 0.05 level (1-tailed).

### 5.3.9.2 Hypothesis Two:

**Information technology utilisation can lead to changes in the organisational structure of firms in the Saudi private sector.**

The one sample *t* test was used to test this hypothesis. The main objective of this procedure is to see if the use of information technology can lead to changes on the structure of business organisations in Saudi Arabia. The *t* test was conducted to test the null hypothesis that information technology can provide no effects on the structure of companies operating in the Saudi private sector. Table 5.19 shows the results of the test. As can be seen, The mean is 3.35 and its standard deviation is 1.07. The *t* statistic is 4.59 and the observed significance level (p value) is .000. Based on the observed significance levels for the *t* test, we can reject the null hypothesis that the use of

**Table 5.19**

**The One Sample T-Test  
For Use of IT and the Organisation's Structure\***

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (P value)</b>
V29k	3.35	1.07	4.59	0.000

\* Willcoxon test (Non-parametric) was carried out and similar results were obtained

information technology has no effect on the structure of business companies in Saudi Arabia. 48.8 percent of the participating top managers agreed or strongly agreed that the use of information technology can lead to changes in the structure of their organisations

such as eliminating some inefficient units or merging some departments that not functioning well with other departments in the organisation. Based on the results obtained from the test which performed here, hypothesis two was substantiated.

### **5.3.9.3 Hypothesis Three:**

**The use of information technology by firms in the Saudi private sector can lead to:**

**A- Decentralised decision-making organisations**

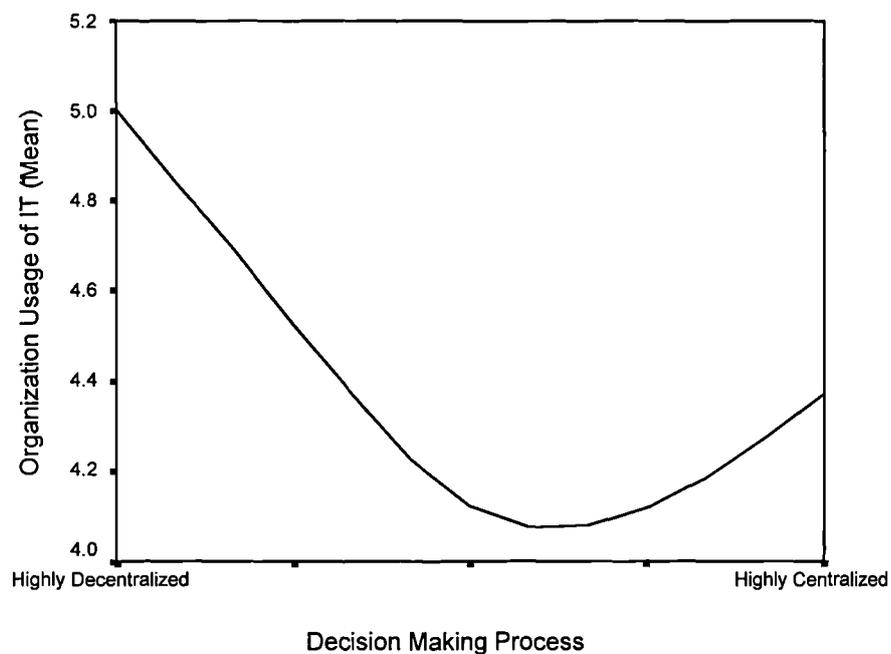
**B- More centralised decision-making at the strategic level.**

**C- More decentralised decision-making at the executive (daily routine) level.**

The relationship between information technology and the decision-making process was studied by many researchers in the literature. As discussed in Chapter two, some studies noted that the massive use and implementation of information technology should lead to decentralisation while others found that information technology leads to centralisation and decentralisation in the same time. It decentralises the decision-making process with tighter supervision and control (Bird & Lehrman, 1993). In order to see what are the expected effects of using information technology on the decision making process in the Saudi private sector, hypotheses 3A, 3B, and 3C were developed. In order to test hypothesis 3A, the linear regression analysis was used to test this hypothesis. The objective of this procedure was to see whether a relationship exists between information technology usage and the decision making process. In other words, we want to test the null hypothesis that there is no relationship between the use of information technology and decentralisation in organisations operating in the Saudi private sector or that the slope of the population is equal to zero. According to Norusis (1997), the values of the

two variables should always be plotted before computing the regression or the Pearson correlation coefficient. Plotting allows the researcher to detect the nature of the relationship between the two variables before computing further analysis. Figure 5.2 shows the mean (not the raw data) for usage of information technology (v13) based on the overall organisational decision making process (v14). We can see that

**Figure 5.2**  
**The Relationship between Use of IT and the  
 Decision Making Process (Mean)**



decentralised or highly decentralised companies have higher mean in using information technology than centralised or highly centralised companies. By only looking at Figure 5.2, it is not clear if a relationship is existing between the organisations' use of information technology and decentralisation. Therefore, a linear regression test was conducted to verify if there is any relationship exists between the two variables. The results of the linear regression test are shown in Table 5.20. As can be seen, the intercept

value ( $a$ ) is 4.802, the sample slope ( $b$ ) value is -.156 and its standard error is .067, so the value for the  $t$  statistics is -2.335. and the  $p$  value is .010. Therefore, we reject

**Table 5.20**  
**Linear Regression Analysis**  
**For IT Usage and the Decision Making Process**

Model		Unstandardised Coefficients		$T$	Sig. (P value)
		B	Std. Error		
1	Constant	4.802	.240	20.030	.000
	Decision Making Process	-.156	.067	-2.335	.010*

\* Significant at 0.05 level (1-tailed)

the null hypothesis that there is no relationship between the use of information technology and decentralisation. The results show that there is a statistically significant relationship between the two variables in favour of the one-sided alternative that greater use of information technology is negatively related to the level of centralisation, i.e. positively related to the level of decentralisation. Thus, hypothesis 3A was substantiated.

In addition, Table 5.21 shows the results of testing variables 30 (Information technology can lead to a more centralised decision-making process at the strategic level) and variable 31 (Information technology can lead to a more decentralised decision-making process at the executive daily routine level). The mean for  $v_{30}$  is 3.87 and its standard deviation is 1.06. The  $t$  statistic is 1.69 and the observed significance level ( $p$

value) is .000. The mean for v31 is 4.10 and its standard deviation is .91. The *t* statistic is 17.35 and the observed significance level (p value) is .000. Based on the observed significance levels for the *t* test we can reject the null hypotheses for both variables. The

**Table 5.21**

**The One Sample T-Test**

**For Use of IT and the Decision-Making Process\***

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (P value)</b>
V30	3.87	1.06	11.69	0.000
V31	4.10	.91	17.35	0.000

\* Willcoxon test (Non-parametric) was carried out and similar results were obtained for both variables

test results for both variables can lead us to conclude that the use of information technology in the Saudi private sector can make the decision making process to become more centralised at the strategic level and more decentralised at the executive (daily routine) level. Based on these results, we can conclude that hypotheses 3B and 3C were substantiated.

**5.3.9.4 Hypothesis Four:**

**The use of information technology in firms operating in the Saudi private sector can lead to a direct negative impact on the number of employees.**

In order to test this hypothesis, variable 29j was tested and analysed. The one sample *t* test was used to test this variable. The main objective of this procedure is to

test the null hypothesis that the use of information technology cannot decrease the number of employees in business organisations in Saudi Arabia (v29j). Variable 32 was also tested to see if information technology can effects the number of middle managers. In addition, variable 33 was tested to see if information technology could contribute to increase the number of workers. Table 5.22 shows the results for testing the three variables. As can be seen, the result for v29j was significant. The *t* test has rejected the null hypothesis for variable 29j. The mean for v29j is 3.54, the standard deviation is 1.12, the *t* statistics is 6.91, and the p value is 0.000. Since we have significant results, we can reject the null hypothesis that information technology cannot decrease the number of employees in business organisations in Saudi Arabia. Based on the results of testing variable 29j, we can conclude that introducing computers and other information technology facilities into business organisations in Saudi Arabia can reduce the number of employees in organisations operating the Saudi private sector. Therefore, hypothesis four was substantiated. On the other hand, the results for v32 and v33 were not significant. The results for variable 32, which suggests that the use of computers and

**Table 5.22**  
**The One Sample T-Test**  
**For Use of IT and Impact on Number of Employees\***

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (P value)</b>
V29j	3.54	1.12	6.91	0.000
V32	2.85	1.01	-2.09	0.98
V33	2.83	1.01	-2.43	0.99

\* Willcoxon test (Non-parametric) was carried out and similar results were obtained for all of the variables.

other information technology facilities can lead to the elimination of middle management, were not significant. The mean for v32 is 2.85, the standard deviation is 1.01, the *t* statistics is  $-2.09$ , and the *p* value is 0.98. Therefore, we cannot reject the null hypothesis that information technology cannot reduce the number of middle management. This result shows us that information technology can lead to no impact on the number of middle managers in organisations in the Saudi private sector. Finally, the results for variable 33, which suggest that the use of computers and other information technology facilities can lead to the creation of more jobs and consequently increasing the total number of workforce, were also not significant. The mean for v33 is 2.83, the standard deviation is 1.01, the *t* statistics is  $-2.43$ , and *p* value is 0.99. Since we have a non- significant result, we cannot reject the null hypothesis that the use of information technology cannot create more jobs or increased the number of employees in the Saudi private sector.

### **5.3.10 Results of Other Variables**

In addition to the main four hypotheses that were discussed earlier, several statistical procedures were used to reach important results related to other variables in the study. The relationship between those variables and the use of information technology will provide us with more understanding of the impact of information technology on the Saudi private sector. The following sub-sections will present the statistical results of testing those variables.

#### **5.3.10.1 The use of IT and the nationality of managers**

To understand how information technology usage differs between Saudi and Non-Saudi managers, the two independent-samples *t*-test was used. According to

Norusis (1997), this procedure can be used to test whether the two populations means are equal based on the results observed in two independent samples - one from each of the populations of interest. The main objective of this procedure is to test the null hypothesis that there is no difference between Saudi and non-Saudi managers (v2) in using information technology facilities (v5) in the performance of their jobs. The one-sided alternative hypothesis is that non Saudi managers use information technology more than Saudi managers. Table 5.23 shows the results of the two independent-samples *t*-test between Saudi and non-Saudi managers with the use of information technology. The test was carried out at 5 percent significant level. As can be seen, the mean for Saudi managers is 3.70, while the mean of non-Saudi managers is 3.98. The standard deviation for the Saudi managers group is 1.10, very slightly larger than the standard deviation of the non-Saudi group that has 1.04. In our sample, the non-Saudi managers are on average .28 higher in usage of information technology than Saudi managers are. Table 5.23 shows that the *t* statistics is -1.79 The degrees of freedom for the *t* statistics is 132. The observed p value is .038. Since 3.8% is smaller than 5%, we can reject the null hypothesis that the two groups, Saudi and non-Saudi managers, come from

**Table 5.23**

**The Two Independent-Samples T-Test results  
for Saudis and Non-Saudis with the Use of IT**

	<b>Manager's Nationality</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>SE Mean</b>	<b><i>T</i></b>	<b>P value (1-tailed)</b>	<b>DF</b>
<b>Manager's Usage of IT</b>	Saudi	3.70	1.10	.093	-1.79	.038	132
	Non-Saudi	3.98	1.04	.13			

populations with the same average of usage for information technology. The results thus indicate that the difference is significant. In effect, non-Saudi managers use information technology facilities more than Saudi managers do in business organisations in the Saudi private sector.

#### **5.3.10.2 The use of IT and age of managers**

In order to understand the relationship between the use of information technology and the age of managers, the linear regression procedure was used. The objective of this procedure was to test whether there is a relationship between manager's usage of information technology (v5) and age (v1). In other words, we want to test the null hypothesis that there is no relationship between age of managers and the use of information technology or that the slope of the population is equal to zero. Figure 5.3 shows clearly the relationship between manager's usage of information technology (dependent variable) and age (independent variable). As can be seen, the usage of information technology is decreasing with the increase of age. The mean for usage of information technology for younger managers is much higher than the mean for older managers. This can lead us to predict a negative relationship between the two variables. In order to find out statistically the nature of the relationship between those two variables, a linear regression analysis was conducted to test the null hypothesis that there is no relationship between the manager's usage of information technology and age. In other words, we want to test the null hypothesis that the population slope is equal to zero. Table 5.24 shows the results of the linear regression procedure for the variables manager's usage of information technology (v5) and his age (v1). As can be seen, the intercept value ( $a$ ) is 4.542, the sample slope ( $b$ ) is -.231 and its standard deviation error is .101, so the value for the  $t$  statistics is -2.301., and the one tailed  $p$  value is .011.

Therefore, we reject the null hypothesis that there is no relationship between the two variables. Because we observed a negative slope value which is  $-.231$ , then it appears that there is a negative linear relationship between manager's usage of information technology and manager's age. In other words, we will witness a decrease in using information technology when the manager's age increase. Thus, hypothesis two was substantiated.

**Figure 5.3**

**The Relationship between Manager's Usage of IT and Age (Mean)**



**Table 5.24**

**Linear Regression Analysis for Manager's Usage of IT and Age**

Model		Unstandardised Coefficients		T	Sig. (P value)
		B	Std. Error		
1	Constant	4.542	.331	13.703	.000
	Age of Managers	-.231	.101	-2.301	.011*

\* Significant at 0.05 (1-tailed)

### 5.3.10.3 The use of IT and the organisation ownership

The two independent-samples  $T$  test was used to test the use of information technology within organisations based on their ownership. The main objective of using this procedure is to test the null hypothesis that there is no difference between Saudi companies and foreign/joint companies in using information technology (v13). In other words, we want to see if the difference between the two groups equal to zero. The one sided alternative hypothesis is that foreign and joint venture companies in Saudi Arabia are using computers and other information technology facilities more intensively than Saudi companies. In order to conduct the test, company's ownership (v8) was combined into two groups. The first group contained Saudi firms (one hundred and sixty six firms) while the second group contained foreign and joint venture firms (thirty-eight firms were joint venture and only one firm was foreign). The two groups were compared in their utilisation of information technology (v13). The test was carried out at 5 percent significance level and Table 5.25 shows the results of the two independent samples  $t$ -test. As can be seen, the mean for Saudi firms is 4.21, while the mean for joint/foreign firms is 4.49. The standard deviation for the Saudi firms is 1.03 while the standard deviation for the joint/foreign firms is .76. The  $t$  statistics is  $-1.894$  and the degrees of freedom for the  $t$  statistics is 75. The observed  $p$  value is .031. Since 3.1% is smaller than 5%, our test significance level, then we can reject the null hypothesis that the two groups come from populations with the same average of usage for information technology. The results thus indicate that the difference is significant. In effect, the test results can show that joint/foreign companies are using information technology facilities more than Saudi companies in the Saudi private sector.

**Table 5.25**

**The Two Samples T-Test between  
Saudi and Joint/Foreigner Firms in Using IT**

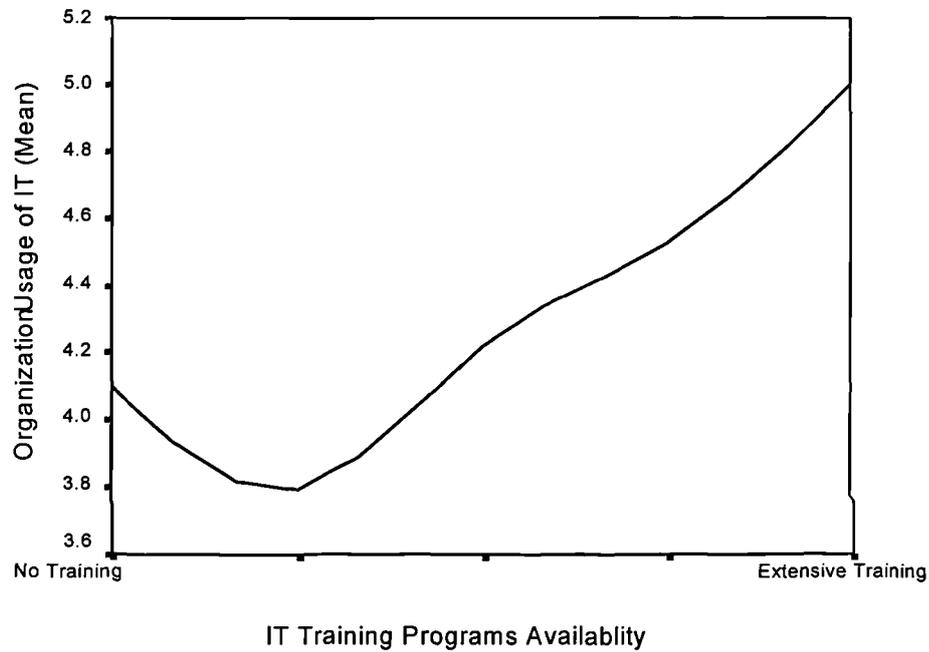
	<b>Firm's Ownership</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>T</b>	<b>P value (1-tailed)</b>	<b>DF</b>
IT Usage	Saudi	4.21	1.03	-1.894	.031	75
	Foreign/Joint	4.49	.76			

**5.3.10.4 The use of IT and training programs**

The Pearson correlation procedure was used to see if there is any relationship between the use of information technology usage and the availability of training programs. The main objective of this statistical procedure is to test the null hypothesis that no relationship is existing between the level of information technology usage and the availability of training programs. Two levels of information technology usage were measured: the individual level and the organisational level. First, variable 5 which is measuring the manager's usage of information technology (individual level) was tested against variable 26 which is *measuring the availability of training programs in the organisation*. Second, variable 13, which is measuring the organisational usage of information technology (organisational level), was also tested against variable 26. Figure 5.4 shows the relationship between the organisational usage of information technology and the availability of training programs. We can see that higher mean of using information technology is accompanied with high availability of training programs. Table 5.26 shows the results of Pearson correlation procedure for both variables 5 and 13 in relating with variable 26. As can be seen, the correlation is significant for both variables. The Pearson correlation coefficient for variable 5

**Figure 5.4**

**The Relationship between the Organisational Usage of IT and the Availability of Training Programs (Mean)**



**Table 5.26**

**The Pearson Correlation Test for the Use of IT  
And the availability of Training Programs**

Variables	Variable 26	
	Pearson Correlation Coefficient	Sig. Level (P) Value
V5	0.184*	.004
V13	0.276*	.000

\* Correlation is significant at the 0.05 level (1-tailed).

