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INFORMATION TECHNOLOGY INVESTMENTS EVALUATION PRACTICES IN THE BANKING SECTOR IN PALESTINE

(INFORMATION TECHNOLOGY MANAGEMENT PERSPECTIVE)

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DISSERTATION

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" ربِ اجعلْ هـذَا الْبلَد ءَامِنا واجنبِني وبِني أَن نعبد الأصنام "

سورة ابراهيم – أية 35

To my father

ABSTRACT

Little is known about the IT investments feasibility evaluation practices in the banking sector in Palestine. This research presents the results of an empirical investigation of IT investment feasibility evaluation practices in the banking industry in Palestine. It sheds light on a number of evaluation issues, including the extent to which formal procedures of evaluation exist within banks, the problems inherent in evaluating IT investments, and the techniques used by banks to evaluate their IT investments.

This research has been conducted as a quantitative one based on a survey inquiry. The target to our survey was all IT managers of the twenty one banks operate in Gaza strip and the West bank. Nineteen of the distributed questionnaires were retrieved and analyzed

In general, the banking sector in Palestine has some sort of formal procedures for evaluating IT investment, and they use a variety of IT investment evaluation techniques. However, closer examination of the formal procedures revealed that these procedures are not precise and detailed ones.

The results also show that there is significant positive correlation between the presence of a written IT strategy and the presence of formal IT investment evaluation procedures, there is a significant positive relation between the presence of formal IT investment evaluation procedures and the success of the implemented IT investments, and there is a significant positive relation between carrying out IT investments evaluation and the success of implemented IT investment. Anyhow, the result did not show a significant positive correlation between the presence of formal IT investment evaluation instructions and carrying out IT investments evaluation

It is recommended that sufficient time, effort, and support from top management should be devoted to IT investment evaluations because it is the most important feeding mechanism, and banks should keep developing and searching for more comprehensive methods that consider broader economic and strategic impacts of their IT investments.

ملخص الدراسة

إن الممارسات المتبعة لدى البنوك الفلسطينية في تقيـيم اسـتثماراتها فـي تكنولوجيـا المعلومات لها اثر كبير على نجاح هذه الاستثمارات و تحقيق المنافع المرجوة منها. يهدف هذا البحث إلى التعرف على هذه الممارسات وذلك بتسليط الضوء على بعض جوانبها والتي شملت: التعرف على الطرق المتبعة في عملية التقييم، وتحديد العقبات التي تواجه عملية التقييم، وهـل تقوم عملية التقييم على أسس ممنهجة ومنظمة أم لا.

وللوصول الى أهداف البحث فقد تم استخدام المنهج الوصفي التحليلي ، حيث تم توزيـع استبانة بأسلوب الحصر الشامل على مدراء وحدة تكنولوجيا المعلومات في المصارف العاملة في قطاع غزة والضفة الغربية والبالغ عددها واحد وعشرون بنكاً. وتم استرداد تسع عشر اسـتبانة أي بنسبة (90.4%) من مجتمع الدراسة، ومن أهم النتائج التي تم التوصل لها:

1. وجود ارتباط ايجابي بين وجود خطة استراتيجية لتكنولوجيا المعلومات لدى البنك ووجود تعليمات ممنهجة لتقييم استثمارات تكنولوجيا المعلومات.
2. وجود ارتباط ايجابي بين وجود تعليمات ممنهجة لتقييم استثمارات تكنولوجيا المعلومـات ونجاح هذه الاستثمارات.
3. وجود ارتباط ايجابي بين القيام بتقييم استثمارات تكنولوجيـا المعلومـات ونجـاح هـذه الاستثمارات.
4. كما لم يثبت وجود ارتباط ايجابي بين وجود تعليمات ممنهجة لتقييم استثمارات تكنولوجيا المعلومات من جانب والقيام بعملية تقييم هذه الاستثمارات من الجانب الآخر.

وعلى ضوء هذه النتائج تم التوصل إلى مجموعة من التوصيات من أهمها:

توفير الوقت الكافي والدعم اللازم وخصوصا من قبل الإدارة العليا لعملية التقييم، وعلى أن يتم تطوير أو البحث عن أساليب تقييم تأخذ بعين الاعتبار النظرة الشاملة للتكاليف والعوائـد المتوقعة من هذه الاستثمارات وخصوصا الاستراتيجية والغير مباشره منها.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

AEC	**Architect, Engineering and Construction**
AHP	**Analytical Hierarchy Process**
ARR	**Accounting Rate of Return**
ATMs	**Automated Teller Machines**
AVR	**Automated Voice Response**
PBK	**Payback Method**
BSC	**Balanced Scorecard**
CEO	**Chief Executive officer**
CIO	**Chief Information Officer**
CMIS	**Computerized Management Information Systems**
CRM	**Customer Relationship Management**
CSF	**Critical Success Factors**
DCF	**discounted cash flow**
EFTPoS	**Electronic Funds Transfer at Point of Sale**
EN	**Enterprise Network**
ERP	**Enterprise Resource Planning**
ICT	**Information and Communications Technology**
IE	**Information Economics**
IRR	**Internal Rate of Return**
IS	**Information System**
IS/IT	**Information System/ Information Technology**
IT	**Information Technology**
IVR	**Interactive Voice Response**
LAN	**Local Area Network**
MCDM	**Multi Criteria Decision-Making**
MIS	**Management information system**
NPV	**Net Present Value**
PIN	**Personal Identification Number**
PNA	**Palestine National Authority**
ROI	**Return On Investment**
ROs	**Real Options theory**
SME	**Small and Medium Enterprises.**

VA	**Value Analysis**
WAN	**Wide Area Network**
WITSA	**World Information Technology and Services Alliance**

APPENDICES

CHAPTER ONE

BACKGROUND CONTEXT

1.1 RESEARCH BACKGROUND:

Globally, Information Technology (IT) spending in the financial services sector will grow 4.1 percent annually from 2004 to 2009, while IT spending in the banking portion of the financial services market will increase from $185 billion in 2003 to $243 billion in 2009 (Cournoyer, 2005).

Information technology may provide organizations, particularly in information intensive industries like the financial industry, with extended opportunities to improve their productivity and business performance (Poon & Davis 2003), to establish new management and organizational forms, and to develop new business activities or to re-engineer the existing ones (Apostolopoulos, Pramataris, & Doukidis, 1997). Moreover, in the banking sector, Information technology has a strong influence on banks operations and strategy (Hitt, Frei, & Harker, 1998), and few banks products and services exist that do not utilize IT at some point in the delivery process (Beccalli, 2006). In Palestine, the effect of IT on the banks operations was apparent in the outcome of the empirical study conducted by EI-Shantaf (2000) which shows that:

a) The percentage of banks, which cannot operate without Computerized Management Information Systems (CMIS) has reached 87.27%.

b) The percentage of CMIS integration in the banks has reached 73.45%.

c) The percentage of banks basically dependent on information resulting from CMIS on making their decisions has reached 77.45%.

d) The percentage of applying some kinds of CMIS in banks has reached respectively: correspondence systems by fax and e-mail 84%, documentation management systems 77.45%, transactions processing systems 76.73%, management reporting systems 76.36%, office information systems 73.09%, decision support systems 49.09%, executive information systems 46.18%, office information systems 43.64%, expert systems 41.45%, teleconferencing systems 32.36%, group decision support systems 43.27% and Correspondence systems by voice 12.73%.

In spite of the high figures of the utilization of IT systems in the banking sector in Palestine presented in EI-Shantaf (2000) study, the rapid change in the technology develop contemporary IT systems that provide extended opportunities for the banks to

improve their productivity and profitability. Automated Teller Machines (ATMs), Electronic Funds Transfer at Point of Sale (EFTPoS), telebanking, smart cards, internet banking, Customer Relationship Management (CRM), and Enterprise Resource Planning (ERP) are examples of value IT systems which are not or partially utilized by banks in Palestine. However, investing in IT systems without careful evaluation may have negative results and impact. Remenyi, Money and Twite (1991) reported that 90% of firms did not have a systematic evaluation process and also reported the following results from these firms:

a) 70% of firms report that their IT systems were not returning the company investment.
b) IT overheads are consistently larger than anticipated.
c) 20% of IT spend is wasted.
d) 40% of IT project realize no net benefit whatsoever

IT investment evaluation increases the likelihood of IT investment success, and enables the banks to manage their investment in IT more effectively by for example, prioritizing new investment, and enhancing organizational learning process (Brown, 2005). Moreover, evaluation is a critical factor to increase the utilization and benefit realization of IT which is at the level of 59.72% in the banks in Palestine according to EI-Shantaf (2000) study.

On the other hand, IT investments evaluation is not an easy task and posses many problems (Renkema and Berghout, 1997). In many cases, the information required is difficult to obtain because intangible and strategic benefits of IT investments are hard to identify or quantify. Hence, evaluation is often ignored or carried out inefficiently or ineffectively (Lin, 2002).

To overcome the IT investments evaluation, researchers and practitioners have developed a variety of contemporary evaluation methods which may help firm to improve their evaluation practices (Peffers and Saarinen, 2002).

Finally, IT investments evaluation is an area of research that has received limited attention in the banking sector in Palestine. Yet the justification of investment in IT is one of the many challenges facing Managers in the banking sector in Palestine.

1.2 PROBLEM STATEMENT:

The first step to improve IT investments evaluation practice in the banking sector in Palestine is to understand where we are standing at present. Unfortunately, little is known about the IT investments evaluation practices in the banking sector in Palestine. Thus, the main goal of this research is to investigate the current IT investments evaluation practices in the banking sector in Palestine

1.3 RESEARCH OBJECTIVES:

More understanding into the current IT investment evaluations practices will help practitioners to improve the quality of their IT investment evaluation. This research aims to provide such better understanding through:

An investigation of the current IT investments evaluation practices in the banking sector in Palestine

The investigation will examine:

I. The extent of the formality of the IT investment evaluation in the banking sector in Palestine and its impact on the evaluation itself and the success of IT investments.
II. The barriers that prevent banks from evaluating their IT investment and the problems face them in the evaluation.
III. The criteria and the methods used for IT investment evaluation.

The last point to mention is that the investigation will be limited to the evaluation practices at the feasibility stage only.

1.4 THE RESEARCH QUESTIONS:

In order to achieve the research main objective, the research will try to answer the following Questions.

a) How formal are the IT investments evaluation at the banking sector in Palestine?
b) What is the impact of the present of formal IT investments evaluation on carrying out the evaluation and the success of IT investments?
c) What are the barriers that prevent Banks from evaluating their IT investments? And the problems face them in the IT evaluation?
d) What criteria and methods are considered and used in the evaluation process of IT investment in the banking sector in Palestine?

1.5 RESEARCH HYPOTHESES:

To examine the impact of the presence of formal IT investments evaluation on both carrying out the evaluation and the success of IT investments, the following hypotheses are formulated:

Hypothesis One: there is a significant positive relation between the presence of a written IT strategy and the presence of formal IT investments evaluation procedures at (0.05) level

Hypothesis Two: there is a significant positive relation between the presence of formal IT investments evaluation procedures and carrying out IT investments evaluation at (0.05) level

Hypothesis Three: there is a significant positive relation between the presence of formal IT investments evaluation procedures and the success of the implemented IT investments at (0.05) level

Hypothesis Four: there is a significant positive relation between carrying out IT investments evaluation and the success of implemented IT investment at (0.05) level

1.6 THE RESEARCH BENEFITS:

This research represents an ample opportunity to:

1. The researcher to improve his knowledge and to bind what is been learned during the MBA courses to the real life practices.
2. Other researchers as this research will serve as background for any future research attempt to design an effective framework for evaluating IT investments for the banking sector in Palestine.
3. The banks' top management, who may, by understand their current evaluation practice, improves the effectiveness with which IT investment decisions are made.
4. Banks and the society in general which can by applying the recommendation of this research save their scarce resources and manage them in an effective way.

1.7 RESEARCH METHODOLOGY AND DESIGN:

1.7.1 Research Methodology:

This research is mainly descriptive in nature as it concerns with describing the current practices of IT investment evaluation in the banking sector. The survey strategy will be used in order to capture most of the data needed

1.7.2 Sources Of Data :

In addition to secondary data, this research will rely mainly on primary data that is collected through questionnaire survey designed specifically for this research.

1.7.3 Research Population:

The target population consists of Chief Information Officers in the twenty one banks operate in Palestine. The census method will be used to collect the required data from the target population.

1.7.4 Research Location:

The research was carried out in the Gaza Strip, and West Bank.

1.7.5 Data Analysis :

The data which will be collected from the questionnaire survey will be analyzed using descriptive statistics capability of the SPSS (Statistical Packages for Social Science) program. All relevant and necessary statistics such as frequencies, percentage, and t-test analysis will be used to process the raw data and to transfer them to useful information that can be interpreted.

1.7.6 Research Design :

The first phase of this research included identifying and defining the problems and establishment objective of the study and development research plan. The second phase of the research included a summary of the comprehensive literature review. The third phase of the research included a field survey which was conducted with the evaluation practice of IT system in the bank. The forth phase of the research focused on the modification of the questionnaire design, through distributing the questionnaire to pilot study. The purpose of the pilot study was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the study. In addition, it was important to ensure that all information received from the managers of the banks would be useful in achieving the research objective..

The fifth phase of the research focused on distributing questionnaire. This questionnaire was used to collect the required data in order to achieve the research objective. Twenty one questionnaires were distributed to the research population but only 19 were retrieved (90.4%). The sixth phase of the research was data analysis and discussion. Statistical Package for the Social Sciences, (SPSS) was used to perform the required analysis. The final phase includes the conclusions and recommendations.

1.8 RESEARCH LIMITATIONS:

IT investment evaluation is a broad subject and there are no one research could cover all its aspects. Frisk and Plantén (2004) has summaries the different evaluation strategies, approaches and perspectives used in conducting an IT investment evaluation and put them into a framework (figure1.1). This framework will be used as a roadmap to identify the research domain and to delimitate what to explore. The shaded shapes in the figure show the area that will be covered in this study.

By referring to the dissertation title, objectives, and figure one, we could conclude that this study will concentrate only on the IT management prospective about the methodology used by banking industry in Palestine to evaluate their IT investments at the feasibility stag.

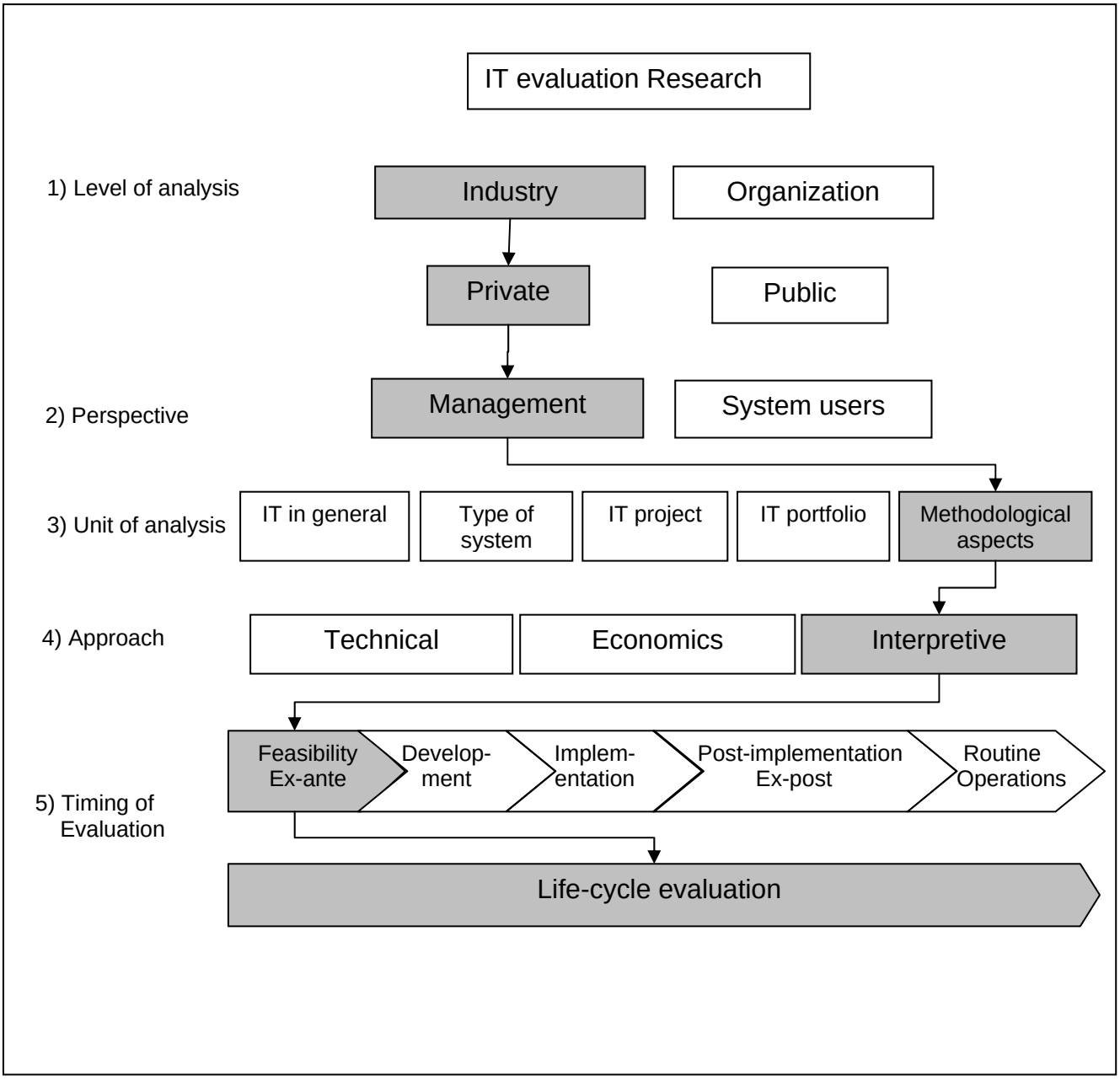

Figure 1.1: **Framework of IT evaluation research (Adapted from Frisk and Plantén, 2004)**

1.9 DEFINITIONS USED IN THE DISSERTATION

The research purpose is concerned with understanding the "IT investment evaluation practices". Each term of this phrase in addition to the central keywords used throughout the dissertation will be defined here. While most of the terms mentioned have many definitions suggested by various authors, the definitions chosen below is the most useful within context of this dissertation

The first term and most fundamental definition used throughout this dissertation is about information technology (IT). "IT describes any kit concern with capture, storage, transmittal or presentation of information" (Robson, 1997). In other words "IT refers specifically to technology, essentially hardware, software and telecommunications networks. It is thus both tangible (e.g. with servers, PCs, routers and network cables) and intangible (e.g. with software of all types). IT facilitates the acquisition, processing, storing, delivery and sharing of information and other digital content" (Ward and Peppard, 2002). Typically, the term information technology is used interchangeably with information system (Rainer, Turban, and Potter, 2006; Serafeimidis, 1997; Ward and Peppard, 2002), and we will use the two terms interchangeably in this dissertation

The second definition is concern with the term Investments. "Investments are commitments of resources, made with the purpose of realizing benefits that will occur over a reasonably long time in the future…. Therefore, an investment in information technology may be referred to as any acquisition of software or hardware which is expected to expand or increase the business benefits of an organization's information systems and render long-term benefits" (Lin, 2002). The terms "Investment", "system", and "project" are used synonymously in this dissertation.

The third definition is concern with the term evaluation. Evaluation can be defined as "a series of activities incorporating understanding, measurement and assessment. It is either a conscious or tacit process, which aims to establish the value of, or the contribution made by, a particular situation." (Remenyi et al. 1997 as cited in Andresen 2001), or from management perspective, evaluation is referred to as a process of determining by quantitative and/or qualitative means the worth of IT to the organization (Doherty and King 2001; Serafeimidis 1997). The terms "appraisal", "assessment", and "evaluation" are frequently used within the IT literature in a synonymous manner (Ballantine and Stray 1998; Serafeimidis 1997).

Therefore, by combining the definitions of investment in IT and evaluation mentioned above one can define IT investment evaluation as the weighing up process to rationally assess the value of any acquisition of software or hardware which is expected to improve the business value of an organisation's information systems (Lin 2002)

The fourth term is the ambiguous term "value" which raised from the above definition and need further clarification to eliminate the danger of misinterpretation. As shown in Table 1.1, the value of an IT investment consists of positive impacts (benefits) and negative impacts (sacrifices). These impacts are divided into monetarily measurable impacts (financial impacts) and non-monetary impacts (non-financial impacts). With respect to financial impacts, a further distinction is made between net cash flow and net profit. Net cash flows comprise the sum of cash inflows and cash outflows whereas net profit is defined as the accounting registration of income and expenditures. Regarding non-financial impacts, positive contributions of an IT investment and negative contributions are differed which are of either quantitative or qualitative nature (Renkema and Berghout 1997).

Table 1.1: Source component of value

Investment Impact	**positive**	**Negative**	**Total**
Financial	Cash inflow	Cash outflow	Net cash flow
	income	Expenditures	Net profit
Non-financial	Positive contribution	Negative contribution	Net contribution
Total	Benefits	Sacrifies	Value

Source: Renkema and Berghout (1997, page2)

Another related keyword is IT evaluation practices which in this dissertation, referes to the tool, methodology or set of procedures that used to carry out the IT evaluation. They may consist of either informal or formal IT evaluation procedures. Although evaluation might be carried out as the project is being developed, implemented or indeed after implementation, the term "evaluation" used here to imply an ex-ante consideration of IT investments which consist of the activities carried out during the feasibility study stage of systems. Finally, "Methods", "approaches", and "techniques" is another set of terms which used interchangeably in this dissertation.

1.10 STRUCTURE OF THE DISSERTATION

The dissertation has been divided into seven chapters.

Chapter 1, this chapter, contains an introduction to the study, the statement of the problem, research questions, the significance of the study, definitions of terms, and delimitations and limitations of the study.

In Chapter 2 an overview of the banking sector in Palestine is presented. Moreover, the effect of IT on the bank's performance is discussed.

The third and the forth, are one block and represent a review of literature that provides detailed background and summarizes relevant research.

In Chapter 3, the importance of IT investment evaluation, the obstacles to the evaluation, and the intangible characteristic of the cost and benefit the IT investment is first introduced, then the chapter is ended by classifying IT investment into different categories and by listing the typical benefits of each category.

In Chapter 4, the IT evaluations methods are classified into different classes and one or more methods from different classes are critically reviewed. Then at the end of the chapter the answering to how to select an evaluation method is discussed.

Chapter 5 guides the reader through our research process and presents our research methodology as well as important points of consideration like the methods of collecting data and a discussion about validity and reliability,

Chapter 6 contains research findings, discussed where possible in the light of previous research, and the result of the hypotheses testing.

Chapter 7 provides conclusions drawn from the findings, and recommendations for further research.

Finally, we attached six appendices which contain supplementary material connected to the previous chapters' contents.

CHAPTER TWO

INFORMATION TECHNOLOGY ANDTHE BANKING SECTOR

2.1 INTRODUCTION:

This chapter starts with a short brief about the banking sector in Palestine. The aim of this brief is just to help the reader to draw a picture of the population of this research and how it is evolved over time. The remaining of the chapter moves the focus of the discussion from the banking sector in Palestine to a wider angle by discussing, in general, the effects of IT on the banking sector and the relation between the IT and banking sector performance.

2.2 THE DEVELOPMENT OF THE BANKING SECTOR IN PALESTINE:

The development of the banking sector in Palestine was affected dramatically by the political circumstances that Palestine went through. Before 1948, there were many banks working in Palestine, the most famous one was the Arab Bank that was established in 1930 in Jerusalem and had many branches. In the period between 1948 and 1967, there were two bank systems in Palestine; the West Bank followed the Jordanian bank system while Gaza Strip followed the Egyptian bank system. There were 8 banks with 32 branches working in the West Bank and 6 banks with 7 branches working in the Gaza Strip. Aside from the Bank of Palestine who had permission in 1981 to start working in the Gaza strip and the Cairo Amman Bank who had permission in 1986 to work in the west bank, Banks working in the Gaza Strip and the West Bank had to stop their activities between 1967 and 1993 due to the Israeli occupation. After signing Paris protocol on Economic Relation between Palestine National Authority (PNA) and Israel in 1994, many political and economical changes took place. Table 2.1 shows development in the banking sector in Palestine between the period 1995 and 2005.

Table 2.1: The development of banks and its branches in Palestine during the period 1995-2005

Year	Region	Number of Banks			Number of Branches & Offices		
		National	Foreign	Total	National	Foreign	Total
1995	West Bank	4	10	14	5	33	38
	Gaza Strip	2	0	2	9	10	19
	Total	6	10	16	14	43	57
1996	West Bank	6	11	17	10	39	49
	Gaza Strip	2	1	3	10	12	22
	Total	8	12	20	20	51	71
1997	West Bank	7	11	18	16	45	61
	Gaza Strip	2	1	3	13	15	28
	Total	9	12	21	29	60	89
1998	West Bank	7	12	19	24	50	74
	Gaza Strip	2	1	3	16	15	31
	Total	9	13	22	40	65	105
1999	West Bank	7	12	19	31	52	83
	Gaza Strip	2	1	3	19	15	34
	Total	9	13	22	50	67	117
2000	West Bank	7	11	18	33	52	85
	Gaza Strip	2	1	3	19	16	35
	Total	9	12	21	52	68	120
2001	West Bank	8	11	19	38	52	90
	Gaza Strip	2	1	3	20	16	36
	Total	10	12	22	58	68	126
2002	West Bank	8	10	18	38	52	90
	Gaza Strip	2	1	3	21	16	37
	Total	10	11	21	59	68	127
2003	West Bank	8	11	19	39	56	95
	Gaza Strip	2	1	3	21	17	38
	Total	10	12	22	60	73	133
	West Bank	8	11	19	40	56	96
	Gaza Strip	2	1	3	21	17	39
2004	Total	10	12	22	61	73	134
	West Bank	8	10	18	47	53	100
	Gaza Strip	2	1	3	24	16	40
2005	Total	10	11	21	71	69	140

Source: Palestine Monetary Authority (n.d.)

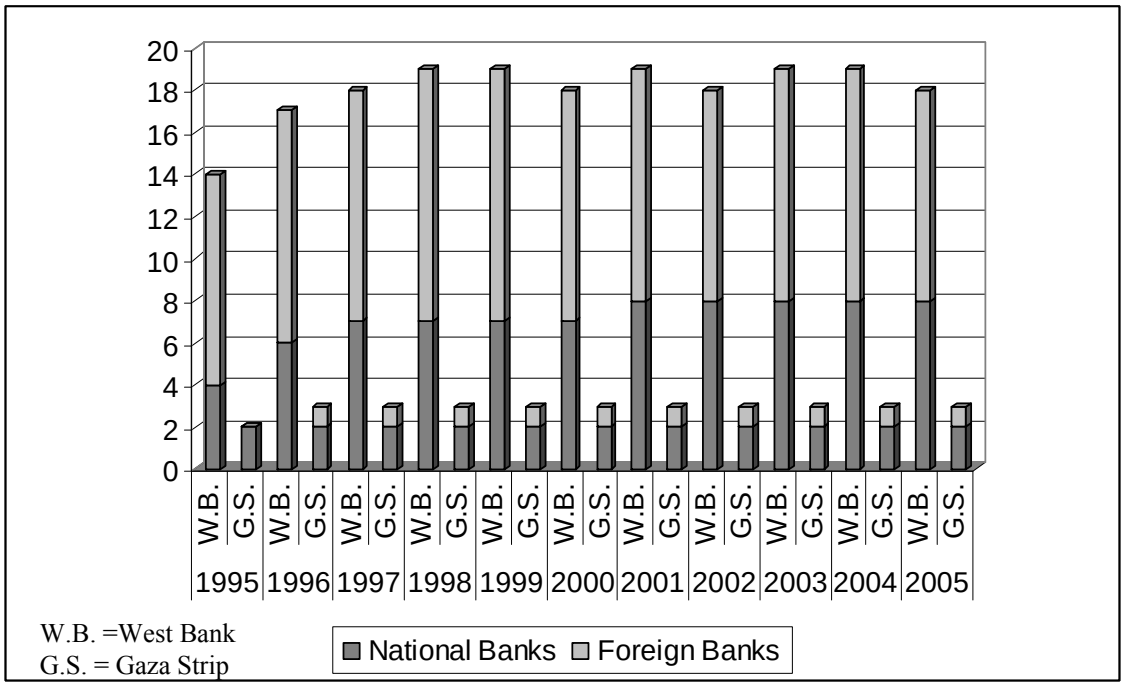

Figure 2.1: The development of banks in Palestine during the period 1995-2005

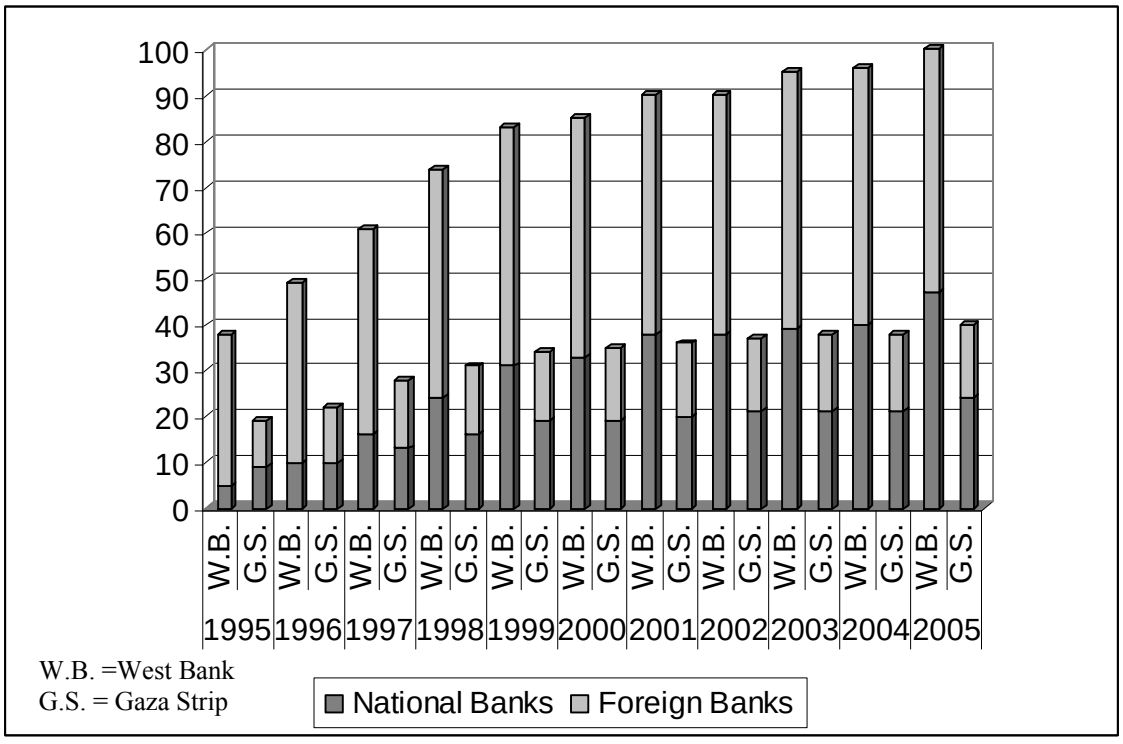

Figure 2.2: The development of banks' branches in Palestine during the period 1995-2005

2.3 THE EFFECTS OF IT ON THE BANKING SECTOR

The effect of information technology on the banking sector can be discussed from different angles, possible discussions include the followings:

a. The effects of technological innovation on the economy and its capacity for continued growth which in its turn affect banking sector.
b. The effects of technology on globalization: Advances in information technologies reduce the costs of communication, leading to more global services and capital markets. Globalization, in turn, increases competition and contributes to the spread of technology.
c. The effects of technology on financial services industry consolidation, both in terms of corporations and products.
d. The effects of technological innovation on the delivery channels.
e. The effects of technological innovation on the payment system.

We will limit our discussion to the last two points were we will discuss the effects of technology on the delivery channels and the payment systems, These points have been selected because they shows how the implementation of information technology has brought direct revolution in the functioning of the banks.

2.3.1 The Effects of IT on The Delivery Channels

The contribution of the technological innovations to the distribution channels of Banks has a long history, beginning with ATMs (1970s), telephone banking, Branch Networking, Electronic Funds Transfer at Point of Sale (FTPoS), Personal Computer Banking, and now, internet banking. Appendix A explains these electronics channel and their benefits in detail. In general, the investments in these technologically innovative channels resulted in lower per transaction costs in these channels and substantial increases in customer convenience (Clemons & Hitt 2000). According to a study carried out by Booz, Allen & Hamilton, an ATM transaction costs 55 cents; an interactive voice response (IVR) telephone transaction costs 35 cents; a personal computer transaction costs 20 cents, a point-of-sale debit costs 15 cents; an Internet transaction costs just 1 cent, while the cost of an in-branch transaction averages $1.50 (Johnson, 1999). Figure 2.3 shows the transaction cost of each channel

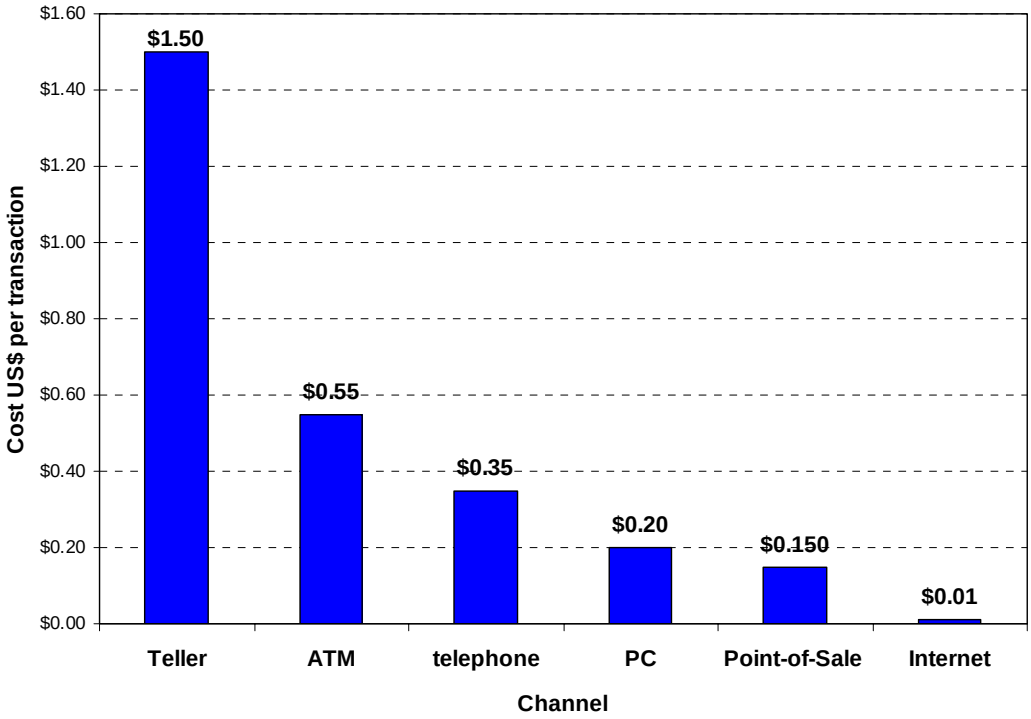

Figure 2.3: Transaction cost of each delivery channel (Johnson, 1999)

2.3.1.1 Electronic Delivery Channels Utilized by Banks in Palestine

An analysis of the types of electronic delivery channels utilized by banks in Palestine is presented in Table 2.2. The focus of the analysis is on the six main delivery channels identified in literature namely ATMs, Telephone Banking, PC-Banking, Internet Banking, Branch Network and EFTPoS. The information in Table 2.2 was collected as part of this research through a telephone survey with the IT managers or their representative in the respective banks at the mid of January 2007. As indicated in Table 2.1, it was found that the most popular electronic banking delivery channels in Palestine are ATMs and Branch Networks followed by Internet banking, and Telephone banking. The 76.2% utilization of the ATMs is expected to increase as a result of the new regulations of the Palestine Monetary authority that request bank to have an ATM in any new open branch. Finally, it worth to notice that most of the internet banking investment are implemented recently which reflect the awareness of the Banks to benefits of these innovative delivery channels.

Table 2.2 : Electronic Delivery Channels Utilized by Banks in Palestine.

	BANKS	ATM	TELEPHONE BANKING	PC-BANKING	INTERNET BANKING	BRANCH NETWORK	EFTPOS
1	Bank Of Palestine	Yes	Yes	No	Yes	Yes	Yes
2	Palestine Islamic Bank	Yes	No	No	No	Yes	No
3	Al-Aqsa Islamic Bank	Yes*	No	No	No	No	No
4	The Palestine Investment Bank	Yes*	No	No	Yes*	Yes	No
5	Arab Islamic Bank	Yes	No	No	No	Yes	No
6	The Commercial Bank of Palestine	Yes	Yes	No	No	Yes	No
7	Palestine International Bank	Yes	No	No	No	Yes	No
8	Al-Quds Bank for Development and Investment	Yes*	No	No	Yes*	Yes	No
9	Arab Palestinian Investment Bank	No	No	No	No	No	No
10	Alrafah bank	Yes	No	No	No	Yes	No
11	Union Bank for Saving and Investment	No	No	No	No	No	No
12	Arab Bank	Yes	Yes	No	Yes	Yes	No
13	Bank of Jordan	Yes	No	No	No	Yes	Yes
14	Cairo-Amman Bank	Yes	Yes*	No	Yes*	Yes	Yes
15	Jordan Kuwait Bank	Yes*	No	No	No	No	No
16	The Housing Bank of Trade and Finance	Yes	Yes	No	Yes	Yes	No
17	Jordan Commercial Bank	No	No	No	No	No	No
18	Egyptian Arab Land Bank	Yes*	No	No	Yes*	Yes*	No
19	Jordan National Bank	No	No	No	No	No	No
20	The Principle Bank of Development and Agriculture Credit	No	No	No	No	No	No
21	HSBC Bank Middle East	Yes	No	No	No	Yes	No
	The Percentage of Banks Utilize the service	**76.2**	**23.8**	**0.0**	**33.3**	**66.7**	**14.3**

* mean that the bank invested in this technology but the service is still offline.

2.3.2 The Effects of IT on The Payments System

Technology is transforming both money itself and the way we manage it. During the 1990's two different groups of electronic money or new payment systems are being developed and introduced around the world: The pre-paid cards and the software-based products to make payments over the Internet (Reixach, 2001). These two products represent an intermediate to the introduction of pure digital cash and thy are explained in details in Appendix B.

Banks that will utilize electronic money could find it much cheaper than handling cheques and the paper records that accompany traditional money. With conventional systems it is estimated that a significant part (30-40%) of the interest rates are needed to cover the management costs The use of electronic money systems should have a clear impact on the reduction of these costs (Reixach, 2001).

In general, the advantages of the new electronic payment systems with respect to the ones currently used can be summarized by following points:

1. increased security, anonymity and preservation of privacy,
2. reduction of transactions costs,
3. easier international payments,
4. consumers have access to much larger markets (and therefore overall efficiency improves), and
5. better means of control of personal finances by users directly (instead of financial institutions).

While the disadvantages can be summarized as follow:

1. Everything is fairly new, and therefore untried.
2. The need for new standandaridazation or regulation.
3. Possibility of losses in case of hardware breakdown.
4. Possibility of new criminal activities and better means to carry out other unlawful ones (tax evasion, money laundering).

2.4 THE IT AND THE BANKING SECTOR PERFORMANCE

Many research tried to investigates the contributions of IT investment to the banks' performance by following different perspectives. In one perspective, research tried to examine the direct effects of IT investment on the efficiency, productivity, or profitability. Prasad and Harker (1997) examined the contribution of IT to the productivity and profitability in U.S. retail banking by analyzing the IT spending data for about 47 banks between the years 1993-95, each of the analyzed banks has assets exceeding $6 billion which make these banks constitute the larger banks. This analysis, which is carried out with two measures of productivity and two for profitability, indicated that increased investment in IT capital may have no real benefits and may be more of a strategic necessity to stay even with the competition. However, the results indicate that there are substantially high returns to increase in investment in IT labor, and that retail banks need to shift their emphasis in IT investment from capital to labor. Beccalli (2006) used a sample of 737 European banks over the period 1993-2000 to investigate whether investment in Information influencing the performance of banks. The study relied on the measure of both standard accounting ratios and cost and alternative profit efficiency measures. The investigation reached to the existence of a small relationship between total IT investment and the improvement in the bank profitability or efficiency indicating the existence of a profitability paradox. Moreover, the investigation concluded that the impact of different types of IT investment (hardware, software and services) on banks' performance is heterogeneous. Berger (2003) examined technological progress and its effects in the banking industry. The research suggested improvements in costs and lending capacity due to improvements in "back-office" technologies, as well as consumer benefits from improved "front-office" technologies. The research also suggested significant overall productivity increases in terms of improved quality and variety of banking services. In addition, the research indicates that technological progress likely helped facilitate consolidation of the industry.

The second perspective examined the bottom line by studying the effect of IT investment on the stock price. Dos Santos, Peffers, and Maurer (1993) examined stock price reaction to the IT investment announcements by studying a sample consists of 97

IT investment announcements by manufactures and financial services firms over the period from 1981 to 1988. The results of the study did show the IT investment announcements that are classified as innovative have a statistically significant average excess return of 1.03%, and over 64% of the announcements have positive excess returns. In comparison, the non-innovative IT investment announcements have statistically insignificant negative average excess return. On the other hand, Chatterjee, Pacini, and Sambamurthy (2002) finds significant evidence that positive abnormal returns and increased trading volume are associated with IT infrastructure investment announcements, while Dehning, Richardson, and Zmud (2003) found positive abnormal returns to announcements of IT investments by firms making transformative IT investments. The reaction of the stock price was more attractive in Richardson, Oh, and Kim (2006) study which looked at 339 IT investment announcements and found out the average share price of a stock increases 0.32 percent one day after the news of an IT investment goes public.

The third perspective suggests that IT investments do not lead to value creation for the firm that makes the investment; but the benefits are passed on to their customers in the form of consumer surplus. Sunil, Krishnan, and Fornell (2004), based on the analysis of longitudinal data on 50 U.S. firms for the period 1994-2000, indicated a positive association between IT investments and customer satisfaction. This positive association was more apparent when they studied specifically the effect of customer interfacing CRM systems on customer knowledge and customer satisfaction

In conclusion, there is a contradiction in the findings and the literature review did not show doubtfully the positive contributions of IT investment to the banks' performance. This known ,academically, as “IT Productivity Paradox” which refers shortly to debate whether or not investment in IT provides improvements in productivity and business efficiency. Brynjolfsson and Yang (1996) proposed that the reasons behind the IT Productivity Paradox could be;

1. Measurement Error: Outputs (and inputs) information are not being properly measured by conventional approaches.
2. Lags: Time lags in the pay-offs of information technology make analysis of current costs versus current benefits misleading.

3. Redistribution: Information technology is especially likely to be used in redistributive activities among firms, making it privately beneficial without adding to total output.
4. Mismanagement: The lack of explicit measures of the value of information makes it particularly vulnerable to misapplication and over consumption by managers.

2.5 SUMMARY

Advances in information technology and telecommunications have brought direct revolution in the functioning of the banks. In the service delivery aspect, many new delivery channels were introduced; these new delivery channels include automated teller machines (ATM's), telephone banking, Branch Networking, Electronic Funds Transfer at Point of Sale, Personal Computer Banking, and internet banking.

In Palestine, the indications are that the electronics delivery channels of banking have not fully utilized and this result could be generalized to other type of IT investments.

Finally, under normal circumstances, IT investments among themselves or IT investments and non-IT investments will compete for scarce resources, especially financial resources of the bank. Effective evaluation of IT investments at the feasibility stage will help banks to ensure that they have selected the investment that have positive contributions to the productivity, profitability, competitiveness, effectiveness, performance, and the success of the bank.

CHAPTER THREE

INFORMATION TECHNOLOGY INVESTMENTS AND THEIR EVALUATION

3.1 INTRODUCTION:

This chapter represents the first part of the theoretical framework and background of this dissertation. The chapter starts with presenting the purposes of and the obstacles to IT investments evaluation practices, then it attempts to show the criteria concern the organizations when evaluating investments in IT. Finally, to simplify studying IT investments they will be classified into categories.

3.2 THE GROWING NEED FOR IT INVESTMENTS EVALUATION:

The IT evaluation literature (Farbey et al. 1992; Ballantine and Stray, 1998; Lin, 2002; Nijland, 2004) shows that evaluation is needed to serve various objectives. They are:

1. To justify a proposed or existing system;
2. To enable organizations to decide between competing projects;
3. To enable decisions concerning expansion, improvement or the postponement of projects;
4. To gain information for project planning;
5. To act as a control mechanism over expenditure, benefits and the development and implementation of projects;
6. To act as a learning device enabling improved appraisal and systems development to take place in the future;
7. To evaluate and train personnel responsible for systems development and implementation;
8. To ensure that systems continue to perform well;
9. To enable decisions concerning the adaptation, modification or dismissal of information systems; and
10. To allocate (and distribute) costs and benefits to appropriate organizational departments or business units.

While there are no considerable changes to these objectives over time, the necessity for the IT evaluation has increased for three other reasons;

First, organizations are devoting high levels of resources on IT investments. Global IT spending volumes represented 6.8 percent of global Gross Domestic Product with 8.9

percent as an average annual growth rate between 2001 and 2005. It is expected to top $3 trillion in 2006 and will reach almost $4 trillion by 2009 (WITSA, 2006). However, actual spending levels are likely to be higher than those actually reported, given that the total organizational costs associated with IT investments for example, staff training; organizational restructuring costs; employee time and so forth are unlikely to be included in reported costs. In addition, there are many investments which are not reported.

Secondly, the rapid development in IT significantly impacted the way in which organizations use and benefit from IT. At first, IT was applied to functional areas to increase the efficiency of the organizations by benefit form the high speed of computer to perform some operations much more quicker and with less errors than people could do. Then at later stage, IT was used to improve the organization's effectiveness through making better information available. Now a day, IT being associated with transformations and affecting the whole organization and its business processes, services and products (Andresen, 2001; Nijland, 2004).

Thirdly, the globalization and competitive climate which organizations face today push towards more concern to be paid to IT effectiveness measurement, cost justification and cost containment.

All of the above reasons light on the importance of a thorough evaluation of IT investments before, during and after the implementation.

3.3 DIFFICULTIES OF IT EVALUATION:

Organizational managers as well as IT professionals recognize IT evaluation to be one of the important unresolved concerns in information management (Nijland, 2004). They claims that it is a complicated and elusive concept and therefore difficult to approach both conceptually and operationally (Serafeimidis, 1997). The following paragraphs address the most important difficulties associated with IT evaluation

First, Evaluation is a very subjective activity which cannot be separated from human intellect, history, culture and social organization (Serafeimidis, 1997). Therefore, in conceptual terms evaluation is never value or context-free. Evaluation inherits

characteristics from the particular people who carry it out at a particular time and use criteria which are based on specific assumptions.

Secondly, the impact of IT can be seen as the interactions of their technical and social components. Consequently, when an IT is evaluated multiple dimensions are expected to be exposed. These include technical, economic, managerial, social and behavioral aspects (Serafeimidis, 1997)

Thirdly, evaluation of IT investments is problematic due to typical characteristics of such investments in comparison with other investments (Nijland, 2004). The most commonly cited special characteristics of IT investment which cause difficulty to evaluate IT investments include among others the following:

A. The value of IT:

IT evaluation is all about assessing the value of information technology. A great deal of the difficulties associated with IT evaluation stems from the characteristics of information itself (Walter and Spitta, 2004; Nijland, 2004). Information is a non-physical thing which is easy to duplicate, transport and manipulate at low costs. Moreover, information has no intrinsic value but depends on its context to generate its value. Thus, its value depends on its use and varies between individuals and situations. Moreover, defining the value of information in relation to the decisions that can be based upon it is also problematic due to intervening factors such as the individual competencies of a manager to make use of certain information (Walter and Spitta, 2004) . Finally, assessment of the value of information can not be done without acquiring the information during the assessment process (Nijland, 2004).

B. The benefits from the IT investment:

Identifying or quantifying the benefits of IT investment is one of the major difficulties of the evaluation process. The benefits from an IT investment could be categorized into four different categories as illustrated in figure 3.1 and listed below (Brown, 1994);

1. *The tangible benefits*, also called hard benefits, are easily measured and have attached quantifiable value, the time and money saved by automating manual

labor, which represent an improvement in the organization efficiency, are an example of the tangible benefits of IT investment.

2. *The intangible benefits*: are known benefits but often neglected due to the difficulties to quantify them. Improving decision making, Obtaining information faster, improving staff satisfaction, or achieving better customer satisfaction are examples of intangible benefits which demands several assumption and approximation to measure them.
3. *The hidden benefits:* are potentially easy to measure but cannot be wholly attributable to the proposed investment and sometimes can only be realized as a result of further investments. For example, the implementation of a Local Area Network (LAN) across an organization provides the infrastructure on which valuable shared applications can later be implemented. Although this is a potential benefit made possible by the LAN, it cannot be realized unless these shared applications are also successfully introduced.
4. *The strategic benefits:* are usually benefits occurring at some distant point in the future that come as a result of the synergistic interaction among a number of contributing factors. A better market positioning of the organization is an example of the strategic benefit which is difficult to quantify in advance and can only be partially attributed to a given IT investment.

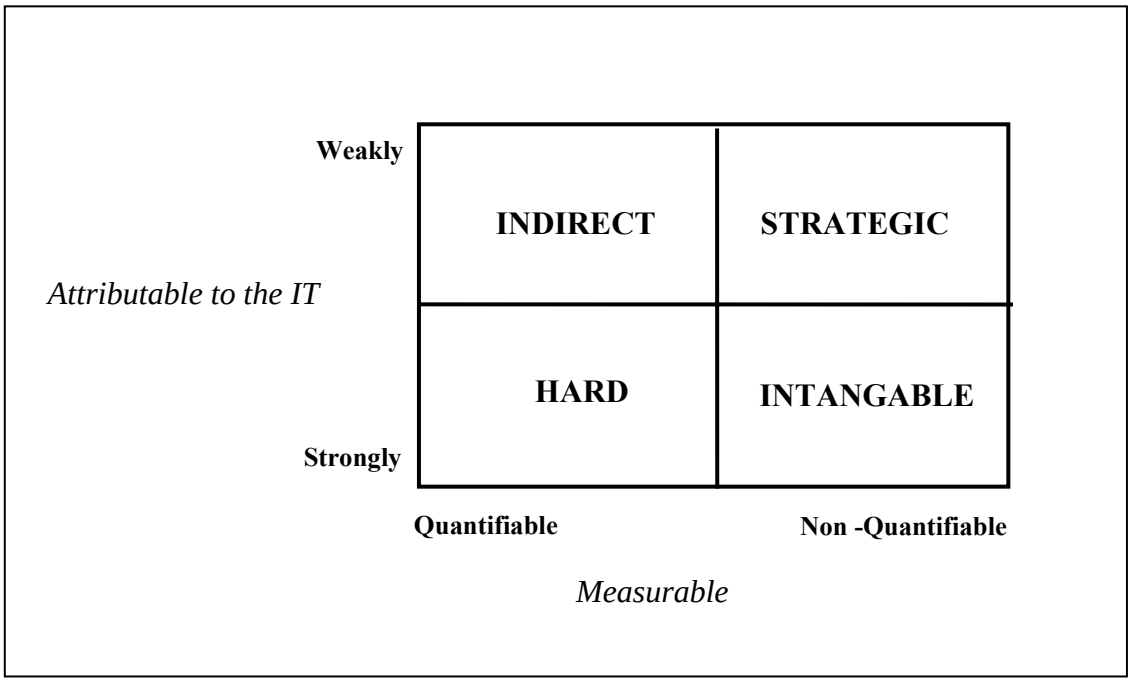

Figure 3.1 Different types of IT benefits (Brown, 1994)

C. The costs of the IT investment:

At first glance costs seem to pose little problem to the evaluation of IT investment and many researchers dealt with it as a resolved issue (Berghout and Remenyi, 2005). However, the below list of difficulties illustrates that this is perhaps not the case and there are many unresolved issues regarding IT Investment cost.

1. *Difficulties with Direct cost*
    a. Data capture problems: While direct costs has little problem with respect to quantification, they often underestimated. examples of non-recorded costs includes "the unexpected additional hardware accessories (e.g. secondary data storage devices), the installation and configuration costs (often needing expensive outside consultancy), the environmental costs (e.g. under floor wiring, air conditioning, new lighting or additional furniture), the running costs (the power consumption of color screens, laser printers and plotters are considerable), the maintenance costs (systems engineers spend up to 70% of their time understanding code already written before being able to install new functions), the systems breakdown (can seriously harm ongoing business), the security costs (e.g. protection against systems abuse and viruses), the networking costs (e.g. access times to external information systems can be expensive), the training costs (consistently underestimated) ,and the cost of phasing a system out at the end of its lifespan". (Hochstrasser, 1990 pp. 215)
    b. Overhead allocation problems: Cost accounting of IT includes many charging issues making this a personal and political problem (Bannister and McCabe 1999; as cited in Berghout and Remenyi, 2005)
    c. Accounting conventions: There seems to be no generally accepted accounting norms for administrating IT expenses (Nijland, 2004). Different standards regarding amortization and capitalization are applied between and within countries

2. *Difficulties with indirect cost:*

    In addition to data capture problems, overhead allocation problems, and accounting conventions problem, IT indirect cost has also an identification problems. IT is always part of something else, being a

project or departmental unit which makes it difficult to identify. Indirect cost could be divided into indirect human cost or indirect organizational cost. As a rule of thumb, indirect human and organizational costs might well be four times as high as direct costs (Hochstrasser, 1990).

Indirect human cost could be defined as the time spent by people integrating new system into current work practices (Hides, Irani, & Love, 2000). In addition to the time spent by people, Hochstrasser (1990) pointed to the new salary structures resulting from training a sophisticated workforce to handle the new technology, and increase in the stuff turnover as forgotten human costs

Organizational costs are caused by the transition from old to new work practices (Hochstrasser, 1990). Losses in organizational productivity, strains on organizational resources and organizational restructuring are examples of such a cost (Hides et en. 2000).

3.4 CRITERIA USED IN IT INVESTMENTS EVALUATION:

The effectiveness with which IT investment evaluation are made are significantly impacted by the criteria used in the evaluation process (Bacon, 1992). The criteria specify which projects are the 'right' projects to be selected, and which projects will not be carried out. From this viewpoint, if a 'wrong' set of criteria is selected, a wrong (less effective) set of projects will be the outcome of evaluation.

According to Bacon (1992), Criteria are concerned with the financial and non-financial justifications used in the proposing, evaluating and deciding upon a project or investment. Criteria answer the question: Why the investment decision was made?

Bacon (1992) performed a research on 80 companies from Britain, the United States, Australia, and New Zealand to find out what criteria are used by organizations when evaluating investments in IT. First, twenty CIO's were questioned on what criteria their organizations use in selecting IT investment projects with the aim of developing a full list of the criteria used in practice. The result of the interviews was a fifteen criterion grouped into three categories; financial criteria, management criteria and development criteria. The financial criteria's purpose is to show the monetary return

of the project or the time it takes to recover the project costs. The management criteria are connected to how well the project supports the strategic and managerial needs while the development criteria are connected to the actual project process. Then, a survey including the refined list of criteria distributed on 203 companies from which an 80 company replied with a usable one. The results of the survey are summarized in table 3.1 in which the second column shows the percentage of companies that use a given IT project (investment) selection criterion, the third column shows the average percent of projects to which a given criterion is applied for those companies using the criterion, and the forth column shows the average of the respondents ranking of each criterion based on the total value of projects to which the criterion is applied. Further description of the criteria exist in appendix C.

Table 3.1: Criteria used in the selection of IT projects

Criteria	% of companies using the criteria	% of project to which applied by the company using	Ranking
Financial Criteria			
Discount cash flow			
1- Net Present Value	49	58	4
2- Internal Rate of Return	54	54	2
3- Profitability Index Method	8	47	14
Other financial			
4- Average/Accounting Rate of Return	16	47	10
5- Payback Method	61	51	5
6- Budgetary Constraint	68	64	8
Management Criteria			
7- Support Explicit Business Objectives	88	57	1
8- Support Implicit Business Objectives	69	44	3
9- Response to Competitive Systems	61	28	6
10- Support Management Decision Making	88	29	7
11- Probability of Achieving Benefits	46	63	9
12- Legal/Government Requirements	71	13	13
Development Criteria			
13- Technical/System Requirements	79	25	12
14- Introduce/Learn New Technology	60	13	15
15- Probability of Project Completion	31	62	11

Source: Bacon (1992)

Peffer and Saarinnen (2002) conducted similar study by surveying 105 CIO's and other senior bank executives in the United States about the evaluation method (criteria) used by them to evaluate IT investments. The survey included a refined list of method

gathered from scanning banking industry journals and discussions with bank executives. The criteria were divided into five broad categories according to whether the evaluation objective involved profitability, strategic value, risk, use and operations, or development success.