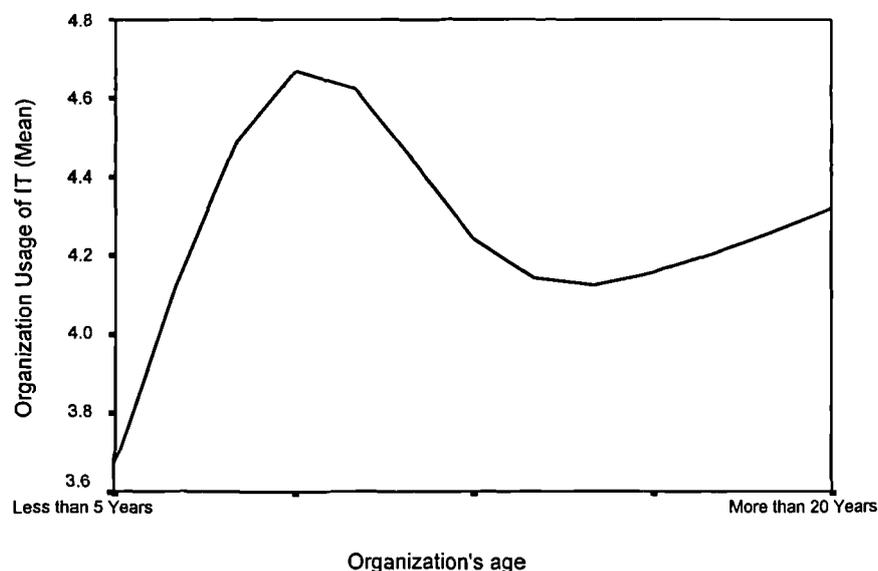
(manager's usage of information technology) is 0.184 and the one-sided significant level (p) value is .004. In addition, the Pearson correlation coefficient for variable 13 (organisation's usage of information technology) is 0.276 and the one-sided significant

level (p) value is.000. Both variables (v5 and v13) were positively correlated with variable 26. These significant results can lead us to reject the null hypotheses for both variables. We can conclude that the data suggests that the use of information technology (manager's usage and organisation's usage) in organisations in the Saudi private sector is positively correlated with the availability of training programs.

### 5.3.10.5 The use of IT and the company's age

The ANOVA test and the Cubic regression model were used here in order to see whether a relationship exists between information technology usage and the age of the company in the Saudi private sector. In other words, we want to test the null hypothesis that there is no relationship between the use of information technology (v13) and the age of the organisation (v9). Figure 5.5 shows the mean (not the raw data) for organisation's usage of information technology (dependent variable) based on the age of the company (independent variable). Companies with less than five years in business obtained 3.67 as

**Figure 5.5**  
**The Relationship between IT Usage and Firm's Age (Mean)**



the lowest mean for using information technology while companies with more than 20 years obtained a mean of 4.31. Firms in the business between 5 to 10 years have achieved the highest mean for using information technology in the whole sample. Table 5.27 shows the results of the ANOVA test. As can be seen, the sum of squares between groups is 3.556, the df is 4, the mean square is .889, the *F* is .911, and the *P* value is .485. Because .485 is higher than 5%, we cannot reject the null hypothesis that there are no differences in using information technology between organisations based on their

**Table 5.27**

**The ANOVA Test for  
IT Usage and the Age of the Company**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Between Groups	3.556	4	.889	.911	.458
Within Groups	194.150	199	.976		
Total	197.706	203			

ages. In other words, organisations in the Saudi private sector use information technology similarly regardless of how long they were in business. In addition, Table 5.28 shows the results of the Cubic regression model for the same variables. As can be seen, the sample slope (*b*) for v9 (organisation age) is 2.759 and its standard error is 1.908, so the value for the *t* statistics is 1.446 and the *P* value is .149. In addition, the sample slope (*b*) for v9\*\*3 (organisation age) is .096 and its standard error is .061, so the value for the *t* statistics is 1.574 and the *P* value is .117. Therefore, we cannot reject the null hypothesis that there is no relationship between the two variables (v9 and v13). The results obtained suggest that there is no statistically significant relationship between

the use of information technology and the age of the company in the Saudi private sector.

**Table 5.28**  
**The Regression Analysis (Cubic Model) for the**  
**Use of IT and the Age of the Company**

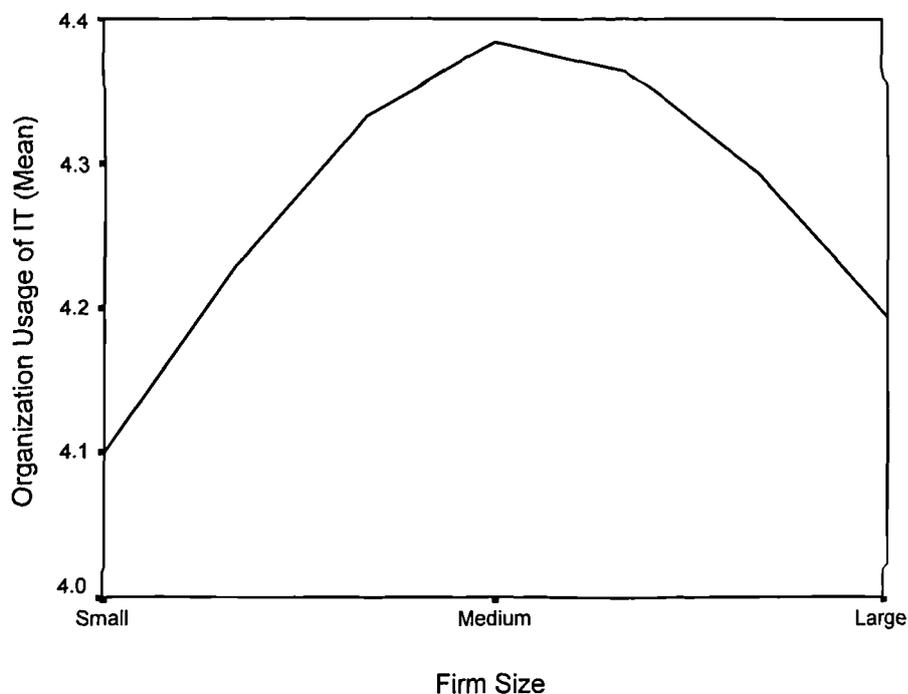
<b>Curve Fit</b>				
MODEL: MOD_2.				
Dependent variable.. V13		Method.. CUBIC		
Listwise Deletion of Missing Data				
Multiple R	.11594			
R Square	.01344			
Adjusted R Square	-.00136			
Standard Error	.98754			
Analysis of Variance:				
	DF	Sum of Squares	Mean Square	
Regression	3	2.65738	.88579413	
Residuals	200	195.04850	.97524250	
F =	.90828	Signif F = .4380		
----- Variables in the Equation -----				
Variable	B	SE B	T	Sig. (p value)
V9	2.759776	1.908990	1.446	.1498
V9**2	-.936658	.613729	-1.526	.1285
V9**3	.096225	.061137	1.574	.1171
(Constant)	1.908734	1.819004	1.049	.2953

#### 5.3.10.6 The use of IT and the company's size

The ANOVA test and the Quadratic regression model were used here in order to see whether a relationship exists between information technology usage and the size of the company in the Saudi private sector. In other words, we want to test the null hypothesis that there is no relationship between the use of information technology (v13)

and the size of the organisation (v10). Figure 5.6 shows the mean (not the raw data) for organisation's usage of information technology (dependent variable) based on the size of the company (independent variable). In order to carry out the test, the six groups in variable 10 (company's size) were classified into three groups. The first group contained 20 small firms (up to 100 employees). The second group contained 86 medium firms

**Figure 5.6**  
**The Relationship between IT Usage and the Firm's Size (Mean)**



(101-500 employees) and the third group contained 98 large firms (more than 500 employees). This classification is based on the researcher experience hence there is no universally accepted criterion for identifying firm size by number of employees (Walters & Samiee, 1990). The three groups were compared in their utilisation of information technology (v13). The mean for information technology usage for small organisations (up to 100 employees) was 4.10 and the mean for large organisations (more than 500 employees) is 4.19. Medium size organisations (101-500 employees) have achieved 4.38

as the highest mean in the whole sample for using information technology. By only looking at Figure 5.6, it is quite difficult to establish any relationship between the organisations' use of information technology and the size of the company. Therefore, the ANOVA test and the Quadratic regression model were conducted to verify if there is any relationship between the two variables (v10 and v13). Table 5.29 shows the results of the ANOVA test. As can be seen, the sum of squares between groups is 2.252, the df is 2, the mean square is 1.126, the  $F$  is 1.158, and the  $P$  value is .316. Because .316 is higher than 5%, we cannot reject the null hypothesis that there are no significant differences in using information technology between organisations based on their sizes. In other words, organisations in the Saudi private sector use information technology

**Table 5.29**  
**The ANOVA Test for**  
**IT Usage and the Size of the Company**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Between Groups	2.252	2	1.126	1.158	.316
Within Groups	195.454	201	.972		
Total	197.706	203			

similarly regardless of their sizes. In addition, Table 5.30 shows the results of the Quadratic regression model for the same variables. As can be seen, the sample slope ( $b$ ) for v10 (organisation size) is .994 and its standard error is .712, so the value for the  $t$  statistics is 1.396 and the  $P$  value is .164. In addition, the sample slope ( $b$ ) for v10\*\*2 (organisation size) is -.236 and its standard error is .161, so the value for the  $t$  statistics is -1.470. and the  $P$  value is .143. Therefore, we cannot reject the null hypothesis that there is no relationship between the two variables (v10 and v13). The results obtained

suggest that there is no statistically significant relationship between the use of information technology and the size of the organisation in the Saudi private sector.

**Table 5.30**  
**The Regression Analysis (Quadratic Model) for the**  
**Use of IT and the Size of the Company**

<b>Curve Fit</b>				
MODEL: MOD_1.				
Dependent variable.. V13			Method.. QUADRATIC	
Listwise Deletion of Missing Data				
Multiple R		.10674		
R Square		.01139		
Adjusted R Square		.00156		
Standard Error		.98611		
Analysis of Variance:				
	DF	Sum of Squares	Mean Square	
Regression	2	2.25235	1.1261733	
Residuals	201	195.45354	.9724057	
F =	1.15813		Signif F =	.3162
----- Variables in the Equation -----				
Variable	B	SE B	T	Sig. (p value)
V10	.994067	.712120	1.396	.1643
V10**2	-.236782	.161068	-1.470	.1431
(Constant)	3.342715	.741126	4.510	.0000

### 5.3.10.7 Top management attitude towards IT

The one sample t test was used to test this variable. The main objective of this procedure is to test the null hypothesis that the top management in business organisations in Saudi Arabia does not encourage the utilisation and implementation of information technology in its organisations. The results of the *t* test for testing variable

22 are shown in Table 5.31. As can be seen, the mean is 4.70 and its standard deviation is .53. The *t* statistic is 45.654 and the observed significance level (p value) is .000. Based on the observed significance levels for the *t* test, we can reject the null hypothesis

**Table 5.31**  
**The One Sample T-Test**  
**For Top Management Attitude towards IT**

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (P value)</b>
V22	4.70	.53	45.65	0.000

that the top management in business organisations in the Saudi private sector do not encourage the utilisation and implementation of information technology in its organisations. With a very high mean (4.70) towards the support for information technology, the results suggest that it is quite unlikely that business organisations in Saudi Arabia suffer from a negative attitude by top management towards information technology. 97.5 percent of the respondents agreed that the top management in their organisations was encouraging or strongly encouraging the implementation and utilisation of information technology. The data obtained suggest that organisations working in the Saudi private sector have the encouragement and the full support from their top management towards the utilisation of information technology.

#### **5.3.10.8 The use of IT and the firm's communication & procedures**

The one sample *T* test was conducted here to understand the impact of using information technology on the organisation's communication and procedures. The main

objective of the test was to test the null hypothesis that the use of information technology in business organisations in Saudi Arabia cannot lead to more formalised communication and procedures in the organisations' daily activities. Table 5.32 shows the results of the *t* for testing variable 28. As we can see, the mean is 3.61 and its

**Table 5.32**

**The One Sample T-Test for the Use of  
IT and the Organisations' Communication and Procedures**

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (<i>P value</i>)</b>
V28	3.61	.96	9.124	0.000

standard deviation is .96. The *t* statistic is 9.124 and the observed significance level (p value) is .000. Based on the observed significance levels for the *t* test, we can reject the null hypothesis that the use of information technology cannot lead to more formalised communication and procedures in the daily activities of organisations in Saudi Arabia. More than 69 percent agreed or strongly agreed that the use of information technology can lead to more formalised communication and procedures in their organisations. These results replicated the findings of some literature which suggested that the use of information technology can increase the formalisation of communication and procedures within the organisation.

**5.3.10.9 IT and employees resistance**

The one sample *t*-test was used to see whether employees in the Saudi private sector resist the use of information technology in their organisations. The main objective of this procedure is to test the null hypothesis that the mean for employee's resistance to

using information technology is equal to one (absolutely no resistance). The alternative hypothesis is that the mean for employee's resistance towards using information technology is greater than one. Table 5.33 shows the results of *t* test, As can be seen, the mean is 1.88 and its standard deviation is 0.93. The *t* statistic is 13.56 and the observed significance level (p value) is .000. 44.9 percent of the participated sample agreed that no resistance towards information technology exists among their employees. The resistance's mean is 1.88, which indicates that a weak resistance exists among employees towards information technology. Based on the observed significance levels for the test, we reject the null hypothesis that the mean for employee's resistance towards using information technology is equal to one (absolutely no resistance). It seems that resistance exists but it is not strong enough to cause major organisational problems for business organisations in the Saudi private sector. The results of other statistical analysis performed have also suggested that while companies with more than 20 years in business have no strong resistance, new companies have the highest average of resistance to use information technology.

**Table 5.33**  
**The One Sample T-Test**  
**For Resistance towards IT among Employees**

	<b>Mean</b>	<b>Std. Deviation</b>	<b><i>T</i></b>	<b>Sig. (P value)</b>
V34	1.88	0.93	13.56	.000

In addition to testing variable 34, the participating companies were asked about factors that could cause resistance to the use of information technology if it exists among their employees. Table 5.34 shows factors that cause resistance to using

information technology in companies operating in the Saudi private sector. As can be seen, 47.3 percent of the sample believe that language barrier is the highest factor causing the resistance to use information technology. Most of the information technology facilities that are now available in the market require the knowledge of foreign languages particularly English. Many companies operating in Saudi Arabia depend heavily on labourers who come from India, the Philippines, Bangladesh, and some Middle Eastern countries who only speak poor English. This causes difficulty for many workers to adapt to the high technology that is provided by their companies. 44.9 of the sample believe that unskilled workers are another important factor causing resistance to using information technology in the Saudi private sector. Fears of losing jobs, technophobia and inadequate education are also other important factors that could cause resistance to using information technology among employees. 31.7 of the sample

**Table 5.34**  
**Factors Cause Resistance of Using Information Technology**

<b>Factors</b>	<b>Frequency</b>	<b>Percentage</b>
Language Barrier	97	47.3%
Unskilled Workers	92	44.9%
Fear of Losing Job	69	33.7%
Technophobia	68	33.2%
Inadequate Education	67	32.7%
Lack of Training Programs	65	31.7%
Lack of Creative Administrative Leadership	38	18.5%
High Cost of Purchasing/Maintaining Technology	36	17.6%
Over-Expectation of Technology	24	11.7%
Limited Size of Firm's Operations	15	7.3%

believe that the lack of training programs is another factor causing resistance to using information technology in their firms even though more than 36 percent of the respondents agreed that their companies provide training programs to a great extent.

#### **5.4 The Qualitative Results**

As discussed in the previous chapter, personal interviews were chosen, in addition to the mailed questionnaires, to collect the primary data in this study. The personal interview approach is an appropriate method as it provides the opportunities to examine several issues in more detail than is possible in a mailed questionnaire. Even with difficulties to carry out interviews in Saudi Arabia, the researcher decided to meet some of the top managers of Saudi companies in order to know their opinions about the impact of information technology on organisations. Ten random companies were contacted for in-depth interviews and six agreed to participate. Each interview lasted for about one hour. The interviewees expressed their opinions and views freely in response to the questions that were asked by the researcher. The same questions were asked in each of the six interviews. The questions covered issues related to the impact of information technology on organisations. The impact of information technology on the organisation's strategy, structure, and people were discussed in depth. Table 5.35 shows the major findings of the six interviews that were carried out. As can be seen, four managers indicated that using information technology can improve the organisations productivity. Five managers stated that they noticed improvements in some areas since information technology was introduced in their companies. With the exception of company two, the managers interviewed indicated that information technology can increase profitability, help business to expand, improve position in relation to

**Table 5.35****Major Findings of Personal Interviews**

<b>Variables</b>	<b>First Interview</b>	<b>Second Interview</b>	<b>Third Interview</b>	<b>Fourth Interview</b>	<b>Fifth Interview</b>	<b>Sixth Interview</b>
<b>Impact of IT</b>						
<b>Strategy:</b>						
Can Improve productivity	Y	Y	DK	DK	Y	Y
Can Increase profitability	Y	N	Y	Y	Y	Y
Can Help the company to grow	Y	N	Y	Y	Y	Y
Can Increase competitiveness	Y	DK	Y	DK	Y	Y
Can be Useful tool for top management	Y	Y	Y	Y	Y	Y
Can Save time and money	Y	DK	Y	DK	Y	Y
<b>Structure:</b>						
Can lead to More formalisation	Y	Y	Y	Y	Y	Y
Can lead to Smaller and flatter structure	Y	N	N	Y	Y	Y
Can Make Decision making centralised	Y	Y	Y	Y	Y	Y
Can Make Decision making decentralised	N	Y	Y	Y	N	Y
<b>People:</b>						
Can Reduce number of employees	Y	N	N	Y	Y	Y
Can Eliminate middle management	Y	N	N	N	N	Y
Can Increase number of employees	N	N	N	N	N	N
Can Balance shortages of skilled labour	Y	N	N	N	Y	Y
<b>Implementation of IT</b>						
IT strategy	Y	N	Y	N	Y	Y
IT outsourcing	N	N	N	N	Y	N
Top management support	Y	N	Y	N	Y	Y
IT training is provided	Y	N	Y	N	Y	Y
Resistance to IT	N	Y	N	Y	N	N
<b>Others:</b>						
More impact of IT in the future	Y	Y	Y	DK	Y	Y
Government support for IT is needed	Y	Y	Y	Y	Y	Y

Y= Yes

N= No

DK= Don't Know

competitors, and can save time and money. We can notice clearly that five companies are agreeing that many benefits can be gained from adopting information technology. Another issue, which was discussed with the six managers, is the impact of information technology on the organisation's structure. All the managers interviewed stated that information technology can lead to more formalisation in communication between members of the organisation. Four out of the six managers suggested that information technology can lead to a smaller, simpler, flatter structure. Some departments can be eliminated or merged with other departments because of the introduction of computers and other information technology facilities. The six managers agreed that computers can enhance the decision making process. Some managers suggested that with the introduction of computers, centralisation in the decision making can become more concentrated at the top levels but at the same time there will be more decentralisation at the lower levels for daily and routine activities. Two companies (one and five) working in the financial sector experienced more centralisation in the decision making process both at the top levels and lower levels of the organisation. The impact of information technology on people is another important issue that was discussed with the six managers. Four managers believe that the introduction of computers and other information technology facilities can reduce and limit the number of employees in their organisations. Two managers suggested that there was no effect on the number of employees in their organisations since they used some information technology facilities - those two companies are working in the plastic and construction business respectively. Two companies believe that the number of middle managers can be reduced by the introduction of information technology while the other four companies stated that information technology cannot effect middle management. All the managers interviewed agreed that information technology cannot increase the number of employees or even

create more new jobs. The six managers added that information technology would not totally replace labour in the future. Three managers have indicated that using computers will help balanced the shortages of skilled labour in the Saudi market but the other three disagreed.