Table 3.2 shows the evaluation categories, the evaluation methods for each evaluation category, and the proportion of bank executives who stated that they used each evaluation concept to justify proposed investment.

Table 3.2: Evaluation categories and the most used methods to evaluate each category

Criteria categories	Criteria	Proportion of CEOs Using Each Method in ex-anti evaluation
Profitability (cost and benefit)	Cost/benefit analysis	0.85
	Payback period	0.73
	Return on investment	0.58
	Discounted cash flows	0.38
	Model of the bank's operations	0.16
Use/operations (effective, reliable and flexible use of the system)	User satisfaction	na
	Maintenance feasibility (will provide needed flexibility)	0.7
	Reliability testing	0.68
	Level of system use	na
Strategic value (importance for the success of the bank)	Analysis of customer needs (market survey)	0.79
	Analysis of user requirements	0.79
	Analysis of competitive threats/opportunities	0.63
	Analysis of industry structure and competition	0.62
	Critical success factors	0.15
	Value chain	0.06
Development/procurement (control of implementation of the system)	Project schedules	0.83
	Project budgets	0.82
	References from other bankers	0.72
	Post implementation audit	na
	Programming productivity	na
Risk (effects of technical, economic, implementation, operational, and financial assumptions)	Financial feasibility (Can firm manage the cost?)	0.86
	Economic feasibility (Will it be worth doing?)	0.86
	Technical feasibility (Can it be done?)	0.81
	Operational feasibility (Desirable within operational framework?)	0.77
	Implementation feasibility (Can developer do it?)	0.68

Source: Peffer and Saarinnen (2002).

3.5 TYPES OF IT INVESTMENT:

Investments in IT are often made with very different objectives. Many Researchers (Farbey et al., 1993; Grover et al,. 1997; Hochstrasser, 1990; Peffer and Saarinens, 2002; Weill and Olson, 1989; Willcock, and Lester, 1996) attempted to classify IT investment into larger groups in order to simplify the choice of the evaluation method(s) to evaluate them. These classifications are summarized in table 3.3. The table gives the reader a better overview of the similarities and differences between the researcher's categorization.

Table 3.3: Overview of types of IT investments

Weill & Olson (1989)	Hochstrasser (1990)	Farbey, et al. (1993)	Willcock & Lester (1996)	Grover, et al. (1997)	Peffer & Saarinen (2002)
Threshold		Mandatory change	Mandatory investments	maintenance and enhancement to the existing system	Strategic necessity
Transactional	Cost replacement	Automation	Investments to improve performance	traditional development,	Routine cost saving
	economy of scale	Direct value added			
Informational	information sharing and manipulating	MIS and DSS systems	Infrastructure investments	Decision support system	Strategic IT
	Infrastructure	Infrastructure		infrastructure investment	
Strategic		Inter-organizational systems		strategic system	
	economy of scope	Strategic systems	Investments to achieve competitive advantage		
	Customer support				
	quality support				
	New technology		Investments in research (Investments to be prepared	Strategic product value	Strategic product value
				Related IT	Related IT
		Business transformation		business process redesign	

Source: Weill & Olson (1989); Hochstrasser (1990); Farbey, et al. (1995); Willcock, & Lester (1996); Grover, et al. (1997); Peffer & Saarinens (2002).

Weill and Oslon (1989) categorized IT investments based on the objective for which IT investment is embedded in the business strategy into four generic types; Transactional IT investment, Strategic IT investments, Informational IT investment, and Threshold IT investment. This classification match to a large extent the classification performed by Peffer and Saarinen (2002) which was based on the perceived role of the IT investment. They found four perceived role; routine cost saving, strategic necessity, strategic IT and strategic product value-related IT.

Hochstrasser (1990) suggested that individual IT-initiatives can be classified into larger project groups that share similar business objectives. He identifies eight different types of projects; Cost replacement projects, information sharing and manipulation projects, infrastructure projects, economy of scale projects, economy of scope projects, customer support projects, quality support projects, and new technology projects.

Willcock, and Lester (1996) performed another classification by matching the business objective with the type of IT project. They categorized IT investment into five different types; Mandatory Investment, Investment to improve performance, Investments to gain competitive edge, Infrastructure investment, and Research investment. On the other hand, Grover et al. (1997) categorized IT system base on the function they preformed into: maintenance and enhancement to the existing system, traditional development, Decision support system, strategic system, business process redesign, and infrastructure investment

One of the most widely used classifications, is the classification provided by (Farbey et al., 1993, as cited in Andresen 2001; Kennedy, 1999; Seibel, 2005) which known as the ladder model. The ladder consists of eight rungs. The rungs are generally described by the way IT changes or improves the company and its business activities. Another characteristic of the rungs is the higher rung implies, in general, a higher uncertainty in the impact. The Rungs named as follow:

Rung 1 - Mandatory Changes: Three types of forced changes affect IT system decisions:(a) Strategic necessity whereas competitors have introduced some new technology and this is necessary to compete; (b) Technological necessity, which may be driven by obsolescence or a technological advancement which is necessary to implement in order

to advert undesirable effects; and, (c) Regulatory or legal necessity that drives an organization to conform to regulations or laws and do not represent a choice for the firm.

Rung 2 -Automation: This rung represents applications designed to replace existing methods in order to reduce costs."

Rung 3 - Direct Value Add: This rung is represented by applications which not only reduce costs but add value, often by doing things which were not done before.

Rung 4 - MIS and DSS systems: This represents IT investments that provide information for planning, control and decision making. Providing better quality information enables managers to make better decisions. Better means, in this case, more accurate, timely, relevant, reliable information and information presented in a more easily used form.

Rung 5 - Infrastructure: This rung represents IT investments which provide a general capability but may not be targeted at any specific IT system. They provide a basis upon which other IT systems can be used to add value to the company.

Rung 6 - Inter-Organizational Systems: This rung is represented by systems which cross organizational boundaries, systems which are shared by two or more organizations, mainly trading partners.

Rung 7 - Strategic Systems: In this rung, Strategic Systems considers leveraging Information Technology as a competitive advantage which aligns the business strategy with information technology planning. Referenced by Farbey (Farbey et al., 1993) and defined by Michael Earl, Strategic Use is:

1. gaining competitive advantage;
2. improving productivity and performance;
3. enabling new ways of managing and organizing; and,
4. developing new types of business.

Rung 8 - Business Transformations: The top rung focuses on strategic business transformations that are critical to the survival of the business. Transformations can be initiated by a company desiring to change its business or if it is forced to change the business because of economic difficulties. Regardless of the reasons, an overhaul of the organization and its supporting Information Technology enterprise is necessary in order to survive.

The last point to mention about the IT investment ladder is concerned with the benefit expected from each rung. It must be noted that rarely does an IT investment yield one type of benefits alone. Any given IT investment can be expected to deliver a range of various types of benefits. Moreover, different kinds of IT investment can produce different combinations of types of benefits, with more sophisticated IT investment usually moving towards soft and difficult to measure benefits as illustrated in table 3.4. While any type of benefit can generally be sought and realized by an IT investment, Table 3.4 emphasizes those types of benefits that are typically associated with each investment type.

Table 3.4: Typical Benefits of Different IT Investments

Rung	***IT investment types***	***Typical benefits types***			
		Hard	***Intangible***	***Indirect***	***Strategic***
8	Business Transformations				✓
7	Strategic Systems			✓	✓
6	Inter-Organizational Systems		✓	✓	✓
5	Infrastructure		✓	✓	
4	MIS and DSS		✓		
3	Direct Value Added	✓	✓		
2	Automation	✓			
1	Mandatory Changes	✓			

Source: Farbey. et al. (1993).

3.6 SUMMARY:

IT is increasingly integrated into the cores of businesses and may satisfy the organization's desire of having a competitive edge, but that require IT investments to compete for scarce resources of the orgization which adds pressure on decision makers to have better justification for the investments. Although that sound good, evaluating an IT investment is not an easy task due to the problem inherited from the evaluation itself, the untangling value of IT investment itself, and multi-impact of the IT investment on the organization. Organizations may evaluate IT investment from more than one dimension, evaluations may concentrate on the profitability, the strategic value, the risk, the use and operations, or the development success of the IT investment, and that may depend on a large extent on the reason of the IT investment which may be mandatory, Automation, Direct value added, MIS and DSS, Infrastructure, Inter- organizational systems, Strategic systems or Business transformation.

CHAPTER FOUR

INFORMATION TECHNOLOGY INVESTMENTS EVALUATION METHODS

4.1 INTRODUCTION:

This chapter is divided virtually into two parts. The main purpose of first part is to present a broad review of diverse methods to evaluating IT investments in an organization. The first part does not claim to review all available methods to evaluate IT investments, but rather focuses on a number of the more common or recent techniques. The second part offers a clue about how to select a possible optimal method(s) to evaluate different type of IT investments.

4.2 IT INVESTMENT EVALUATION METHODS:

Evaluation is conducted with the intention to draw the worth out of IT investment. This "worth" is established by understanding the full range of consequences which may include quantitative "hard" and qualitative "soft" ones. A variety of methods have been developed which take into consideration the "hard", the "soft" or both types of consequences. appendix D contains a list of the available methods. The discussion below will start from methods deal with the “Hard" consequences step gradually towards methods deal with the "soft" ones. Furthermore, to facilitate the review of methods which will be discussed, methods have been grouped into four approaches: financial, multi-criteria, indicators and qualitative approach.

4.2.1 Financial Approach:

4.2.1.1 Traditional Financial Approach:

The traditional financial approach is usually prescribed for the evaluation and selection of all corporate investment proposals (Renkema & Berghout, 1997). This approach focus on the incoming and outgoing cash flows as a result of the investment made. Traditional Financial approach could be divided into two groups of techniques; the first group neglects the time value of money. The Payback Method (PBK) and the Accounting Rate of Return Method (ARR) are examples of this group. PBK evaluates a project on the basis of how quickly it takes to pay for itself, whereas ARR divides the average annual income from a project by its initial capital investment. The second group focuses on the evaluation of cash flows, based on the time-value of money, using discounted cash flow (DCF) techniques. DCF techniques reduce all estimated cash

outflows and inflows associated with a given investment or project back to the present, so as to express everything in present dollar terms. Cash flows in different periods and in different projects therefore have a common basis of comparison. Two popular discounted cash flow methods prevail: the Net Present Value (NPV) and the Internal Rate of Return (IRR). The former discounts cash flows, using a time value of money as the discount rate; the latter seeks the discount rate that equals positive and negative cash flows. For an investment to be acceptable respectively, the NPV should be greater or equal to zero, or the IRR should be equal or greater than the time value of money.

Both DCF techniques and non DCF techniques, has received much criticism from many authors (Hochstrasser, 1990; Irani, 2002; Serafeimidis, 1997; Walter & Spitta, 2004). Major problems concern the ability of the method to: value intangible benefits and costs; estimate future cash flows; identify the possibility to properly value management flexibility; and to determine the appropriate discount rate.

The above mentioned techniques and other traditional financial techniques are summarized in table 4.1 due to their great popularity.

Table 4.1: Common financial Evaluation Techniques

Method	Formula	Strength	weaknesses
Simple Cost-Benefit Ratio: A simple ratio of a project's total benefits to the total costs incurred; projects are accepted if their ratio is greater than one or if a firm has a minimum cost-benefit ratio that must be attained	$\frac{TotalBenefits}{TotalCosts}$	• Can easily calculate and compare • Provides a means to rank multiple projects based on capital efficiency	• Ignores time value of money • Fails to consider the timing of cash flows • Ratio is compared to ad hoc and arbitrary yardsticks • Minimum cost-benefit ratio in a firm is arbitrarily set • Can be misleading when comparing multiple projects since this technique is insensitive to the magnitude of the project and its returns • Does not account for qualitative/intangible factors • Ignores risk

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Table 4.1: Common financial Evaluation Techniques (Continued)

Method	Formula	Strength	weaknesses
Payback or Break-Even: Time period needed to recover initial investment expenditure; projects are accepted if their payback periods are deemed appropriate by guidelines established within the firm	$C_o + \sum_{t=1}^{n} C_t = 0$	• Can easily calculate and interpret • Reflects a "real world" in which technology costs decline over time and the technology itself quickly becomes obsolete • Provides a yardstick to complement other techniques like NPV and IRR	• Ignores time value of money • Fails to account for cash flows after payback period • Cutoff period is arbitrary • May be misleading when evaluating mutually exclusive projects • Encourages a short-term, rapid-return focus at the expense of long-term benefits • Does not account for qualitative/intangible factors • Ignores risk
Average Rate of Return on Investment (ARR or ROI): Sometimes referred to as the average return on book value or the accounting rate of return, this formula represents the ratio of average net income of an investment after depreciation and taxes to the average annual investment; projects are accepted when ratio is greater than or equal to company or industry averages	$\frac{Avg.\,Annual\,Income}{Avg.\,Annual\,Investment}$	• Can easily calculate and compare	• Ratio is compared to ad hoc and arbitrary yardsticks • Ignores time value of money, giving too much weight to distant cash flows and insufficient weight to more immediate receipts • Focuses on accounting income, not cash flows, which are affected by how a firm treats depreciation and which cash flows are defined as capital expenditures • Does not account for qualitative/intangible factors • Ignores risk
Profitability Index (Benefit-Cost Ratio): Ratio of a project's present value to the initial investment; projects are accepted when the index is greater than one	$\frac{present\,Value}{Intial\,Investment}$	• Can easily calculate and • Compare • Useful for ranking projects (by greatest NPV per dollars invested) under conditions of capital rationing • Closely resembles net present value	• Can be misleading when comparing mutually exclusive projects • Ratios cannot be summed in the same way values can be added • Does not account for qualitative/intangible factors

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Table 4.1: Common financial Evaluation Techniques (Continued)

Method	Formula	Strength	weaknesses
Internal Rate of Return (IRR): Rate of discount at which a project's NPV equals zero; projects are accepted when the calculable IRR is in excess of the opportunity cost of capital	$\frac{Payoff}{Investment} - 1$	• Widely used and recognized • Brings all projects to common footing. • Can easily compare rates • takes the time value of money into account	• Difficult to calculate for multi-year projects with multiple payoffs • Assumes reinvestment at same rate • Multiple rates of return may exist when there is more than one change of sign in cash flows • May provide inaccurate rankings when comparing investments of different size or different timing of cash flows Incorrectly assumes that net cash inflows can be reinvested at the same rate • Cannot finesse the term structure of interest rates, making it difficult to account for multiple opportunity costs • Does not account for qualitative/intangible factors • does not calculate risk if dealing with mutually exclusive investments
Net Present Value (NPV): Present value of the investment's money flows using a required rate of return or hurdle rate; projects are accepted when investments show a positive NPV	$C_o + \sum_{t=1}^{n} \frac{C_t}{(1+r_t)^t}$	• Theoretically superior method • Accounts for time value of Money • Allows comparison of mutually exclusive projects and projects of unequal duration • Maximizes value for unconstrained project selection, • risk can be calculated when comparing investments	• Some may find this approach more difficult to comprehend and more involved in terms of calculations • The risk-adjusted discount rate can be difficult to determine • Does not account for qualitative/intangible factors • Difficult to compare projects of Unequal lives or sizes

C_o = Initial investment; C_t = Cash flow for time period t; r_t = interest rate for time period t
t = time period (year); n = duration (in years)

Source: Connolly (1999)

4.2.1.2 Alternative financial evaluation approach: The Real Options (ROs):

Real options analysis has been suggested as an alternative financial evaluation technique which takes into account both the uncertainties of future benefits and costs and the investment's strategic value. In other words, Real options analysis can help to assess the risks associated with IT investment decisions, taking into account the fact that business strategies and system requirements may change.

The application of real options (ROs) to evaluate IT investment have been extensively discussed in recent research (Benaroch & Kaufman,1999). Part of these researches focused on valuation decisions for a single project or mega project. For instance, Taudes, Fuerstein, and Mild (2000) used an options model to quantify the benefits of switching from an earlier-generation software, SAP R/2 to the next version, SAP R/3, for a real-world manufacturing company. Similarly, Schwartz and Zozaya-Gorostiza (2003) illustrated the application of the real options for the valuation of the deployment of point-of-sale debit services by a banking network in New England. Other parts of researches provided insight into how real options can be used to evaluate a portfolio of projects which are typically characterized by several interdependencies and sequencing constraints (Bardhan, Bagchi, & Sougstad 2004). A good example of an investment characterized by several interdependencies is the IT infrastructure investments which may provide the option to launch a follow-up or second stage investments in the future. Unless the option value of this flexibility is taken into consideration in the NPV calculation, companies will not be able to justify strategic investments in information technology that provide a longer-term view of business value. In real options analysis, the actual value of IT investments can be expressed by the following formula:

$$\text{NPV (total)} = \text{NPV (infrastructure)} + \text{NPV (second-stage)} \quad (4.1)$$

So by incorporating the NPV of the follow-up investment, an IT infrastructure project with a negative NPV, when evaluated on a stand-alone basis, may have a positive one

The real options model requires two important input parameters: the variance of the NPV of the second stage projects, and the NPV of the second stage project itself. The real options model to determine the value of an option to exchange risky development costs for risky revenues can be expressed by the following equation (Bardhan et al., 2004):

$$V_{opt} = B\,N(d1) - Ce^{-rt}\,N(d2) \qquad (4.2)$$

where,

B = present value of expected project benefits,

C = present value of the expected project costs,

N(.) = cumulative standard probability density function,

$d_1 = [\ \ln(B/C) + (rt + \sigma 2\ t/2)\ ] / \sigma\ \sqrt{t}$

$d_2 = d_1 - \sigma\ \sqrt{t}$

σ^2 = variance of expected project returns

t = time to option expiration

r = risk-free interest rate

The real option technique has the following disadvantages (de Jong., Ribbers, & van der Zee, 1999):

1. the estimation of the input values for the variance and NPV of the second stage project is difficult
2. the model is too simplistic because too many assumptions are being made.
3. the model is too complex to communicate.

However, the Real options technique has the advantage that it overcomes the difficulties in traditional discounting approaches and can compute the value of technology investments more realistically. Further, Real options technique explicitly considers the investments uncertainty/risk and managerial options (Stewart, 2002).

4.2.2 The Multi-Criteria Approach:

In addition to the financial consequences, an IT investment has non-financial consequences that cannot or not easily be expressed in monetary terms. Because of the differences between financial and non-financial consequences, it is difficult to compare the different consequences on an equal basis. Methods from the multi-criteria approach solve this problem by creating one single measurement for each investment. Different variants of multi-criteria methods exist, but their working mechanisms are similar, they start by assigning a number of goals or decision criteria then scores have to be assigned to each criterion for each alternative considered. Also the relative importance of each criterion should be established, by means of weights. The final score of an alternative is calculated by multiplying the scores on the different decision criteria with the assigned weights. The Information Economics (IE) and Analytical Hierarchy Process (AHP) will be discussed in details as examples of multi-criteria approaches

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4.2.2.1 Information Economics (IE):

The IT evaluation method called, Information Economics (IE), was first published in 1988 (Andresen, 2001). Information Economics is a structured framework through which the value and the risk of IT investment can be evaluated. It looks at how system will be developed and used, as well as what benefits the system may bring. The IE provides the mean for selecting IT investment by analyzing three domains: the economic domain, the business domain and the technology domain. Furthermore, each domain's analysis is carried out by investigating multiple factors. In general, Two types of factors are defined: Value factors (indicated by +) and Risk factors (indicated by -). Value factors are per definition adding a positive value to the IT investment whereas risk factors are indicating an increased risk for failure for the IT investment. The three domains and the factors underneath each of them are listed below and illustrated in figure 4.1.

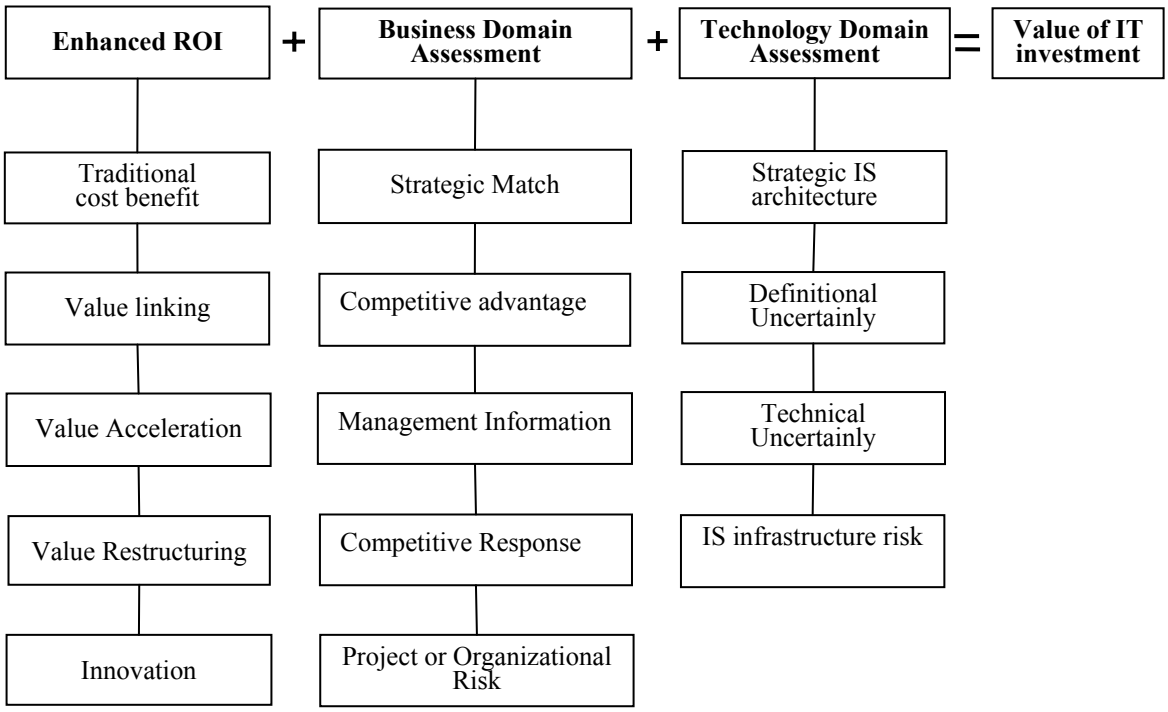

Figure 4.1: The three domains in IE (Andresen, 2001)

1. The **Economic domain** (+)**,** alternatively called enhanced return on investment (ROI), is divided into five factors:

   The traditional cost/benefit analysis

   This factor focuses on the directly quantifiable costs and benefits of the IT investment such as software cost, reduction of operating expenses, etc.

   Value linking (VL)

   In this area all economically quantifiable benefits that are achievable in other business units of the company because of the IT investment usage, are included.

   Value acceleration (VA)

   Quantifiable economic benefits, that are characterized as one-off benefits e.g. reduced time scale for operations, belong to this area.

   Value restructuring (VR)

   Benefits that can be characterized as increasing the employees' time spent on more value

The **business domain** consists of 5 factors, they are as follows:

Strategic match (SM) (+)

How well does the IT investment support the strategic plans in the company? The degree of match between the strategic plans and the IT investment is the focus of this factor.

Competitive advantage (CA) (+)

Implementing the IT investment will provide some competitive advantage to the company. This factor focuses on how significant is the competitive advantage the company achieves by implementing the IT investment.

Management information (MI) (+)

This factor focuses on providing information to the company's managers and on the degree of information support to the managers that is enabled by the IT investment.

Competitive response (CR) (+)

How long is it possible to delay the IT investment without significant reduction of competitive strengths? The factor focuses on how important the IT investment is to the company's position in its business area.

Project and organizational risk (OR) (-)

How large is the organizational risk for failure if the IT investment is implemented? It focuses on the degree to which the organization is capable of carrying out the changes required by the IT investment.

2. The **technology domain** consists of 4 factors, they are as follows:

Strategic IS architecture (SA) (+)

How well does the IT investment fit into the existing IS architecture plans? This factor evaluates the degree to which the project is aligned with the overall information systems strategies.

Definitional uncertainty (DU) (-)

This factor assesses the degree to which the requirement and/or the specification of the IT investment are known.

Technology uncertainty (TU) (-)

How well technically prepared is the company in order to use the IT investment? This factor assessed the readiness of the technology used in the IT investment.

IS infrastructure risk (IR) (-)

This factor focuses on a risk assessment of the degree of non-project investment necessary to accommodate the IT investment.

The final results of IE are two numerical values. The first shows the total value of the IT investment and it is calculated as follow:

1. The economic domain, as a whole, is assigned a mark (ranging from 0 to 5)
2. Each of the Value factors (indicated by +) described in the business and technology domain is assigned a mark ranging from 0 to 5.
3. A weight ranging from 0 to 5 are assigned to The economic domain and the Value factors based on company perspective
4. The total value is calculated by multiplying the positive factors mark by the company's weighting of that factor
5. The total value can range from a minimum of 0 to a maximum of 150

The second output is the total risk. It is calculated the same way as the total value but using the risk (negative) factors instead of the positive factors. The total risk illustrates the risk of failure of implementing the IT investment.

In summary, Information Economics method has many strength points. First, it is a detailed concept which allows evaluators to apply the method directly without having to agree on their own criteria. Secondly, it considers three important domains in an IT evaluation: the economic, the business and technology, both with regards to benefits and risk. Thirdly, using multiple factors in ROI evaluation makes it suitable to estimate the economic impacts of a variety of IT investments. Fourthly, weighting the method's factors according to the company's preferences allow the company to highlight factors with a high priority instead of viewing the evaluation criteria as equally important. The last strength is the flexibility to amend the definition of the existing factors or to add new factors according to the requirements defined by the company. On the other hand, few weaknesses in IE can actually be identified. IE requires considerable expertise in application and is expensive in use due to its in-depth analysis which might make it too complex for the appraisal of simple systems. Some of its concepts are too vaguely defined for a direct application. The prescription of evaluation criteria is in general deterministic and might prove to be too rigid in some situations. Finally, the weight assigned to the factor is based on subjective judgment and is not based on a scientific method.

4.2.2.2 Analytical Hierarchy Process (AHP):

The Analytical Hierarchy Process (AHP), which was developed first by Saaty (1977, 1980), is one of the Multi Criteria Decision-Making (MCDM) approaches to which much attention is being paid recently. AHP can be applied to multi criteria Decision problem in which the decision makers aim at selecting an alternative from a known set of alternatives and they have difficulties in accurately determining the various factor weights.

Analytic Hierarchy Process involves nine phases (see Figure 4.2). For more details about how each phase should be conducted please refer to Huizingh and Vrolijk (1995); Render and Stair (2000); and Saaty (1980).