The six managers were also asked if they had implemented an information technology strategy in their organisations. Four companies indicated that they had a strategy for information technology in their organisations. Managers of those four companies stated that they had spent long time in planning and executing the introduction of information technology in their organisations. Only one company (company five) had outsourced its information technology activities while the rest carried out the job themselves. Four managers indicated that information technology has the full support from the top management at their organisations. Training programs on how to use information technology facilities are available in four companies while the other two companies provide their employees with no training. Resistance towards the use of information technology is existing among the employees of two companies while the other four has no resistance at all. Finally, the six interviewees indicated that with the increased development in information technologies, a further impact of these technologies on Saudi organisations could be felt in the future. They suggested that the Saudi government must play a part in this issue. More telephone lines, databases, networks, and the authorisation of the Internet in the country are badly needed.

To summarise, this chapter contained three main parts. The first part discussed and defined the statistical techniques that were used in this study. The second part, which is the core of this chapter, contained the quantitative results of the study. The

sample descriptive statistics, the sample's information technology statistics, and several issues related to the response rate were discussed in the beginning of the second part. The second part also presented thoroughly the analysed results of the research's hypotheses. The third and last part concentrated on the results of the qualitative data that was gathered through personal interviews with six top managers. All of these analyses and results will be discussed in more depth in the next chapter.

## **CHAPTER SIX**

### **THE DISCUSSION**

#### **6.1 Introduction**

The main objective of this research is to explore the impact of information technology on organisations that operate in the Saudi private sector. In order to achieve this objective, the previous chapter reported the findings and results of the data that was collected through both the mail questionnaires and the personal interviews. As can be seen in Chapter Five, the statistical analysis has suggested a number of relationships between organisational components (strategy, structure, and people) and the use of information technology. In this chapter, we will focus on the discussion of the findings of this study. The findings are grouped and discussed in accordance with the research framework posed in this study. As mentioned in the previous chapter, the mail questionnaires and the personal interviews can be seen respectively as a quantitative and a qualitative approach to studying the use of information technology on organisations. The data gathered through the mail questionnaires and the personal interviews provided *useful understanding of both the impact and the implementation perspectives.*

This chapter is divided into two main sections. The first section discusses the relationship between the use of information technology and organisational characteristics, based on the findings from the mail questionnaires and the personal interviews as well as relevant results published in the literature. The second section discusses organisational issues related to the implementation perspective, using evidence from the questionnaires, the personal interviews, and findings reported in the literature.

## **6.2 The Impact Perspective**

The findings from both the mail questionnaires and the personal interviews have provided insights into the impact of information technology on organisations operating in the Saudi private sector. The results presented in Chapter Five represent new empirical evidence, which can help us to increase our understanding of the impact of information technology on organisations in the Saudi environment. In this section, we will discuss the findings related to organisational components: strategy, structure, and people. The contingency and environmental factors will also be discussed in this section.

### **6.2.1 Strategy**

The notion that information technology affects strategic issues is supported by many studies in the literature (see, for example, Jelassi, 1993; Morris & Westbrook, 1996; Newman & Kozar, 1994; Venkatraman, Henderson & Oldach, 1993). Evaluating the impact of information technology on strategy is a complex process because most of its impact is widely known to be long-term, intangible and qualitative in nature. The issue of evaluating the business benefits from information technology has been a concern for managers over the last three decades (Currie, 1995). The literature on the benefits of information technology to organisations has conflicting and unclear conclusions because benefits from information technology are difficult to identify and always hard to measure and quantify (Carroll, 1997). Solow (1987) stated that “You can see computer age everywhere but in the productivity statistics.” Managers who have responsibility for evaluating information technology investments are faced with an exceedingly complex technology the effects of which are not just technical but go deep

into the social structure of the organisation (Farbey, Targett & Land, 1994). Despite its initial appeal, investment in information technology requires economic justification of benefits. Studies investigating the productivity and business impact of information technology have been unable to establish a consistent relationship between information technology investments and a firm's performance (Barua & Lee, 1997). In general, one can say that the overall effects of using information technology clearly depend on how individual firms use it and how this usage affects their subsequent performance.

In this study, several variables of the strategy component were studied: the impact of information technology on productivity, on profitability, and on the growth of business. The impact of information technology on productivity was found to be significant. The statistical analysis suggests that information technology usage within organisations in Saudi Arabia can improve the overall productivity. A significant result was obtained between this variable and the use of information technology in hypothesis testing for the whole sample. It is this belief in perceived positive impacts of using computers and other information technology that will motivate many Saudi organisations to adopt such technology. This was found to be consistent with some of the studies in the literature. In three case studies, Lee (1994) found that the use of information technology has shown significant positive impacts on productivity. Applying a mathematical approach, the results in his study showed that the use of information technology has contributed positively in both profit maximisation and cost minimisation (Lee, 1994). Hitt and Brynjolfsson (1996) also studied the relationship between productivity and investment on information technology in 370 US firms between 1988 and 1992. They found evidence in their study which suggested that

information technology investment had a significant impact on a company's productivity.

This research suggests that strategic reasons have driven many organisations in Saudi Arabia to use computers and other information technology facilities for several years. More than 18 percent of the participating sample used computers and other information technologies before the 1980's. The majority of the sample (63.9 percent) adopted information technologies between 1980 and 1990. Two factors can explain this high percentage. Firstly, the 1980's were a boom period for the Saudi economy because of the high oil revenues. Firms in the oil and industry sector along with firms in the financial sector made the greatest use of computers and other information technologies compared to others in the sample. Secondly, during the 1980's there was a huge technology revolution, particularly in computer technology, accompanied by a big drop in prices. This led many organisations in the Saudi private sector to take advantage of the power that computers can offer. A recent study, which investigated the use of computers in contractors' firms in Saudi Arabia, has also found that the majority of the computer users in those firms had perceived the advantages of using computers and introduced this technology into their organisations during the 1980's (Shash & Al-Amir, 1997).

The statistical results obtained in this study suggest that information technology in the Saudi private sector can be used as a strategic tool in providing better service for customers and assisting top managers and executives in setting strategies and future plans. Many organisations, particularly in the service sector, are now using computers to fast access information that enables their employees to provide better services to

customers and to respond quickly to customer's demands. More than 77 percent of the participating companies, who are actually operating in a highly competitive market, believed that they can use information technology as a strategic tool in their organisations in order to increase competitiveness.

The results regarding the usefulness of information technology indicated that introducing computers and information technology into business organisations in Saudi Arabia could be very useful. These results are consistent with the findings of many previous studies. Udo and Guimaraes (1994), in a study surveying 201 US business managers to test decision support systems (DSS) benefits, found that organisations with a strong strategic position are more likely to derive greater benefits from their DSS than firms in a weak strategic position. This can show that the implementation of information technology does not necessarily improve an organisation's strategic position in a given industry, but can also help sustain a leadership position.

The statistical analysis concerning the impact of information technology on profitability showed significant results. It seems that the use of information technology in the Saudi private sector can save money by reducing labour costs, and reducing the time for jobs to be done. These results were consistent with a study carried out by Lubbe et al. (1995) who examined the relationship between profitability performance (operating expense ratio) and the level of information technology investment (information technology expenses ratio) amongst the long-term life insurance firms in South Africa. Lubbe et al. (1995) found that the most profitable companies or top performers are likely to spend a significantly higher proportion of their non-interest operating expense on information technology and the least profitable companies are

more likely to spend a significantly smaller proportion of their non-interest operating expense on information technology. Today, American firms allocate nearly 50% of capital investment to information technology, with an increase rate of information technology investment that is nearly double that of other capital goods and that is a clear evidence on information technology's profitability-and productivity-enhancing potential (King, 1998).

It is certain that assessing the impact of information technology on organisation profitability is a very complex process. Therefore, it is important to mention here that one must be very cautious in accepting results based only on survey studies. In this study, the necessary data was gathered through mail questionnaires and personal interviews and these two approaches *did not provide clear idea of how firms in the Saudi private sector achieved greater profitability by using information technology*. The researcher believes that longitudinal studies that are repeated over an extended period of time and studies based on quantitative techniques are more accurate in providing definite answers regarding the impact of information technology on profitability. Longitudinal studies and studies based on quantitative techniques for assessing the impact of information technology on firms operating in the Saudi private sector are needed and could be carried out as further studies in the future.

In addition, the results for information technology and growth in this study suggest that introducing computers and information technology into business organisations in Saudi Arabia might can help organisations to grow. The empirical evidence in this study suggested the existence of a positive relationship between information technology usage and growth. It was seen in Chapter Five that when

information technology usage increased the rate of growth also increased. Companies that are experiencing small or large expansions have a higher mean of information technology usage than companies with small or large contraction. These results should be interpreted with great care since the causality between the use of information technology and business growth could not be established. In other words, the study could not explain if business growth has led to more usage of information technology or the use of information technology caused business growth for many companies.

The findings of personal interviews with six top managers from different sectors in business show that five of the managers interviewed believe that information technology can help their companies to expand, as well as having other benefits. They argued that investing in information technology is an expensive process and it must be managed wisely in order to reap the benefits. The managers interviewed believed that the way the technology is exploited is the most important issue in adopting information technology. As Harris and Katz (1991) indicated, several academics and practitioners have cautioned that while the level of *spending on information technology is important*, the way in which this technology is used to pursue economic benefits may be even more significant.

Researchers agree that the use of information technology applications should make a contribution to the organisation's strategy but they found that assessing this contribution is always very difficult. Many researchers face complex issues in assessing the impact of information technology on the efficiency or the productivity of the organisation. It is not an easy task to measure such impacts but a useful question to ask

is what the effect on the organisation's strategy would be if the systems were not implemented? (Fitzgerald, 1998).

We can conclude that the empirical evidence which was obtained in this study supports the hypothesis that information technology utilisation can provide positive impacts on the strategy of business organisations in Saudi Arabia. A number of motives were recorded for implementing new information technology. It is believed that the most common motives include cost reduction, increased output, improved quality and reliability. Most are concerned in some way with improving competitiveness. The researcher in this study believes that further longitudinal studies and studies based on quantitative approaches are needed in the future. These conclusions were found to be consistent with many studies in the literature (see, for example, Attewell & Rule, 1984; Boynton, 1993; Clegg et al., 1997; Kraemer & Dedrick, 1994; Molloy & Schwenk, 1995; Porter & Millar, 1985; Turban, McLean, & Wetherbe, 1996).

### **6.2.2 Structure**

With many new phenomena such as business process re-engineering (BPR) and downsizing, which became a way of life for many organisations in the late 1980's and the 1990's, many organisations were changed dramatically. Studies show that economic recession, slow economic growth, increased international competition, lower costs and advancement in information technology were the main factors that led to these phenomena. As suggested by many authors, with the use of information technology middle managers no longer need to serve as channels for the transmission of operations feedback or control directives between operational managers and top management.

Thus, there was a drastic reduction in the layers and number of middle management. Managerial levels were reduced and the distance between the top management and the place where the work is done was shortened dramatically. Many authors studied the impact of information technology on the organisational structure and investigated how information technology led many companies to redesign the structure of their organisations to meet the new challenges of the 1990's (see, for example, Baskerville & Smithson, 1995; Carroll, 1994; Hoffman, 1994; Scott Morton, 1991).

In this study, three organisational characteristics associated with information technology were studied and analysed. Firstly, the impact of information technology on the structure (form) of the organisation. Secondly, the impact of information technology on formalisation of communication within the organisation. Thirdly, the impact of information technology on the decision-making process. The results concerning the impact of information technology on the form of organisations in Saudi Arabia were found to be significant. The empirical evidence suggests that information technology usage within organisations in Saudi Arabia might be able to lead many businesses to change the structure of their organisations. Almost half of the participating companies agreed or strongly agreed that information technology can be linked with the structural changes that can take place in their organisations. They indicated that the use of information technology can help their organisations to become smaller and flatter in shape. Four of the six managers who were interviewed in this study believe that the adoption of information technology can help their firms to eliminate several units and managerial levels that were unproductive and inefficient. This action can lead to smaller and flatter organisations with less complex structures. These results were consistent with what has been found and discussed in the literature. Stebbins & Sena and Shani

(1995) reported that currently and in the future, conventional organisations will be flatter, more lateral and less hierarchical. Organisations will be customer driven and will depend on cross-functional teams dedicated to products, projects and customers.

The findings regarding the impact of information technology on the formalisation of communication in organisations were found to be significant. The statistical results suggest that the use of information technology by organisations in the Saudi private sector can lead to more formalised communication and procedures between members of the organisation in their daily business activities. A significant result was obtained between this variable and the use of information technology in hypothesis testing for the whole sample. More than 69 percent of the participating sample agreed or strongly agreed that information technology can increase formality in communication and managerial procedures in their organisations. In these organisations, communication and managerial procedures has to follow the formal standards and authority channels regardless of using computers or other information technology facilities. In other words, these organisations are moving toward systems that are more bureaucratic in order to perform their business activities. The explanation for these results is that top management formalise the communication process as a way to gain control. The data suggest that formality in communication between managers themselves and between managers and other employees in lower levels of the organisation is emphasised even with the use of modern information technology. Despite these results, researchers believe that information technology must evolve as a facilitator of communication between decision units and a provider of information processing equity throughout the organisation (Barua, Ravindran, & Whinston, 1997).

Although several communication facilities were used within the participating companies in this study, telephones and fax machines were used by the whole sample. Only 47.3 percent of the participating sample used electronic mail as a mean of communication mostly with individuals located outside Saudi Arabia. The managers interviewed indicated that misconceptions still exist among many organisations in Saudi Arabia regarding the importance of electronic mail. It is believed that the lack of many modern communication and information technology services such as the Internet, which is not authorised locally in Saudi Arabia at the time of writing this thesis, is the major reason behind this lack of understanding. The six managers interviewed agreed with what was found in the literature that modern information technologies will significantly reduce the communication costs between the members of their organisations. Therefore, they implored the Saudi government to invest heavily to improve the country's communication infrastructure, increase the number of telephone lines and to provide more advanced commercial services to the business environment such as the Internet. The discussion with the six managers emphasised the idea that information technology must form quick and easy communication and collaboration among individuals, business units and other work groups, using electronic methods such as E-mail and electronic meeting systems instead of paper.

The impact of information technology on the decision-making process was studied extensively in the literature. Leavite and Whisler (1958) were the first to predict that the introduction of computers would affect the decision-making process. They predicted that computers would make the centralisation of decision-making much easier. Some later studies suggested that the use of information technology would lead to more centralisation of decision-making while others suggested that information technology

should lead to more decentralisation. Other studies suggested that information technology would lead to both centralisation and decentralisation at the same time (Gurbaxani & Whang, 1991). Because of these different conclusions reached by previous research, there was no clear indication in the literature of information technology's effect on centralisation and decentralisation (Malone, 1997).

In this study, the results regarding the impact of information technology on the decision-making process were investigated. The statistical results showed that decentralised or highly decentralised companies in Saudi Arabia have higher mean use of information technology than centralised or highly centralised companies. The results from the linear regression procedure suggest that there is a statistically significant relationship between the two variables in favour of the one-sided alternative that greater use of information technology is negatively related to the level of centralisation, i.e. positively related to the level of decentralisation. The data suggest that the use of information technology in the Saudi private sector is most marked in the decentralised organisations rather than the centralised ones. It was also noticed that there is a trend toward downsized (smaller) organisations that allow top management to delegate more decision-making to lower levels. The explanation for the decentralisation trend is that top managers believe that business functions and activities can be performed more effectively in decentralised organisations. With access to the information and communications capabilities they need, top managers can control the overall direction of the organisation. These results should be interpreted with great care since the direction of causality could not be established. In other words, the study could not explain if decentralisation can lead to more usage of information technology or if the use of information technology can lead many organisations to be decentralised.

In addition, the statistical results in this study suggest that the use of information technology by firms in the Saudi private sector has led towards more centralised decision-making for the strategic issues in the upper levels of the organisation. At the same time, there has been a speeding up and decentralisation of the operational decisions (the daily routine decisions) at the lower levels of the organisation. The findings from the six interviews carried out in this study showed that the use of information technology by firms in the Saudi private sector can lead to a great enhancement in decision-making. Information technologies can provide managers with accurate information that enables them to make faster and better decisions. In the literature, enhancing the decision-making was found to be a major factor in favour of using information technology. Molloy and Schwenk (1995) found in four case studies they carried out in the US that the use of information technology does improve both the efficiency and, more importantly, the effectiveness of the decision-making process. A study carried out by Teng and Calhoun (1996) indicates that managers attribute perceived improvements in decision-making to information technology usage. They added that intensity of information technology usage in decision-making is associated with a wide range of perceived improvements in decision-making, ranging from micro-level information use in decision-making to macro-level organisational decision process, and from decision efficiency to overall effectiveness.

The data gathered through the personal interviews also suggest that information technology can lead to extensive centralisation of decision-making. Two managers indicated that information technology can centralised the decision-making process in the upper levels of the organisation. It seems that those two managers believe that centralisation is a way of maintaining managerial control and the decentralisation

philosophy is not desirable in their organisations. This leads to the conclusion that information technology can encourage either centralisation or decentralisation in business organisations. According to O'Brien (1996), the strategy of the organisation, the philosophy of top management, the culture of the organisation, and the use of information technology will shape the organisational decision-making process. As mentioned earlier, these conflicting findings replicate what has been seen in many studies in the literature. George and King (1991) reported that the relationship between information technology and the decision-making process is not a simple causal one and disagreed with claims that the *research questions involved have been resolved*.

### **6.2.3 People**

Over the past three decades, many people believed that using computers in the workplace was a major cause of unemployment. Several studies showed that firms could sometimes use information technology to produce the same output with fewer people. Some researchers believe that information technology has affected both blue and white-collar employees in many sectors. Somewhat surprisingly, however, several other studies have not provided broad support for the hypothesis that information technology has been a substitute for human labour or even increased the productivity of the workers. In some cases, studies showed that information technology does not cause loss of jobs but can increase the level of employment and create more jobs (Osterman, 1986). As we have seen in Chapter Two, this conflict in the findings of many studies has led to the emergence of two opposing factions: people who believe that information technology will cause unemployment and those who believe that this is not going to happen.

In this study, three variables related to the impact of information technology on people were tested: the impact on the total number of employees, the impact on middle management, and the impact of information technology on creating more jobs and consequently increasing the total number of employees. The statistical analysis regarding the impact of information technology on the total number of employees provided evidence that the use of information technology in the Saudi private sector can lead to a negative effect on the total number of employees. The impact of information technology on the number of employees was found to be significant. The empirical evidence suggests that information technology usage within private organisations in Saudi Arabia can help to reduce the total number of the workforce. A significant result was obtained between this variable and the use of information technology in hypothesis testing for the whole sample. It is assumed that the reason for this reduction is that top managers believe that their organisations have excess people relative to competitors and believe this represents inefficiency within their organisations. These results were consistent with a recent study carried out by Shash and Al-Amir (1997). They found that using computers in a contractors' firms in Saudi Arabia has resulted in reducing the manpower needed for certain jobs. Some firms which participated in their study stated that the use of computers in accounting activities has limited the number of personnel in order to achieve a reduction in costs. They also noticed that using computers has resulted in reducing the manpower previously needed for tasks such as keeping personal records of employees, equipment information, and old project information (Shash & Al-Amir, 1997).

It is clear that information technology can lead to an increase in the average skill level of employed workers by raising the demand for workers with more education

relative to those who do routine jobs (Brynjolfsson, 1994). Many companies operating in Saudi Arabia which depend heavily on labourers from India, the Philippines, Bangladesh, and some Middle Eastern countries, are now decreasing the number of their unskilled workers and looking for skilled and educated employees (knowledge workers) who can offer more productivity and efficiency. This decline in the number of unskilled workers was associated with more investment in computers and other information technologies which have can provide Saudi firms with more power and more productivity. Jifri and Meadows (1996) in their study about the role of information in the information technology trade between the UK and Saudi Arabia reported that the Saudi government is also keen to reduce the number of foreign workers and it sees automation, with information technology an essential component, as a way of achieving this goal. According to Kraemer and Dedrick (1994) *information technology improves labour productivity directly by substituting for labour or improving the productivity of workers. The gains in labour productivity can be seen easily when computers are installed to perform routine functions and replace workers carrying out those activities. Because of the shortages of skilled workers in the Saudi private sector, we can see that 47 percent of the participating sample in this study agreed or strongly agreed that introducing the appropriate information technologies will help to balance these shortages of skilled labour.*

Four out of the six interviews conducted in this research indicated that the total number of employees is decreasing in many organisations in the Saudi private sector. In other cases, some organisations in Saudi Arabia which have not made staff redundant have decided not to hire new employees in the current conditions. Many observers in Saudi Arabia believe that the economic conditions after the Gulf War, financial

problems, aggressive competition at home and abroad, and the advance in information technologies are major factors leading to redundancies. These results were consistent with what has been seen in many studies in the literature. With the phenomenon of downsizing all over the world, many workers lost their jobs. In the United States more than three million jobs have been eliminated each year since 1989, and there has been loss of 43 million jobs since 1979. Government budget cuts alone have resulted in more than 1.1 million lost jobs in the defence industry since 1987, with another 700,000 cuts expected through 1998 (Mishra, Spreitzer, & Mishra, 1998). Many studies found that the adoption of advanced information technologies is a major factor in these lay-offs. Brynjolfsson, Malone, Gurbaxani, and Kambil, (1994), in a study involving six sectors substantially representing all manufacturing and services industries in the US, found that information technology investments strongly correlated with a decline in the size of the establishment and the number of employees.

The results concerning the impact of information technology on the number of middle managers were not significant. The empirical evidence shows that information technology usage within organisations in Saudi Arabia cannot reduce the number of middle managers. A non-significant result was obtained between this variable and the use of information technology in hypothesis testing for the whole sample. The statistical results for variable 32 suggest that information technology cannot reduce the number of middle managers in Saudi Arabia. This conclusion was also supported by some of the interviews carried out in this study. Three out of six top managers who were interviewed in this study believe that middle management will continue to exist despite the implementation of information technology facilities. They indicated that middle managers are playing significant roles in assisting the top management to carry out

several managerial activities within the organisation. Middle managers perform interpersonal roles and they sometimes make decisions and analyse things in greater depth. These findings are consistent with several studies in the literature. Some of these studies suggested that information technology does not decrease but increase the number of middle managers in organisations (Shaul, 1964; Wynne & Otway, 1983). These studies suggested that information technology increases the complexity of organisations which generates a need for greater co-ordination and also increases the complexity of middle managers' jobs, both of which increase their numbers. Thus, more middle managers are needed to complement top management efforts. (Pinsonneault & Kraemer, 1997).

However, the other three managers interviewed in this study believe that the decline in the number of middle managers can be related to the adoption of information technology. In those three organisations, the number of middle managers had declined, but at the same time, those managers did not lose their jobs. A few of the managers were retrained, promoted, and moved up in the organisation while most of them were transferred to different positions. This decline in the number of middle managers in those three organisations was found to be consistent with many studies over the last 40 years since Leavitt and Whisler (1958) predicted in their famous article "management in the 1980's" that information technology would reduce the number of middle managers. The authors of these studies argue that middle managers mainly have information providing roles and that information technology, by permitting top managers to bypass middle managers in both downward and upward communication activities, will take over most of the middle managers' tasks. Thus, fewer will be required (see, for example, Child 1984; Drucker 1988; Malone et al. 1987).

Finally, the statistical results regarding the role of information technology in creating more jobs and consequently increasing the number of employees found were not to be significant. A non-significant result was obtained between this variable and the use of information technology in hypothesis testing for the whole sample. The statistical results for variable 33 suggest that information technology cannot create more jobs or even increase the number of employees. All the managers interviewed believe that the use of information technology will not create more jobs or even increase the number of workforce.

#### **6.2.4 Contingency Factors**

The statistical results in this study suggest that the use of information technology is not correlated with the size of the organisation. The linear regression test showed no statistically significant results and no relationship exists between information technology usage and the organisational size in the Saudi private sector. The results showed that medium-sized organisations (101-500 employees) achieved the highest mean for using information technology in the whole participating sample. Medium-sized organisations have a higher mean than large organisations (more than 500 employees). The only explanation of these results is that large companies in Saudi Arabia, on average, were not leaders in realising the full economic benefits of information technology. This was found to be consistent with a study carried out by Harries and Katz (1991) who studied the use of information technology in the US life insurance industry. On the other hand, small organisations (up to 100 employees) have the lowest mean for using information technology in the sample. A possible explanation of the low usage of information technology in small organisations is that small firms in Saudi Arabia may be in the early stages of technology adoption. Abdul-Gader (1990) who studied end-user

computing (EUC) success factors in private organisations in Saudi Arabia has reported that small organisations are less likely to have successful EUC experience. The small organisations' tendency towards centralisation and the lack of adequate resources have meant those organisations are unable to create a favourable atmosphere for EUC (Abdul-Gader, 1990).

In addition, several statistical tests were performed in order to find out if any relationship exists between information technology usage and size by sectors but the results showed no statistically significant relationship between these variables. The data analysed in the study showed some indications that large companies invest more money on information technology than small companies. The results also showed that large companies in Saudi Arabia have tended to adopt information technology earlier than small companies. However, there were no significant findings to show if information technology utilisation depends on the age of the company. The data showed no statistically significant relationship exists between the company's usage of information technology and the age of the organisation. It seems that younger companies in Saudi Arabia are also investing in information technology in order to take advantage of the facilities it offers.

The results in this study also showed that the oil and industry sector and the financial sector are adopting advanced information technologies more widely than the other five sectors investigated. One explanation is that most companies operating in those two sectors have solid experience with information technology due to their western management styles. Many foreign managers, particularly from the United States and Western Europe, (Britain, France, Italy, and Germany) and Japan are working in oil

and industrial companies. These professional managers bring with them their experience, knowledge, and many modern managerial practices. Several Saudi companies went into joint ventures with companies from the developed world. Most major banks in Saudi Arabia are owned by Saudis with other foreigner partners, particularly from the United States and Europe. Therefore, we can understand why those companies are taking the lead in using information technology. In addition, the results from testing hypothesis three showed that foreign and joint venture companies operating in Saudi Arabia are using computers and other information technology facilities more intensively than Saudi companies. From these findings, we can say that Saudi firms have to invest more in information technology in order to get advantages from the power that modern information technologies can bring.

Another explanation for the high usage of information technology in the financial sector is the nature of work carried out by firms operating in this field. The bulk of activities in banks and insurance companies involves dealing with information. Vast amounts of information are produced, processed, transferred, and stored daily by financial firms which leads those firms to invest, adapt, and use information technology facilities more than the others.

### **6.3 The Implementation Perspective**

The implementation process for integrating newly designed or improved information systems into the organisation involves a variety of activities. It involves technical, behaviour, and ethical activities that could affect the whole organisation (O'Brien, 1996). Therefore, the implementation process is a vital step in ensuring the

success of new information systems. Many studies showed that even a well-designed information system could fail if it is not properly implemented. In this study, the six personal interviews with six top Saudi managers have provided useful insights that can help us to understand the implementation process of information technology in the Saudi private sector. Although the information obtained from the six interviews represent the six managers' opinions or perceptions and cannot be granted to represent the real condition of each company, the outcomes from conducting those interviews were very significant.

Several issues related to the implementation process were raised and discussed with the six managers. Firstly, the organisational approach chosen by each organisation to plan their information technology needs. Secondly, some technical and behavioural issues that can affect the application of information technology. Thirdly, the essential role of top management to support information technology adaptation. The major findings of these three issues will be fully discussed in the following sections.

### **6.3.1 Approach to IT Strategic Planning**

The six interviews carried out in this study showed that two companies (company two and four) were suffering from serious problems with their information technology implementation. Five of the companies used internal resources to implement their information technology activities. Only one company (five), which operates in the insurance business, decided to outsource its information technology activities due to a lack of technical staff. The data gathered showed that four companies (one, three, five and six) successfully planned their information technology adoption before they implemented any information system into their organisations. Two of those four

successful companies (one and five) both operate in the financial sector. Each of these four companies is performing its information technology activities within a well-designed information technology strategy, which was developed by both top management and the information systems specialists in the organisations. In each of these four companies, the information technology strategy has provided a clear framework for the company to develop its information systems in a methodical way. Information technology strategies in these companies have identified objectives, opportunities, methods, and explained how information technology can be exploited within the organisation. Issues such as organisational needs, hardware, software, user training, and other organisational issues were well covered in the strategies. In these four companies, the information technology strategy was not designed independently but carefully planned to be consistent with the rate and direction of other organisational strategies. These explicit steps resulted in a successful implementation of information technology in these four organisations.

While successful implementations are taking place in four companies, two companies (two and four) have major problems in implementing their information technologies. These two companies do not have information technology strategies that can control information technology activities within their organisations. Technical and human problems arise from time to time in both companies. In company two, different information systems such as personal computers (PCs), Macintoshes, and PowerPCs were installed. Different software and applications were purchased for these systems. This led to incompatibility between the systems which precluded the benefits of interworking between these systems and could also cause technical problems. Technical staff dealing with different systems has found it difficult to provide adequate services for

each system. Employees in the company have to deal with different operating systems in order to carry out their tasks. As Moynihan (1993) stated, without an information technology strategy, there is a tendency to create a series of isolated and incompatible “islands of information” throughout an organisation.

In company four, the assistant to the company’s general manager, when asked if the company had a vision or strategy regarding information technology, replied that no strategy was designed for the information technology adoption. In this company, no consideration was given to the overall information needs of the organisation. Because of the lack of information technology strategy, no clear rules or guidelines will control the purchasing for information systems. Each department in this company obtains its own hardware and software without co-ordination with other departments in the company. This has led to replicate systems that can offer similar functions and results. In addition, the company might have lost a large amount of money which could have been saved in price discounts from hardware and software suppliers if a co-ordinated purchasing policy had been in place.

These examples show that developing an information technology strategy is a major responsibility for today’s managers. Creating an information technology strategy is a significant step towards creating a vision which controls the organisational information needs. Information technology strategic planning is one of the most critical issues for today’s management because it is essential for the successful exploitation of information technology, which has become the “sole heart” of most of today’s organisations (Hoffman, 1994). Research and studies show that setting a technology strategy for the organisation is an important issue and it is not less important than setting

other strategies such as marketing, manufacturing, financial, and human resources. Technological strategies have no meaning apart from the other functional strategies that make up the overall plan for a business unit. As suggested by Weiss and Birnbaum (1989), technological strategy must be formulated and pursued systematically as part of the overall organisation's strategy.

In 1994, research at Warwick Business School (UK) was carried out to compare several international studies focusing on the key issues facing information system executives and managers in several countries. The countries included in the study were: Australia, Estonia, Europe, the Gulf Co-operative Council (Saudi Arabia, Kuwait, Qatar, Bahrain, Oman, and the United Arab Emirates), Hong Kong, India, Slovenia, Taiwan, United Kingdom and the United States. The research, after analysing and comparing the essential issues for information systems executives, reported that information system planning is a vital issue for all those countries but it was the most essential issue for information systems executives and managers in the Gulf Co-operative Council, Hong Kong and Slovenia (Kelly et al., 1994).

In recent years, many modern organisations have planned and implemented their information systems based on an approach called "Systems development life cycle" (SDLC). This systematic development process allows end users and information specialists to design information systems based on an analysis of the information requirements of the organisation. Turban et al. (1996) suggested that the systems development life cycle include the steps of (1) identify problems and opportunities, (2) analyse and document existing systems, (3) determine information requirements, (4) design technology and personnel requirements, (5) develop, test, and validate system,

(6) implement system, and (7) evaluate and maintain the system. They emphasised that all of the previous activities that are involved in the planning process are highly related and interdependent. The systems development cycle is iterative and evolutionary. It may move back at any time to repeat previous activities in order to modify and improve a system they are developing. However, they do have a basic sequential flow from the point of origin to “identify new problems and opportunities.” The information system planning process, which must be a part of the regular business planning process of the organisation, is highly desirable in modern organisations. The planning process should result in an information system to support the organisation’s end users and its business operations and assist business and information technology objectives (Reich & Benbasat, 1996).

### **6.3.2 Technical and Behavioural Considerations**

Serious problems in developing and operating information systems can come from technical problems and behavioural reactions of those affected by changes brought about by those information systems. It is very important for managers in today’s organisations to consider technical and behavioural issues in their plans and prepare their organisations and employees to face the difficulties that can arise from these two important issues. In the following sections, we will discuss both of those issues in further detail.

#### **6.3.2.1 Technical Considerations**

The data gathered from the personal interviews showed that some companies that were visited in this study have several technical problems. In company two, the lack of an information technology strategy, as mentioned earlier in this chapter, resulted in

several incompatible information systems being installed. In 1993, the company unsuccessfully attempted to install local area networks (LANs) between these systems. All the technical solutions to achieve that have failed. Incompatible hardware and software led to major problems for the technical staff in the company. Having to work with different systems, technicians have to deal almost daily with many technical problems and obstacles. The same company signed a contract in 1995 with a local software firm to design a program for its accounting and financial department. The software firm designed and installed the program but unfortunately, it was not used at all. Several crashes and technical problems occurred and the new program did not meet the needs of the accounting department staff. The project was cancelled with a loss of approximately SR 85,000.

In 1996, several departments in company four with no previous planning or co-operation purchased several personal computers from different companies. Due to the organisation's strategy to go for the "best" (cheapest) price, most of the departments have purchased very low quality systems. Technical problems started with some of these systems on the day they were delivered. The suppliers provided no professional technical support. Not all the departments involved negotiated the technical issues with vendors before they purchased their systems. Consequently, several of the new systems purchased did not work properly and caused some departments to upgrade them or in few cases replace them.

Many researchers in the field of information technology have suggested that establishing information technology standards for hardware, software, and communication is vital to the success of this principle. Organisations that have dispersed

their information technology functions without establishing enterprise-wide standards may encounter difficulties and added costs trying to tie together multiple incompatible hardware and software products (Framel, 1993). Since any mistake made in this field may have serious and irretrievable consequences, the role management plays in defining information technology strategies should be characterised by a true long-term vision and a strong determination and, above all, performed without improvisation (Grossi, 1990).

### **6.3.2.2 Behavioural Considerations**

*Most researchers agreed that the success of information technology implementation into organisations should not be measured only by its efficiency in terms of minimising costs, time, and the use of information resources; success should also be measured by the effectiveness of the information technology in supporting and meeting the goals of end users and their work groups and organisations (Hoffman, 1994). That is simply because information technologies are designed, operated, and used by people in a variety of organisational settings. Therefore, implementation is an important activity in the deployment of information technology into organisations and requires effective planning and determination.*

Because the implementation process will bring changes into many aspects of the organisation, serious problems could arise at any time. Behavioural reactions can be seen in those people affected by changes brought about by the new systems. The data gathered through the six interviews carried out in this study showed that some companies have confronted behavioural reactions towards using information technology. In company two, resistance arose between employees in the accounting and financial department when a new accounting program was installed. During the first

week, employees were asked to make themselves familiar with the use of computers. Introductory course were given by the technical staff of the company on how to use computers. In the second week, the software firm which developed and designed the program sent two engineers who introduced the employees to the program and gave them a quick tour of the major points of the program. No program manuals or documentation was left for the employees in case they needed help. Within one month, software bugs and other technical problems started to cause the program to collapse. The employees felt that the program was inappropriate and did not meet their needs. Some employees in the department started to encourage the other individuals to ignore the new system and to go back to their traditional style of work. Within two months, no one was using the new program and the department kept running under the old traditional system. Therefore, the project was failed and was consequently abandoned.

Five years ago, the use of new Computer Aided Design (CAD) was also resisted by a group of engineers in company three which operates in the building and construction business. The introduction of the new system had been thoroughly planned and had the backing of the top management. The group who resisted the implementation of the CAD system consisted of the three oldest engineers in the department of engineering. They refused to use the new system and they kept telling the younger engineers that the traditional techniques for designing and drawing were still more accurate and effective. They resisted the new system because they were comfortable with their current way of doing things. The three engineers indicated to the management that they were unsure about how the new situation would work out. This is often true in cases where information technology is introduced into jobs that did not previously use it. Fortunately, with management determination and effective planning for implementing

the new system, the three engineers were persuaded to use the new system six months after installation. Today, the engineering department in this company is fully computerised and equipped with the latest engineering software and hardware.

Another important issue raised by the general manager of company six is that some managers in Saudi organisations spend money on technology for its own sake with no genuine requirement for that technology. In other words, some managers, particularly Saudis, just use computers and other information technology as a way to “show off”. Such managers want it to be noticed that they are using modern technology in performing their jobs, but in reality, they are not. This problem can be viewed from different angles, such as the manager’s personality and the way that he sees things. Another explanation can be the cultural and social changes which have occurred in the Saudi society since the 1970’s. The increased governmental revenues, particularly with high oil prices in the 1980’s, has provided wealth and prosperity for the country. Most Saudis enjoyed high living standards such as those normally seen only in the developed world. This has led to chaos for many Saudis. Many Saudi citizens, with good incomes, wanted to acquire many things, sometimes things they needed and sometimes things they did not. The lifestyle for many Saudis was influenced by many things that come from the developed world, particularly Europe and the United States. Saudi managers were at the core of this dramatic change and some of them tried to imitate western managers, both in their appearance and their usage of technology. Some managers in several organisations believed that having computers would make their organisations “modern” although some of them do not use these computers at all! Many organisations spent large amounts of money on computers and other information technologies without planning or assessing the real needs for those systems. This tendency to acquire and use

technology for its own sake has become a major problem which many Saudi organisations must solve.

The examples discussed earlier show that behavioural and sometimes social issues are important in the implementation of information technology. People may react to new systems in unexpected ways making even the best technically designed system useless. Managers in modern organisations must act to resolve any form of dysfunctional behaviour. According to Turban et al. (1996), the three most common forms of dysfunctional reaction to newly introduced information systems are aggression (physical or non-physical, intended to disrupt or destroy the system), projection (attempts to blame the system for problems not caused by the system), and avoidance, which is the most common reaction, (defensive reactions by personnel who withdraw from, or ignore, the system). Resistance can be minimised by encouraging end users acceptance and productive use of new information technologies. Positive behaviour towards information technology must be encouraged and motivated. Individuals who are intimidated or simply reluctant to familiarise themselves with the new technology should be assured that the changes will enable them to be more productive in their jobs.