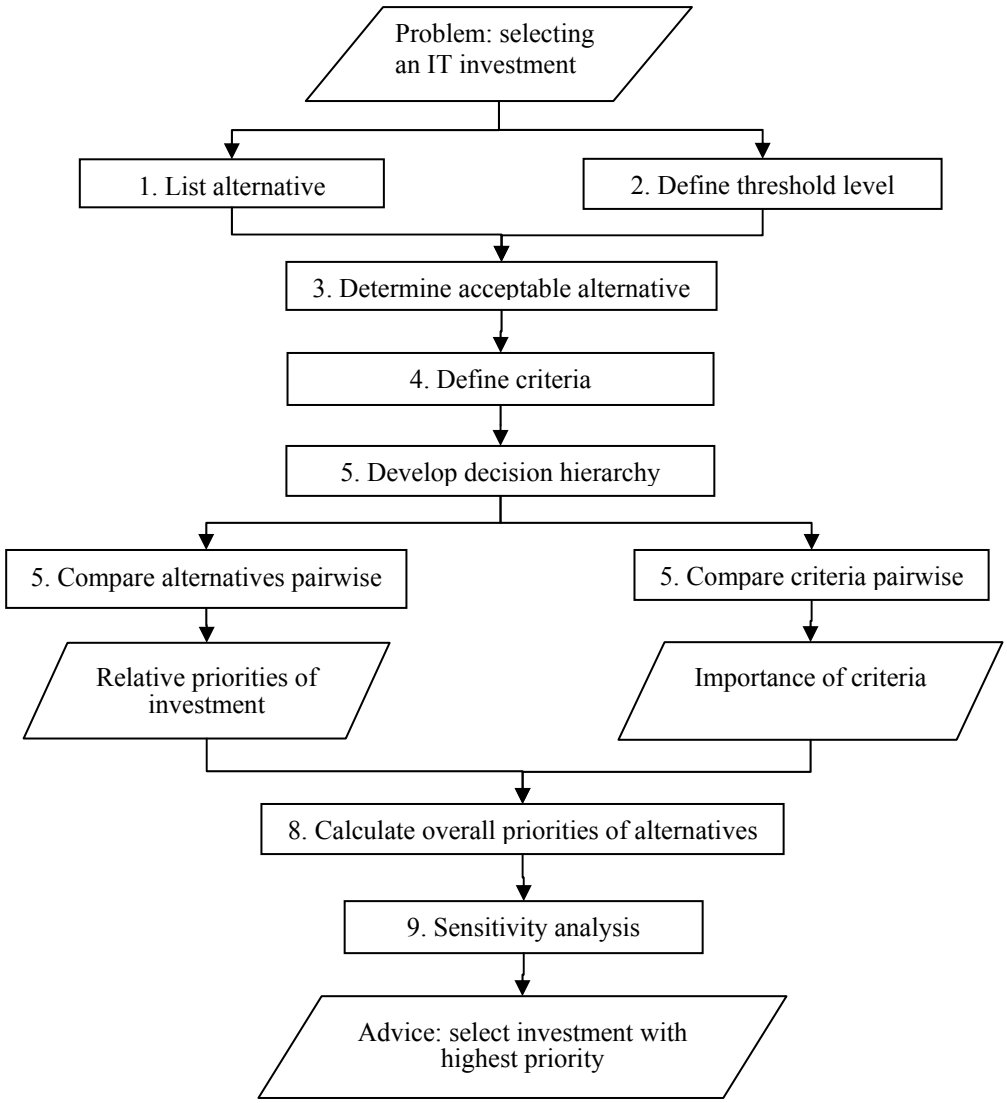

Figure 4.2: Nine phases of Analytic Hierarchy Process (Huizingh & Vrolijk, 1995)

Analytic Hierarchy Process, like every method, has some strengths and weaknesses. Huizingh and Vrolijk (1995) discussed the applicability of AHP as a tool for decision making on IT investment and they conclude the following:

1. AHP incorporates both quantitative and qualitative criteria. Moreover, a criterion can also be divided into sub criteria
2. AHP is a structured and Flexible method. The decision maker can return to any previous phase in order to make some changes without the repeating all judgments. Moreover, changes in the model, such as the addition of an alternative or criterion, have only a limited impact on other parts of the model
3. AHP provides the ability, in several ways, to state and evaluate explicitly the different opinion of every member in the decision making group. First, the members can reach consensus on each pairwise comparison. Then these collective judgments are used by AHP to compute priorities. In the second method each member makes his or her judgments and subsequently these judgements are combined. Different weights can be assigned to different member by adding the members as an additional layer to the decision hierarchy
4. Using an AHP model is quite easy provided that an AHP software package is available. Moreover, the Sensitivity analyses and what-if analyses, which is easy to be carried out by using AHP software package, increase the confidence in the outcome of the analysis
5. While AHP can handle the multiple goals, constraints and risks of IT investment, AHP assumes that all criteria are independent which is sometimes not the case. AHP methods do not apply to problems having resource feasibility, optimization requirements or project interdependence property constraints.

4.2.3 The Indicators Approach:

Indicators have been widely proposed as a means for IT investment evaluation purposes (Walter & Spitta, 2004). Indicators attempt to consider both quantitative and qualitative aspects of the IT investment value. In the indicators approach, quantitative aspects tend to be directly measurable, while qualitative aspects have to be indirectly measured via quantitative surrogates. The Balanced Scorecard (BSC), The King's method, the 4-level model, the boundary values, and the integrated key figures are methods built based on the indicator approach (Walter & Spitta). The next section will discuss The Balanced Scorecard (BSC) in details.

4.2.3.1 Balanced Scorecard (BSC):

Kaplan and Norton (1992) first introduced the concept of "Balanced Scorecard (BSC)." The Balanced Scorecard translates mission and strategy into objectives and measures, organized into four perspectives: financial, customer, internal business process, and learning and growth. researchers adapt the Balanced Scorecard model for measuring and evaluating IT investment. Some major adaptation attempts included "BSC for the IT function" (Grembergen & Bruggen, 1997), the "IS Scorecard" (Martinsons et al., 1999), the "e-Commerce Scorecard" (Hasan & Tibbits, 2000), "the Balanced Scorecard and the IT governance" (Grembergen, 2000), the generic "e-business scorecard" (Grembergen & Amelinckx, 2002), and "the Scorecard for e-Procurement applications" (Vaidya et al., 2002)

In the version adapted by Martinsons et al. (1999), an IT department is seen as an internal service supplier with end-users as customers. Moreover, the original perspectives groups are renamed into user orientation, corporate contribution, operational excellence and future orientation, as illustrated in figure 4.3. This IT-BSC May help managers evaluate IT investments, as well as the performance of an IS organization. The IT-BSC translates perspectives into corresponding metrics and measures that reflect strategic goals and objectives.

One objective in the group "corporate contribution" is, for instance, "control of IT expenses", measured as percentage deviation from the budget or by IT budget per turnover.

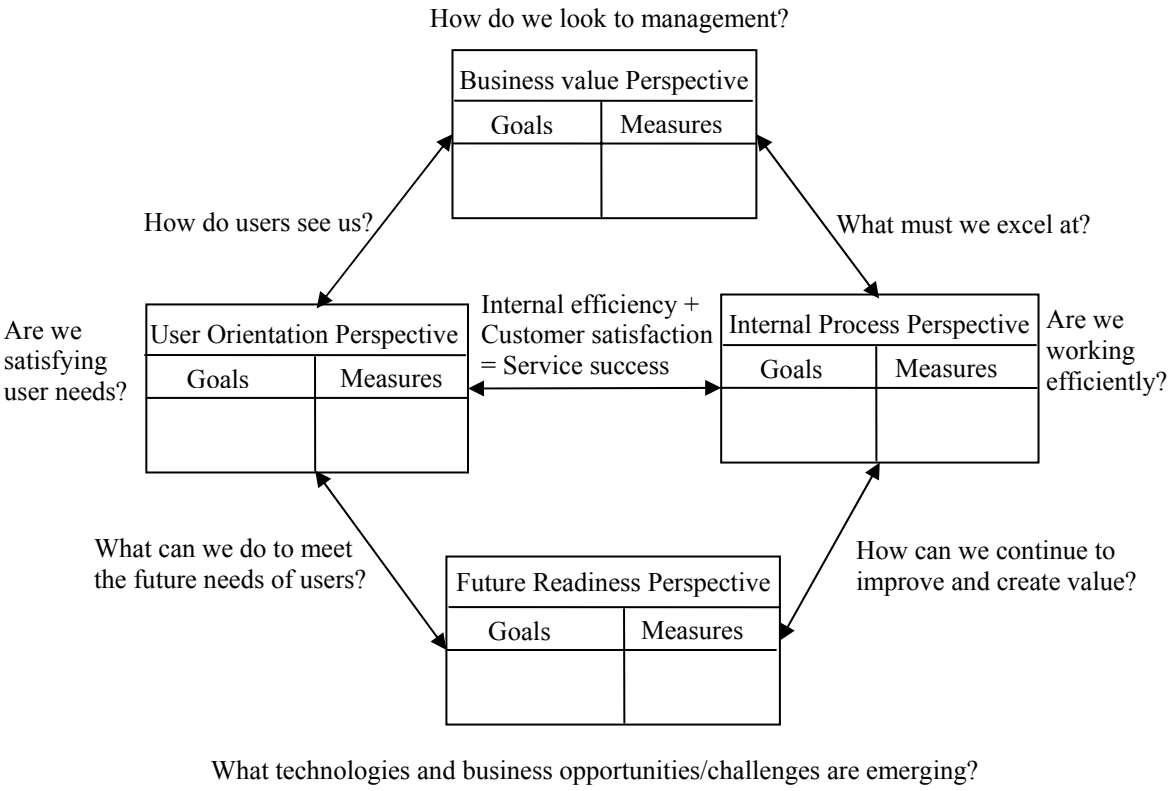

Figure 4.3: The BSC performance measures (Kaplan and Norton 1992)

Overall, the balanced scorecard can be criticized for the following reasons (Walter and Spitta, 2004):

a) It suffers from measurement and construct validity problems.(i.e. qualitative aspects are either disregarded or represented by surrogates of often questionable validity)
b) Using comprehensive indicator systems can be costly in terms of data collection
c) The choice of desired values for indicators is often complicated because the respective underlying objectives might be conflicting.
d) The difficulties to appropriate interpretation of indicators

The balanced scorecard's advantages are that it attempts to focus on the most central measures and intends to combine financial and non-financial as well as past and future-oriented indicators in a holistic way. It can also enhance the overall communication between IT executives and business executives through a harmonization of objectives and actions

4.2.4 Qualitative Approach:

Methods under this approach evaluate IT investments by providing qualitative output (e.g. subjective statements). These methods mainly do not focus on providing a financial output even though it might be part of the completion of the method. The next sections will discuss the Value Analysis (VA) and the Critical Success Factors (CSF) as examples of techniques that use the qualitative approach to evaluate IT investments.

4.2.4.1 Value Analysis (VA):

Value Analysis is an exploratory technique which emphasizes value rather than cost and is used primarily for evaluating concepts such as "better information." (Farbey, et. al., 1993). The method is based on the following three assumptions (Silva, 2003):

a) Innovation is value driven and not cost driven
b) intangibles can be identified and subjectively assessed but rarely measured accurately, and
c) Individuals driven by cost and those driven by effectiveness will inevitably clash.

Value Analysis tries to assess the incremental value, as perceived by decision-makers, of the outputs of a proposed system. The analysis involves a number of procedures (Farbey & Finkelstein, 2001). First an agreed estimate of the value of a proposed investment is established via a multi-stage iterative process (e.g. Delphi procedure). Next, a working model of how the system will work in practice is constructed, for example a prototype. The analysis provides simple models that can be expanded and modified until all complex aspects of the problem are included and a system which is regarded as satisfactory for the cost is evolved.

The main difference between other IT evaluation methods and Value Analysis is that the former methods directly aim at measuring value, while the latter uses an evolutionary process to get to a satisfiable value for intangible outputs which tends to build confidence in the eventual result. Advantages of VA include the following:

a) quick identification of user requirements to establish agreed values for outputs, which would normally be classed as intangible;
b) Improving communication between managerial and technical staff.

c) Adding new features to the output system due to incremental nature of the analysis
d) Usually the output systems receive greater user satisfaction than traditionally developed ones.

However, the method has several disadvantages

a) It takes time and money
b) The method lacks an initial estimate of final costs and benefits, which may commit management to unexpected future expenditures
c) Accuracy of the intermediate stages is not always sure.

4.2.4.2 Critical Success Factors (CSF):

The method Critical Success Factors (CSF) is based on early works developed by J. F. Rockart (Rockart 1979). The original idea of CSF was to help business executives with identifying the key requirements that must be fulfilled to ensure success for a manager or a company. CSF has since been adapted a variety of authors to identify the key requirements to ensure success for an IT investment (Bergeron & Begin, 1989; Nah & Delgado, 2006; Sung &Gibson, 2005; Teo & Ang, 1999)

> "Critical success factors are key areas of broader organizational concerns that have an influence on the success of an IT investment. If the critical success factors are not achieved they will become the major obstacles to further corporate progress and ultimately result in a loss of business" (Andresen 2001)

The implementation of method involves comprehensive interviews with executives to obtain their views about the business mission, objectives, the current problems, and the factors that are, in their opinion, critical to the success of the business. Three major tasks have to be completed when the method is used (Andresen, 2001):

1. Identifying the set of top-level corporate goals by management with regard to the IT investment.
2. Isolating the detailed tasks, processes, and resources needed to optimally achieve the set of goals.

3. Derive a high-level specification of the general tasks required to enable the detailed activities to be performed effectively

The output of CSF is a list of ranked critical success factors for implementing the IT investment. The output is very subjective in nature but represents the stakeholders' view of the IT investment. A detailed description of CSF can be found in (Rockart, 1979).

The advantage of the CSF method is the involvement of the stakeholders in the IT investment. Very few methods involve the stakeholders when evaluating the IT investment, but this is mentioned in the eleventh European conference on IT Evaluation as an important aspect of completing IT evaluations (Berghout & Remenyi 2005).

Another advantage in CSF is that it provides a focus on the issues (or criteria) that are regarded as important by the stakeholders. Other approaches evaluate the IT investment using a number of pre-identified criteria which may, in some cases, highlight issues not considered as relevant by the stakeholders. CSF identifies the criteria that the stakeholders consider as relevant in the evaluation, which enables a more precise evaluation because the criteria used match the stakeholders' perception.

However, The CSF method suffers from limitations that may affect the quality and acceptance of its results, such as (Peffers & Gengler, 1998):

a) The lack of an underlying theory for CSF, which limits its acceptance, compared to methods with strong theoretical bases,
b) The lack of a consistent, effective method to implement the concept, which may result in the use of convenient *ad hoc* methods and inconsistent results,
c) The potential for interviewer bias to affect the validity of the results, because CSF results depend on interviewer knowledge of the business, and
d) The dependence on executives understanding of the CSF concept, which may result in an inability of some managers to contribute meaningfully.

4.3 SELECTING IT EVALUATION METHODS:

In the previous part we reviewed a diversified set of the evaluation methods which could be used to evaluate IT investments, and the question which raises now: which evaluation method is the best? Many researcher (Farbey et al., 1993; Hochstrasser, 1990; Willcock, & Lester, 1996) believe that there is no one best way to evaluate all types of IT investments. These authors suggested that firms apply a contingency theory approach to decision-making, where the type of investment and the context of the investment determine the criteria or the evaluation method to be used in evaluating that investment.

Farbey et al (1992) have developed a framework shown in figure 4.4 with the purpose to decide which methods to use when evaluating IT investments. They argue that IT investment should be classified based on five groups of factors which influence evaluation: the role of evaluation, the decision environment, the system characteristics, the organization characteristics, and the cause and effect relationships between an investment and its benefits.

		Role of IT	
		Conservative	*Radical*
		Tactical Quantifiable Simple Support System Follower Certain Impact	Strategic Qualitative Sophisticated Core System Leader
Evaluation Constrains			
Well defined	Specification Stage Standard Decision procedure Numbers important Specific Application Stable Environment Direct Impact	Return on investment Payback Cost/Revenue	Cost Benefit analysis
Fuzzy	Requirement Stage Ad-Hoc Procedure Numbers not important Infrastructure Turbulent environment Indirect Impact	Experimental methods Multi- objective Multi-criteria Prototyping Simulation Game/Role Play User Satisfaction	Boundary Value Critical Success Factor Return on Management Value analysis

Figure 4.4: Summary matrix of matching the investment characteristics and evaluation methods, adapted from (Farbey *et al.*., 1992)

Below is a detail explanation of the five group

Role of evaluation – The choice of a suitable technique will depend upon whether the evaluation is taking place early in the project's planning (the requirements stage) or late (the specification stage). It will also depend upon the level at which the evaluation is being carried out, whether tactical or strategic.

Decision environment - IT decisions do not occur in a vacuum and the choice of evaluation method should match the culture of the organization. This dimension has four sub-dimensions:

1. The decision process: whether it is standard for all projects or *ad hoc*
2. The type of benefits the project is anticipated to bring: whether they are hard and easi1y quantifiable or soft and qualitative.
3. The importance of numbers: whether or not an attempt has to be made to attach numbers to all benefits and costs.
4. The cost of the justification technique: whether simple (cheap) methods only can be used or whether sophisticated (expensive) ones are acceptable.

The system characteristics - The criteria by which a system should be judged must reflect the nature and purpose of that system. This can be described by two variables. The first variable is the nature of the system: whether it is a specific application or provides an infrastructure. The second variable is the relation of the system to the business: whether the system is in a supporting role (e.g. archiving) or core (at the heart of the company's production and delivery chain).

The organization characteristics - The competitive position of the organization may also affect the evaluation. These can be described by two factors. The first factor is the industry situation: whether it is stable or whether there is, or is forecast, a lot of change: re-structuring, turbulence and high levels of IT development. The second factor is the leadership role of the company: whether it aims to pioneer or to follow

Cause and effect relationship - The degree to which it is possible to predict the impact of the new system is an important factor in determining how to perform an evaluation. The impact can be described by two variables, The first variable is the extent to which the benefits are directly related to the system being evaluated The

benefits of the new system may be direct or indirect; it could directly show result e.g. a pay role system will directly reduce costs (direct), or it may depend on something or someone else e.g. the capability of the manager to use information to perform better decision-making in order to deliver the expected benefit (indirect). The second variable defines the degree of uncertainty with which the impact of the new system can be predicted.

The process of matching the IT investment to the evaluation method consists of the three stages;

1. Representing the circumstances of the project which is to be evaluated as points on the matrix.
2. Using the information about evaluation techniques to locate each technique at some point on the matrix.
3. Overlaying the matrixes to match project with technique.

4.4 SUMMARY:

In this chapter a broad review of diverse methods to evaluating IT investments in an organization are presented. The review started by presenting the financial methods which include those traditionally used by accountants. They are structured in nature and based on the assignment of cash values to tangible costs and benefits, but they largely ignore intangible factors. The real option theory is an advance financial technique which provides a solution to the uncertainties underlying IT investment decisions and the ability to incorporate the impact of flexibility on project. Multi-criteria approaches are less structured in nature, but they combine tangible and intangible investment implications, Multi-criteria approaches usually create a single numerical measure for each investment. Indicator approaches combine financial and quantitative non-financial factors to provide several measures for the investment value.

In conclusion, The IT literature is replete with innovative methods to surmount the theoretical problems of IT evaluation. Yet firm should select the method or methods that best fit with the type and the context of the IT investment they wish to evaluate.

CHAPTER FIVE

RESEARCH METHODOLOGY

5.1 INTRODUCTION:

This chapter contains a thorough description of how this research is conducted. We will give cause for which method and approach we have chosen as well as the different types of data collected. Furthermore, we will discuss the validity and reliability of the research.

5.2 RESEARCH PHILOSOPHY AND APPROACH:

In all disciplines the principle purpose of the research is to add to the body of established knowledge by addressing some of the myriad unanswered questions (Remenyi and Williams 1995). The Researches philosophies depends on the way the researcher think about the development of knowledge (Saunders, Lewis, and Thornhil, 2003). Positivism and Interpretivism are the two major research philosophies opposite poles. Positivism has been defined as "an organized method for combining deductive logic with precise empirical observations of individual behavior in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity" (Neuman, 1994; as cited in Lin, 2002). Positivist research is concerned with the empirical testability of theories in order to discover the general principles or laws which govern the natural and social world (Orlikowski & Baroudi, 1991). Positivists claim that reality can be observed and described objectively without interfering with the phenomenon being studied. In a positivist view it is common to use a deductive way of work in which existing principles and theories are used to form a hypothesis in order to draw conclusions. Moreover, there will be an emphasis on a highly structure methodology to facilitate replication and on quantifiable observation that lend themselves to statistical analysis

On the other hand, interpretivism has been defined as "the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds" (Neuman. 1994; as cited in Lin, 2002). Interpretive research aims to understand phenomena from the point of view of participants directly involved with the phenomena under investigation (Orlikowski & Baroudi, 1991). Interpretivists claim that reality can only be understood by subjectively interpreting observations of reality. In an Interpretivists view it is common to use an inductive way of work in which data is first collected and later the theory will be built based on the collected data analysis. The Interpretivist argues that generalizability is not of a crucial importance, but what

important is the in-depth insight into the details of the situation to understand the reality or perhaps the reality working behind them.

This research is based on Positivism philosophy and the knowledge will be developed by using the deductive approach. There are three reasons for advocating such a research philosophy and approach. First of all, the phenomenon that is under test in this research is already studied by previous researches and some theories have been already developed in this field. Secondly, the researcher aim to describe the phenomenon and to test causal relations in a generalized form .third, the researcher (me) is independent of and neither affects nor is affected by the subject of the research

Generally, quantitative studies are often associated with a deductive approach, while qualitative methods are associated with an inductive approach (Saunders al et., 2003). Lin (2002) illustrated the following seven basic differences between the qualitative and the quantitative methods:

1. The quantitative researcher attempts to arrive at an understanding of facts from the outsider's perspective while the qualitative researcher focuses on the perspective of the insider.

2. The quantitative researcher focuses on the accumulation of facts and causes of behaviour and believes that the facts gathered do not change while the qualitative researcher is concerned with the changing or dynamic nature of reality.

3. The quantitative researcher structures the situation by identifying and isolating specific variables for study and by employing specific measurement devices to collect information on these variables. In contrast, the qualitative researcher attempts to gain a complete or holistic view of what is being studied by gathering a wide array of data such as records, documents, observations, interviews or even quantitative data.

4. The quantitative researcher tends to tightly structure and design the procedures in order to verify or disprove predetermined hypotheses. On the other hand, the qualitative researcher tends to use flexible and exploratory procedures to gain a deeper understanding of what is being investigated.

5. The quantitative researcher focuses on the objective data that exist apart from the feelings and thoughts of individuals and is typically expressed in numbers. The

qualitative researcher focuses on subjective data that exist within the minds of individuals and is typically expressed or reported through language.

6. Usually quantitative data are collected under controlled conditions in order to rule out the possibility that variables other than the ones under study could account for the relationships among the variables. In contrast, qualitative data are collected within the context of their natural occurrence.

7. The quantitative researcher focuses heavily on reliability while the qualitative researcher tends to concentrate on validity.

Again, the choice between the qualitative or quantitative method depends on the purpose of the research (Saunders al et. 2003). In This research, we search for knowledge that is to be measured, described and explained in our reality. Hence, the Quantitative method was selected because we believe that it will provide more scientific rigor and objectivity and, will therefore, support actual theory testing. Moreover, the resulting products of quantitative method are said to have greater validity, generalizability, and replicability and, hence, provide greater theoretical contributions.

5.3 RESEARCH STRATEGY:

Research strategy is a general plan about how the research question will be answered. It specifies the source from which the data will be collected (Saunders al et. 2003). Galliers (1992) identifies eight major research strategies currently being applied in the information systems research field. Appendix E contains a detail explanation about each of these research strategies which they are: laboratory experiments; field experiments; forecasting/future research; simulation; phenomenological studies; action research; surveys; and case studies.

Moreover, Research strategy is a way to carry out an inquiry system into a phenomenon being studied (Shanks, Rouse, & Arnott, 1993). Enquires (researches) can be classified in term of their purpose into:

1. *Exploratory research :* It is aimed at formulating more precise questions that future research can answer. Exploratory researchers frequently use qualitative research methods.
2. *Descriptive research:* It attempts to analyze and describe the specific details of a situation, organizational setting or practice. The aim is to take a well-defined subject and describe its structure and function accurately. It focuses on questions such as how did it happen, who was involved, and what did they do and what were the results. It is not concerned so much with the question of why. It can be used to test theory about the structure of a situation, and to disconfirm hypotheses.
3. *Explanatory research:* It attempts to answer the question of why things happened. Research with this objective usually employs methods which allow for a high level of control such as experimental methods.

In addition to identifying the Enquires type, there are another three aspects need to be considered in order to select an appropriate information technology research strategy Galliers (1991). They are:

1. Whether the research will focus on information technology as it impacts on society, on organisations or groups, or on the individual;
2. Whether the research will also focus on the technology itself or on methodological considerations; and
3. Whether the research is concerned with theory building, theory testing, or theory extension.

The recommended criteria proposed by both Galliers (1991) and Shanks et al. (1993) along with eight strategies identified by Galliers (1992) are combined in a matrix format to form the basis for selecting the most appropriate research strategy for this research as shown in Table 5.1.

Table 5.1: selection of a research strategy

Criteria group		Laboratory Experiments	Field Experiments	Forecasting /Future Research	Simulation	Phenomenological Studies	Action Research	Surveys	Case Study
1	Exploratory	No	No		Yes	Yes	Yes	maybe	Yes
	Descriptive	No	No		No	Yes	Yes	Yes	Yes
	Explanatory	Yes	Yes		No	Maybe	No	maybe	maybe
2	Society	No	Maybe	Yes	Maybe	Yes	maybe	Yes	maybe
	Organization/ Group	Maybe	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Individual	Yes	Yes	Maybe	Yes	Yes	maybe	maybe	maybe
3	Technology	Yes	Yes	Yes	Yes	maybe	No	maybe	No
	Methodology	No	Yes	No	Yes	Yes	Yes	Yes	Yes
4	Theory building	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Theory testing	Yes	Yes	No	Maybe	Maybe	Maybe	Maybe	Maybe
	Theory extension	Maybe	Maybe	No	No	Maybe	Maybe	Maybe	Maybe
	Match Objectives?	No	No	No	No	Yes	Yes	Yes	Yes

Source: adapted from Galliers (1991); & Shanks et al. (1993)

The main objective of this research is to describe the practices of IT investment evaluation and in the banking sector in Palestine. Hence, this research is mainly descriptive in nature (the answer to the first criterion). Furthermore, the prime focus of this research is how the banks or a group of people inside a bank handled these processes and practices. Therefore, this research study was focused on the organizations (the answer to the second criteriaon) and the methodologies (the answer to the third criterion) finally, the researcher's concern is simply to describe a situation, make comparisons between different studies and to test the applicability of the formulated hypotheses (the answer to the forth criterion)

The last row in table xxx shows that Phenomenological Studies; Action Research; Surveys; and Case Studies can be adopted as a strategy of this research. A farther thorough investigation is carried below to refine our list and to select the most appropriate strategy for this research.

Phenomenological studies are based more on opinion and speculation rather than observation and place a greater emphasis on the role and perspective of the researcher (Vogel & Wetherbe, 1984; as cited in Coombs, 1999). Its strengths lie in the creation of new ideas and insights. Its weaknesses arise from the unstructured, subjective nature of the process and its inability to identify researchers' biases. Moreover, this approach would not be easy for an inexperienced researcher to follow as it relies heavily on the skills of the researchers and their ability to identify their biases (Galliers, 1991). As a result, this strategy was not chosen for this research study.

Action research is a total process in which a problem situation is diagnosed, remedial action planned and implemented, and its effects monitored. The application of Action is usually restricted to a single event/organization and consequently, there are problems associated with making generalizations from Individual studies. In addition to the above reason, this strategy was excluded mainly because it would be difficult to get an organization to agree to be the subject of an action research within the time limit of this research.

Case study strategy involves small number cases. It involves in-depth analysis through interviews or group discussions of a number of cases from which conclusions are drawn. The weaknesses of case study are the lack of controllability, deductibility, repeatability and generalisability. In fact, the major reason to exclude the case study is the access problem especially to the banks located in the west bank.

The survey strategy is usually associated with the deductive approach. It is a popular and common strategy in business and management research. It allows the collection of a large amount of data from a sizeable population in a highly economical way. the data collected by the survey strategy may not be as detailed as those collected by other research strategies, but they are standardized and can be easy compared with other data obtained from other survey. In addition the survey strategy is perceived as authoritative by people in general (Saunders al et. 2003).

Survey strategy was chosen to accomplish the research objective because the survey was able to get an overview of the practices of IT investment evaluation more quickly and efficiently than any of the research methods mentioned above. In addition, it had enabled the researcher to conduct a descriptive study by focusing on how these practices have been carried out and impacted the banks.

5.4 TARGET POPULATION:

This research is to investigate the practices of IT investments evaluation in the banking sector in Palestine which usually took places at the regional or head offices of the banks. So the potential population would include all members of the steering committee that make decision about IT investment in the 21 banks operate in Palestine. The members who participate in the steering committee vary from bank to bank and from time to time, but the steering committee usually consists of the bank executive manager, his assistance, the chief information officer, and may be the functional managers.

At the beginning of this research, we tried to investigate the opinion of all members of the steering comities, but later, and due to the access problem we faced, we decide to limited our study to be based on the views of the chief information officer of the 21 bank that operate in Palestine. So the census method will be used to collect the data due to the small size of the target population which is 21 chief information officers of the 21 banks operate in Gaza strip and the West Bank.

While we believe that the richness of the information we intend to collect is not affected dramatically by limiting our research only to the views of the chief information officers, we clearly stated that this research represent the “IT Management perspectives" by adding this phrase to the title of this dissertation.

5.5 DATA COLLECTION:

The data sources available to the researcher can be classified as secondary or primary. Secondary data can be defined as information that has already been collected, by for instance previous researchers or by public authorities for their own use. Primary data are data that has not been collected by anyone but has to be collected by us for this specific study.

This dissertation is based on both secondary and primary data. This section will discuss the secondary data as well as the primary in this dissertation and how they have been collected.

5.5.1 Secondary Data In The Research:

At the beginning of this research it was wise to seek information about the subject that has already been collected by other researchers. Most of the secondary data that have been used in the theoretical chapters have been obtained from:

a) books, journals and articles published free on the internet
b) thesis and dissertation available at the university library or from the online libraries of other universities
c) Papers from the online EBSCO resources Database available to the IUG students
d) Papers received directly from their authors by contacting them through e-mail.

Moreover, information about banks in Palestine and their financial data are obtained from the Palestine Monetary Authority either by contacting them directly or from their web site.

5.5.2 Primary Data In The Research:

The questionnaire survey was chosen as one method of primary data collection. The main reasons for selecting the questionnaire as a research instrument include: questionnaires are relatively inexpensive. Secondly the analysis of the data is relatively uncomplicated. Thirdly, it is confidential. Fourthly it is possible to survey a large population in a short period of time. Finally, it is an easy mean to contact respondents located in west bank. A questionnaire provides reliable information as respondents are more likely to answer questions truthfully when their identity is undisclosed.

5.5.2.1 Questionnaire Design

The purpose of survey in the form of a questionnaire is to obtain an overview of IT investments evaluation practices in the Banking sector in Palestine. The researcher sought to compare theory and practice of IT investment evaluation by banks operates in Palestine to serve as a basis for understanding and developing these practices.

The research instruments (Questionnaire) were produced in a three-phase process. Firstly, from the intensive literature review, secondly from consultation with professional, and finally from a pilot study.

In phase one, the questionnaires from previous studies was collected either directly from the internet or by contacting the author. The suitable questions from the collected questionnaires were collected and adapted in some cases.

In phase two, two independent professionals, were asked to give their comments about each item in the first draft questionnaire, the size , the layout of the questionnaire and time needed to complete the survey, etc. A summary of their feedback is as follows:

a) Some attribute variables could be collected directly from secondary data sources
b) Survey scale needs to be reduced from a 7 point to 5 point scale; and
c) Questionnaire size needs to be reduced.
d) The wording of some questions need to be changed
e) They suggested translating the questionnaire to the Arabic language

Through obtaining feedback from these professionals, there was an opportunity for rephrasing some of the ambiguous questions, improving the layout of the questionnaire, and determining the time required for completing the questionnaire. Moreover, an Arabic version of the questionnaire was prepared with great attention to typically match the English version in the contents and the layouts. The Arabic version reviewed by the supervisor and approved

5.5.2.2 Pilot Study:

It is customary practice that the survey instrument should be piloted to measure its validity and reliability and test the collected data. The pilot study was conducted by distributing the prepared questionnaire to panels of experts having experience in the same field of the research to have their remarks on the questionnaire.

Expert representing two panels were contacted to assess the questionnaire validity. The first panel was asked to verify the validity of the questionnaire topics and its relevance to the research objective. The second panel, which consisted of two experts in statistics, was asked to identify that the instrument used was valid statistically and that the questionnaire was designed well enough to provide relations and tests among variables.

Expert comments and suggestions were collected and evaluated carefully. All the suggested comments and modifications were discussed with the study's supervisor before taking them into consideration. At the end of this process, some minor changes, modifications and additions were introduced to the questions and the final questionnaire was constructed.

5.5.2.3 Questionnaire administration:

The completed survey kits were ready to be distributed, The survey kit contained The Arabic and English versions of the questionnaire attached with a cover letters in their language to explain briefly the purpose and the aim of the survey. At the end of the cover letters, the researchers had promised the respondent that their responses and identity would remain strictly confidential in order to maximize the potential response rate

The survey was conducted over the months of January and February 2007 where completed survey kits were distributed to the banks in two different ways. The survey kit was delivered by hand to the Chief Information officers of the three banks with head quarter in Gaza strip. Usually the meeting with the CIO arranged previously through a key person who work in the bank and have a friendship or academic relation with the researcher or his supervisor. The meeting with CIO usually last for five minutes in which an introduction about the purpose of the survey is presented verbally.

Regarding banks with headquarter located in West bank, we tried to submit the survey kit to their branches in Gaza Strip. Unfortunately this way did not work and we received only tree questionnaire from the eight questionnaire distributed in this way.

A second trial was initiated by contacting the CIO directly through phone. The conversations are started with asking the CIO about the electronics delivery channel offered by their banks. This small phone survey tends to be a favor subject to the CIO which facilitate requesting them to participate to fill the longer questionnaire after explaining its purpose verbally. To facilitate filling the questionnaires, they were transformed to MS word form format in which automatic check boxes replaced the ordinary ones and a text field replaced the free spaces. The survey kit was sent to the CIO through e-mail with delivery and read tracking request to ensure that the email was delivered and read by the recipients.

Two weeks later the first reminder were sent to CIO whom did not reply and a thanks letter was sent to the one who submitted their filled questionnaires.

A second reminder was sent ten days later in which we kindly requested from them to submit their reply with in a week.

A third reminder was sent The CIO who did not reply to the second ones. This time a dead line was assigned. Two days after the dead line, phone conversations were conducted with the one who did not reply and all of them apologized for one reason or another they will not be able to participate. At this point we decided to end the collection session and to move to the next step in our research.

5.5.2.4 Questionnaire Description:

The questionnaire survey issued to the respondents is shown in Appendix F. The questionnaire contained 29 closed-ended questions, with mixture of yes/no, quantity, category, scale, and grid questions. The closed response format is easier to code, takes less of the respondents' time, is easier to compare responses, was less biased and ensures that respondents use the researcher's frame of reference. Some space was reserved for additional, individual comments.

The survey was designed with four parts. The first part is divided into section, the first section of part one focused on the respondents' characteristics while the second section of part one focused on the IT characteristics in their bank. Part one included ten questions such as the respondents' educational level, the years of experience, and the major of study. In addition, it contained question about the IT in the responding banks in term of spending

level, the number and size of IT projects, the number of IT employees, and the position of CIO to the CEO.

In the second part, respondents were requested to category the role of IT in their bank and to rate the type of IT Investment that are implemented or will be implemented and why they are justified. Part two consist of four questions in which question 12 and 13 combined in a grid question format.

The third part concentrated on the current IT investment evaluation practices of the respondents' bank. The twelve questions in this part distributed between questions checking the formality of the evaluation practice, question checking the impact of current evaluation practices on the success IT investments themselves or the bank in general, and question searching the reasons behind the current practices.

The last part consists of two questions in which question 29 represented the longest question in the whole questionnaire. This part concerned with the importance and the type of analysis and the methods used for evaluating IT investments. At first, the respondents asks to rate the importance of the methods by grouping them into five analysis type, then they were asked to rate how often every individual method used by their bank in their practical life.

5.6 DATA ANALYSIS:

To achieve the research goal, researcher used the statistical package for the Social Science (SPSS) for Manipulating and analyzing the data. The researcher utilize the following statistical tools :

1. Frequencies and Percentile
2. Alpha- Cronbach Test for measuring reliability of the items of the questionnaires
3. Person correlation coefficients for measuring validity of the items of the questionnaires.
4. spearman –Brown Coefficient
5. One Sample T Test

5.7 EVALUATION OF THE RESEARCH:

Selection of a research instrument affects the validity and reliability of the research, in the following two sections the research will be evaluated based on the validity and reliability of the questionnaire that used as a research instrument.

5.7.1 Validity of The Questionnaire:

Validity refers to the degree to which an instrument measures what it is supposed to be measuring (Pilot and Hungler,1985). Validity has a number of different aspects and assessment approaches. There area two ways to evaluate instrument validity: content validity and statistical validity, which include criterion-related validity and construct validity.

5.7.1.1 Content Validity of the Questionnaire:

Content validity test was conducted by consulting two groups of experts. The first was requested to evaluate and identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to evaluate that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts did agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

5.7.1.2 Statistical Validity of the Questionnaire

To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (person test) which measures the correlation coefficient between each paragraph in the field and the whole field. The second test is structure validity test (person test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of similar scale.

5.7.1.2.1 Criterion Related Validity:

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of nineteen questionnaires, through measuring the correlation coefficients between each paragraph in one field and the whole filed. Table 5.2, 5.3, and 5.4 shows the correlation coefficient and p-value for each field paragraph. As show in the table the p-Values are less than 0.05 or 0.01 except for the item F and H which were taking about new concepts (Inter-organizational systems and Business transformational systems), so the correlation coefficients of most field are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

Table 5.2: correlation coefficient of the items of the fields 12 to 18 in the questionnaire

Field	Items	Person correlation	Significance level
Types of systems in which the bank has invested	**A**	0.615	0.005
	B	0.481	0.037
	C	0.820	0.000
	D	0.767	0.000
	E	0.787	0.000
	F	0.382	0.107
	G	0.781	0.000
	H	0.439	0.060
Types of systems in which the bank intends to invest	**A**	0.674	0.002
	B	0.832	0.000
	C	0.862	0.000
	D	0.711	0.001
	E	0.893	0.000
	F	0.443	0.075
	G	0.837	0.000
	H	0.279	0.262
Reasons used to justify IT project	**A**	0.744	0.000
	B	0.727	0.000
	C	0.753	0.000
	D	0.452	0.052
	E	0.840	0.000
	F	0.758.	0.000
The availability of a written IT strategy		0.758	0.000
Elements included in your IT strategy	**A**	0.528	0.020
	B	0.485	0.041
	C	0.459	0.048
	D	0.580	0.012
	E	0.640	0.004
	F	0.758	0.000
	G	0.528	0.020
The availability of formal IT investment evaluation instructions		0.893	0.000
Elements included in the formal evaluation instructions	A	0.805	0.000
	B	0.721	0.001

Table 5.3: correlation coefficient of the items of the fields 19 to 27 in the questionnaire

Field	Items	Person correlation	Significance level
The procedures used to justify proposed IT Investment	**A**	0.609	0.007
	B	0.845	0.000
	C	0.746	0.001
The effectiveness of each procedures used for IT investment evaluation	**A**	0.669	0.005
	B	0.743	0.001
	C	0.652	0.005
the responsible for the IT evaluation process	**A**	0.808	0.000
	B	0.678	0.003
	C	0.760	0.001
	D	0.625	0.017
	E	0.546	0.016
	F	0.536	0.048
The degree of carrying out the evaluation at the feasibility stage		0.546	0.016
Reasons for not evaluating IT Investment	**A**	0.814	0.000
	B	0.793	0.000
	C	0.554	0.017
	D	0.801	0.000
	E	0.796	0.000
	F	0.847	0.000
	G	0.891	0.000
	H	0.622.	0.006
	I	0.742	0.000
Problems encountered during IT investment evaluation at the feasibility stage	**A**	0.526	0.021
	B	0.554	0.017
	C	0.630	0.005
	D	0.601	0.008
	E	0.773	0.000
	F	0.788	0.000
	G	0.670	0.003
	H	0.531	0.023
	I	0.775	0.000
	J	0.848	0.000
	K	0.472	0.048
	L	0.663	0.003
The Development to the IT investment evaluation practices	**A**	0.829	0.000
	B	0.927	0.000
	C	0.898	0.000
	D	0.832	0.000
The satisfaction with the evaluation practice	**A**	0.957	0.000
	B	0.896	0.000
	C	0.892	0.000
The success of implemented IT Investment	**A**	0.812	0.000
	B	0.845	0.000
	C	0.914	0.000
	D	0.861	0.000

Table 5.4: correlation coefficient of the items of the fields 28 and 29 in the questionnaire

Field	Items	Person correlation	Significance level
The importance of the five general types of analysis	**A**	0.651	0.003
	B	0.509	0.026
	C	0.541	0.017
	D	0.847	0.000
	E	0.678	0.001
Methods used for strategic analysis	**A**	0.849	0.000
	B	0.665	0.002
	C	0.789	0.000
	D	0.892	0.000
	E	0.731	0.000
	F	0.550	0.015
	G	0.793	0.000
Methods used for profitability analysis	**A**	0.860	0.000
	B	0.898	0.000
	C	0.896	0.000
	D	0.863	0.000
	E	0.697	0.001
	F	0.805	0.000
	G	0.815	0.000
	H	0.579	0.012
Methods used for risk analysis	**A**	0.616	0.006
	B	0.741	0.000
	C	0.711	0.001
	D	0.585	0.008
	E	0.714	0.001
Methods used for Development analysis	**A**	0.678	0.001
	B	0.820	0.000
	C	0.834	0.000
	D	0.792	0.000
Methods used for use/operation analysis	**A**	0.733	0.000
	B	0.658	0.002
	C	0.568	0.011

The value of r at df (17) and significant level (0.01) = 0.575
The value of r at df (17) and significant level (0.05) =0.456

5.7.1.2.2 Structure Validity of the Questionnaire:

Structure validity is the second statistical test that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of liker scale.

As shown in table 5.5 the significance values are less than 0.05 or 0.01, so the correlation coefficients of all the fields are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the study .

Table 5.5: Structure validity (correlation coefficient between one filed and all the fields of the questionnaire)

No.	Criteria	Person correlation coefficient	*p-value*
12	**Types of systems in which the bank has invested**	0.461	0.047
13	**Types of systems in which the bank intends to invest**	0.616	0.006
14	**Reasons used to justify IT project**	0.664	0.002
16	**Elements included in your IT strategy**	0.569	0.053
19	**The procedures used to justify proposed IT Investment**	0.730	0.000
20	**The effectiveness of each procedures used for IT investment evaluation**	0.499	0.030
21	**responsibility of the IT evaluation process**	0.600	0.007
23	**Reasons for not evaluating IT Investment**	0.561	0.013
24	**Problems encountered during IT investment evaluation at the feasibility stage**	0.487	0.034
25	**The Development to the IT investment evaluation practices**	0.804	0.000
26	**The satisfaction with the evaluation practice**	0.754	0.000
27	**The success of implemented IT Investment**	0.771	0.000
29	**Methods used In IT investment evaluation**	0.532	0.023

The value of r at df (17) and significant level (0.01) = 0.575
The value of r at df (17) and significant level (0.05) =0.456

5.7.2 Reliability of the Questionnaire:

The reliability of an instrument is the degree of consistency which measures the attribute; it is supposed to be measuring (Polit & Hunger,1985). The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability can be equated with the stability, consistency, or dependability of a measuring tool. The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (Polit & Hunger, 1985).

It is difficult to return the scouting sample of the questionnaire-that is used to measure the questionnaire validity to the same respondents due to the different work conditions to this sample. Therefore two tests can be applied to the scouting sample in order to measure the consistency of the questionnaire. The first test is the Half Split Method and the second is Cronbach's Coefficient Alpha.

5.7.2.1 Half Split Method:

This method depends on finding Pearson correlation coefficient between the means of odd questions and even questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation:

Consistency coefficient = $2r/(r+1)$, where r is the Pearson correlation coefficient. The normal range of corrected correlation coefficient $(2r/ r+1)$ is between 0.0 and + 1.0 As shown in Table 5.6, all the corrected correlation coefficients values are between 0.0 and +1.0 and the significant (α) is less than 0.05 so all the corrected correlation coefficients are significance at $\alpha = 0.05$. It can be said that according to the Half Split method, the dispute causes group are reliable.

Table 5.6: Split-Half Coefficient method

No.	Criteria	person-correlation	Spearman-Brown Coefficient	Sig. (2-Tailed(
12	**Types of systems in which the bank has invested**	.68920	0.816008	0.000
13	**Types of systems in which the bank intends to invest**	.66950	0.802037	0.000
14	**Reasons used to justify IT project**	.51720	0.681782	0.000
16	**Elements included in your IT strategy**	.84960	0.918685	0.000
19	**The procedures used to justify proposed IT Investment**	.73330	0.846132	0.000
20	**The effectiveness of each procedures used for IT investment evaluation**	.85650	0.922704	0.000
21	**responsibility of the IT evaluation process**	.68390	0.812281	0.000
23	**Reasons for not evaluating IT Investment**	0.74364	0.74364	0.000
24	**Problems encountered during IT investment evaluation at the feasibility stage**	0.771348	0.771348	0.000
25	**The Development to the IT investment evaluation practices**	.85770	0.92345	0.000
26	**The satisfaction with the evaluation practice**	.74040	0.850839	0.000
27	**The success of implemented IT Investment**	0.791322	0.791322	0.000
29	**Methods used In IT investment evaluation**	0.5742	0.729513	0.000

5.7.2.2 Cronbach's Coefficient Alpha:

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency. As shown in Table 5.7 the Cronbach's coefficient alpha was calculated for the first field of the causes of claims, the second field of common procedures and the third field of the Particular claims. The results were in the range from 0.7154 and 0.8975. This range is considered high; the result ensures the reliability of the questionnaire.

Table 5.7: Reliability- Cronbach's Alpha

No.	Criteria	Cronbach's Alpha
12	**Types of systems in which the bank has invested**	0.7214
13	**Types of systems in which the bank intends to invest**	0.7154
14	**Reasons used to justify IT project**	0.7855
16	**Elements included in your IT strategy**	0.7687
19	**The procedures used to justify proposed IT Investment**	0.8310
20	**The effectiveness of each procedures used for IT investment evaluation**	0.8014
21	**responsibility of the IT evaluation process**	0.8220
23	**Reasons for not evaluating IT Investment**	0.8202
24	**Problems encountered during IT investment evaluation at the feasibility stage**	0.8821
25	**The Development to the IT investment evaluation practices**	0.8436
26	**The satisfaction with the evaluation practice**	0.7797
27	**The success of implemented IT Investment**	0.8021
29	**Methods used In IT investment evaluation**	0.8975

5.8 SUMMARY:

Several data collection and analysis methodologies that can be used for research was examined, among them questionnaire survey was selected an appropriate tool for satisfying this research objectives. The questionnaire was designed, tested and distributed on the chief information officers in the twenty one banks operate in Gaza strip and the west Bank. Nineteen questionnaires were retrieved giving a net response rate of (90.4%).

The validity and reliability of the research were discussed at the end of this chapter while the result and their interpretations will be discussed in the next chapter.

CHAPTER SIX

RESEARCH RESULTS

6.1 INTRODUCTION:

In this chapter the analysis and the interpretations of the data collected by the questionnaire will be represented first, while the hypotheses testing will be represented at the end of the chapter.

6.2 ANALYSIS AND INTERPRETATION OF DATA:

This section represents the outcome of the analysis and the interpretation of the data collected by the questionnaire along with a comparison with other related surveys. As described in the previous chapter, the questionnaire has been structured in four large parts: a) characteristics of the respondents and their banks; b) IT investments and their role in the bank; c) IT investments evaluations practices; d) methods used for evaluating IT investments. For this reason we are going to structure this section according to the same parts discussed above

6.2.1 Characteristics of The Respondents and The Banks:

6.2.1.1 Respondents Characteristics

All the respondents were an IT Manager or persons who could represent their view and all of them came from an IT background. Moreover, 15.8% of them hold a Master degree while the rest hold Bachelors degree and 73.7% of them have at least ten years of experience in the IT field. Table 6-1 shows more details about the respondents' characteristics.

Table 6.1: Respondents' characteristics

Character	Status	Frequency	Percent
Position/ Title	IT Manager	19	100.0
	other	0	0
	Total	19	100.0
Educational Background	IT Background	19	100.0
	other	0	0
	Total	19	100.0
Highest Educational Degree held	Bachelors Degree	16	84.2
	Masters Degree	3	15.8
	Other	0	0.0
	Total	19	100.0
Total year of experience in the IT field	Less than 5 years	1	5.3
	5-10 years	4	21.1
	11-15 years	10	52.6
	Greater than 15	4	21.1
	Total	19	100.0

6.2.1.2 Banks Characteristics

As for the number of IT staff in the banks, the first consideration to note is that not all banks have answered this question (36.8% have not). Table 6.2 shows that 25.0% of banks have less than five IT employees in their bank, 41.67% of banks have between five to ten IT employees, 8.33% of banks have between eleven to fifteen IT employees and 25.0% of the banks have more than fifteen IT employees.

Table 6.2: Number of IT employees in banks

Number of IT staff in the banks (including branches)	Frequency	Percent
Less than 5 employees	3	25.00
Between 5 to 10 employees	5	41.67
Between 11 to 15 employees	1	8.33
More than 15 employees	3	25.00
Total	12	100.00

In response to the question concerning with the number of reporting level between the IT Manager and the chief executive officer (see table 6.3), most of respondents indicated that the IT manager has a direct link or one reporting level to the chief executive officer. 47.4% of respondents indicated that they have a direct link to chief executive officer, while 31.6% indicated that there is one reporting level between them and the chief executive officer..

Table 6.3: The position of the IT Manager related to the Chief Executive officer

position	Frequency	Percent
Direct Link	9	47.4
One Level	6	31.6
Two level	3	15.8
three or more Level	1	5.3
total	19	100.0

Although we promise the anonymity to the respondents' information in the cover letter, 68.42% of respondent did not answer questions related to their IT budgets and projects (questionnaire items No 7 to 10). Table 6.4 shows size of IT spending by the six respondent banks for the year 2006 and 2007.

Table 6.5 shows the size of IT projects for the six respondent banks for the year 2006 and 2007. It is worth to note that the 69.6% of IT investments in the year 2006 and 83.7% of IT investments in the year 2007 are of a size smaller than $100,000 which may indicate that most of these investments are an upgrade or expansion to the existing systems or infrastructure.

Table 6.4: Banks IT spending for the year 2006 and 2007

category	2006		2007	
	Frequency	Percent	Frequency	Percent
Less than $200,000	1	16.67	1	16.67
From $200,000 To $500,000	3	50.0	3	50.0
From $500,000 To $1,000,000	0	0.0	0	0.0
Greater than $1,000,000	2	33.3	2	33.3
Total	6	100.0	6	100.0

Table 6.5: The size of IT projects for the year 2006 and 2007

category	2006		2007	
	Frequency	Percent	Frequency	Percent
Less than $ 100,000	32	69.6	41	83.7
From $100,000 To $ 500,000	14	30.4	8	16.3
From $500,000 To $ 1 million	0	0.0	0	0.0
Greater than $ 1 million	0	0.0	0	0.0
Total	46	100.0	**49**	100.0

A thorough analysis to the IT budget in the banking sector, see Table 6.6, shows that about 5.2% of a typical bank's total revenues are consumed by IT. Moreover, the IT expending represents 10.42 percent of operating expenses. These percentages are lower than the one which could be find in the leading banks. A study, published in 2006, by the Boston Consulting Group (BCG) on Twenty-one leading European banks from ten countries reported that, on average, IT spending represented 9.5 percent of total revenues, and 13.6 percent of operating expenses in 2004 (Boston Consulting Group, 2006).

The last point to mention here is that the information presented in table 6.4 to 6.6 should be read with high precaution due to the small number of respondents.

Table 6.6: Banks IT budgets for the year 2006 as a percentage of total revenues, total expenses, and managerial expenses.

Bank ID	Total Revenues	Total Expenses	IT budget 2006	IT budget/total revenues	IT budget / total Expenses
A	$25,800,110	$14,724,056	$1,500,000	5.81%	10.19%
B	$5,347,652	$3,388,052	$150,000	2.80%	4.43%
C	$11,728,589	$3,815,959	$1,150,000	9.81%	30.14%
D	$4,135,344	$3,061,494	$250,000	6.05%	8.17%
E	$5,193,316	$3,581,105	$200,000	3.85%	5.58%
F	$6,973,591	$4,999,466	$200,000	2.87%	4.00%
			Overall average	5.2%	10.42%

Source: data in the first two columns are obtained from the Palestinian monitory Authorities, while the data in the third column are obtained from the respondents answers to the 7th question in the questionnaire. The forth column is the result of dividing the 3rd column by the 1st column in the table while the fifth column is the result of dividing the 3rd column by the 2nd column in the table.

6.2.2 IT Investments and Their Role in The Bank:

The first question in this section, whose findings are summarized in table 6.7, investigated the perceptions role of IT systems in the bank. All the respondents (100%) indicated that IT systems at least provide key operational processes which are essential to everyday operations. This finding is supported by the findings of both EI-Shantaf (2000) and Lin (2002). EI-Shantaf (2000) showed that the percentage of the banks operating in Gaza Strip, which cannot operate without computerized Management information systems is 87.27%, while Lin (2002) showed that the percentage of IT manager who indicated that IT provided key operational processes which are essential to everyday operations is 98.4%. Our percentage is higher than the percentage of Ashanti for two fold. First, EI-Shantaf concentrated on one type of IT system while we asked about all type of IT systems. Secondly, the IT backgrounds characteristics of the respondents of this research let them to be more aware than the other users about the role of IT in their bank.

Moreover, 57.9% of the respondents (obtained by adding the second row to the third row in table 6.7) indicated that IT system are of strategic importance to the bank and 42.1% indicated that IT systems are used to develop processes which may become important in the future. These findings are lower than the findings of Lin (2002) which were 88.9% and 86.4% respectively. The reasons behind this lower percentage can be: First, Lin (2002) included in his survey only the top 500 firms while our survey included the leader, followers and survival banks. Secondly, the economic level in Palestine prevents banks from introducing innovative risky products which is not the case for the Australian economy.

Table 6.7: The role of IT systems in the banks

categories	Freq.	Percent
IT systems provide a support role which is not critical to every operation	0	0.0
IT systems provide key operational processes which are essential to every operation	8	42.1
IT systems provide a key operational process which are essential to every operation and they are a major competitive advantage	3	15.8
IT systems provide key operational processes which are essential to every operation and they are a major competitive advantage. Moreover, they are innovate and are used to develop product or process which may become important in the future	8	42.1
Total	19	100.0

Other questions of the survey ,whose findings are summarized in table 6.8, dealt with the type of IT investments in which banks have invested and in which they intend to invest; both with the same type of possible answer. The statistically positively significant types of IT investments in which the banks have invested most have been the Mandatory investments (73.68%), and Infrastructure investment (71.58%). On the other hand, Investing in Inter-organizational systems recorded a significant negative T value which means that most banks did not invest in such type of IT investment.

If we analyze where enterprises intend to invest, we see that they continue to demonstrate norms more or less similar to investments already carried out in addition to the intentions on the value added, Automation, and Informational IT systems.

the new direction in the type of IT investment in which the bank intend to invest could be explained by that: banks has built their infrastructure and now they intend to increase the efficiency of their banks through automation systems, the effectiveness through information systems, and their profitability through direct value added systems. Yet, banks do not enjoy the transformational benefits from the IT development.

Table 6.8: Types of IT systems in which banks have invested and intend to invest

Systems Types*	Type of IT investments in which banks **have invested**				Type of IT investments in which banks **intends to invest**			
	Weight mean	**T Value**	**Sig.**	**Rank**	**Weight mean**	**T Value**	**Sig.**	**Rank**
Direct value added systems	64.21	0.940	0.360	5	81.18	3.816	0.002	1
Infrastructure	71.58	2.480	0.023	2	78.82	4.016	0.001	2
Mandatory systems	73.68	3.369	0.003	1	76.67	4.499	0.000	3
Informational IT systems	68.42	1.714	0.104	3	75.29	4.190	0.001	4
Automation systems	63.16	1.000	0.331	6	73.33	3.117	0.006	5
Strategic systems	67.37	1.508	0.149	4	67.06	1.191	0.251	6
Inter-organizational systems	37.89	-3.745	0.001	8	60.00	0.000	1.000	7
Business transformation systems	53.68	-1.031	0.316	7	52.22	-1.327	0.202	8

* The Definitions and the details of these systems type are included in section 3.5 pp. 33

In the last item in this section, whose findings are summarized in table6.9, the IT managers were ask to provide views of the reasons used to justify IT investments in their banks. Increasing efficiency is seen as the most popular reason for justifying IT investment followed by improving service quality, obtaining client satisfactions and sustaining competitive advantage. From table 6.9 we observe that banks no longer invest preferentially in investments that leads directly to cost reduction (though they have still reached important levels: 77.89%), but rather, due to the fact that we are immersed in the age of competitively, they prefer to invest on systems that lead (directly or indirectly through Increasing efficiency and improving service quality) to sustain a competitive advantage.