It is true that some people are uncomfortable with information technologies, particularly computers, some to the point of fear. People who perceive themselves to be successful in their jobs are particularly prone to resist changing the ways of working that helped them achieve their success. So, one of the keys to solving problems with end user resistance is proper end user education and training, improved communications with other staff, particularly those who are involved with information technology, and end user involvement in the development and implementation of new systems. Many studies

showed that the presence of a key individual “champion” is very important for others to imitate. Accordingly, individuals who exhibit charismatic leadership behaviour must be identified, encouraged, and trained to use information technology. Therefore, it is the role of the top management to create an information technology strategy that includes specific provisions for encouraging workers to accept change, by easing the process of change itself, and by helping them understand that the new ways of doing things will be better for them.

### **6.3.3 The Role of Top Management**

The data gathered through the six interviews in this study showed that the support and involvement of top management is a very important step in order to obtain benefits from the adoption of information technology. While four out of the six companies interviewed had the support of the top management in their organisations, two companies were lacking this support. In company one, the support of the top management has led to a successful implementation of information technology. Realising the advantages of investing in information technology, the top management in this bank succeeded in forming a good strategy towards the adoption of information technologies. Top managers in the bank are very pleased with the benefits of investing in information technologies. Nowadays, the bank is investing heavily in information technologies and performing well financially. In company three, the determination and support of the company’s top management succeeded in persuading three engineers to use the CAD system. The system was implemented successfully and the company is now getting benefits from it. On the other hand, company four is suffering from the lack of top management’s involvement in information technology activities. The lack of

information technology strategy in this company is a clear indication of the absence of top management's role. Although the company is still doing well in business, there are many problems preventing the success of information technology in this company. As we discussed earlier, the lack of an information technology strategy has led the company to fall into chaos. Major managerial, technical and behavioural problems are facing the company and there is a need for the top management to become directly involved.

A major problem regarding information technology in the developing countries is that most of the policymakers do not perceive information as an important resource vital for national development (Malek & Alshoaibi, 1998). The value of information is lower in the developing countries than in the developed countries which realised the importance of information much earlier (Mody & Dahlman, 1992). This can also be seen in business organisations in many of these countries. Many top managers in the developing countries, including Saudi Arabia, still do not appreciate that information is an important asset to the organisation. Some of these managers believe that investing in information technologies is a waste of time and money, and financial resources must be spent on other valuable things such as bonuses and salaries. This problem has caused many senior managers to neglect the importance of information and fail to invest in information technologies.

The involvement and support of senior management in the implementation process is a primary step for the successful exploitation of information technology. Rockart, Earl and Ross, (1996) pointed out that to implement information technologies successfully, line managers at all levels of the organisation must be heavily involved. In response to strategic or tactical changes, information technology managers in the

organisation can change only one variable, the technology. The information technology management has no power to make necessary changes on the other components of the organisation; organisational structure, corporate culture, management processes, and people. Only line management has the responsibility and power to effectively change those variables (Rockart et al., 1996).

According to Farbey et al. (1993) there are four key reasons why today's top managers need to be more closely involved with information technology. Firstly, information technology is now affecting many organisational strategic issues. Secondly, information technology is now at the core of business processes enabling many organisations to re-engineer and redesign many of their essential business processes. Thirdly, information technology accounts for large financial outlay on hardware, software, software development, networking, maintenance, and consultations. The expenditure on information technology has risen inexorably over the years and most organisations have seen this become an increasingly important category of total organisational expenditure (Fitzgerald, 1998). Fourthly, information technology is becoming more complex as users demand new and improved applications and equipment. Technical staff in the organisation must carefully describe information technology in non-technical terms when communicating with top management and soliciting their support, because top managers are much more comfortable with things they understand. This has led some researchers to call for the appointment of a senior executive to represent information technology at board level (Rowe & Herbert, 1990). In addition, the implementation of information technology involves risk and uncertainty (Segars & Grover, 1996). Investments in information technology represent a major source of business risk and this risk must be managed effectively through the link with

the firm's strategy, the structure of the organisation, the measurement and control system, the reward system, and the characteristics of the technology (Morone, 1989). The implementation process also includes several other managerial, technical, and behavioural problems that can arise at any time. Therefore, these issues should be the concern of the top managers and not be delegated to lower management levels.

In summary, it is certain that securing top management endorsement is a very important step in order to achieve effective exploitation of information technology. The successful implementation of information technology depends on a favourable attitude by the senior managers. The top management can play a significant role by carefully matching the needs of the organisation and information technology solutions, developing information technology strategies, managing organisational change, resolving technical and behavioural difficulties, and effectively controlling the implementation process within the organisation.

## **CHAPTER SEVEN**

### **SUMMARY AND RECOMMENDATIONS**

The main objective of this research is to explore the impact of using information technology on business organisations in Saudi Arabia. The literature review has covered and discussed several organisational issues that could be affected by the use of information technology. The data needed to carry out this study was gathered through mail questionnaires as well as personal interviews with top managers in the Saudi private sector. The managers were asked about their opinions/perceptions about the impact of using information technology on their organisations. After analysing the data, several results were thoroughly and carefully discussed and considerable findings emerged. The four hypotheses that were developed in this study were tested and significant insights were obtained. This chapter, which is divided into four sections, will summarise the main results of this study. The first section will discuss the limitations of the study. The second section will explore the study's main findings that are related to the two perspectives: the impact and the implementation. Other major findings will also be briefly reported in the second section. The third section will cover some of the implications recommended for the Saudi government. Finally, the fourth section will provide suggestions for further research and will establish directions for future studies in order to increase our understanding of the impact of information technology on business organisations in the developing countries such as Saudi Arabia

#### **7.1 Limitations of the Study**

There are some limitations in this study. Those shortcomings include the following:

- While the study showed significant findings related to the impact of information technology on business organisations in Saudi Arabia, the generalisation of the study's findings should be carried out with care. The data used in this study is taken from the top 500 large companies in Saudi Arabia. Because the findings are based on data from a non-probability sample, it could be argued that the sources of information reflect a common-source bias. Therefore, it is possible that they were more efficient at managing information technology than the average companies in their respective industry sectors.
  
- The theoretical model (Figure 1.1) clearly shows interdependent between all of the variables. Our empirical results suggest that there exists a relationship between the use of information technology and some of the organisational characteristics, but the direction of causality remain unexplained. Therefore, the results in this study should be treated with great care.
  
- Because this study has been carried out at one point in time and not over an extended period of time, it is considered to be cross-sectional in nature, based only on information about what was going on at the time of the study. Therefore, the study could not capture the real dynamic nature of information technology in business organisations. Many interesting issues such as how organisations actually use information technology might be excluded.
  
- The impact of information technology on the management processes was not covered in the study. This is due to the fact that many organisations in Saudi Arabia are not familiar with this new issue therefore meaningful results will not

be obtained. The effect of using information technology on management processes is still under extensive research in the developed world in order to reach consolidated conclusions. Therefore, it is very important to consider carrying out future research on this topic in the developing countries such as Saudi Arabia.

- Another limitation of this study is the use of mail questionnaires. Some researchers argue that using questionnaires lead to some disadvantages in collecting the necessary data for studies such as this one. Different methods such as the case study should be used instead. The case study allows the researcher to perceive the actual impacts of information technology to a wider and greater extent.

Even though the study had the above limitations, the research has been successfully executed and provided new understanding of the impact of information technology on business organisations in Saudi Arabia. As discussed in the earlier chapters, assessing the real impacts of using information technology is a complex issue and to increase our understanding of the real effects of such technology, studies such as this research are extremely necessary in developing countries such as Saudi Arabia.

## **7.2 Main Findings of the Study**

Several important findings of relevance to information technology practitioners and academics can be drawn from this study. Based on both the theoretical framework presented in Figure 1.2 and model of the organisation presented in Figure 1.1, this

section will report firstly the study's main findings that are related to the impact perspective. The second part of the section will provide the main findings related to the implementation perspective. Finally, other major results obtained in this study will be summarised in the third part of this section.

### **7.2.1 The Impact Perspective**

As discussed in Chapter One, the organisation's components are interdependent and change in any one may result in compensatory change in others. The dynamic relationships among the five elements of the organisation (Figure 1.1) and the way in which they may interact with each other have not been explored here. This research focuses only on the impact of information technology on three components of the organisation: strategy, structure, and people separately, and the main findings are as follow:

#### **7.2.1.1 Strategy**

The main findings related to the strategy component are:

- *The empirical evidence which was obtained in this study suggests that information technology utilisation is expected to have positive impacts on the strategy of business organisations in Saudi Arabia.*
  
- This study provides insight into the relationship between the use of information technology and growth. The study suggests that a positive relationship exist between information technology usage and business growth in organisations operating in the Saudi private sector. The data suggests that organisations with high usage of information technology have a higher business growth rate than organisations with low usage of information technology.

- Top managers in the Saudi private sector believe that information technology usage within organisations in Saudi Arabia can help to improve productivity and expected to increase profitability.
  
- It appears that information technology adoption by organisations in the Saudi private sector is mainly driven by several important motives. The current study finds that respondents believe that the use of information technology can help companies to grow, provide better service for customers, assist top managers and executives in performing their jobs, and expected to improve the organisation's strategic position against its competitors.
  
- The current study suggests that the overall effects of using information technology is dependent on how individual firms use it and how this usage affect their subsequent performance. The success or failure of an organisation's use of information technology is largely dependent on the capability of the firm's managers at all levels to understand the capabilities of information technology resources and to use them effectively.

#### **7.2.1.2 Structure**

The main findings related to the structure component are:

- The results obtained in this study suggest that the use of information technology is expected to lead many business organisations in Saudi Arabia to change their forms towards smaller and flatter structures.

- The study suggests that the use of information technology in the Saudi private sector is not dependent on the size of the company.
  
- The empirical evidence in this study suggests that the use of information technology by organisations in the Saudi private sector can lead to more formalised communication and procedures in their daily business activities.
  
- The current study finds evidence to support the view that the use of information technology can lead to more decentralised decision-making. The results obtained suggest that a positive relationship exist between information technology usage and decentralisation. Decentralised or highly decentralised firms in Saudi Arabia have higher mean use of information technology than centralised or highly centralised organisations. The evidence also showed that information technology could lead to centralisation and decentralisation at the same time.

### **7.2.1.3 People**

The main findings related to the people component are:

- The study provides evidence to support the hypothesis that the use of information technology in business organisations in Saudi Arabia can help to reduce the total number of the organisations' employees. This is particularly the case regarding unskilled workers. This decline in the number of unskilled workers is associated with more investments in computers and other information technologies that can enable Saudi firms to achieve more power and more productivity.

- The study did not provide evidence to support the view that the use of information technology in business organisations will lead to the elimination of middle management.
  
- Top managers in the Saudi private sector believe that information technology will not be able to create more new jobs and consequently increasing the number of employees in the Saudi private Sector.

### **7.2.2 The Implementation Perspective**

Several insights related to the implementation perspective were found in this research. The following are a summary of the main findings obtained in this perspective:

- Developing an information technology strategy is essential for the successful exploitation of information technology. This study suggests that setting an information technology strategy for the organisation is an important issue and it is not less important than setting other strategies such as marketing, manufacturing, financial, and human resources.
  
- The study suggests that technical problems could cause organisations to lose substantial amounts of money. In order to implement information technology successfully, organisations in the Saudi private sector have to establish hardware and software standards that will control the installation of new hardware and software. This would assist these organisations to ensure compatibility between their information systems and would therefore reduce technical problems.

- Implementing information technology into organisations brings change and that can cause behavioural problems among the organisation's employees. Such problems include the resistance to adapt to or use new information systems. The organisation's management has to act immediately to solve any behavioural problems which arise. The success of information technology in business organisations should not only be measured by its efficiency in terms of minimising time and costs; success should also be measured by the effectiveness of the information technology in supporting and meeting the goals of end users and their work groups and organisations.
  
- The study found evidence to support the hypothesis that resistance to using information technology exists in organisations in the Saudi private sector but this resistance is not strong enough to cause major problems for those organisations. New companies in business have the highest average level of resistance while companies with long time in business have almost no resistance to using information technology.
  
- Language barriers, the presence of unskilled workers, fear of losing a job, technophobia, inadequate education, and lack of training programs are the highest factors contributing to the resistance to using information technology in business organisations in Saudi Arabia.
  
- The involvement and support of top management in the implementation process is a primary step for the successful exploitation of information technology. This study found evidence that organisations working in the Saudi private sector have

the encouragement and full support of their top management in the utilisation of information technology.

- The data obtained in this study showed that a positive relationship exists between training and the use of information technology in business organisations in Saudi Arabia. Information technology utilisation will prosper in organisations which provide their employees with extensive training far more than in organisations with low training levels or which provide no training at all to their employees.

### **7.2.3 Other Major Results**

In addition to the main findings outlined above, the study obtained other major results that could lead to more understanding of the real impact of information technology on organisations in the Saudi private sector. Such results include the following:

- The findings show that organisations working in the oil and industry sector and the finance sector are using advanced information technologies more widely than those working in the other five sectors.
- Non-Saudi managers use information technology facilities more than Saudi managers do in business organisations in the Saudi private sector.
- The study found a negative relationship exists between a manager's use of information technology and his age. In other words, the study noticed a decrease in using information technology the older a manager is.

- Foreign and joint venture companies operating in Saudi Arabia are using computers and other information technology facilities more than Saudi companies.
  
- The current study has found no evidence to support the hypothesis that information technology utilisation within the Saudi private sector is dependent on the age of the company.

### **7.3 Implications for the Saudi Government (Policy Implications)**

As a developing country, Saudi Arabia encounters some barriers to achieving the advantages which come from using information technology. In order to eliminate these difficulties, several actions are recommended here for the Saudi Government in order to increase the use and therefore the benefits of information technology in the kingdom. These recommendations include the following:

- This study suggests that the government should develop and formulate national information policies. A national information policy is very important because it defines the nation's information needs, how to acquire them and what information technology to employ in order to harness its information resources (Zulu, 1994).
  
- Expand and maintain the existing local and national communication infrastructure in order to support more diffusion of information technology. Telephone lines and other communication services should reach houses,

buildings, schools, universities, hospitals, business offices, and should be provided any time, anywhere in the country with reasonable prices.

- Establish regional institutes specialising in information technology education and training. The use of these institutes should be encouraged by the government, public and private organisations. This will lead to the creation of strong base of qualified manpower for the development and diffusion of information technology in Saudi Arabia.
  
- Re-evaluate the existing educational programs related to computer and information technologies at all education levels in the country. The re-evaluation process should result in strong recommendations on how to enhance and improve these educational programs in order to provide the country with well-educated graduates in the fields of computer and other related majors.
  
- Encourage and support research and development (R&D) activities in the country particularly in the field of computer and information technology. Universities, technical colleges, vocational centres, and the private sector should be highly motivated, empowered, and financially supported in this matter.
  
- Establish international links with countries that have had successful experiences in the field of computer and information technologies. Saudi Arabia can imitate such countries to create appropriate plans for its own environment. Countries such as the new developed nations of East Asia (Singapore, Hong Kong, Malaysia, Taiwan, and South Korea) are good examples in this field.

#### **7.4 Directions for Further Research**

A large number of issues were raised in this thesis which require further attention. Recognising that this study has no precedent in Saudi Arabia, being the first of its kind, it is hoped that it will open new avenues for management and information technology researchers in the kingdom to carry out more studies in this important field. Studying the impacts of using information technology in Saudi Arabia is very important and there are numerous opportunities for future research. Possible future research might include the following:

- A study to investigate the impact of information technology on small organisations in the Saudi private sector in order to understand their usage, problems, and needs regarding information technology.
- After adequate adjustment, the methodology used in this study could be applied to study the impact of information technology on the public and governmental sector in Saudi Arabia.
- Longitudinal researches and quantitative approaches are essential and needed to study the impacts of information technology on business organisations. Such studies in Saudi Arabia are clearly required in the future to confirm the cause and effect relationships among the study variables.
- A study to examine the dynamic relationships among the five elements of the organisation (Figure 1.1) and the way in which they may interact with each other.

- Today, the impact of using information technology on management processes is an issue of great concern among academics and business managers in the West, particularly in the US and Europe. Information technology became a primary tool in many organisational activities such as business processes reengineering (BPR) and job redesign. Those functions have gained great significance for today's organisations; therefore, future research in the impact of using information technology on such issues is needed in countries such as Saudi Arabia.
  
- Today, the social impacts of using information technologies are becoming important issues in the field of social sciences. For example, studies about the effects of using computers on children, individuals, and societies are needed and could lead us towards more understanding of the real impact of this important technology.

It is believed that information technology will continue to affect our lives and societies and the impact of this technology will be seen for many years to come. Many researchers have predicted that information technology in the future will shape more the way people, organisations, and markets behave. Today, many articles in the literature are devoted to describing how the computing and communication technologies of the next century will profoundly change our institutions and the way we work. Researchers believe that information technologies of the future will be faster, cheaper, and more easily understood by end users. It is very important for the developing countries such as Saudi Arabia to encourage more adoption and utilisation of information technology and allow such fascinating technology to contribute extensively to the development process.

## BIBLIOGRAPHY

- Abdeen, A. (1984). *The Saudi financial system: In the context of Western and Islamic finance*. Chichester, New York: John Wiley & Sons, Inc.
- Abdul-Gader, A. H. (1990). End-User computing success factors: Further evidence from a developing nation. *Information Resources Management Journal*, 3(1), 2-13.
- Abdul-Gader, A. H. & Kozar, K. A. (1995). The impact of computer alienation on information technology investment decisions: An exploratory cross-national analysis. *MIS Quarterly*, 19(4), 535-559.
- Al-Abdullatif, M. A. (1992, November). Saudi Aramco's metropolitan data network. *Proceedings of the 13th national computer conference (NCC), Riyadh, Saudi Arabia*, 135-148.
- Alarfaj, A. H. (1996). *Acquisitions and mergers in Saudi Arabia: Reasons and effects*. Unpublished Ph.D. Thesis, University of St-Andrews, UK.
- Al-Farsy, F. (1986). *Saudi Arabia: A case study in development*. London: KPI Ltd.
- Al-Farsy, F. (1990). *Modernity and tradition: The Saudi equation*. London: Kegan Paul International Ltd.
- Allen, R. (1997, December 31). Planned rise in Saudi budget deficit attacked. *The Financial Times*, p. 3.
- Allen, T. J., & Scott-Morton, M.S. (1994). *Information technology and the corporation of the 1990s: research studies*. New York, Oxford: Oxford University Press.
- Al-Riyadh. (1998, May 30). *The Internet in the Saudi Market*. Issue No. 10932, page 28. (In Arabic).
- Al-Tasan, M.A. (1992). The role of King Abdulaziz City for Science and Technology in information services in the Kingdom of Saudi Arabia. *Journal of Information Science*, 18(6), 491-495.
- Al-Turki, S., & Tang, N. (1998). Information technology environment in Saudi Arabia. *Proceedings of the Conference on Administrative Sciences: New Horizons and Roles in Development, KFUPM, Dhahran, Saudi Arabia*, 1, 92-126.
- Attewell, P., & Rule, J. (1984). Computing and organizations: What we know and what we don't know. *Communication of the ACM*, 27(12), 1184-1192.
- Babbie, E., & Halley, F. (1995). *Adventures in social research: Data analysis using SPSS for Windows*. London: Pine Forge Press.
- Bahrami, H. (1992). The emerging flexible organization. *California Management Review*, 34(4), 33-52.