Table 6.9: reasons used to justify IT investment

reason	mean	Weight mean	T Value	Sig.	rank
Increasing efficiency	4.68	93.68	10.940	0.000	1
Quality improvement	4.58	91.58	8.216	0.000	2
Client satisfaction	4.56	91.11	6.710	0.000	3
Sustaining a competitive advantage	4.37	87.37	5.344	0.000	4
Cost reduction	3.89	77.89	3.032	0.007	5
Employee satisfaction	3.84	76.84	3.281	0.004	6

This priority differs from the findings of both Ward et a1. (1996) and Lin (2002) who have listed cost reduction as being the major current drivers for IT investments. See table 6.10 for details.

Table 6.10: comparison between the reasons used to justify IT investment found in this research and other researches

Rank	This Research	W et .al (1996)	Lin (2002)
1	Increasing efficiency	Cost reduction	Cost reduction
2	Quality improvement	Increasing efficiency	Sustaining a competitive advantage
3	Client satisfaction	Quality improvement	Increasing efficiency
4	Sustaining a competitive advantage	Enable change	Quality improvement
5	Cost reduction	Business necessity	Business necessity
6	Employee satisfaction		

6.2.3 IT Investments Evaluations Practices:

This section can be divided virtually into three themes. The first theme is concerned with identifying the characteristic of input parameters that may affect the evaluations practices. We limited our investigation to the presence of IT strategy and formal procedures. The second theme is concern about the evaluation process itself like how often it is been conducted, who is conducting them and why they had not been conducted. The third them is concerned with the perceived satisfaction from the current IT investment evaluation practices and its feedback on the evaluation practices.

It is argued that identifying banks' current IT evaluation practices has to start with analyzing the characteristics of their IT strategies. That can be justified mainly for the following reasons (Hochstrasser & Griffiths 1991):

1. IT strategies will influence the different IT investments' desirability
2. with the presence of IT strategies, IT evaluation will focus more easily on long-term goals rather than short-term benefits
3. The IT evaluation will serve the whole bank instead of individuals
4. IT strategies will reduce the risk of local IT investments being incompatible with the future plans of the company

Table 6.11 shows that 61.11% of the respondents have a written IT strategy. This is higher than the findings of Andresen (2001) and Farbey et. al.(1992). Andresen (2001) state that only about one third of the responding companies having a written IT strategy while Farbey et. al.(1992) state that fewer than half the responding companies having a written IT strategy. The difference could be due to a difference in the responding firm industries. Anderson (2001) surveyed the construction industry, Farbey et. al.(1992) surveyed several industries, while our survey concentrate on the banking sector which is an information intensive industry.

Table 6.11: IT strategy and its major elements

	Weight mean
Banks with a written IT strategy	61.11%
Elements included in the banks IT strategy	
Mission statement	100 %
Vision statement	87.50 %
Strategic goals	100 %
Aligning IT and bank goals	91.67 %
means to achieve the strategic goals	91.67 %
key performance indicators	90.91 %
quantified measures	75.00 %

For those banks that have a written IT strategy the content is examined (see table 6.11). The responses are analyzed with regard to which elements the companies have included in their IT strategy. It is found that 100% of banks have a description of their mission statement, 87.5 % have a description of their vision statement, and 100% defined their strategic goals, 91.67% have aligned their IT with the bank goal and have defined the means to achieve these goals, 90.91% have key performance indicators, but when it comes to the quantifying measures, the percentage drops to 75%. This drop highlights the difficulties encountered in quantifying the intangible and indirect costs and benefits of the IT investments.

After investigating the banks strategy, we moved to the second parameter that may affect the IT investment evaluation practices. The research identified the extent to which formal evaluation procedures are in place within the respondent banks. Table 6.12 shows that (73.68%) of the respondent banks have formal IT investment evaluation procedures This percentage is higher than the one found by Farbey et al. (1992) who reported that just over half of the organizations they studied had a formal justification procedure for evaluating IT investments.

Although the majority of the banks have formal IT investments evaluations procedures as indicated by the positive (T=2.285) significant (sig. =0.035) value of the T-value test, most of the respondent banks believe that their formal IT evaluations procedures are not a precise and detailed ones as indicated by the negative (T= -3.012) significant (sig. = 0.007) value of the T-value test.

Table 6.12: The presence of Formal IT Investment Evaluation instructions in banks and what they consist of.

	Weight mean	**T Value**	**Sig.**
Banks who have Formal IT Investment Evaluation procedures	73.68	2.282	0.035
The Formal IT Investment Evaluation procedures can be described as			
General IT Investment Evaluation instructions	52.63	0.224	0.826
Precise and detailed written IT Investment Evaluation instructions	21.05	-3.012	0.007

The next aspect analyzed is the procedures used to justify IT investments (see table 6.13). The sig. values for all type of procedures are insignificant. Anyhow, the general evaluation procedures ranked first, the formal evaluation procedures specifically designed for IT investment ranked in the second place, and the oral guidelines and subjective arguments ranked in the third place. The use of general evaluation procedures implies that bank do not consider the differences in evaluating IT investments compared to evaluating other investments. This could be due lack of knowledge of existing IT evaluation methods.

Table 6.13: Procedures used to justify the IT investments

procedures used to justify proposed IT project	mean	Weight mean	T Value	Sig.	rank
General evaluation procedures	4.56	91.11	1.437	0.169	1
evaluation procedures specifically designed for IT investment	3.42	68.42	1.407	0.176	2
Oral guidelines and subjective arguments	2.89	57.78	-0.369	0.717	3

Next we investigated how each of the above procedures is effective in justifying proposed IT investment. The results are shown in table 6.14. Again, all the sig. values in this table are insignificant. Anyhow, the general evaluation procedures ranked first, the formal evaluation procedures specifically designed for IT investment ranked in the second place, and the oral guidelines and subjective arguments ranked in the third place. It is surprising that evaluation procedures specifically designed for IT investment are ranked behind the general evaluation procedures which give the impression that the evaluation procedures specifically designed for IT investment are not well prepared and can not fit the different type of systems the bank invest in.

Table 6.14: The effectiveness of the procedures that used to justify proposed IT investments

	mean	W. mean	T Value	Sig.	rank
General evaluation procedures	3.63	72.50	1.718	0.106	1
evaluation procedures specifically designed for IT investment	3.53	70.59	1.941	0.070	2
Oral guidelines and subjective arguments	2.76	55.29	-0.889	0.387	5

Next we moved to the second theme where we first asked the question of who is involved in the evaluation process. The chief executive officers came first by participating in 82.5 % of all IT investments evaluations, followed by the IT department with (81.2%) while external sources and the functional department ranked in the third and forth places respectively and both have a small insignificant T value.

Table 6.15: Persons carrying out the responsible for IT investment evaluation

	Never	Rarely	Sometimes	Often	Always	mean	Wight mean	T test	Sig.	Rank
CEO	6.3	12.5	0.0	25.0	56.3	4.13	82.5	3.435	0.004	1
IT department	11.8	5.9	5.9	17.6	58.8	4.06	81.2	3.043	0.008	2
External source	33.3	6.7	33.3	6.7	20.0	3.20	64.0	0.564	0.582	4
Functional department	13.3	13.3	40.0	6.7	26.7	2.73	54.7	-0.67	0.512	5

Then we attempted to ascertain whether IT investment generally were subject to feasibility evaluation. The answers revealed that only 47.4% of the respondents bank either "always" or "often" perform an evaluation before making an IT investment, while 15.8 % do not evaluate their IT investment at all. Table 6.17 shows these finding in details while Table 6.18 shows a comparison between the findings of this research and other researches about the extent of feasibility evaluation.

Table 6.16: Extent of appraisal of IT investments

Item	Never	Rarely	Sometimes	Often	Always	mean	Wight mean	T test	Sig.
22	15.8	0.0	36.8	26.3	21.1	3.37	67.37	1.235	0.233

Table 6.17: Extent of appraisal of IT investments compared with other studies

Evaluate?	**Ballantine *et al.* 1996**	**Andresen, (2000)**	**This research**
Yes	62	56	47.4
Sometimes	27	19	36
No	9	25	15.8
N/A	2		
Total	100%	100%	100%

Moreover, we investigated the reasons given by respondents for not appraising all IT investments at the feasibility stage. the difficulties in the evaluation process itself came first, followed by a bunch of organizational reasons like the a lack of organizational structure, operational urgency, lack of interest, lack of support of top management, and the political reasons within the organization.. The findings are detailed in table 6.18.

Moreover, it is worth to note that most of these barriers are not widespread among the respondent banks where the T-value is always negative and insignificant.

Finally, most of the respondents do not believe that IT investments were not evaluated because they were a small investment.

Table 6.18: Barriers preventing IT investment evaluation

Reason	mean	Weight mean	T Value	Sig.	rank
difficulties in the evaluation process itself	2.89	57.78	- .399	0.695	1
There is a lack of organizational structure; i.e. no defined responsibilities.	2.61	52.22	- 1.022	0.321	2
Operational urgency does not always permit time. (lack of time)	2.50	50.00	-1.584	0.132	3
Lack of interest to carry out the evaluation	2.44	48.89	- 1.458	0.163	4
Lack of support of key personnel or the top management	2.44	48.89	- 1.492	0.154	4
Political reasons within the organization; i.e. evaluation might have negative consequence for key persons.	2.44	48.89	- 1.656	0.116	4
the projects are mandatory and have to be undertaken in order to keep the business moving	2.28	45.56	- 1.871	0.079	5
The cost of conducting the evaluation is high	2.28	45.56	- 2.007	0.061	5
The size, value and risk of the project involved are neglectable.	1.83	36.67	- 3.964	0.001	6

The survey went deeper by investigating the difficulties in the evaluation process itself (see table 6.19). The various problems that face the respondents when they conduct the evaluation of IT investments were classified into three groups: information requirement problems, knowledge related problems and organizational problems.

On average, 52.87% of the respondents experience information requirements problems which make them the greatest cause of concern for banks. What is surprising is that the T-value test for quantification and the identification of relevant benefits were a significant negative value where the quantification recorded T= -2.141 and Sig. = 0.046 while the identification recorded T= - 3.716 and Sig. = 0.002. This finding contradicts with the literature review of this research. The literature review showed that identifying and quantifying the benefits of IT investment is one of the major difficulties of the evaluation process. The possible justification for our findings is that the banks invested in a mandatory and infrastructure systems and not in strategic or transformational ones. So, they do not find many difficulties in identifying and quantifying the strategic benefits of these systems.

Table 6.19: Problems encountered during appraisal

Problems encountered during appraisal	This research				Ballantine et. al (1996)	
	mean	**Weight mean**	**T Value**	**Sig.**	**Weight mean**	**rank**
Information requirements						
Identification of relevant costs	2.94	58.89	- 0.236	0.816	30.7	5
Quantifying relevant costs	2.72	54.44	- 1.317	0.205	26.7	6
Identification of relevant opportunity costs	2.67	53.33	- 1.558	0.138	34.7	4
Quantifying relevant opportunity costs	2.61	52.22	- 2.122	0.049	36.0	3
Quantifying relevant benefits	2.53	50.53	- 2.141	0.046	81.3	1
Identification of relevant benefits	2.39	47.78	- 3.716	0.002	65.3	2
Knowledge related						
Unfamiliarity with project appraisal technique	2.56	51.11	- 2.046	0.057	12.0	2
Difficulty with interpretation of results	2.35	47.06	- 3.096	0.007	17.3	1
Calculation of Discount Rate	2.35	47.06	- 2.524	0.023	2.7	3
Organizational problems						
Lack of data/information	2.56	51.11	- 1.810	0.088	18.7	2
Lack of time	2.21	44.21	- 2.616	0.018	37.3	1
Lack of interest	2.06	41.11	- 3.183	0.005	14.7	3

Some respondents also feel that they have problem with identifying and quantifying cost. In some cases, the IT investment projects implemented by the bank exceeded their located budget and banks depend, objectively or subjectively, on their budgets constraint to evaluate their IT investment. That's make the respondents feel they had failed to identify and quantify the direct or the overhead cost of their IT investments.

Table 6.19 also shows that, on average, 48.40% of the respondents experience knowledge related problems. 51.11% of them are unfamiliar with project appraisal technique, 47.06% of them face difficulties with interpretation of the evaluation results, and 47.06 of them face problem in calculating discount rate that are used in the financial evaluation techniques. Yet these problems are not widespread among the respondent banks due the negative significant T value for all of them

Moreover, on average, 48.40% of the respondents experience organizational problems. 44.21% of the respondents suffer from the time stress, and 41.11% do not find support and interest from their banks for conducting the evaluation. Again, these organizational problems are not widespread among the respondent banks due the negative significant T value.

Next we moved to the third theme which dealt with the perceived satisfaction from the current IT investment evaluation practices and its feedback on the evaluation practices them selves.

In order to ascertain the levels of satisfaction with the practices used to appraise IT investments, respondents were asked to indicate their level of satisfaction (see table 6.20). The results generally indicated high levels of satisfaction with the practices used among the individual respondents. 76.67% of the respondents are satisfied with the impact of their current evaluation practice on the improvement of the bank performance, and 74.74% are satisfied with the impact of the evaluation practices on their IT investment success. Table 6.20 shows the respondent perceived satisfaction in details.

Table 6.20: The level of satisfaction from the current IT investments evaluation practices

The satisfaction from:	mean	w. mean	T Value	Sig.	rank
The methods used for evaluation	3.47	69.47	1.761	0.095	3
Impact of evaluation on project success	3.74	74.74	4.379	0.000	2
Impact of evaluation on improving the firm performance	3.83	76.67	4.499	0.000	1

Moreover, we went one step further and investigated if there is a correlation between the perceived role of IT investment and the satisfaction of IT investment evaluation practices. the result of person correlation test show that the coefficient correlation equal -.419 and the value of the p- value equal .074 , which mean that There is a negative correlation between the perceived role of IT investment and the satisfaction of IT investment evaluation practices significant at (0.1) level. That makes sense because the evaluation objectives will be hard to achieve due the difficulties to identify and quantify the strategic benefits from the IT investment. This finding is consistence with the findings of Peffers and Saarinen (2002) who reported that banks executives who see IT investments in terms of cost cutting are more satisfied with the evaluation process than those who view such investments in terms of strategic advantage.

Next we investigated whether IT mangers perceived the implemented IT investments with this evaluation practices as a successful ones. The results generally indicated that the implemented IT investments were a successful one. the respondents believe that the development stage of the implemented IT investment was a successful by 76.67%, the operation stage was successful by 81.11, the quality of the implemented systems are at 78.89, and the impact of the IT investment on the banks was successful by 85.56.

Table 6.21: The level of perceived success of the implemented IT investment

the success of implemented IT investment in regard to	mean	Weight mean	T Value	Sig.
The Development process	3.83	76.67	5.000	0.000
The Use process	4.06	81.11	7.007	0.000
The Quality of the system	3.94	78.89	4.994	0.000
The Impact of the system on the organization	4.28	85.56	7.210	0.000

The last item in this theme focused on how often banks improve their procedures and techniques used in IT investments evaluations. By analyzing the responses from IT managers it is found that developing new evaluation instructions ranked first, developing instructions for selecting evaluation methods ranked second, searching for better evaluation methods ranked third, and developing new instructions for evaluation specific IT system ranked forth. Yet none of these actions are a significant one as shown by the sig. column in table 6.22, and that may be due to the high level of satisfaction the respondent showed about their current evaluation practices (as shown in table 6.20),

Table 6.22: Frequencies of initiatives in the development of the IT evaluation practice

Action	mean	Weight mean	T Value	Sig.	rank
develop a new evaluation instructions	3.42	68.42	1.637	0.119	1
develop instructions for selecting evaluation methods	3.37	67.37	1.508	0.149	2
search for better evaluation methods	3.37	67.37	1.439	0.167	2
develop new instructions for evaluation of specific IT system	3.22	64.44	0.809	0.430	3

6.2.4 Methods used for evaluating IT investments

In this section a thorough investigation about the type of analysis and methods that are used in the IT investment evaluation are carried out. The IT managers were first asked to rate the importance of each of the five general types of analysis (strategic value, profitability, risk, development/procurement, use/operations) that may used in the evaluation. They rated all the five analysis type as being important for IT investments evaluation. This is consistent with the findings obtained by Peffers and Saarinen (2002) with slight change in the ranking. Table 6.23 shows the IT managers' perceived importance of each of type of the analysis to the IT investments evaluation ranked in ascending order.

Table 6.23: IT managers' perceived importance of the five type of the analysis to the IT investments evaluation

types of analysis	This research					Peffers & Saarinen (2002)
	mean	Weight mean	T Value	Sig.	rank	rank
PROFITABILITY (COST AND BENIFT)	4.26	85.26	5.265	0.000	1	1
STRATEGIC VALUE (important for the success of the bank)	4.21	84.21	6.172	0.000	2	3
USE/OPERATIONS (effective, reliable and flexible use of the system)	4.11	82.11	4.595	0.000	3	2
RISK (dangers from effects of technical, economic, implementation, operational, and financial assumptions)	3.89	77.89	4.164	0.001	4	4
DEVELOPMENT/PROCUREMENT (control of implementation of the system)	3.89	77.89	3.923	0.001	4	5

Next, the IT mangers were asked to indicate how often a specific method (also categorized into five general analysis types) is used, in practice, to evaluate IT investments.

Table 6.24: Methods used by banks to evaluate IT investments

	This research					Peffers & Saarinen (2002)
	mean	**Weight mean**	**T Value**	**Sig.**	**rank**	**Weight mean**
PROFITABILITY						
Cost-benefit analysis	4.05	81.05	4.064	0.001	1	85
Return on investment (ROI)	3.95	78.95	3.828	0.001	2	58
Payback period analysis	3.79	75.79	3.174	0.005	3	73
Internal rate of return	3.74	74.74	2.926	0.009	4	N/A
Return on management	3.74	74.74	2.800	0.012	4	N/A
Productivity Index	3.74	74.74	2.926	0.009	4	N/A
Discounted cash flows (DCF, NPV)	3.63	72.63	2.364	0.030	5	38
Model of the bank operations (Operations Research model)	2.94	58.89	0.212-	0.834	6	16
STRATEGIC VALUE						
Analysis of customer needs (market survey)	4.21	84.21	5.404	0.000	1	79
Analysis of user requirements	3.68	73.68	3.369	0.003	2	79
Value chain analysis	3.67	73.33	2.287	0.035	3	6
Critical Success Factors (CSF)	3.42	68.42	1.714	0.104	4	15
Analysis of industry structure and competition	3.32	66.32	1.102	0.285	5	63
Analysis of competitive threats/opportunities	3.26	65.26	1.097	0.287	6	62
Economic theories	3.11	62.22	461.	0.651	7	N/A
USE/OPERATIONS						
Maintenance feasibility (will provide needed flexibility)	4.21	84.21	6.702	0.000	1	70
Reliability testing	4.16	83.16	6.600	0.000	2	68
Level of system use	4.11	82.11	5.504	0.000	3	N/A
RISK						
Financial feasibility (Can we manage the cost?)	4.00	80.00	4.135	0.001	1	86
Operational feasibility (Is it desirable within operational framework?)	3.84	76.84	4.086	0.001	2	77
Technical feasibility (Can it be done?)	3.83	76.67	4.123	0.001	3	81
Economic feasibility (Will it be worth doing?)	3.68	73.68	2.577	0.019	4	86
Implementation feasibility (Can intended developer do it?)	3.58	71.58	2.357	0.030	5	68
DEVELOPMENT/PROCUREMENT						
Project budgets	3.68	73.68	2.577	0.019	1	82
References from other banks	3.68	73.68	2.577	0.019	1	72
Project schedules	3.63	72.63	2.882	0.010	2	83
Programmer productivity measures	3.26	65.26	1.097	0.287	3	N/A

Finally, due to their great popularities, we highlight the extent to which capital investment appraisal techniques are used to appraise the feasibility of IT investment. Table 6.25 shows that cost benefit analysis is the most widely used financial technique, followed by Return on investment and payback period analysis. Moreover, the majority of respondent banks in the survey used more than one capital investment appraisal techniques to make a decision regarding the feasibility of the most IT investment. Table 6.25 shows these finding ranked in ascending orders and compared with the findings of other researches.

Table 6.25: The extent of using capital investment appraisal techniques in IT investment evaluation

Financial techniques	**This research**		**Ballantine et. al (1996)**		**Peffers & Saarinen (2002)**	
	Weight mean	Rank	**Weight mean**	Rank	**Weight mean**	**Rank**
Cost-benefit analysis	81.05	1	76	1	85	1
Return on investment (ROI)	78.95	2	42	3	58	3
Payback period analysis	75.79	3	70	2	73	2
Internal rate of return	74.74	4	28	5	N/A	
***Return on* management**	74.74	5	7	6	N/A	
Productivity Index	74.74	6	1	8	N/A	
Discounted cash flows (DCF, NPV)	72.63	7	31	4	38	4
Other			4	7		

6.3 TEST OF HYPOTHESES

6.3.1 The First Hypothesis

There is a significant positive relation between the presence of a written IT strategy and the presence of formal IT Investment evaluation procedures at (0.05) level

To testify this hypothesis we applied a person correlation test and the result shown in table 6.26. The result show that the correlation coefficient equal 0.523 and the value of the p- value equal 0.026 which is less than 0.05, which mean that there is significant positive correlation between the presence of a written IT strategy and the presence of formal IT investment evaluation procedures at (0.05) level

Table 6.26: The correlation coefficient between the presence of a written IT strategy and the presence of formal IT investment evaluation procedures

		formal IT investment evaluation procedures
written IT strategy	Pearson Correlation	**.523**
	Sig. (2-tailed)	**.026**
	Size of the sample	**19**

This result of hypothesis one is an expected one. Formal IT investment evaluation should be an integral part of business strategy formulation. WARD and PEPPARD (2002, pp404) argues that

> "No matter how good the IS strategy is and how successful the organization is in supplying IS services, if the technology does not support business changes and is not effectively used, benefits will not be realized"

To achieve this goal they proposed a framework in which the first step is to identify and evaluate the implications of IT based opportunities, as an integral part of business strategy formulation, through establishing appropriate criteria for decision making on investment in information technology.

6.3.2 The Second Hypothesis

There is a significant positive relation between the presence of formal IT investment evaluation procedures and carrying out IT investments evaluation at (0.05) level

To testify this hypothesis we applied a person correlation test and the result shown in table No. (35) , the result show that the coefficient correlation equal 0.409 and the value of the p- value equal 0.084 which is greater than 0.05, which mean that There is no significant positive correlation between the present of Formal IT Investment Evaluation instructions and carrying out IT investments evaluation at (0.05) level

Table 6.27: The correlation coefficient between the presence of formal IT investment evaluation procedures and carrying out IT investments evaluation

		carrying out IT investments evaluation
Formal IT investment evaluation procedures	Pearson Correlation	**0.363**
	Sig. (2-tailed)	**.127**
	Size of the sample	**19**

It is surprising that there is no association between whether or not banks evaluated their IT investment and whether or not they have formal procedures for doing so. The results not only show that evaluation is just as likely to take place whether or not there are formally defined procedures in place, but that a large percentage of banks evaluate IT investment despite the lack of clearly defined procedures. It seems that action leads the planning in most cases, yet top management is still conservative about spending money and they usually request at least an ad hoc justification for the investments. Anyhow, our findings are consistent with the conclusion drawn by Ballantine et. al (1996) from their research in which 39 of the 43 companies that have clearly defined procedures evaluated their project, 2 did not evaluate, 2 did not know whether they evaluated or not! This compares with 51 organizations who did not have clearly defined procedures, of which 44 evaluated their project, while 6 did not.

6.3.3 The Third Hypothesis

There is a significant Positive relation between the presence of formal IT investment evaluation procedures and the success of the implemented IT investments at (0.05) level

To test this hypothesis we applied a person correlation test and the result shown in table No. (39) , the result show that the coefficient correlation equal 0.540 and the value of the p-value equal 0.021 which is less than 0.05, which mean that There is a significant Positive relation between the present of Formal IT Investment Evaluation procedures and the success of the implemented IT investments at (0.05) level

Table 6.28: The correlation coefficient between the presence of formal IT investment evaluation procedures and the success of the implemented IT investments

		the success of the implemented IT investments
formal IT investment evaluation procedures	Pearson Correlation	**0.540**
	Sig. (2-tailed)	**0.021**
	Size of the sample	**19**

6.3.4 The Forth Hypothesis

There is a significant Positive relation between evaluating IT investments and the success of implemented IT investment at (0.05) level

To testify this hypothesis we applied a person correlation test and the result shown in table No. (38) , the result show that the coefficient correlation equal 0.521 and the value of the p- value equal 0.027 which is less than 0.05, which mean that There is a significant Positive relation carrying out IT investments evaluation and the success of implemented IT investment at (0.05) level .

Table 6.28: The correlation coefficient between evaluating IT investments and the success of implemented IT investment

		success of implemented IT investment
Evaluating IT investment	Pearson Correlation	**0.521**
	Sig. (2-tailed)	**0.027**
	Size of the sample	**19**

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIOS

7.1 CONCLUSIONS:

The main goal of this research is to investigate the current IT investments evaluation practices in the banking sector in Palestine. In chapter one we setup four main questions to be answered to achieve this goals. Now we will answer these questions based on the findings in the previous chapter

7.1.1 How formal are the IT investments evaluation at the banking sector in Palestine?

In general, the banking sector in Palestine has some sort of formal procedures for evaluating IT investment. However, closer examination of the formal procedures revealed that these procedures are not precise and detailed ones. Moreover, the following is a summary of aspects that need to be considered when thinking about improving the current IT investments evaluation practices:

1. 39% of the banks do not have a written IT strategy
2. 46 % of the banks do not have quantified measures to ensure that they have achieved their strategic goals.
3. 26.32% of the banks do not have formal IT investment evaluation instructions,
4. Banks rely on general evaluation procedures and subjective arguments, which perceived to be not effective, to evaluate their IT investments
5. Most banks do not consider the differences in evaluating IT investments compared to evaluating other investments.
6. 11.8% of IT investments evaluation goes without interfering from the IT department.
7. 15.8 % of banks do not evaluate their IT investment at all.

7.1.2 What is the impact of the presence of formal IT investments evaluation on carrying out the evaluation and the success of IT investments?

The answer to this question can be achieved from the results of the hypotheses testing which stated that:

1. There is significant positive correlation between the presence of a written IT strategy and the presence of formal IT investment evaluation procedures
2. There is a significant Positive relation between the present of Formal IT Investment Evaluation procedures and the success of the implemented IT investments
3. There is a significant Positive relation carrying out IT investments evaluation and the success of implemented IT investment
4. the results did not show a significant positive correlation between the present of Formal IT Investment Evaluation instructions and carrying out IT investments evaluation

7.1.3 What are the barriers that prevent Banks from evaluating their IT investments? And the problems face them in the IT evaluation?

The results show that there are no principal reasons for not appraising all IT investments. Yet avoiding the following barriers may improve the evaluation practices:

a) The a lack of organizational structure
b) Operational urgency
c) Lack of interest
d) Lack of support of top management
e) Political reasons within the organization

Moreover, banks face some problems in the evaluation process itself, but still they are not major ones. These problems are:

a) The Identification and the quantification of relevant costs
b) The Identification and the quantification of relevant opportunity costs
c) The quantification and the identification of relevant benefits
d) Unfamiliarity with project appraisal technique
e) Difficulty with interpretation of results
f) Calculation of discount rate

7.1.4 What criteria and methods are considered and used in the evaluation process of IT investment in the banking sector in Palestine?

In general, the banking sector in Palestine use a variety of IT investment evaluation criteria and techniques. The strategic value, profitability, risk, development, and operations are all an important criteria that are considered, objectively or subjectively, when banks evaluate their IT investment.

Regarding the techniques used by the banks, cost benefit analysis is the most widely used financial technique to measure the profitability, followed by Return on investment and payback period analysis. On the other, other prominent techniques from IT literature such as Information Economics, Analytic Hierarchy Process, and Balanced Scorecard, which are discussed in detailed in the fourth chapter, are not used.

7.1.5 Other interesting findings

Finally, other interesting findings from this research are:

1. Overall, the banks IT managers saw IT system as having key operational, strategic, or high potential (future) roles and that the role of IT was more than just as a support mechanism. This view will impact the type of IT systems in which the bank will invest in the future.
2. IT managers who perceived the role of IT as a strategic one are less satisfied with the evaluation practice than those who view such role as a key operational one only.
3. The results generally indicated high levels of satisfaction with the current evaluation practices. Given that all of the respondents are heavily involved in the appraisal process within those banks, it is unlikely that evaluation practices, and their associated problems, will substantially alter much in the future.

7.2 RECOMMENDATIONS:

IT Investment evaluation is a difficult process, simply because there are a wide range of interacting socio-technical variables that need to be considered. Yet that should not be consider as an excuse for mangers to view the evaluation process as a 'hurdle' that has to be overcome, and they should consider it the most important feeding mechanism supporting the organizational learning process. Moreover, the researcher recommends the following points that may improve the current IT investment evaluation practices:

1. For banks to measure the IT value, they must begin by aligning the direction of IT strategy and business. This requires that executive management be involved in the process in order to communicate business strategy and intent and participate in the identification of a way in which IT strategy can contribute to the business

2. Banks should keep developing and searching for more comprehensive methods that considers broader economic and strategic impacts of their IT investment

3. Understanding the IT investment life cycle, and expanding the view of cost to include the indirect costs associated with individuals and organization will give a true and broader understanding of cost and will help banks to identify cost more accurately. Moreover, the assumptions and dependencies on which costs calculation are based should be fully acknowledged and understood by management.

4. Direct link between The IT managers and the chief executive officers may eliminate some of the organizational problem that prevent conducting the evaluation

5. The IT department should be involved in all IT investment appraisals

6. Finally, Banks should devote sufficient time and effort to IT investment evaluations

7.3 FUTURE RESEARCH DIRECTIONS:

The most difficult element during the study has been to limit myself to certain areas and stay focused on the purpose of the research. A lot of times I have come across subjects that have been highly interesting for further research and development. Here are a few suggestions of some of these ideas that may be interesting for future research.

1. Future researches may extend the understanding of IT investment evaluation by studying the IT investment evaluation in other industries or in the public sector.
2. Future researches can go deeper by studying the evaluation of specific type of IT investment like the infrastructure or strategic ones.
3. This research concentrated on IT investment evaluation practices at the feasibility stage only. In academic research there seems to be great support for understanding and improving ex-post investment evaluations practices as well. Ex-post investment evaluations helps firms learn from their mistakes and to bring the Investment to its best by to identify shortcomings and correct them.
4. This research could work as a base for future researches to develop a framework for IT investment evaluation.
5. Future researches could work on developing a specific method to evaluate specific type of IT investment. Methods learned in the operational research, like simulation, AHP, and goal programming could be used to improve the decision about IT investment.
6. The effect of the IT on the banking sector and its performance is covered briefly in this research. Future researches can investigate these effects in more details and from different angles.
7. Finally, strategic planning for information technology and its alignment with the corporate strategy is a great subject which has received limited attention in Palestine.

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Appendix A

Various electronic delivery channels

Electronic delivery channels adopted by banks include, but are not limited to:

A. Automated Teller Machines (ATMs)

Rose (1999; as cited in Abor, 2005) , describes ATMs as follows: "an ATM combines a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the bank's book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day". When fully utilized, ATMs can be used for balance inquiry, cash withdrawal, transfer of funds, bill payments and making deposits. ATMs are a cost-efficient way of yielding higher productivity as they achieve higher productivity per period of time than human tellers (an average of about 6,400 transactions per month for ATMs compared to 4,300 for human tellers (Rose 1999; as cited in Abor, 2005). Furthermore, as the ATMs continue when human tellers stop, there is continual productivity for the banks even after banking hours.

B. Telephone Banking

"Telephone banking (Telebanking) can be considered as a form of remote or virtual banking, which is essentially the delivery of branch financial services via telecommunication devices where the bank customers can perform retail banking transactions by dialing a touch-tone telephone or mobile communication unit, which is connected to an automated system of the bank by utilizing Automated Voice Response (AVR) technology" (Balachandher, Santha, Norhazlin, & Prasad , 2001).

The telebanking service provides an alternative to almost all of the functions available on the Automated Teller Machines except withdrawal and deposit of cash. The facilities available include checking account balance, funds transfer between current, savings and credit card accounts and bill payments

According to Leow (1999; as cited in Balachandher et al, 2001) telebanking has numerous benefits for the banks. The costs of delivering telephone-based services are substantially lower than those of branch based services. It provides retail banking services even after banking hours (24 hours a day). It offers retail banking services to customers at their offices/homes as an alternative to going to the bank branch or an ATM. This saves customers time and may positively effect their satisfaction and loyalty.

C. Personal Computer Banking

"PC-Banking is a service which allows the bank's customers to access information about their accounts via a proprietary network, usually with the help of proprietary software installed on their personal computer" (Abor, 2005). Once access is gained, the customer can perform a lot of retail banking functions. PC-Banking has the benefits of Telephone Banking and ATMs.

D. Internet Banking

The idea of Internet banking according to Essinger (1999, as cited in Abor, 2005) is: "to give customers access to their bank accounts via a web site and to enable them to enact certain transactions on their account, given compliance with stringent security checks".

Internet banking by its nature offers more convenience and flexibility to customers coupled with a virtually absolute control over their banking. Service delivery is informational (informing customers on bank's products, etc) and transactional (conducting retail banking services).

As an alternative delivery conduit for retail banking, it has all the impact on productivity imputed to Telebanking and PC-Banking. Aside that it is the most cost-efficient technological means of yielding higher productivity. Furthermore, it eliminates the barriers of distance / time and provides continual productivity for the bank to unimaginable distant customers.

E. Branch Networking

Networking of branches is the computerization and inter-connecting of geographically scattered stand-alone bank branches, into one unified system in the form of a Wide Area Network (WAN) or Enterprise Network (EN); for the creating and sharing of consolidated customer information/records.

It offers quicker rate of inter-branch transactions as the consequence of distance and time are eliminated. Hence, there is more productivity per time period. Also, with the several networked branches serving the customer populace as one system, there is simulated division of labour among bank branches with its associated positive impact on productivity among the branches. Furthermore, as it curtails customer travel distance to bank branches it offers more time for customers' productive activities.

F. Electronic Funds Transfer at Point of Sale (EFTPoS)

An Electronic Funds Transfer at the Point of Sale is an on-line system that allows customers to transfer funds instantaneously from their bank accounts to merchant accounts when making purchases (at purchase points).

Increased banking productivity results from the use of EFTPoS to service customers shopping payment requirements in stead of clerical duties in handling cheques and cash withdrawals for shopping. Furthermore, the system continues after banking hours, hence continual productivity for the bank even after banking hours. It also saves customers time and energy in getting to bank branches or ATMs for cash withdrawals which can be harnessed into other productive activities.

Appendix B

Electronic Money (Reixach, 2001).

This appendix explains two different groups of electronic money or new payment systems: The pre-paid cards and the software-based products to make payments over the Internet.

A. The pre-paid smart cards

While there are different types of pre-paid cards, we will limit our technical discussion about the pre-paid cards to the pre-paid smart card because they are the most used type. Smart cards consist of a plastic card with an embedded chip. The chip embedded in the card can hold memory features and can as well include a microprocessor. This latter allows for the use of cards being extended to new applications. Pre-paid smart cards can serve as a payment mechanism by loading and storing monetary value in the chip embedded in the card. The value loaded in the card can later be disbursed when paying for the provision of goods and services. Smart card can operate technically in different way; the following is the most common way:

Memory cards: Have data storage space and some require a PIN for access. It is the simplest type of smart cards, it is quite inexpensive to produce, and it is mainly suitable for single purpose. Most telephone cards are of this type.

Shared-key cards: Store a secret key and can communicate with cards that share that key. Use standard microcontrollers with masked-in software for the cryptographic authentication algorithms. Cards are relatively low cost but the mechanism requires validation at the point of sale, for which some sophisticated equipment is needed, thus raising the overall costs of the system.

Signature-transporting cards: The same chip hardware as in shared-key cards but with different software. Cards contain a ready-made supply of blank checks, which are large pre-generated random numbers that can be assigned a denomination and signed to use as digital money, one check at a time. It is also relatively low-cost and since blank checks are loaded in advance and checks need not be re-verified, no point of sale validation is required, with equipment used there being less costly. These cards also maintain privacy for the users, and seem to provide good security and convenience levels at very reasonable costs

Signature-creating cards: Contain a dedicated coprocessor, which makes them capable of generating large, random numbers (the blank checks) to be used as digital money. For example, instead of spending signatures created by the system provider, they create their own. This is the most complex type developed, and they are quite expensive to produce.

Also, Smart card can be used in different way; table B.1 shows these different ways.

Table B.1: List of some different ways in which smart card can be used.

Single-purpose: intended for the provision of one single good o service	Multi-purpose: multiple acceptors and/or multiple issuers.
Disposable: monetary value can only be stored once.	Re-loadable when the value stored has been spent.
Pre-paid card only	Combination cards, which can as well be used as credit and/or debit cards
Single currency : one single currency can be stored in the card	Multi-currency, allowing different currencies to be stored in different "pockets", and some as well incorporating an exchange mechanism among different currencies
Limited value to be stored in the card	Unlimited value, with no restrictions in the value that can be loaded in the card.
Centralized systems: issuers can keep record of all transactions trough links of all terminals	Untraceable systems: the issuer has no records of all transactions.
Compensation for loss: accountable systems trough records maintained of all transactions.	No compensation in case of loss

B. Internet Electronic money

Internet payment mechanisms could be grouped into three broad classes: electronic cash systems, credit-debit systems and systems supporting security through credit-card. These three types are summarized in table B.2 and explained in details below.

Table B.1: Internet payment mechanisms.

Type of Electronic Money	Payment Protocol Model
Electronic Cash	Cash Cash consists of a token that may be authenticated independently of the user
Credit-debit systems	Cheque Payment instruments whose validity requires reference to the issuer
Systems supporting security presentation	Card The scheme provides a payment mechanism through the existing credit card infrastructure

Electronic Cash systems: Customers purchase electronic currency certificates from a currency server. They purchase for certificates by using credit cards (or other systems). Once issued, the electronic currency could be spent with merchant who deposit the certificates in their own accounts or spend the currency elsewhere.

Digicash or Netcash are two examples of this system. In the case of Digicash, the system uses the so-called public-key cryptography that, like encryption, makes it possible to securely send a card number over the Net . The Digicash approach is called "blinding technology", because the system lets the issuing bank certify an electronic note without tracing whom it was issued to. This means that the Electronic Cash preserves the anonymity in any transaction. Every electronic coin has a unique code of identification and it can only be used for one payment. In case of theft, it is possible to identify of the owner of the stolen electronic money.

The main advantage of the systems seems to be the absolute anonymity. Some disadvantages exist concerning the need to maintain a large database of past transactions to prevent double spending. In the case of Digicash it is necessary to track all the certificates that have been deposited. In the case of Netcash it is necessary to keep track of all the certificates that have been issued, but not yet deposited. These systems are the closer systems to what we could call pure digital cash.

Credit-debit systems: Customers are registered with accounts on payment servers and authorize charges against those accounts. Consumers pay on the Internet using their credit card. In order to protect the account numbers, the users register with the firm and receive identification numbers in exchange of their card number. With this procedure, card numbers never pass over the network. In order to make a purchase, the customer only needs to supply their identification number to the merchant. One key advantage of the system is auditability. Once a payment instrument has been deposited, the owner of the debited account can determine who authorized the payment and whether the instrument was endorsed by the payee and properly deposited. This model does not provide anonymity, but it is useful for certain kind of business activities, an even desired by a part of individuals.
CMU's NetBill , First Virtual's InfoCommerce, and USC-ISI's NetCheque are examples of systems that could be included under this category.

Systems supporting secure presentation: A customer's credit card number is encrypted using public key cryptography so that it can only be read by the merchant, or in some cases by a third party processing the service. The system seeks to leverage current credit cards systems by adding security.
The main advantage can be that the customers do not need to be registered with a network payment service. The customer only needs a credit card account. At the same time this could be considered a problem because without registration of customers the encrypted credit card transaction does not constitute a signature: anyone with knowledge of the customer's credit card number can create an order of payment. This sort of fraud is the same that can occur when somebody pays by giving the credit card number over the phone.
Cybercash is using this system. If security in encrypted credit card transaction increases, it is believed that many systems will follow this approach. From a diffusion point of view, this could be seen as the most interesting way. Through this procedure consumers get used to make payments with credit cards on the Internet. And after a trial period of essay, they may be willing to start using E-cash systems.

Appendix C

Description of criteria (Bacon, 1992)

The **financial criteria** that were used by the CIO's in Bacons (1992) study are described below;

Net Present Value (NPV) is a discounted cash flow (DCF) method that takes into account the time value of money. A specified rate of return is used to discount all cash flows as of time zero. If the resulting Net Present Value is Positive then the go-ahead might be given for the project/investment.

Internal Rate of Return (IRR) is also a DCF method, However, compared to the Net Present Value Method, there is no directly specified rate of return. Instead, the objective is to find the rate of return for a project or investment, based upon the cash flows and respective time periods, that makes its net present value equal to zero.

***Profitability Index method (PIM*)** is a third DCF method. When it is based on the NPV method it provides comparable profitability among different projects or investments by dividing the present value of the future cash flows of a project by its initial fixed investment. When it is based on the Internal Rate of Return method, the higher the rate of return the better the project is.

Average or Accounting Rate of return (ARR) for a project is found by dividing the average annual income after tax over the life of a project by the initial fixed investment,

Payback method (PBK) estimates the time required to recover the initial investment, i.e., how quickly a project or investment will pay for itself. The estimated net cash flows for each year are added until they total the initial investment. The time required is the payback period; the shorter it is the more preferable the project. There is also the discounted payback method, which takes the time value of money into account; each years estimated net cash flow is discounted at the required rate of return, and the resulting present values are added until they total the initial investment.

Budgetary Criteria or Constrains apply where project/investment go-aheads is subject to or influenced by pre-established funding allocations.

The **management and development criteria** used in the evaluation of IT investments are described below;

Support of Explicit Business Objectives applies where a systems project or investment is given the go-ahead to fulfill business strategy or objectives that are articulated in some sort of plan, generally a corporate or business-unit plan

Support of implicit business objectives is the justification where a systems project or investment is given a go-ahead in recognition of business objectives/aims that are understood through not necessarily formalized/articulated in any plan.

Response to competitive systems is the justification when a project is initiated in direct or indirect response to the competition adopting, or appearing likely to adopt, new information systems and/or IT technology that is likely to bring about increased competitive pressure. It may also be the justification in a proactive sense, i.e., seeking competitive advantage through the use of IT /IS.

Support of Management Decision Making is the main criterion when an important part of the projects justification is enhanced information for enabling more informed, more rapid, or easier management decision making andlor enhanced communication.

Probability of achieving benefits relates to the probability (or risk) of the planned projects achieving (or not achieving) what is intended to achieve in terms of its benefit and/or business effects. The factors and assumptions involved in this type of criterion might be included in a business analysis of the project.

Legal or governmental requirements refer to the justification when a project or hardware/software investment is undertaken primarily to meet governmental regulations or legislation, as for example with taxation or reporting requirements.

Appendix D

Alphabetical list of IT evaluation methods

This appendix is originally based upon research in the universities of Amsterdam, Delft and Eindhoven, the Netherlands. Although this research has been carried out with the utmost care, this list cannot be exhaustive. New methods are published almost daily and consultancy agencies often use a well-considered method but which is not published because of the possible competitive advantage. Furthermore, several methods combine features of other methods. For some methods the original source is not given, but is referred to in articles or books in which the method is mentioned or reviewed. The list of references is not an exhaustive one, but it has been strived for to give the best references, preferably from the IS literature. Also, not all methods are specifically designed for the evaluation of IT investment proposals.

Table C.1: ***Alphabetical list of IT evaluation methods*** (Andresen 2001)

Method	**References**
Accounting Rate of Return (ARR)	(Bacon 1992)
Analytic hierarchy process	(Saaty 1980); in: (Carter 1992)
Application benchmark technique	(Joslin 1965); in: (Powell 1999)
Application transfer team approach	in: (Lincoln et al. 1990)
Automatic value points	in: (Lincoln et al. 1990)
Balanced scorecard	(Kaplan & Norton 1992)
Bayesian analysis	(Kleijnen 1980)
Bedell's method	(Bedell 1985)
Buss's method	(Buss 1983)
Benefits-risk portfolio	(McFarlan & McKenney 1983)
Benefit assessment grid	(Huigen & Jansen 1991)
Bradford Information System Evaluation Method	(Wolstenholme, Henderson, & Gavine 1993)
Breakeven analysis	(Sassone 1988)
Boundary values (spending Ratios) (BV)	in: (Farbey, Land, & Targett 1993)
Business Impact or Time Release Analysis	in: (Remenyi, Sherwood-Smith, & White 1997)
Cost Avoidance	in: (Sassone 1988)
Cost Benefit Analysis (CBA)	(King & Schrems 1978); (Sassone & Schaffer 1978)
Cost Benefit ratio	(Tam 1992)
Cost Displacement	in: (Sassone 1988)
Cost effectiveness analysis	in: (Sassone 1988)
Cost-value technique	(Joslin 1968)
Cost-revenue analysis	in: (Farbey, Land, & Targett 1993)
Composite and ad hoc methods	in: (Farbey, Land, & Targett 1993)
Critical Success Factors (CSF)	(Rockart 1979)
Customers resource life cycle	(Ives & Learmonth 1984); in: (Hochstrasser & Griffiths 1991)
Decision Analysis	in: (Sassone 1988); in: (Powell 1999)
Delphi evidence	in: (Powell 1999)

Method	References
Economic Assessment – I/O Analysis	in: (Remenyi, Money, & Twite 1995)
Executive Planning for Data Processing (EPDP)	in: (Lincoln et al. 1990)
Functional Analysis of Office requirements	(Schaeffer 1988)
Game-playing and role-playing	in: (Farbey, Land, & Targett 1993)
A Health Check of the Strategic Exploitation of IT	(Construct IT 1997)
Hedonic wage model	in: (Sassone 1988)
Information Economics (IE)	(Parker & Benson 1989)
Internal Rate of Return (IRR)	(Brealey & Myers 1988); (Fox, Kennedy, & Sugden 1990)
Investment mapping	(Peters 1988)
Investment portfolio	(Berghout & Meertens 1992)
Information Systems Investment Strategies (ISIS)	in: (Lincoln et al. 1990)
Knowledge based systems for IS evaluation	(Agarwal, Tanniru, & Dacruz 1992)
Kobler Unit framework	(Hochstrasser & Griffiths 1991)
Lautanala's method	(Lautanala et al. 1998)
Measuring the Benefits of IT Innovation (MBITI)	(Construct IT 1998)
MIS utilisation technique*	in: (Powell 1999)
Multi Objective Multi Criteria (MOMC)	in: (Farbey, Land, & Targett 1993); (Vaid-Raizada 1983)
Net Present Value (NPV)	(Brealey & Myers 1988); (Fox, Kennedy, & Sugden 1990)
Option theory	(Dos Santos 1991)
Payback period	(Brealey & Myers 1988); (Fox, Kennedy, & Sugden 1990)
Potential Problem Analysis (PPA)	in: (Powell 1999)
Process Quality Management (PQM)	in: (Lincoln et al. 1990)
Profitability index method (PIM)	(Bacon 1992)
Proportion of Management Vision Achieved	in: (Remenyi, Money, & Twite 1995)
Prototyping	in: (Farbey, Land, & Targett 1993)
Quality engineering	(Hochstrasser 1993)
Relative Competitive Performance	in: (Remenyi, Money, & Twite 1995)
Return On Investment (ROI)	(Brealey & Myers 1988); (Farbey, Land, & Targett 1993)
Return on Management (ROM)	(Strassmann 1990)
Requirements-costing technique	(Joslin 1968)
Schumann's method*	in: (Swinkels & van Irsel 1992)
Satisfaction and priority survey	in: (Lincoln et al. 1990)
SESAME	(Lincoln et al. 1990)
Seven milestone approach	(Silk 1991)
Strategic Investment Evaluation and Selection Tool Amsterdam	(Irsel, Fuitsma, & Broshuis 1992)
Simulation	in: (Farbey, Land, & Targett 1993)
Strategic application search	in: (Lincoln et al. 1990)
Strategic Match Analysis and Evaluation	in: (Remenyi, Money, & Twite 1995)
Strategic option generator	(Wiseman 1985)
Systems investment methodology	in: (Lincoln et al. 1990)
Socio-technical project selection	(Udo & Guimaraes 1992)
Structural models	in: (Sassone 1988)
System dynamics methodology	(Wolstenholme, Henderson, & Gavine 1993)
Systems measurement	(Spraque & Carlson 1982); in: (Powell 1999)
Time savings times salary	in: (Sassone 1988)
Transformate Model	in: (Remenyi, Money, & Twite 1995)
User Attitudes	in: (Remenyi, Money, & Twite 1995)
User Information Satisfaction (UIS)	(Miller & Doyle 1987)
User utility function assessment technique	in: (Powell 1999)

Method	References
Value Analysis	(Keen 1981)
Value Chain Assessment (firm and industry)	(Porter 1985)
Ward's portfolio analysis	(Ward 1990)
Wissema's method*	(Wissema 1985)
Work Study Assessment	in: (Farbey, Land, & Targett 1993)
Zero based budgeting	in: (Zmud 1983)

Appendix E

Some of the Most common IS research strategies

In this appendix some of the most common IS research strategies are reviewed and their advantages and limitations explained. Galliers (1992) critically assess the range of research strategies open to IS researchers. He identifies eight major research strategies currently being applied in the information systems field. In the followings, each of these strategies is reviewed.

1. Laboratory Experiments

According to Galliers (1992), the most significant characteristic of laboratory experiments is the identification of the precise relationships between variables in a designed, controlled environment using quantitative analytical techniques. This is done with a view to making generalizable statements applicable to real world situations. The major strength of this method rests in the ability of the researcher to isolate and control a small number of variables that may then be studied intensively.

The major weakness of this approach is the limited extent to which identified relationships exist in the real world. In addition, much of the research undertaken using this method utilizes students as surrogates for real decision makers, thus adding to the sanitised nature of the laboratory situation.

2. Field Experiments

Field experiments are an extension of laboratory experiments, attempting to construct an experiment in a more realistic environment (Galliers, 1992). The strengths and weaknesses are similar to those encountered in laboratory experiments but an additional weakness is a difficulty in finding organizations prepared to be experimented on. Furthermore, replication is problematic, in that it is extremely difficult to achieve sufficient control to enable replication of the experiment with only the study variables being altered.

3. Forecasting / Future Research

Forecasting relies on statistical techniques such as regression analysis and time-series analysis to extrapolate likely future trends from past data. Conversely, futures research is concerned with the emergence of new social forms and behaviors, and the development of the so-called information society or information. It is therefore a particularly appropriate approach when investigating the future societal impacts of information technology. Strengths of the forecasting method include the ability to provide insights into likely future occurrences, but these insights are dependent on the precision of past data in the one case and the expertise of the scenario builders on the other. Other limitations relate to the unpredictability of environmental factors and the problems associated with self-fulfilling prophesies identified by Checkland (1981, as cited in Coombs 1999) who stated, 'Predictions on the outcome of observed happenings in social systems may change the outcome. Physical systems cannot react to predictions made about them; social systems can.

4. Simulation

Simulation is a method used to solve problems which are difficult or impossible to solve analytically by copying the behavior of the system under study by generating appropriate random variables. Its strengths are associated with these particular situations. It weaknesses relate, as in the case of laboratory and field experiments, to the difficulties associated with devising a simulation that accurately reflects the real world situation it is supposed to replicate.

5. Phenomenological Studies

phenomenological studies are based more on opinion and speculation rather than observation and place a greater emphasis on the role and perspective of the researcher. Galliers (1992) notes that this sort of research strategy tends to be a more free-flowing process (i.e. less structured) and is more likely to be an individual rather than a group activity. This kind of creative process makes a valuable contribution to the building of theories which can be subsequently tested by more formal means. Its strengths lie in the creation of new ideas and insights. Its weaknesses arise from the unstructured, subjective nature of the process.

6. Action Research

It has been suggested that the action research approach might be seen as a subset of the case study and field experiment categories. However, the underlying philosophy of this approach sets it apart from the more scientific approaches. This underlying philosophy relates to the fact that action researchers know that their very presence will affect the situation they are researching. Indeed, their role is to actively associate themselves with the practical outcomes of the research in addition to seeking to identify theoretical outcomes. In addition, the roles of subject and researcher can easily be reversed at times during action research studies .

The strengths of this form of research include very practical benefits that are likely to accrue to client organizations as a result and the fact that the researcher's biases are made overt in undertaking the research. Its weaknesses include the fact that its application is usually restricted to a single event/organization and consequently, there are problems associated with making generalizations from individual studies. Other limitations of the approach include the different interpretations and lack of control over individual variables resulting in difficulties when attempting to distinguish between cause and effect. This approach also places a great deal of responsibility on the action researchers, who must be aware that in certain circumstances they could align themselves with a particular grouping whose objectives are at odds with other groupings. The ethics of the research must therefore be an important consideration.

7. Surveys

Survey research looks at a particular phenomenon by means of a questionnaire or interview. It involves obtaining information directly from participants by posing questions to them. The researcher's task is to collect information relating to the variables and based on the information gathered, to examine the patterns of relationship between the variables based on the responses presented at the time the question is asked. Survey research normally deals with studies on how people feel, perceive and behave and the object is to determine how these variables are related.

Galliers (1992) argues that surveys are a good means of looking at a far greater number of variables than is possible with experimental approaches. They can therefore

provide reasonably accurate descriptions of real world situations from a variety of viewpoints. Given large sample sizes, generalization of the results may also be less of a concern. However, there are a number of drawbacks in survey research. Little insight is usually gained regarding the causes or the processes behind the phenomenon under study. Furthermore, there is also the possibility of bias on the part of respondents, because they will be self-selecting, on the part of the researcher and due to the point in time that the research is undertaken.

8. Case Studies

Case study research involves a small number of samples or 'cases'. It involves indepth analysis through interviews or group discussions of a number of cases from which conclusions are drawn. Case study research is very relevant in studies that focus on the understanding of areas of organizational functioning that are not well documented and are amenable to investigation through contact with the organization . It is best used in studies that require deeper understanding of how things happen rather than testing relationships between them .

there are four significant problems with case study research; the lack of controllability, deductibility, repeatability and generalizability. Galliers (1992) notes that case studies are usually restricted to a single event or organization and that it is difficult to collect similar data from a sufficient number of similar organizations making it difficult to generalize from case study research. In addition, the data collection and analysis processes are both subject to the influence of researcher characteristics and rely heavily on the researcher's interpretation of events, documents and interview material. However, these problems are not insurmountable and can be mitigated to some extent if a careful and rigorous methodological approach is adopted.

Appendix F

Questionnaires and cover letters

Information Technology (IT) Investments evaluation practices in the banking sector in Palestine

Department of Business Administration
The Islamic University of Gaza

Survey Questionnaire

Dear Sir/Madam,

Thank you for agreeing to participate in this Research Study on IT investments evaluation practices in the banking sector in Palestine.

Information technology (IT) has a strong influence on banks operation and strategy. Understanding how the banking sector in Palestine evaluates their IT projects/systems at the feasibility stage will improve the effectiveness with which IT projects decisions are made and will help banks to allocate their resources in an effective manner and to increase the likelihood of IT project success.

The goal of the research is to study the procedures and the criteria that are used to evaluate IT project in the banking sector in Palestine and to examine how well these practices align with the theoretical arguments in this field.

Please find attached a brief survey for you to complete. Your participation in this survey is strictly confidential. Your individual responses will be anonymous and will not be made available to other sources. Your responses will provide me a base for greater insight and understanding of studied subject. Your participation is completely voluntary and this survey should only take about 30 minutes to complete.

Thanks for helping me completing this project!

Sincerely,

Hassan El-kourd

PART I : BACKGROUND INFORMATION

A. Background information about the candidate

1) Position/ Title	
2) Do you come from an IT Background?	☐ Yes ☐ No
3) Highest Educational Degree held?	☐ Diploma or less ☐ Bachelors Degree ☐ Masters Degree ☐ Doctorate ☐ Other (specify) _____
4) Total year of experience in the IT field?	