- Bakos, J., & Kemerer, C. (1992). Recent applications of economic-theory in information technology research. *Decision Support Systems*, 8(5), 365-386.
- Bancroft, G., & O'Sullivan, G. (1993). *Quantitative methods for accounting and business studies (3<sup>rd</sup> Ed.)*. London: McGraw-Hill Book Company.
- Barua, A., & Lee, B. (1997). The information technology productivity paradox revisited: A theoretical and empirical investigation in the manufacturing sector. *The International Journal of Flexible Manufacturing Systems*, 9, 145-166.
- Barua, A., Ravindran, S., & Whinston, A. (1997). Coordination in Information Exchange Between Organisational Decision Units. *IEEE Transactions on Systems, Man, and Cybernetics-Part A: Systems and Humans*, 27(5), 690-698.
- Baskerville, R., & Smithson S. (1995). Information technology and new organizational forms: Choosing chaos over panaceas. *European Journal of Information Systems*, 4, 66-73.
- Beatty, C. A., & Gordon, J. R. (1988). Barriers to the implementation of CAD CAM systems. *Sloan Management Review*, 29(4), 25-33.
- Bell, D. (1973). *The coming of post-industrial society*. New York: Basic Books.
- Bell, J. (1996). *Doing your research project: A guide for first-time researchers in education and social science*. Buckingham: Open University Press.
- Benjamin, R. I., & Levinson, E. (1993). A framework for managing IT-enabled change. *Sloan Management Review*, 34(4), 23-33.
- Berenson, M. & Levine, D. (1992). *Basic business statistics: Concepts and applications*. Englewood Cliffs, NJ: Prentice Hall Inc.
- Berndt, E., & Morrison, C. (1991). *Assessing the productivity of information technology equipment in U.S. manufacturing industries*. Cambridge, MA: National Bureau of Economic Research.
- Bhattacharjee, A., & Hirschheim, R. (1997). IT and organisational change: Lessons from client/server technology implementation. *Journal of General Management*; 23 (2), 31-46.
- Bird, A., & Lehrman, W. (1993). The effects of major information technology adoption in Japanese corporations. *Japan and The World Economy*, 5, 217-242.
- Blanton, J. E., Watson, H. J., & Moody, J. (1992). Toward a better understanding of information technology organisation: A comparative case study. *MIS Quarterly*, 16(4), 531-555.
- Blili, S., & Raymond, L. (1993). Information technology: Threats opportunities for small and medium-sized enterprises. *International Journal of Information Management*, 13(6), 439-448.

- Boynton, A. C. (1993). Achieving dynamic stability through information technology. *California Management Review*, winter, 35(2), 58-77.
- Breath, C., & Ives, B. (1986). Competitive information-systems in support of pricing. *MIS Quarterly*, 10(1), 85-96.
- Bryman, A. (1989). *Research methods and organization studies*. London: Unwin Hyman.
- Brynjolfsson, E. (1993). The productivity paradox of information technology. *Communications of the ACM*, 36(12), 67-77.
- Brynjolfsson, E. (1994). Information assets, technology, and organization. *Management Science*, 40, 12, 1645-1662.
- Brynjolfsson, E., Malone, T., Gurbaxani, V., & Kambil, A. (1994). Does information technology leads to smaller firms. *Management Science*, 40(12), 1628-1644.
- Buchanan, D., & Boddy, D. (1983). Advanced technology and the quality of working life: The effects of computerized controls on biscuit-making operators. *Journal of Occupational Psychology*, 56, 109-119.
- Business Monitor International. (1995). *Saudi Arabia 1995-97: Annual report on government, economy, the business environment and industry, with forecast through end-1997*. London: Business Monitor International Ltd.
- Business Week. (1993, April 12). pp. 15-19.
- Business Week. (1994, May 9). *The pain of downsizing*. pp. 60-69.
- Carroll, G. R. (1994). Organizations... The smaller they get. *California Management Review*, 37(1), 28-41.
- Carroll, T. (1997). A strategy for empowerment: The role of midwives in computer systems implementation. *Computer Methods and Programs in Biomedicine*, 54, 101-113.
- Carter, N. M. (1984). Computerization as a predominant technology: Its influence on the structure of newspaper organizations. *Academy Management Journal*, 27(2), 247-270.
- Carter, R. (1989). *Students' guide to information technology*. Oxford Heinemann Newnes.
- Carter, R. (1991). *Information technology: made simple*. Oxford: Butterworth-Heinemann.
- Chandler, A. (1962). *Strategy and structure: chapters in the history of industrial enterprise*. Cambridge, MA: MIT Press.

- Child, J. (1984). New technology and development in management organization. *OMEGA*, 12, 3, 211-223.
- Child, J. (1987). Information technology, organization, and the response to strategic challenges. *California Management Review*, Fall, 30(1), 33-50.
- Clegg, C., Axtell, C., Leela, D., Barbara, F., Hull, R., Lloyed-Jones, R., Nicholls, J., Reg, S., & Tomlinson, C. (1997). Information technology: A study of performance and the role of human and organizational factors. *Ergonomics*, 40(9), 851-871.
- Clover, V., & Balsley, H. (1984). *Business research methods* (3<sup>rd</sup> Ed.). Grid.
- Computer News Middle East (1996, May). *Networking technology in Saudi Arabia*.
- Cooper, D., & Emory, C. (1995). *Business research methods* (5th ed.). Chicago: Irwin.
- Cooper, R., & Zmud, R. (1990). Information technology implementation research: A technological diffusion approach. *Management Science*, 36(2), 123-139.
- Crane, D. J. (1997). How the Web is changing the business of business information. *The Electronic Library*, 15(4), 311-316.
- Culpan, O. (1995). Attitudes of end-users towards information technology in manufacturing and service industries. *Information & Management*, 28, 167-176.
- Currie, W. (1995). *Management strategy for I.T.: An international perspective*. London: Pitman Publishing.
- Curwin, J., & Slater, R. (1988). *Quantitative methods for business decisions* (2<sup>nd</sup> ed.). London: London Van Nostrand Reinhold (International).
- Daft, R. L. (1995). *Organization theory & design*. (5<sup>th</sup> Ed.). St. Paul, MN: West Publishing Company.
- Daft, R. L. (1997). *Management*. Orlando, FL: The Dryden Press.
- Davenport, T. (1994). Saving IT's soul: Human-centred information management. *Harvard Business Review*, March-April, 72(2), 119-131.
- Dawson, P., & McLaughlin, I. (1986). Computer technology and the redefinition of supervision: A study of the effects of computerization on railway freight supervisions. *Journal of Management Studies*, 23, 116-132.
- Dewitt, R. (1998). Firm, industry, and strategy influences on choice of downsizing approach. *Strategic Management Journal*, 19, 59-79.
- Dougherty, D., & Bowman, E. (1995). The effects of organizational downsizing on product innovation. *California Management Review*, 37(4), 28-44.

- Drucker, P. (1988). The coming of the new organization. *Harvard Business Review*, Jan-Feb, 66(1), 45-53.
- Duck, J. D. (1993). Managing change: The art of balancing. *Harvard Business Review*, November-December, 71(6), 109-118.
- Due, R. T. (1995) The knowledge economy. *Information Systems Management*, Summer, 76-78.
- El Magzoub, M., & Alabdulaaly, A. (1992, November). The role of research in the advancement of computer technology in Saudi Arabia. *Proceedings of the 13th national computer conference (NCC), Riyadh, Saudi Arabia*, 73-94.
- El Mallakh, R., & El Mallakh, D. (1982). *Saudi Arabia: Energy, developmental planning, and industrialization*. Washington DC: Heath and Company.
- Emory, W. (1985). *Business research methods*. (3rd Ed.). Illinois: Irwin Inc.
- Evans, P. B., & Wurster, T. S. (1997) Strategy and the new economics of information. *Harvard Business Review*, September- October, 75(5), 71-82.
- Farbey, B., Land, F. & Targett, D. (1993) How to assess your *IT investment: a study of methods and practice*. Oxford: Butterworth-Heinemann.
- Farbey, B., Targett, D., & Land, F. (1994). The great IT benefit hunt. *European Management Journal*, 12(3), 270-279.
- Feeny, D. F., & Willcocks, L. P. (1998). Core IS capabilities for exploiting information technology. *Sloan Management Review*, Spring, 39(3), 9-21.
- Fiedler, K., Grover, V., & Teng, J. (1994). An empirical study of information technology enabled business process redesign and corporate competitive strategy. *European Journal of Information Systems*, 4, 17-30.
- Fitzgerald, G. (1998). Evaluating information systems projects: A multidimensional approach. *Journal of Information Technology*, 13, 15-27.
- Foster, L. W., & Flynn, D. M. (1984). Management information technology: Its effects on organizational form and function. *MIS Quarterly*, 8, 229-236.
- Fowler, F. J. (1989). *Survey Research Methods*. Newbury Park, CA: Sage Publications Inc.
- Framel, J. E. (1993). Information Value Management. *Journal of Systems Management*, December, 16-41.
- Frankfort-Nachmias, C. & Nachmias, D. (1996). *Research methods in the social sciences* (5th Ed.). London: Arnold.

- Freeny, D., & Willcocks, L. (1998). Core IS capabilities for exploiting information technology. *Sloan Management Review*, Spring, VOLUME, 9-21.
- Frenzel, C. W. (1992). *Management of information technology*. Boston, MA: Boyd & Fraser.
- Galbraith, J. R. (1977). *Organizational design*. Reading, MA: Addison-Wesley Publishing Company.
- Galliers, R., Merali, Y., & Spearing, L. (1994). Coping with information technology? How British executives perceive the key information systems management issues in the mid-1990s. *Journal of Information Technology*, 9, 223-238.
- George, J. F., & King, J. L. (1991). Examining the Computing and Centralisation Debate. *Communication of the ACM*, 34(7), 63-72.
- Gibson, C. & Nolan, R. (1974). Managing the four stages of EDP growth. *Harvard Business Review*, 52(1), 76-88.
- Green, S. B., Salkind, N. J. & Akey, T. M. (1997). *Using SPSS for Windows: Analyzing and understanding data*. Upper Saddle River, NJ: Prentice Hall.
- Gremillion, L. L. (1984). Organization size and information system use: An empirical study. *Journal of Management Information Systems*, 1(2), 4-17.
- Grossi, G. (1990). Promoting Innovation in a big Business. *Long Range Planning*, 23(1), 41-52.
- Grover, V., Teng, J., & Fiedler, K. (1993). Business process re-design: an integrated planning framework. *OMEGA*, 21(4), 1-15.
- Gurbaxani, V., & Whang, S. (1991). The Impact of Information Systems on Organisations and Markets. *Communication of the ACM*, 34(1), 59-73.
- Harris, S. E., & Katz, J. L. (1991). Firm size and the information technology investment intensity of life insurers. *MIS Quarterly*, September, 15(3), 333-352.
- Hitt, L., & Brynjolfsson, E. (1996). Productivity, business profitability, and consumer surplus: Three different measures of information technology value. *MIS Quarterly*, June, 20(2), 121-142.
- Hoffman, G. M. (1994). *The Technology Payoff: How to profit with empowered workers in the information age*. New York, NY: Irwin.
- Howell, D. C. (1992). *Statistical Methods for Psychology* (3rd Ed.). Belmont, CA: Duxbury Press.
- Howell, J. M., & Higgins, C. A. (1990). Champions of technological innovation. *Administrative Science Quarterly*, 35, 317-341.

- Huck, S. W., & Cormier, W. H. (1996). *Reading Statistics and Research*. New York, NY: Harper Collins College Publishers.
- Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. (1997). Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, September, 21(3), 279-304.
- Iman, R. & Conover, W. (1989). *Modern Business Statistics*. New York, NY: John Wiley & Sons Inc.
- Ives, B., & Learmonth, G. (1984). The information system as a competitive weapon. *Communications of the ACM*, 27(12), 1193-1201.
- Jellasi, T. (1993). Gaining business from information technology: The case of Otis Elevator, France. *European Management Journal*, 11(1), 62-73.
- Jifri, S., & Meadows, J. (1996). The role of information in the information technology trade between the UK and Saudi Arabia. *Journal of Librarianship and Information Science*, 28(3), 141-147.
- Johany, A., Berne, M. & Mixon, W. (1986). *The Saudi Arabian Economy*. London: Croom Helm Ltd.
- Kanuk, L., & Berenson, C. (1975). Mail surveys and response rates: A literature review. *Journal of Marketing Research*, 12, 440-453.
- Kaplan, R. (1983). Measuring manufacturing performance: A new challenge for management accounting research. *Accounting Review*, October, 58(4), 686-705.
- Keen, P. G. (1981). Information systems and organizational change. *Communications of the ACM*, 24(1), 24-33.
- Keen, P. G. (1984). Planning for successful innovation. In H. J. Otway & M. Peltu (Ed.), *Managerial challenge of new information technology*. London: Butterworths.
- Keen, P. G. (1991). *Shaping the future: Business design through information technology*. Boston, MA: Harvard Business School Press.
- Kelly, G., Watson, R., Galliers, R., & Brancheau, J., (1994). *Key issues in information systems management: An international perspective*. (Research Paper No. 134). Warwick Business School, University of Warwick, UK.
- Kelly, M. R. (1994). Productivity and information technology: The elusive connection. *Management Science*, 40(11), 1406-1425.
- Kettinger, W. J., Grover, V., Guha, S., & Segars, A. H. (1994). Strategic information systems revisited: A study in sustainability and performance. *MIS Quarterly*, March, 18(1), 31-58.

- Kimberly, J. & Evanisko, M. (1981). Organisational innovation: The influence of individual, organisational, and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal*, 24(4), 689-713.
- King, W. R. (1998). IT-Enhanced productivity and profitability. *Information Systems Management, Winter*, 15(1), 64-66.
- Kinney, P. R., & Gray, C. D. (1994). *SPSS for Windows: made simple*. Hove, UK: Lawrence Erlbaum Associate.
- Kraemer, K. & Dedrick J. (1994). Payoffs from investment in information technology: Lessons from the Asia-Pacific region. *World Development*, 22(12), 1921-1931.
- Kraemer, K. (1991). Strategic computing and administrative reform. In C. Dunlop & R. Kling (Ed.), *Computerization and controversy: Value conflicts and social choices* (pp. 167-180). Boston, MA: Academic Press.
- Kvanli, A. H., Guynes, C. S., & Patur, R. J. (1996). *Introduction to business statistics* (4<sup>th</sup> Ed.). St Paul, MN: West Publishing Company.
- Kwon, T. & Zmud, R. (1987). Unifying the fragmented models of information systems implementation. In R. Boland & R. Hirschheim (Ed.), *Information Systems Research*. New York, NY: John Wiley & Sons, Inc.
- Leavitt, H. J. (1965). Applied organizational change in industry: Structural, technological and humanistic approaches. In J.G March (Ed.), *Handbook of Organizations*. Chicago, IL: Rand McNally.
- Leavitt, H. J., & Whisler, T. L. (1958). Management in the 1980s. *Harvard Business Review*, November-December, 36(6), 41-48.
- Lee, B. (1994). *Assessing strategic impacts and business value of information technologies in the manufacturing sector*. Unpublished doctoral thesis, The university of Texas at Austin, USA.
- Lubbe, S., Parker, G., & Hoard, A. (1995). The Profit Impact of IT investment. *Journal of information technology*, 10, 44-51.
- Magal, S. R., & Lewis, C. D. (1995). Determinants of information technology success in small businesses. *Journal of Computer Information Systems*, spring, 35(3), 75-83.
- Malek, M., & Alshoaibi, A. (1998). Information technology in the developing countries: Problems and prospects. *Proceedings of the Conference on Administrative Sciences: New Horizons and Roles in Development*, King Fahad University of Petroleum & Minerals, Dhahran, Saudi Arabia; March 16-18, Vol. I, 81-91.
- Malone, T. W. (1997). Is empowerment just a fad? Control, decision making, and IT. *Sloan Management Review*, Winter, 38(2), 23-35.

- Malone, T., Yates, J. & Benjamin, R. (1987). Electronic Markets and Electronic Hierarchies. *Communication of the ACM*, 30(6), 484-497.
- Malone, T., & Crowston, K. (1994). The interdisciplinary study of coordination. *ACM computing surveys*, 26(1), 87.
- Markus, M., & Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research. *Management Science*, 34(5), 583-598.
- Mayer, A. D. & Sykes, A. M. (1996). *Statistics*. London: Arnold.
- McCosh, A. (1985). The organisation, its aims, and using information technology to achieve them. *Information Technology and Public Policy*, 4(1), 23-35.
- McKersie, R., & Walton, R. (1991). Organizational change. In M. S. Scott Morton (Ed.), *The corporation of the 1990s: Information technology and organizational transformation* (pp. 244-277). New York, NY: Oxford University Press.
- Ministry of Planning (1995). *Achievements of the development plans 1390-1415 (1970-1995)*. Riyadh, Saudi Arabia: Ministry of Planning.
- Ministry of Planning (1996). *The Sixth Development Plan*. Riyadh, Saudi Arabia: Ministry of Planning.
- Minitab (1996). *Minitab Reference Manual: Release 11*. State College, PA: Minitab Inc.
- Mische, M., & Bennis, W. (1996). Reinventing through reengineering: A methodology for enterprisewide transformation. *Information Systems Management, Summer*, 13(3), 58-65.
- Mishra, K. E., Spritzer, G. M., & Mishra, A. K. (1998). Preserving employee moral during downsizing. *Sloan Management Review, winter*, 39(2), 83-95.
- Mitchell, M., & Stone, J. (1992). Union effects on productivity: Evidence from Western U.S. Sawmills. *Industrial and Labor Relations Review*, 46, 135-145.
- Moch, M. K., & Morse, E. V. (1977). Size, centralization and organizational adoption of innovations. *American Sociological Review*, 42, 716-725.
- Mody, A., & Dahlman, C. (1992). Performance and potential of information technology: An international perspective. *World Development*, 20 (12), 1703-1719.
- Molloy, S., & Schwenk, C. (1995). The effects of information technology on strategic decision making. *Journal of Management Studies*, 32(3), 283-311.
- Morone, J. (1989). Strategic Use of Technology. *California Management Review* (31:4), 91-110.