B. Background information about the IT in the bank

5) How many IT people do you have in your bank (including branches)?	
6) What is the position, in your bank, of the Head of the IT department related to the Chief Executive, i.e. how many reporting levels are there between the IT Head and Chief Executive?	☐ Direct Link ☐ One Level ☐ Two level ☐ three or more Level
7) What is the approximate size of your bank IT spending for the year (2006)	
8) What is the approximate size of your bank IT spending for the year (2007)	
9) How many IT project of the following size has your bank implemented in the last 12 months?	a) < $ 100,000? _____ Projects b) $100,000 - $ 500,000? _____ Projects c) $500,000- $ 1 million _____ Projects d) >$ 1 million _____ Projects
10) How many IT project of the following size is your bank planning to implement in the next 12 months?	a) < $ 100,000? _____Projects b) $100,000 - $ 500,000? ____ Projects c) $500,000- $ 1 million ___ Projects d) >$ 1 million __ Projects

PART II : IT INVESTMENTS AND THEIR ROLE IN THE BANK

11) Which of the following categories would best describe the role of IT systems in your bank?(Select only one)	
a) IT systems provide a support role which is not critical to every operation to your bank	☐
b) IT systems provide key operational processes which are essential to every operation of your bank.	☐
c) IT systems provide a key operational process which are essential to every operation and they are a major competitive advantage	☐
d) IT systems provide key operational processes which are essential to every operation and they are a major competitive advantage. Moreover, they are innovate and are used to develop product or process which may become important in the future	☐

Systems Types	**12)** How much your bank ***has invested*** on the following types of systems**?** Investing size: Not at all ⟶ Extensively	**13)** How much your bank ***intends to invest*** on the following types of systems? Investing size: Not at all ⟶ Extensively
Mandatory systems (e.g. major enhancement to the old systems, or investing in new systems due to technical necessity, legal requirements, or to keep up with the competition.)	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Automation systems (IT that supports the firm's operations and typically involves repetitive transactions; the primary foci are cost reduction, productivity, efficiencies, and labor savings)	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Direct value added systems (applications which not only reduce costs but add value, often by doing things which were not done before**)**	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Informational IT systems (IT geared towards the development of a firm's information and communications to provide better information for planning, control and decision making e.g. MIS and DSS)	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Infrastructure (Hardware or software systems installed to enable the subsequent development of front-end systems.)	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Inter-organizational systems (IT investments with links across companies' boundaries which means two or more companies sharing the IT system).	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Strategic systems (IT that alters a firm's products and services or changes the way a firm competes in its industry to create competitive advantage and build market share; the overall objective is to drive sales).	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐
Business transformation systems (A combination of management and technology is used to change the organizational structure).	☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐

14) How often the following reason is used to justify IT project?	(Not at all) (Extensively)
a) Cost reduction	a) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
b) Increasing efficiency	b) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
c) Quality improvement	c) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
d) Sustaining a competitive advantage	d) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
e) Client satisfaction	e) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
f) Employee satisfaction	f) ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

PART III : IT INVESTMENTS EVALUATIONS PRACTICE

15) Do you have a written IT strategy?	☐ Yes ☐ No
16) Which of the following element are included in your IT strategy?	
a) Mission statement	a) ☐ Yes ☐ No
b) Vision statement	b) ☐ Yes ☐ No
c) Strategic goals	c) ☐ Yes ☐ No
d) Aligning IT and banks goals	d) ☐ Yes ☐ No
e) means to achieve the strategic goals	e) ☐ Yes ☐ No
f) key performance indicators	f) ☐ Yes ☐ No
g) quantified measures	g) ☐ Yes ☐ No

17) Does your bank have Formal IT Investment Evaluation procedures	☐ Yes ☐ No
18) How do you describe these procedures?	
a) They are general IT Investment Evaluation procedures	☐ Yes ☐ No
b) They are Precise and detailed written IT Investment Evaluation procedures	☐ Yes ☐ No

19) How widely the following procedures are used to justify proposed IT project?	never	rarely	sometimes	often	always
a) Oral guidelines and subjective arguments	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) General evaluation instructions	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Written instruction and recommendations specifically designed for IT systems	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) Other (please specify) _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5

20) How effective are they in justifying proposed IT project?	never	rarely	sometimes	often	always
a) Oral guidelines and subjective arguments	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) General evaluation instructions	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Written instruction and recommendations specifically designed for IT systems	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) Other (please specify)_____	☐ 1	☐ 2	☐ 3	☐ 4	☐5

21) Who is involved in the IT evaluation process?	never	rarely	sometimes	often	always
a) CEO or Executive committee	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) MIS department	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Functional department	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) External source	☐ 1	☐ 2	☐ 3	☐ 4	☐5
e) Other, specify	☐ 1	☐ 2	☐ 3	☐ 4	☐5

22) How often does your bank evaluate their IT project before implementation (feasibility stage evaluation)?	never	rarely	sometimes	often	always
	☐ 1	☐ 2	☐ 3	☐ 4	☐5

23) Which of the following were the reasons for not evaluating IT project?	never	rarely	sometimes	often	always
a) the projects are mandatory and have to be undertaken in order to keep the business moving	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) The size, value and risk of the project involved are neglectable.	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Operational urgency does not always permit time. (lack of time)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) The cost of conducting the evaluation is high	☐ 1	☐ 2	☐ 3	☐ 4	☐5
e) Lack of interest to carry out the evaluation	☐ 1	☐ 2	☐ 3	☐ 4	☐5
f) Lack of support of key personnel or the top management	☐ 1	☐ 2	☐ 3	☐ 4	☐5
g) Political reasons within the organization; i.e. evaluation might have negative consequence for key persons.	☐ 1	☐ 2	☐ 3	☐ 4	☐5
h) difficulties in the evaluation process itself	☐ 1	☐ 2	☐ 3	☐ 4	☐5
i) There is a lack of organizational structure; i.e. no defined responsibilities.	☐ 1	☐ 2	☐ 3	☐ 4	☐5

24) Which of the following problem do you face while appraising IT projects at the feasibility stage?	never	rarely	sometimes	often	always
Information requirements					
a) Quantifying relevant benefits	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) Identification of relevant benefits	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Quantifying relevant opportunity costs	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) Identification of relevant opportunity costs	☐ 1	☐ 2	☐ 3	☐ 4	☐5
e) Identification of relevant costs	☐ 1	☐ 2	☐ 3	☐ 4	☐5
f) Quantifying relevant costs	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Knowledge related					
g) Difficulty with interpretation of results	☐ 1	☐ 2	☐ 3	☐ 4	☐5
h) Unfamiliarity with project appraisal technique	☐ 1	☐ 2	☐ 3	☐ 4	☐5
i) Calculation of Discount Rate	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Organizational problems					
j) Lack of time	☐ 1	☐ 2	☐ 3	☐ 4	☐5
k) Lack of data/information	☐ 1	☐ 2	☐ 3	☐ 4	☐5
l) Lack of interest	☐ 1	☐ 2	☐ 3	☐ 4	☐5
m) *Other, what?* _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5

25) How often the following practice is conducted at your bank?	never	rarely	sometimes	often	always
a) develop a new evaluation instructions	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) develop instruction for selecting evaluation methods	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) search for better evaluation method	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) develop a new instruction for evaluation of specific IT system	☐ 1	☐ 2	☐ 3	☐ 4	☐5

26) How satisfied you are with the evaluation practice of IT system in regard to	**Low**				**High**
a) The methods used for evaluation	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) Impact of evaluation on project success	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Impact of evaluation on ensuring high impact on firm performance	☐ 1	☐ 2	☐ 3	☐ 4	☐5

27) What is your perception of the success of implemented IT systems in regard to the	**Total failure**				**Total success**
a) Development process	☐ 1	☐ 2	☐ 3	☐ 4	☐5
b) Use process	☐ 1	☐ 2	☐ 3	☐ 4	☐5
c) Quality of the system	☐ 1	☐ 2	☐ 3	☐ 4	☐5
d) Impact of the system on the organization	☐ 1	☐ 2	☐ 3	☐ 4	☐5

PART IV : METHODS USED FOR EVALUATING IT INVESTMENTS

28) We have listed below five general types of analysis for producing information to evaluate proposed new IT project. Please indicate the importance of each of type of information in your bank

(Hint: read question No.28 before answering this question)

	Importance				
	Low				**High**
A. STRATEGIC VALUE (important for the success of the bank)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
B. PROFITABILITY (COST AND BENIFT)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
C. RISK (dangers from effects of technical, economic, implementation, operational, and financial assumptions)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
D. DEVELOPMENT/PROCUREMENT (control of implementation of the system)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
E. USE/OPERATIONS (effective, reliable and flexible use of the system)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

29) Please check boxes to indicate the specific methods used in your bank, if any, for this type of analysis

	never	rarely	sometimes	often	always
A. STRATEGIC VALUE					
Analysis of industry structure and competition	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Analysis of competitive threats/opportunities	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Critical Success Factors (CSF)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Value chain analysis	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Analysis of customer needs (market survey)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Analysis of user requirements	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Economic theories	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Other, what? _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
B. PROFITABILITY					
Cost-benefit analysis	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Payback period analysis	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Return on investment (ROI)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Internal rate of return	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Discounted cash flows (DCF, NPV)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Return on management	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Productivity Index	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Model of the bank operations (Operations Research model)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Other, what? _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
C. RISK					
Technical feasibility (Can it be done?)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Economic feasibility (Will it be worth doing?)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Implementation feasibility (Can intended developer do it?)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Operational feasibility (Is it desirable within operational framework?)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Financial feasibility (Can we manage the cost?)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Other, what? _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
D. DEVELOPMENT/PROCUREMENT					
Project schedules	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Project budgets	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Programmer productivity measures	☐ 1	☐ 2	☐ 3	☐ 4	☐5
References from other banks	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Other, what? _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
E. USE/OPERATIONS					
Reliability testing	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Maintenance feasibility (will provide needed flexibility)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Level of system use	☐ 1	☐ 2	☐ 3	☐ 4	☐5
Other, what? _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5

استبانة حول
الممارسات المتبعة لدى قطاع البنوك في فلسطين في تقييم أنظمة تكنولوجيا المعلومات

السيد/ مدراء دائرة تكنولوجيا المعلومات

تحية طيبة وبعد،،،

تقوم أنظمة تكنولوجيا المعلومات بدور حيوي في قطاع البنوك وتشمل هذه الأنظمة جميع الأجهزة والبرامج والشبكات وغيرها من التقنيات التكنولوجية التي تساعد البنوك في أداء خدماتها كالصراف الآلي ونقاط البيع والأنظمة التي تساعد على تقديم الخدمات البنكية من خلال شبكة الانترنت والتلفون وشبكات الاتصالات المحلية.

إن عملية تقييم هذه الأنظمة ، قبل تبنيها أو تنفيذها ، يساعد على اتخاذ القرار المناسب في استثمار موارد المؤسسة بشكل أفضل واختار الأنظمة التي تعود على المؤسسة بأكبر فائدة. يسعى الباحث في هذه الإستبانة إلى التعرف على الممارسات والطرق المتبعة لدى قطاع البنوك في فلسطين في تقييم أنظمة تكنولوجيا المعلومات .

وحيث أننا نؤمن بأنكم خير مصدر للوصول إلى المعلومات المطلوبة، كونكم أهل خبرة واختصاص، ونعهد بكم الاهتمام والاستعداد الدائمين لمؤازرة الأبحاث العلمية، التي تخدم مجتمعنا وتطوره. نتوجه أليكم وكلنا أمل أن نجد التعاون المطلق من قبلكم، وذلك من خلال الإجابة على الأسئلة المحتواة في هذه الاستبانة والتي نتعهد لكم بالمحافظة على عدم إظهار هوية المجيب عنها وعدم استخدامها في أي مجال غير مجال البحث العلمي.

ولكم فائق الشكر والعرفان ،،،،

الباحث

الجزء الاول: معلومات عامة

1) المسمى الوظيفي	
2) هل دراستك الاكاديمية مرتبطة بتكنولوجيا المعلومات	☐ نعم ☐ لا
3) المؤهل العلمي	☐ دبلوم او اقل ☐ بكالوريس ☐ ماجستير ☐ دكتوراه ☐ غير ذلك؟ أذكر _____
4) عدد سنوات الخبرة في مجال تكنولوجيا المعلومات	

5) أي الخيارات التالية يصف وبشكل دقيق دور تكنولوجيا المعلومات في البنك الذي تعمل به؟ (اختر خيار واحد فقط)	
أ) تقوم تكنولوجيا المعلومات بدور ثانوي لايتعدى دور مساند للمهام التشغيلية الرئيسية في البنك	☐
ب) تقوم تكنولوجيا المعلومات بدور رئيسي هام في غالبية المهام التشغيلية الرئيسية في البنك.	☐
ت) تقوم تكنولوجيا المعلومات بدور رئيسي هام في غالبية المهام التشغيلية الرئيسية في البنك بالاضافة الى كونها ميزة تنافسية رئيسية لايمكن الاستغناء عنها	☐
ث) تقوم تكنولوجيا المعلومات بدور رئيسي هام في غالبية المهام التشغيلية الرئيسية في البنك بالاضافة الى كونها ميزة تنافسية رئيسية لايمكن الاستغناء عنها. كما تستخدم تكنولوجيا المعلومات لاابتكار طرق وخدمات ومنتجات جديدة يمكن ان يكون لها اهميتها في المستقبل	☐

6) كم يبلغ عدد الموظفين العاملين في تكنولوجيا المعلومات في البنك ؟ (العدد يشمل الفروع ايضاً)	
7) في الهيكل التنظيمي للبنك الذي تعمل بها، ماهي طريقة اتصال مدير تكنولوجيا المعلومات مع المدير العام	☐ أتصال مباشر ☐ يوجد مستوى تنظيمي واحد فقط يفصل بينهما ☐ يوجد مستويان تنظيميان يفصلان بينهما ☐ يوجد ثلاث مستويات تنظيمية او اكثر تفصل بينهما
8) كم بلغ الحجم الكلي للاستثمارات في تكنولوجيا المعلومات (أجهزة، برامج، شبكات، ... الخ) للعام 2006	
9) ما الحجم الكلي المتوقع للاستثمار في تكنولوجيا المعلومات(أجهزة، برامج، شبكات، ... الخ) للعام للعام 2007	
10) ماهو عدد مشاريع تكنولوجيا المعلومات التي تم تنفيذها خلال العام 2006 ؟ (اذكر العدد)	i. _____مشروع تقل تكلفته عن 010000 دولار ii. _____مشروع تتراوح تكلفته بين 100000 و 500000 دولار ii. _____مشروع تتراوح تكلفته بين 500000 و مليون دولار iv. _____مشروع تزيد تكلفته عن مليون دولار
11) ما هو عدد مشاريع تكنولوجيا المعلومات التي سيتم تنفيذها خلال العام 2007 ؟ (اذكر العدد)	v. _____مشروع تقل تكلفته عن 100000 دولار v. _____مشروع تتراوح تكلفته بين 100000 و 500000 دولار v. _____مشروع تتراوح تكلفته بين 500000 و مليون دولار v. _____مشروع تزيد تكلفته عن مليون دولار

نوع النظام	12) ما حجم ما تم إنفاقه في السنوات السابقه على الانواع التالية من أنظمة تكنولوجيا المعلومات (قارن بين الانظمة بعضها البعض)					13) ما حجم ما سيتم انفاقه في السنوات المقبله على الانواع من أنظمة تكنولوجيا المعلومات (قارن بين الانظمة بعضها البعض)				
	حجم الانفاق					حجم الانفاق				
	لايذكر	ضئيل	متوسط	كبير	ضخم	لايذكر	ضئيل	متوسط	كبير	ضخم
انظمة ضرورية هي الانظمة التي يلزم البنك على تركيبها او تطويرها بسبب تغير التكنولوجيا اومتطلبات المنافسة الضروريه او الاشتراطات القانونيه	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة أتمته (Automation) هي الأنظمة التي تستخدم في اتمتة العمليات الروتينية في البنك ويكون الغرض منها غالبا تخفيض التكاليف التشغيلية	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة تؤدي إلى رفع قيمة البنك وهي أنظمة يكون الغرض منها زيادة عدد اوحجم اونوع خدمات البنك أو انتشارها ويمكن قياس الفائدة او العائد منها بشكل مباشر	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة معلومات هي الانظمة التي تساعد على تحسين جودة وايصال المعلومات والتي غالبا ماتساعد في التخطيط واتخاذ القرار (مثال: انظمة المعلومات الادارية وانظمة اتخاذ القرار)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة بنية تحتيه هي عبارة عن الاجهزة وشبكات الاتصال وانظمة التشغيل التي تساعد لاحقا في بناء انظمة وبرمجيات يستفيد منها المستخدم	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة ربط مع البنوك الموسسات الاخرى وهي انظمة تمتد خارج نطاق البنك ويشترك فيها أكثر من بنك	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمة استراتيجية وهي انظمة لها بعد استراتيجي وتؤثر على الطريقة التي ينافس فيها البنك وطرق تادية خدماته ويكون الهدف منها غالبا زيادة نشاط البنك ودخله	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
انظمه تحوليه (Transformational) أنظمة تقوم بتغييرات جذرية تساعد البنك على تغيير طبيعة عمله او العمل في مجالات جديدة	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

14) يركز البنك على مشاريع أنظمة تكنولوجيا المعلومات التي تهدف الى:	لا	نادراً	احيانا	غالباً	دائماً
أ- خفض التكاليف	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب- زيادة كفائة البنك	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ت- زيادة جودة خدمات البنك	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ث- المحافظةعلى الميزة التنافسية للبنك	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج- زيادة رضى الزبون	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ح- زيادة رضى الموظفين	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

الجزء الثاني: ممارسات التقييم

15) هل يوجد لدى البنك خطة استراتيجية خاصة بتكنولوجيا المعلومات			**نعم** ☐	**لا** ☐
16) إذا كانت توجد خطة استراتيجية لتكنولوجيا المعلومات ، على أي من العناصر التالية تحتوي هذه الخطة				
أ- الرسالة Mission statement	h)	**نعم** ☐	**لا** ☐	
ب- الرؤية Vision statement	i)	**نعم** ☐	**لا** ☐	
ت- الأهداف الاستراتيجية Strategic goals	j)	**نعم** ☐	**لا** ☐	
ث- ربط أهداف دائرة وتكنولوجيا المعلومات مع أهداف البنك Aligning IT and banks goals	k)	**نعم** ☐	**لا** ☐	
ج- وسائل وطرق تحقيق الأهداف	l)	**نعم** ☐	**لا** ☐	
ح- مؤشرات رئيسية تساعد على التأكد من سير الأمور في الاتجاه الصحيح نحو تحقيق الأهداف	m)	**نعم** ☐	**لا** ☐	
خ- مقاييس كمية لقياس مدى تحقيق الأهداف	n)	**نعم** ☐	**لا** ☐	

17) هل يوجد لدى البنك وثائق تحدد التعليمات أو الإجراءات الواجب اتباعها لتقييم مشاريع تكنولوجيا المعلومات	**نعم** ☐	**لا** ☐
18) كيف يمكن وصف تعليمات واجراءات هذه الوثائق		
أ) تعليمات و إجراءات عامة لتقييم مشاريع تكنولوجيا المعلومات	**أ-** **نعم** ☐	**لا** ☐
ب) تعليمات و إجراءات دقيقه ومفصلة صممت خصيصا لتقييم مشاريع تكنولوجيا	**ب-** **نعم** ☐	**لا** ☐

19) ما مدى استخدام الطرق التالية لتقييم المشاريع المتعلقة بانظمة تكنولوجيا المعلومات	لا	نادراً	احيانا	غالباً	دائماً
أ- تعليمات وتوصيات شفهيه	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ب- تعليمات عامة ومكتوبه لتقييم المشاريع بشكل عام	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ت- تعليمات وتوصيات دقيقه ومفصلة لتقييم مشاريع تكنولوجيا المعلومات	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ث- غير ذلك؟ أذكر _____	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
20) مامدى فاعلية الطرق التالية لتقييم المشاريع المتعلقة بانظمة تكنولوجيا المعلومات	لا	نادراً	احيانا	غالباً	دائماً
أ- تعليمات وتوصيات شفهيه	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ب- تعليمات عامة ومكتوبه لتقييم المشاريع بشكل عام	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ت- تعليمات وتوصيات دقيقه ومفصلة لتقييم مشاريع تكنولوجيا المعلومات	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ث- غير ذلك؟ أذكر _____	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

21) ما هي الجهات او الشخصيات التي تقوم بعملية التقييم	لا	نادراً	احيانا	غالباً	دائماً
أ) المدير التنفيذي او اللجنة التنفيذية	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ب) قسم تكنولوجيا المعلومات	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ت) مستشارين من خارج البنك	1 ☐	2 ☐	3 ☐	4 ☐	5☐
ث) الاقسام التشغيلية	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ج) غير ذلك ؟ أذكر _____	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

22) هل يقوم البنك لديكم بتقييم (دراسة جدوى) مشاريع او انظمة تكنولوجيا المعلومات	لا	نادراً	احيانا	غالباً	دائماً
	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

23) اي النقاط التالية كان السبب في عدم تقييم انظمة تكنولوجيا المعلومات في البنك الذي تعمل بها	لا	نادراً	احيانا	غالباً	دائماً
أ) النظام كان الزامي واجبر البنك عليه	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ب) تكلفة النظام او المشروع قليله ولا تستوجب التققيم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ت) ضيق الوقت	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ث) تكلفة القيام بعملية التقييم كبيرة	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ج) لايوجد اهتمام بعملية التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ح) لايوجد دعم من قبل الادارة لعملية التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
خ) اسباب سياسية داخل البنك	☐ 1	☐ 2	☐ 3	☐ 4	☐5
د) صعوبات فنية في القيام بملية التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ذ) لايوجد هيكل تنظيمي في البنك لتحديد المسئوليات والصلاحيات عن عملية التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5

24) ماهي المشاكل التي تواجهك عند القيام بعملية تقييم مشاريع او انظمة تكنولوجيا المعلومات	لا	نادراً	احيانا	غالباً	دائماً
مشاكل تتعلق بالمعلومات التي ستستخدم في التقييم					
أ) تقييم فوائد النظام بشكل كمي	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ب) تحديد كل فوائد النظام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ت) تقييم الفرص البديلة بشكل كمي	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ث) تحديد كل الفرص البديلة	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ج) تحديد كل التكاليف ذات الصلة بالنظام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ح) تقييم تكاليف النظام بشكل كمي	☐ 1	☐ 2	☐ 3	☐ 4	☐5
مشاكل تتعلق بالمعرفة					
خ) الصعوبة في تحليل وتفسير نتائج طريقة عملية التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
د) عدم معرفة الطرق المستخدمة في تقييم انظمة تكنولوجيا المعلومات	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ذ) صعوبة تحيد معدل الفائدة في حساب قيمة مشاريع تكنولوجيا المعلومات	☐ 1	☐ 2	☐ 3	☐ 4	☐5
مشاكل تتعلق بالمؤسسة	5				
ر) ضيق الوقت	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ز) قلة المعلومات والتفاصيل الخاصة بالبنك	☐ 1	☐ 2	☐ 3	☐ 4	☐5
س) عدم اهتمام البنك بنتائج التقييم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ش) غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5

25) مامدى قيام البنك بالنشاطات التالية	لا	نادراً	احيانا	غالباً	دائماً
أ) تطوير التعليمات والسياسات المستخدمة لتقييم انظمة تكنولوجيا المعلومات	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب) تطوير المعايير المستخدمة لاختيار طرق تقييم انظمة تكنولوجيا المعلومات	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ت) البحث عن طرق تقييم افضل	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ث) البحث عن طرق تقييم افضل لانواع معينة من انظمة تكنولوجيا المعلومات	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

26) مامدى رضاك عن	مستاء	ضعيف	مقبول	جيد	راض جداً
أ) الطرق المستخدمة في تقييم انظمة تكنولوجيا المعلومات في البنك	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب) تاثير تلك الطرق في زيادة فرصة نجاح هذه الانظمة عند تطبيقها	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ت) تاثير تلك الطرق في زيادة ملائمة هذه الأنظمة مع بيئة المؤسسة	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

27) ماتقيمك لانظمة تكنولوجيا المعلومات الموجودة في مؤسستك	فشل تام ←				نجاح تام
أ) خلال فترة التطوير والبناء (هل تمت عملية التطوير بدون صعوبات)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب) خلال فترة الاستخدام (هل تلبي جميع احتياجات المستخدمين)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ت) من حيث جودة هذه الانظمة	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ث) من حيث ملائمة هذه الانظمة للبنك	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

الجزء الثالث: الطرق المتبعة في عملية التقييم

28) يمكن دراسة و تقييم مشاريع المتعلقة بأنظمة تكنولوجيا المعلومات من محاور مختلفة، الجدول التالي يحتوي على خمسة محاور يمكن ان تشتملها عملية التقييم، حدد اهمية هذه المحاور حسب الممارسات المتبعة في البنك لديك عند القيام بعملية التقييم

	درجة الاهمية				
	غير مهم				مهم جداً ←
أ- القيمة الاستراتيجية للمشروع (دراسة اثر النظام على نجاح البنك)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ب- ربحية المشروع (دراسة التكاليف والعوائد)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ت- المخاطر (دراسة المخاطر التقنية والاقتصادية والمخاطر الاخرى)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ث- تنفيذ المشروع (دراسة قابلية تنفيذ النظام اوالسيطره عليه خلال فترة التنفيذ)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
ج- استخدامات النظام (دراسة الجوانب التي تتعلق بثبات وفعالية ومرونة النظام)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

29) حدد ما مدى استخدام مؤسستك للطرق التالية في عملية تقييم مشاريع او أنظمة تكنولوجيا المعلومات

	لا	نادراً	احيانا	غالباً	دائماً
أ- طرق دراسة القيمة الاستراتيجية للمشروع					
تحليل تركيبة الصناعة	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل الفرص و المخاطر وحدة المنافسة	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل عوامل النجاح الحرجة *Critical Success Factors*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل سلسة المنافع *Value chain analysis*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل أحتياجات الزبائن	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل احتياجات المستخدم	☐ 1	☐ 2	☐ 3	☐ 4	☐5
استخدام النظريات الاقتصادية	☐ 1	☐ 2	☐ 3	☐ 4	☐5
غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ب- طرق دراسة ربحية المشروع					
تحليل المنافع والتكاليف *Cost-benefit analysis*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
تحليل فترة الاسترداد *Payback period analysis*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
العائد على الاستثمار *Return on investment*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
معدل العائد الداخلي *Internal rate of return*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
التدفق النقدي المخصوم *Discounted cash flows (DCF, NPV)*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
العائد على الإدارة *Return on* management	☐ 1	☐ 2	☐ 3	☐ 4	☐5
مؤشر الإنتاجية *Productivity Index*	☐ 1	☐ 2	☐ 3	☐ 4	☐5
نماذج بحوث العمليات	☐ 1	☐ 2	☐ 3	☐ 4	☐5
غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ت- طرق دراسة المخاطر					
الجدوى الفنية (إمكانية تنفيذ النظام من ناحية فنية)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
الجدوى الاقتصادية (دراسة المخاطر الاقتصادية)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
الجدوى التطويرية (دراسة المخاطر المحتملة خلال فترة التطوير)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
الجدوى التشغيلية (دراسة المخاطر المحتملة خلال فترة التشغيل)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
الجدوى المالية (دراسة المخاطر المالية)	☐ 1	☐ 2	☐ 3	☐ 4	☐5
غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ث- دراسة النظام من خلال دراسة متطلبات تنفيذ المشروع					
جدولة المشاريع	☐ 1	☐ 2	☐ 3	☐ 4	☐5
موازنة المشاريع	☐ 1	☐ 2	☐ 3	☐ 4	☐5
قياس إنتاجية المبرمجين	☐ 1	☐ 2	☐ 3	☐ 4	☐5
المقارنة مع البنوك الأخرى	☐ 1	☐ 2	☐ 3	☐ 4	☐5
غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5
ج- طرق دراسة فاعلية استخدامات النظام					
اختبار درجة الوثوقية / الاعتماد على النظام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
قياس مرونة النظام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
قياس سهولة الاستخدام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
قياس رضى المستخدمين للنظام	☐ 1	☐ 2	☐ 3	☐ 4	☐5
غير ذلك ؟ أذكر _____	☐ 1	☐ 2	☐ 3	☐ 4	☐5