- Morris, T., & Westbrook, R. (1996). Technical innovation and competitive advantage in retail financial services: A case study of change and industry response. *British Journal of Management*, 7, 45-61.
- Moynihan, E. (1993). *Business management and systems analysis*. UK: Alfred Waller Ltd.
- Najjar, M. J. (1995, October). An overview of the Saudi legal system. *Middle East Insight Magazine*. Retrieved October 5, 1996 from the World Wide Web: <http://www.us-saudi-business.org/flegal.html>
- Naylor, J. B., & Williams, J. (1994). The successful use of IT in SMEs on Merseyside. *European Journal of Information Systems*, 3(1), 48-56.
- Newman, J., & Kozar, K. A. (1994). A Multimedia solution to productivity gridlock: A re-engineered jewelry appraisal system at Zale corporation. *MIS Quarterly*, March, 18(1), 21-30.
- Nolan, R. L. (1979). Managing the crises in data processing. *Harvard Business Review*, 57(2), 115-126.
- Norusis, M. (1993). *SPSS for windows professional statistics, Release 6.0*. Chicago, IL: SPSS Inc.
- Norusis, M. (1997). *SPSS 7.5 guide to data analysis*. Upper Saddle River, NJ: Prentice Hall.
- Nunnally, J. (1978). *Psychometric theory*. New York, NY: McGraw Hill.
- O'Brien, J. A. (1996). *Management information systems: Managing information technology in the networked enterprise (3<sup>rd</sup> Ed.)*. Chicago, IL: Irwin.
- O'Sullivan, E. (1989). Noose closes on software pirates. *Meed*, 33(10), 8.
- Osterman, P. (1986). The impact of computers on employment of clerks and managers. *Industrial and labor Relations Review*, 39(2), 175-186.
- Osterman, P. (1991). The impact of IT on jobs and skills. In M. S. Scott Morton (Ed.), *The corporation of the 1990s: Information technology and organizational transformation* (pp. 220-243). New York, NY: Oxford University Press.
- Panko, R. R. (1991). Is office productivity stagnant?. *MIS Quarterly*, June, 15(2), 191-203.
- Peppard, J. (1993). *IT strategy for business*. London: Pitman.
- Pinsonneault, A., & Kraemer, K. (1997). Middle management downsizing: An empirical investigation of the impact of information technology. *Management Science*, 43(5), 659-679.

- Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage. *Harvard Business Review*, July-August, 63(4), 149-160.
- Presley, J. R. (1984). *A guide to the Saudi Arabian economy*. London: Macmillan.
- Rashid, N., & Shaheen, E. (1992). *Saudi Arabia and the Gulf War*. Missouri: International Institute of Technology Inc.
- Raymond, L., Bergeron, F., Gingras, L., & Rivard, S. (1989). Specific problems in the computerization of S.M.E.s: Case studies. Presented at 16<sup>th</sup> International small Business Congress, Sao Paulo, 22-25 October.
- Raymond, L., Pare, G., & Bergeron, F. (1995). Matching information technology and organizational structure: An empirical study with implications for performance. *European Journal of Information Systems*, 4(1), 3-16.
- Reich, B. & Benbasat, I. (1996). Measuring the linkage between business and information technology objectives. *MIS Quarterly*, March, 20(1), 55-81.
- Roach, S. S. (1989). America's white-collar productivity dilemma. *Manufacturing Engineering*, August, 104.
- Robey, D., & Azevedo, A. (1994). Cultural analysis of the organizational consequences of information technology. *Accounting, Management & Information Technology*, 4(1), 23-37.
- Robson, W. (1993) *Strategic management and information systems*. London: Pitman
- Rockart, J. F. & Scott Morton, M. S. (1984). Implications of changes in information technology for corporate strategy. *Interface*, 14(1), 84-95.
- Rockart, J., Earl, M., & Ross, J. (1996). Eight imperatives for the new IT organization. *Sloan Management Review*, Fall, 43-55.
- Rogers, E. M. (1983). *Diffusion of innovations* (3<sup>rd</sup> Ed.). New York, NY: The Free Press.
- Roscoe, J. T. (1975). *Fundamental research statistics for the behavioural sciences* (2nd Ed.). New York, NY: Holt, Rinehart and Winston.
- Rowe, C., & Herbert, B. (1990). IT in the boardroom: the growth of computer awareness among chief executives. *Journal of General Management*, 15(4), 32-44.
- Ruhli, E., & Sauter-Sachs, S. (1993). Towards an integrated concept of management efficiency. *Management International Review*, 33(4), 295-313.
- SAMA. (1995). *Money and banking statistics*. Riyadh, Saudi Arabia: The Saudi Arabian monetary agency.
- SAMA. (1996). *Thirty-second annual report*. Riyadh, Saudi Arabia: The Saudi Arabian monetary agency.

- SAMA. (1997). *The annual report 1997-1418h*. Riyadh, Saudi Arabia: The Saudi Arabian monetary agency.
- Sankar, B. Y. (1991). Implementing information technology: A managerial audit for planning change. *Journal of Systems Management*, November, 42(11), 32-37.
- Scott Morton, M. (1991). *The corporation of the 1990s: Information technology and organizational transformation*. New York: Oxford University Press.
- Scott Morton, M. (1995). Emerging organizational forms: Work and organisation in the 21st century. *European Management Journal*, 13(4), 339-345.
- Segars, A., & Grover, V. (1996). Designing company-wide information systems: Risk factors and coping strategies. *Long Range Planning*, 29(3), 381-392.
- Sekaran, U. (1992). *Research Methods for Business* (2nd Ed.). New York, NY: John Wiley & Sons, Inc.
- Shash, A., & Al-Amir, M. (1997). Information technology in contractors' firms in Saudi Arabia. *Construction Management and Economics*, 15, 187-200.
- Shaul, D. R. (1964). What's really ahead for middle management. *Personnel*; Nov-Dec, 8-17.
- Siddiqui, M. A. (1997). The use of information technology in academic libraries in Saudi Arabia. *Journal of Librarianship and Information Science*, 29(4), 195-203.
- Solow, R. M. (1987, July 12). We'd better watch out. *New York Times*, p. 36.
- SPSS. (1996). *SPSS user guide: SPSS base 7.0 for windows*. Chicago, IL: SPSS Inc.
- Stebbins, M., Sena, J., & Shani, A. (1995). Information technology and organization design. *Journal of Information Technology*, 10, 101-113.
- Steiner, T. D. & Teixeira, D. B. (1990). *Technology in banking*. New York, NY: Dow Jones Irwin.
- Stewart, T.A. (1994, July 11). Managing in a wired company. *Fortune*, 44-56.
- Taylor, S., & Todd, P. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Teng, J. & Calhoun, K. (1996). Organizational computing as a facilitator of operational and managerial decision making: An exploratory study of managers' perceptions. *Decision Science*, 27 (4), 673-710.
- Thomas, R. (1997). *Quantitative methods for business studies*. London: Prentice Hall Europe.

- Thong, J., & Yap, C. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *OMEGA*, 23(4), 429-442.
- Tom, P. L. (1991). *Managing information as a corporate resource*. New York, NY: Harper Collins Publishers.
- Tomaska, R. (1987). *Downsizing: Reshaping the corporation of the future*. New York, NY: American Management Association.
- Turban, E., Mclean, E., & Wetherbe, J. (1996). *Information technology for management: Improving quality and productivity*. New York, NY: John Wiley & Sons, Inc.
- Udo, G. & Guimaraes, T. (1994). Empirically assessing factors related to DSS benefits. *European Journal of Information Systems*, 3(3) 218-227.
- Venkatraman, N., Henderson, J., & Oldach, S. (1993). Continuous strategic alignment: Exploiting information technology capabilities for competitive success. *European Management Journal*, 11(2), 139-149.
- Vogt, W. P. (1993). *Dictionary of statistics and methodology: A non technical guide for the social sciences*. Newbury Park, CA: Sage Publications Inc.
- Vollmann, T., & Brazaz, M. (1993). Downsizing. *European Management Journal*, 11(1), 18-29.
- Walters, P., & Samiee, S. (1990). A Model for assessing performance in small U.S. exporting firms. *Entrepreneurship Theory and Practice*, 15 (2), 33-50.
- Watanabe, K., & Arao, Y. (1995). Omron's creative information system. *Long Range Planning*, 28(2), 39-48.
- Weiss, A., & Birnbaum, P. (1989) Technological infrastructure and the implementation of technological strategies. *Management Science*, 35(8), 1014-1028.
- Wynne, B., & Otway, H. (1983). Information technology, power and managers. *Office, Technology, and People*, 2, 43-56.
- Yap, C. S. (1986). *Information technology in organisations in the service sector*. Unpublished Ph.D. Thesis, University of Cambridge, UK.
- Zuboff, S. (1988). *In the age of the smart machine*. New York, NY: Basic Books.
- Zulu, S. (1994). Africa's survival plan for meeting the challenges of information technology in the 1990s and beyond. *Libri*, 44(1), 77-94.

## APPENDIX A

### THE QUESTIONNAIRE COVERING LETTER (IN ENGLISH)

KINGDOM OF SAUDI ARABIA

Ministry of Higher Education

KING FAISAL UNIVERSITY



المملكة العربية السعودية  
وزارة التعليم العالي  
جامعة الملك فيصل

February/22/1997

Dear Sir

Information technology is of growing significance in economic activity throughout the world and is already an important component in the operation of many organisations. Information technology refers to the developed and advanced technology which uses microprocessor based machines: microcomputers, automated machines, telecommunication equipment to collect, process, store, generate, disseminate, rearrange and exploit information.

I am carrying out a Ph.D. study at University of St. Andrews, UK, under the supervision of Prof. Mo Malek. The research studies the impact of information technology on organisations in the Saudi private sector. As one of the top 500 companies in Saudi Arabia for the year 1996, it is very important for me to know your views regarding the impact of information technology. Results from the study will yield valuable information to researchers in this field and individual organisations such as your own. I am writing to ask for your co-operation with this work. In particular, I would be most grateful if you would complete the enclosed questionnaire and return it to me in the enclosed envelope. It is very important for my study that all questionnaires are returned, since my sample has been selected to be representative. I would therefore be most grateful for your response.

I would like to assure you that all data and information provided would be treated with the utmost secrecy and they will be used only for the purpose of this scientific study.

Thank you for your assistance.

Yours sincerely,

Ahmed Alshoabi

3  
3  
3

الرياض ☎ ١١٨٢ - توكس ٦٧٠٠٢٠ لاهل اس جي - ☎ ٣٧٧٠٠٠  
Dammam ☎ 1982 Telex 670020 Faisal S.J. ☎ 8577000

الاحساء ☎ ١٠٠ - توكس ٦١١٠٢٨ لاهل اس جي - ☎ ٥٨٠٠٠٠٠  
Al-Ahsa ☎ 400 Telex 661028 Faisal S.J. ☎ 5800000

الرقم: \_\_\_\_\_  
التاريخ: \_\_\_\_\_  
No. \_\_\_\_\_  
Date \_\_\_\_\_



**APPENDIX C**  
**LETTER FROM THE SAUDI CULTURAL ATTACHÉ**  
**IN THE UNITED KINGDOM**

Royal Embassy of  
Saudi Arabia  
London

SAUDI ARABIAN CULTURAL BUREAU  
29 BELGRAVE SQUARE  
LONDON SW1X 8QB

Telephone: 0171-245 9944/5467  
Cable Address: ELMIAH LONDON, S. W. 1  
Telex: 299909 ELMIAH G  
Fax: 0171 245 9895



المملكة العربية السعودية  
وزارة التعليم العالي  
مكتب الملحقة الثقافية في بريطانيا

الرقم:

التاريخ:

المرفقات:

Our Ref: AN/AB/SB/F107

Date : 13/01/1997

**TO WHOM IT MAY CONCERN**

**Re: Mr. Ahmad A Al-Shoaibi (Ref: F99)**

This is to confirm that the above mentioned student is a Saudi government scholarship holder studying for PhD in Management at the University of St. Adrews as from April 1995.

As an integral part of his dissertation "The Impact of Information Technology on Organization: The Case of the Saudi Private Sector", Mr. Al-Shoaibi is coming in a field trip to Saudi Arabia to collect the relevant data.

This letter was issued according to his wish to present at different companies in Saudi Arabia.

  
ABDULLAH M. AL-NASSER  
CULTURAL ATTACHE

PS: Please quote our reference number in all correspondence.

APPENDIX D

LETTER FROM THE SAUDI CULTURAL ATTACHÉ  
IN THE UNITED KINGDOM (IN ARABIC)

Royal Embassy of  
Saudi Arabia  
London

SAUDI ARABIAN CULTURAL BUREAU  
29 BELGRAVE SQUARE  
LONDON SW1X 8QB

Telephone: 0171-245 9944/5/6/7  
Cable Address: ELMIAH LONDON, S. W. 1  
Telex: 299999 ELMIAH G  
Fax: 0171 245 9895

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



المملكة العربية السعودية

وزارة التعليم العالي

مكتب الملحقة الثقافية في بريطانيا

الرقم: ١٥  
التاريخ: ١٤١٧/٩/٦  
المرفقات:

الموضوع: الموافقة على لرحلة العلمية

الأكاديمية: F99

المحترم

الأخ الكريم المبتعث/ أحمد عبدالله الشعبي

السلام عليكم ورحمة الله وبركاته.. وبعد،

إشارة إلى خطابك المؤرخ في ١٨/٩/١٩٩٦م المتضمن طلبك الموافقة على قيامك برحلة علمية للمملكة لجمع المادة الخاصة بدراستك.

نود لفادتك بأننا رفعنا طلبك لجامعة الملك فيصل ووردنا قرار معالي مدير الجامعة رقم ٣٢/٤٣٦/أ وتاريخ ٢٠/٨/١٤١٧هـ القاضي بالموافقة على قيامك بالرحلة العلمية للمملكة لمدة ثلاثة أشهر إعتباراً من ١٥/٢/١٩٩٧م.

مع تمنياتنا بالتوفيق...

الملحق الثقافي في بريطانيا  
عبد الله بن محمد الناصر

١٤  
٩/٦

**APPENDIX E**  
**THE MAILED QUESTIONNAIRE**

**Part One: Personal & Educational and Professional Background**

الجزء الأول: المعلومات الشخصية & الخلفية التعليمية ، والمهنية

(الرجاء وضع دائرة حول رقم الإجابة الوحيدة التي تختارها) (PLEASE CIRCLE ONE)

1. Your Age: العمر: ١-

Less than 25 Years أقل من ٢٥ سنة	25 - 35 Years ٢٥ - ٣٥ سنة	36 - 45 Years ٣٦ - ٤٥ سنة	46 - 55 Years ٤٦ - ٥٥ سنة	Over 55 Years أكبر من ٥٥ سنة
1	2	3	4	5

2. Your nationality is: الجنسية: ٢-

Saudi سعودي	Non-Saudi غير سعودي
1	2

3. The highest degree you are holding is: آخر مؤهل علمي حصلت عليه هو: ٣-

Less than Bachelor أقل من البكالوريوس	Bachelor بكالوريوس	Master ماجستير	Ph.D. دكتوراه	Other* أخرى*
1	2	3	4	5
*Other (Please specify) _____ * أخرى (أرجو ذكرها)				

4. Your field of study is: مجال دراستك هو: ٤-

Computer حاسب آلي	Engineering هندسة	Business / Management إدارة أعمال	Accounting محاسبة	Other* أخرى*
1	2	3	4	5
*Other (Please specify) _____ * أخرى (أرجو ذكرها)				

5. To what extent do you personally use computers and other information technology facilities in the performance of your job?  
 ٥- إلى أي مدى تقوم شخصيا باستخدام الكمبيوتر ووسائل تكنولوجيا المعلومات الأخرى في أداء عملك؟

Don't Use at All لا أستخدمة على الإطلاق	Very Little Use نادرا ما أستخدمة	Use Sometimes أستخدمة أحيانا	Most Of Time أستخدمة غالبا	Use Always أستخدمة دائما
1	2	3	4	5

6. What is the managerial level of your position?  
 ٦- ما هو المستوى الإداري لوظيفتك؟

Top Management إدارة عليا	Middle Management إدارة وسطى	Lower Management إدارة دنيا
1	2	3

## Part Two: The Organisation

## الجزء الثاني: المنظمة:

(PLEASE CIRCLE ONE) (الرجاء وضع دائرة حول رقم الإجابة الوحيدة التي تختارها)

7. Which of the following sectors best describes the major business activities at your organisation?  
 ٧- ضمن أي من القطاعات التالية يمكن أن تصنف النشاط الرئيسي لمنشأتكم؟

Agriculture	قطاع الزراعة	1
Contracting	قطاع المقاولات	2
Finance	القطاع المالي	3
Oil & Industry	قطاع النفط والصناعة	4
Services	قطاع الخدمات	5
Trading	القطاع التجاري	6
Diversified	متعددة الأنشطة	7
Other*	أخرى*	8
*Other (Please specify) _____		* أخرى (أرجو ذكرها)

8. Type of the organisation ownership:

٨- ملكية المنشأة :

Saudi 100% سعودية ١٠٠%	Foreigner 100% أجنبية ١٠٠%	Joint venture مشتركة
1	2	3

9. How old is your organisation in this business?

٩- كم سنة مضت على المنشأة وهي تعمل في هذا المجال ؟

Less than 5 years أقل من ٥ سنوات	5 – 10 Years من ٥ إلى ١٠ سنوات	11 – 15 Years من ١١ إلى ١٥ سنة	16 – 20 years من ١٦ إلى ٢٠ سنة	More than 20 years أكثر من ٢٠ سنة
1	2	3	4	5

10. How many people are employed at your organisation?

١٠- كم عدد الموظفين في منشأتكم ؟

Less than 20 أقل من ٢٠ موظف	Between 20-50 ما بين ٢٠ - ٥٠ موظف	Between 51 – 100 ما بين ٥١ - ١٠٠ موظف	Between 101 – 500 ما بين ١٠١ - ٥٠٠ موظف	Between 501 – 1000 ما بين ٥٠١ - ١٠٠٠ موظف	More than 1000 أكثر من ١٠٠٠ موظف
1	2	3	4	5	6

11. How would you describe the growth of the business activities at your organisation over the last three years?

١١- كيف يمكنك أن تصف نمو أعمال منشأتكم خلال السنوات الثلاث الماضية ؟

Large Contraction انكماش كبير	Small Contraction انكماش بسيط	About The Same لا يوجد فرق	Small Expansion توسع بسيط	Large Expansion توسع كبير
1	2	3	4	5

12. The market your organisation operating in is:

١٢- كيف يمكنك أن تصف تنافسية السوق الذي تعمل فيه منشأتكم ؟

Totally Not Competitive سوق عديمة التنافس	Limited Competition سوق محدودة التنافس	Competitive سوق تنافسية	Highly Competitive سوق عالية التنافس	Very highly Competitive سوق شديدة التنافس
1	2	3	4	5

13- How heavy your firm uses information technology?

١٣- مامدى وكثافة استخدام منشأتكم لوسائل تكنولوجيا المعلومات ؟

Very Limited Use استخدام محدود جدا	Limited Use استخدام محدود	Moderate Use استخدام متوسط	High Use استخدام عالي	Very Heavy Use استخدام كثيف جدا
1	2	3	4	5

14. How do you describe the decision making process in your organisation?

١٤- كيف يمكنك أن تصف عملية اتخاذ القرارات في منشأتكم ؟

Highly Decentralised غير مركزية للغاية	Decentralised غير مركزية	Neutral لا أدري	Centralised مركزية	Highly Centralised مركزية للغاية
1	2	3	4	5

**Part Three: Use and Impact of Information Technology:**

الجزء الثالث: استخدام وتأثير تكنولوجيا المعلومات:

**(PLEASE CIRCLE ONE)** (الرجاء وضع دائرة حول رقم الإجابة الوحيدة التي تختارها)

15. Do you use computers and other information technology facilities at your organisation?

١٥- هل تستخدمون الكمبيوتر ووسائل تكنولوجيا المعلومات في منشآتكم ؟

Yes نعم	No لا
1	2

**If NO, Please go to question no. 18**

إذا كانت إجابتك لا , فأرجو الانتقال إلى سؤال ١٨

16. When was a computer first used at your organisation?

١٦- متى أستخدم الكمبيوتر لأول مرة في منشآتكم ؟

Earlier Than 1980 قبل عام ١٩٨٠	Between 1980 and 1990 بين عامي ١٩٩٠-١٩٨٠	Between 1991 and 1995 بين عامي ١٩٩١-١٩٩٥	Less than 2 Years ago خلال الأسنتين الماضيتين
1	2	3	4

17. Is there a department/section for computer or information technology at your organisation?

١٧- هل توجد إدارة/قسم للكمبيوتر أو تكنولوجيا المعلومات في منشآتكم ؟

Yes نعم	No لا
1	2

18. If computers are not in use yet, when do you expect your organisation to start using them ?

١٨- إذا لم يستخدم الكمبيوتر في منشآتكم بعد ، فما هو الزمن المتوقع لإدخاله ؟

Within 3 months خلال ثلاثة أشهر من الآن	Between 4Months and 1Year ما بين ٤ أشهر إلى سنة واحدة	1 - 3 Years ما بين سنة إلى ٣ سنوات	3 - 5 Years ما بين ٣ إلى ٥ سنوات	No intention لا توجد نية لاستخدامه
1	2	3	4	5

19. Please indicate whether the following facilities are available at your organisation, if so, how heavily they are used?

١٩- أرجو توضيح ما إذا كانت الوسائل والتجهيزات التالية متوفرة في منشأتكم، وإذا كانت كذلك، فما هي درجة أو كثافة استخدامها؟

Not Available	Very Limited Use	Limited Use	Moderate Use	High Use	Very Heavy Use
غير موجود	استخدام محدود جدا	استخدام محدود	استخدام متوسط	استخدام عالي	استخدام كثيف جدا
0	1	2	3	4	5

بالاعتماد على الأوزان المعطاة لدرجات الاستخدام بالجدول أعلاه ، أختار مستوى استخدام كلا من الوسائل والتجهيزات التالية :

Telephone	الهاتف	0	1	2	3	4	5
Facsimile	الفاكس	0	1	2	3	4	5
Telex	التلكس	0	1	2	3	4	5
Mainframe Computers	أجهزة الكمبيوتر الكبيرة	0	1	2	3	4	5
Personal Computers (PC)	أجهزة الكمبيوتر الشخصية	0	1	2	3	4	5
Local Area Networks (LAN)	الشبكات المحلية	0	1	2	3	4	5
Word Processors	معالج الكلمات	0	1	2	3	4	5
Microfilm / Microfiche	الميكروفيلم/الميكروفيش	0	1	2	3	4	5
Computerised Production Systems	نظم الإنتاج الإلكترونية	0	1	2	3	4	5
Computer Aided Design (CAD)	التصميم بالحاسب الآلي	0	1	2	3	4	5
Computer Aided Manufacturing (CAM)	التصنيع بالحاسب الآلي	0	1	2	3	4	5
Expert Systems	نظم الخبراء	0	1	2	3	4	5
Factory Automation (Robotics)	أتمتة المصانع (الإنسان الآلي)	0	1	2	3	4	5
GSM Mobile Telephones	أجهزة الهاتف الجوال	0	1	2	3	4	5
Paging Systems	أجهزة النداء الآلي (البيجر)	0	1	2	3	4	5
Electronic Mail	البريد الإلكتروني	0	1	2	3	4	5
The Internet	شبكة الإنترنت	0	1	2	3	4	5
- Other (Please Specify)	- أخرى (أرجو ذكرها)						
1- _____		1	2	3	4	5	
2- _____		1	2	3	4	5	
3- _____		1	2	3	4	5	

20. Please indicate whether the following software packages for supporting and decision making are available at your organisation, if so, how heavily they are used?  
 ٢٠- أرجو توضيح ما إذا كانت البرامج التالية والتي تساعد على التحليل واتخاذ القرارات متوفرة في منشأتكم، وإذا كانت كذلك، فما هي درجة أو كثافة استخدامها؟

Not Available غير موجود	Very Limited Use استخدام محدود جداً	Limited Use استخدام محدود	Moderate Use استخدام متوسط	High Use استخدام عالي	Very Heavy Use استخدام كثيف جداً
0	1	2	3	4	5

(PLEASE CIRCLE ONE) (أرجو وضع دائرة حول رقم الإجابة الوحيدة التي تختارها)

- Spreadsheets	- الصفحات الإلكترونية	0	1	2	3	4	5
- Databases	- قواعد البيانات	0	1	2	3	4	5
- Managerial Software	- برامج إدارية	0	1	2	3	4	5
- Accounting Software	- برامج محاسبية	0	1	2	3	4	5
- Statistical and Analysis Software	- برامج إحصائية وتحليلية	0	1	2	3	4	5
- Other ( Please indicate)	- أخرى (أرجو ذكرها)						
1- _____			1	2	3	4	5
2- _____			1	2	3	4	5
3- _____			1	2	3	4	5
4- _____			1	2	3	4	5
5- _____			1	2	3	4	5

21. To what extent do you agree that introducing computers and other information technologies proved to be useful for your organisation?  
 ٢١- إلى أي مدى توافق على أن إدخال الكمبيوتر وتكنولوجيا المعلومات قد أثبت فائدته لمنشأتكم؟

Completely not Useful ليست له فائدة مطلقاً	Not Useful عديم الفائدة	Neutral لا أدري	Useful مفيد	Highly Useful مفيد للغاية
1	2	3	4	5

22. What is the attitude of your top management towards the utilisation and implementation of information technology in your organisation?  
 ٢٢- ما هو اتجاه الإدارة العليا لديكم نحو استخدام وتطبيق تكنولوجيا المعلومات في منشأتكم؟

Strongly Discouraging غير مشجع إطلاقاً	Discouraging غير مشجع	Neutral لا أدري	Encouraging مشجع	Strongly Encouraging مشجع جداً
1	2	3	4	5

23. You use computers and other information technology facilities for:

٢٣- تستخدم أجهزة الكمبيوتر وتكنولوجيا المعلومات لديكم في :

Information Technology Usage استخدام تكنولوجيا المعلومات	Yes نعم	No لا
Payroll - الرواتب	1	2
Billing - الفواتير	1	2
Credit/Debit Accounts - حسابات العملاء	1	2
Word Processing (writing letters & business reports) - معالج الكلمات (كتابة خطابات، تقارير)	1	2
Pricing - التسعير	1	2
Cash Control - مراقبة النقدية	1	2
Financial Planning - التخطيط المالي	1	2
Sales Analysis - تحليل المبيعات	1	2
Stock Control - مراقبة المخزون	1	2
Personnel Records - لحفظ سجلات العاملين	1	2
Clint Record Base - قاعدة بيانات العملاء	1	2
Project Control - مراقبة المشاريع	1	2
Production Planning - تخطيط الإنتاج	1	2
Drawing and Designing - الرسم والتصميم	1	2
Electronic Mail (E-mail) - البريد الإلكتروني	1	2
Other Uses (Please specify): - استخدامات أخرى (أرجو ذكرها) 1- _____ 2- _____ 3- _____		

24. Out of the total budget, does your organisation allocate an adequate budget for information technology activities?

٢٤- ضمن الميزانية العامة للمنشأة ، هل تقوم منشأتكم بتخصيص ميزانية مناسبة لأعمال وأنشطة تكنولوجيا المعلومات ؟

Yes نعم	No لا
1	2

- إذا كانت الإجابة لا ، فأرجو الانتقال إلى سؤال ٢٦ . If "No", Please go to question 26.

25. What percentage of the company budget is usually allocated to information technology?

٢٥- كم النسبة التي تشكلها مخصصات أنشطة تكنولوجيا المعلومات من الميزانية العامة للمنشأة؟

1% - 5% ١% - ٥%	6% - 10% ٦% - ١٠%	11% - 20% ١١% - ٢٠%	More than 20% أكثر من ٢٠%	Other* أخرى *
1	2	3	4	5
*Other (Please specify) _____ * أخرى ( أرجو ذكرها)				

26. To what extent does your employing organisation provide its employees with training in the utilisation of computers and other information technology facilities?

٢٦- إلى أي مدى تقوم منشأتكم بتوفير برامج التدريب للعاملين في مجال استخدام أجهزة الكمبيوتر ووسائل تكنولوجيا المعلومات الأخرى؟

Provide no training لا تقدم أي تدريب	To a little extent بقدر محدود	To some extent إلى حد ما	To a great extent إلى درجة عالية	To a very great extent إلى درجة عالية جدا
1	2	3	4	5

27. Are you ahead of or behind your main competitors in using advanced information technology?

٢٧- مقارنة بالمنشآت المنافسة لكم ، هل تعتقد بأنكم متقدمون أم متأخرون في استخدام وسائل تكنولوجيا المعلومات؟

Definitely Behind متأخرون بكل تأكيد	Probably Behind متأخرون	About Same Level في نفس المستوى	Probably Ahead متقدمون	Definitely Ahead متقدمون بكل تأكيد
1	2	3	4	5

28. The use of information technology can lead to more formalisation (of communication and procedures).

٢٨- إن استخدام وسائل تكنولوجيا المعلومات يمكن أن يؤدي إلى زيادة الأساليب الرسمية (في الاتصالات والإجراءات).

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لا أدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

٢٩- (أرجو وضع دائرة حول رقم الإجابة الوحيدة التي تختارها) (PLEASE CIRCLE ONE)

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لأدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

The use of computers and other information technologies can lead to:

- إن استخدام أجهزة الكمبيوتر ووسائل تكنولوجيا المعلومات الأخرى يمكن أن يؤدي إلى:

- Can save the company money by reducing labour costs - توفير بعض المال على المنشأة عن طريق تخفيض تكلفة العمالة .	1	2	3	4	5
- Can reduce time for job to be done. - تخفيض الوقت المطلوب لأداء العمل .	1	2	3	4	5
- Allow organisations to provide a better service to customers. - تقديم خدمة أفضل للعملاء .	1	2	3	4	5
- Make the decision making process easier. - تسهيل عملية اتخاذ القرارات .	1	2	3	4	5
- Assist executives/managers to set strategies and future plans. - مساعدة الرؤساء التنفيذيين والمدراء لوضع استراتيجيات المنظمة وخططها المستقبلية.	1	2	3	4	5
- Improve the overall productivity of the organisation. - تحسين الإنتاجية الكلية للمنشأة.	1	2	3	4	5
- Increase profitability. - زيادة الربحية.	1	2	3	4	5
- Increase competitiveness. - زيادة ورفع مستوى المنافسة.	1	2	3	4	5
- Help the company grow. - مساعدة المنشأة على النمو.	1	2	3	4	5
- Reduce the total workforce and eliminate some jobs. - تخفيض عدد العاملين والاستغناء عن بعض الوظائف.	1	2	3	4	5
- Reduce the number of managerial levels therefore smaller and flatter organisation. - تقليل عدد المستويات الإدارية وبالتالي إيجاد منظمة أصغر وأعرض .	1	2	3	4	5

30. The use of information technology can cause the decision making process to become more centralised at the strategic level.

٣٠- استخدام تكنولوجيا المعلومات يمكن أن يجعل عملية اتخاذ القرارات أن تصبح أكثر مركزية في المستويات العليا بالمنظمة خصوصا في الأمور الهامة والإستراتيجية .

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لأدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

31. The use of information technology can cause the decision making process to become more decentralised at the daily routine (executive) level.

٣١- استخدام تكنولوجيا المعلومات يمكن أن يجعل عملية اتخاذ القرارات أن تصبح أكثر لامركزية في المستويات الدنيا (التنفيذية) بالمنظمة خصوصا في الأمور اليومية والروتينية.

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لا أدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

32. The use of computers and other information technology facilities, especially by top managers, can lead to the elimination of some middle management positions such as supervisors.

٣٢- إن استخدام أجهزة الكمبيوتر ووسائل تكنولوجيا المعلومات الأخرى، خصوصا بواسطة المدراء في الإدارة العليا، يمكن أن يؤدي إلى التخلص من بعض وظائف الإدارة الوسطى مثل المشرفين.

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لا أدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

33. The use of computers and other information technology facilities can lead to growth in business, therefore creating more new jobs and increasing the total workforce.

٣٣- إن استخدام أجهزة الكمبيوتر ووسائل تكنولوجيا المعلومات الأخرى يمكن أن يؤدي إلى النمو في حجم العمل وهذا بالتالي يمكن أن يؤدي إلى إيجاد وخلق وظائف جديدة وارتفاع عدد وحجم العمالة.

Strongly Disagree غير موافق بشدة	Disagree غير موافق	Neutral لا أدري	Agree موافق	Strongly Agree موافق بشدة
1	2	3	4	5

34. To what extent do you feel that there is a resistance to use information technology at your organisation?

٣٤- إلى أي مدى تشعر بوجود مقاومة وعدم تقبل لاستخدام تكنولوجيا المعلومات من قبل الموظفين في منشأتكم؟

To no Extent لا توجد مقاومة على الإطلاق	To a little extent مقاومة ضعيفة	To some Extent مقاومة إلى حد ما	To a great extent مقاومة قوية	To a very great extent مقاومة بشكل كبير للغاية
1	2	3	4	5

35. Factors that you believe cause resistance to the use of information technology at your organisation are: ( Please circle, and you can choose more than one factor )  
 ٣٥- الرجاء وضع دائرة حول العامل أو العوامل التي قد تؤدي في اعتقادكم إلى إحداث مقاومة لاستخدام تكنولوجيا المعلومات وتعوق من استخدامها في منشأتكم :

Unskilled Workers	- العمالة غير الماهرة	A
Fear of Loosing Job	- الخوف من فقدان الوظيفة	B
Language Barriers	- عوائق اللغة	C
Technophobia	- الهلع والخوف من التقنية (عقدة التقنية)	D
Lack of Training Programs	- عدم توفر برامج التدريب	E
Inadequate Education	- عدم كفاية وملائمة التعليم لدى العاملين	F
Over-Expectation of Technology	- الإفراط في التوقع من التكنولوجيا	G
High Cost of Purchasing/Maintenance of technology.	- ارتفاع تكلفة شراء وصيانة التكنولوجيا	H
Limited Size of Firm's Operations	- محدودة نشاطات وأعمال المنشأة	I
Lack of Creative Administrative Leadership	- فقدان القيادة الإدارية الخلاقة	J
Other*	- أخرى *	K
*Other (Please specify)	* أخرى (أرجو ذكرها)	

36. Introducing the appropriate information technologies will help to balance shortages of skilled labour in the Saudi organisations.

٣٦- في اعتقادكم هل استخدام أجهزة الكمبيوتر وتكنولوجيا المعلومات الملائمة لطبيعة نشاط المنشأة سيساعد على سد النقص في الأيدي العاملة الماهرة والمدربة في المنظمات السعودية؟

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
غير موافق بشدة	غير موافق	لا أدري	موافق	موافق بشدة
1	2	3	4	5

37. More impact of information technology on the Saudi organisations still ahead in the future.

٣٧- في اعتقادكم هل سيكون لتكنولوجيا المعلومات تأثيرا أكبر على المنظمات السعودية في المستقبل؟

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
غير موافق بشدة	غير موافق	لا أدري	موافق	موافق بشدة
1	2	3	4	5



**APPENDIX F**  
**THE FIRST FOLLOW UP LETTER**

**KINGDOM OF SAUDI ARABIA**  
Ministry of Higher Education  
**KING FAISAL UNIVERSITY**



المملكة العربية السعودية  
وزارة التعليم العالي  
جامعة الملك فيصل

March/1<sup>st</sup>/1997

Dear Sir

Last week I sent you a questionnaire regarding the impact of information technology on Saudi organisations. As I have not heard from you, I wonder whether you require further information before replying to the questionnaire. If so, please do not hesitate to contact me on the following Address:

King Faisal University  
College of Administrative Sciences & Planning  
P.O. Box 1760  
Al-Hofuf 31982  
Tel & Fax (03) 5800215

Thank you for your time and I hope to hear from you soon.

Yours faithfully

Ahmed Alshoaibi

الرقم: _____ التاريخ: _____	الأسماء: ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠	الاسماء: ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠
	الاسماء: ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠	الاسماء: ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠ ٤٠٠ - ٤٠٠ - ٤٠٠

**APPENDIX G**  
**THE SECOND FOLLOW UP LETTER**

**KINGDOM OF SAUDI ARABIA**  
Ministry of Higher Education  
**KING FAISAL UNIVERSITY**



المملكة العربية السعودية  
وزارة التعليم العالي  
جامعة الملك فيصل

March/12/1997

Dear Sir

Three weeks ago, I sent you a questionnaire regarding the impact of using information technology on Saudi organisations. As I have not heard from you since, a new questionnaire is enclosed. Because you are one of the top 500 most successful companies in Saudi Arabia, it is very important for me to know your views regarding this important issue. Therefore, I would appreciate your effort to fill this questionnaire and return it in the enclosed stamped addressed envelope.

Your prompt reply would be appreciated.

Yours faithfully

Ahmed Alshoaibi

الرياض ١١٨٢ - توكس ٦٧٠٠٢ ليهل لس جى - ٨٧٧٠٠٠	الأحساء ١٠٠ - توكس ٦٦١٠٢٨ ليهل لس جى - ٥٨٠٠٠٠٠	No. _____ : الرقم
Dammam 1982 Telex 670020 Faisal S.J. 8577000	AJ - Absa 400 Telex 661028 Faisal S.J. 5800000	Date _____ : التاريخ

**APPENDIX H**  
**THE THIRD FOLLOW UP LETTER**

**KINGDOM OF SAUDI ARABIA**  
Ministry of Higher Education  
**KING FAISAL UNIVERSITY**



المملكة العربية السعودية  
وزارة التعليم العالي  
جامعة الملك فيصل

March/31<sup>st</sup>/1997

Dear Sir

I am surprised and very much regret not to have heard from you in response to the further two letters I sent to you few weeks ago reminding you about returning the questionnaire which was sent to you last month.

Since your company is one of the most successful in Saudi Arabia, it is very important to know your opinions and ideas regarding the impact of information technology on Saudi organisations. Enclosed you will find a new questionnaire with a stamped and self-addressed return envelope. I am very much hoping that you will fill and return this questionnaire as soon as possible. Please treat this matter as one of extreme urgency.

Your prompt reply will be greatly appreciated.

Yours faithfully

Ahmed Alshoaibi

الرياض ٨٥٧٧٠٠٠٠ ☎ ١٩٨٢ - تليكس ٦٧٠٠٢٠ فيصل اس جي - Dammam ☎ 1982 Telex 670020 Faisal S.J. ☎ 8577000	الإحساء ١٠٠٠ - تليكس ٦٦١٠٢٨ فيصل اس جي - Al - Abha ☎ 400 Telex 661028 Faisal S.J. ☎ 5800000	No. _____ : الرقم Date _____ : التاريخ
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