Impact of Information Technology on Corporate Performance: ***A Practical Study at Palestinian Firms***

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Executive Summary

Palestine resembles an emerging economy; it is in the primitive stage regarding using ISs, which points to the importance of knowing where our position is on the new worldwide business foundation. This research discusses the effect of investments in information systems on overall business results. These investments are resembled by total cost of ownership of ISs made by Palestinian firms in the industrial sector for the period 2000-2005. The research measures the presence of a relationship between total cost of ownership for the information system and several performance financial measures. The data is collected through using both a quantitative questionnaire and a qualitative questionnaire. The measures used are the mean and stander deviation, Pearson correlation, and linear Regression. The study includes dependent variables that are operating income, non operating income, net income; the independent variables used are the cost of SW, HW, average cost for training the employees to use ISs, average cost of technical support, and average information staff salaries costs. The results of this research reflected difference between the results of the qualitative data questionnaire which asserts the existence of relatively big benefits from the usage of the information systems by the Palestinian firms working in the industrial sector. And the quantitative results which gave no significant relationship between the cost of investments in information systems with operating income, and no significant relationship for it with non operating income, and also, no significant relationship for it with net income.

The researchers provided several recommendations, among which is the advice for the firms to reevaluate the current investments and to have the government attention and sponsoring to reduce the information technology wider gab found when the results are compared to other countries.

1. Introduction

The role of MIS in business environment has evolved over time to become an integral part of its business operations. The use of information systems (ISs) has increased in the last 10 years not only by firms, but also by individuals and even governments.

The use of ISs was encouraged by the technological breakthroughs; the advancements in telecommunications such as the internet, the globalization that created a global unlimited marketplace, the strong growing for information economy, and the rise of competitive digital firms.

All of these factors transformed the ISs from data processing systems to decision support systems and became the foundation of the new business environment. However, there is currently an argument on the role and importance of IT in the new business environment as an editor at Harvard Business Review, Nicholas Carr, wrote an article titled “IT Doesn’t Matter,” in May 2003. This article caused significant debate in the world business community.

As for Palestine, which resembles an emerging economy, it is in the primitive stage regarding using ISs, which points to the importance of knowing where our position is on the new worldwide business foundation.

2. Research Problem

The Palestinian organizations invest in information systems and make capital expenditures and operating expenses in order to achieve benefits in their overall business results. This paper investigates the presence of this relationship between the total cost of ownership for the information system and the organizational productivity across the economic Palestinian sector during the period 2000 – 2005. According to this, we can articulate the problem of this research as the following:

Is there a statistical relationship between total cost of ownership for the information systems and economic Palestinian sector income?

3. Research Importance

3.1 This research will reflect the current situation of IT systems effects on the Palestinian corporations’ income to give us an indication of the current trend and direction regarding the benefits of the firms from such systems and their experiences. It also can enable us to make benchmarking when we compare the IT systems investments in private industrial sector firms inside Palestine with worldwide investments of IT in such private sector.

3.2 If further studies for the same research topic are continued in the following years it will give an accurate perspective of how to sponsor the management information systems in Palestine to reduce the technological gap between the emerging Palestinian economy and the world advanced economies to be globally competitive.

3.3 To coordinate the cost incurred for ISs usage with higher income of the firm to achieve it's strategic goals that made it necessary for the use of the IS at the first place.

4. Research goals:

4.1 Providing a theoretical review of information systems, its importance, impact, and role in the organizations.

4.2 Measuring total cost of ownership of information systems deployed in the economic Palestinian sector.

4.3 Measuring the impact of investment in information systems (ISs) on corporate income in Palestine over the period 2000 – 2005 using evidence from accounting data.

The use of ISs is supposed to produce a higher level of productivity by being more accurate, have more quick reactions, the savings in certain processes, a higher quality and more control, in addition to the overall advantages that an IT system should provide to the firm in its different business aspects and connections.
This research aims at providing Palestinian managers with a more thorough perspective of the direct result of investing in such systems on the business net productivity.

4.3 Using research qualitative results to provide recommendations that enhance future usage of IT systems in Palestine:

Even though each firm is an independent entity, but all firms share the fact that a poor decision regarding investments in ISs is more costly than it has ever been, especially with the capital investments in such systems and the lost business share in front of other competitors. Adding this to the difficult Palestinian economic environment circumstances, the importance of such ISs effects on the firms' profit is even greater. This paper can spot some light on the need of the economic Palestinian sector to be enforced and sponsored in it's use of information systems ISs.

4.4 Testing the relationship between total cost of ownership of information systems (TCO) and the income of the Palestinian firms through using a statistical model.

5. Research Hypothesis

This study tests the following main hypothesis:
H0: *there is no relationship between total cost of ownership of ISs and the Palestinian organizations performance using financial income measures.*

From this main hypothesis, we can derive the following sub hypothesis:
H01: *there is no relationship between the cost of SW, HW, and income of the Palestinian companies.*
H02: *there is no relationship between the costs of training employees to use ISs and the income of the Palestinian companies.*
H03: *there is no relationship between the technical support for ISs and the income of the Palestinian companies.*
H04: *there is no relationship between the ISs staff costs and the income of the Palestinian companies.*

6. Research Variables

6.1 The dependent variable of this study is the performance of the Palestinian organizations. The researchers will use the following income measures that include:

- Operating income (productivity in dollars), non-operating income and net income.
- A statistical model.

Using more than one measure is to know which of the previous is affected by the TCO of the ISs, because studies point that this is important to indicate the performance of the companies.

6.2 The independent variable, which is TCO of the ISs, includes the cost of the HW, SW, employee training, technical support, and IS administration staff salary.
There are other factors that affect the performance of the Palestinian organization such as the total firm employees' salaries, the interest rates, the inflation, the market growth, the occupation effect and other factors, nevertheless, for this research all other variables will be considered constant except for investing in ISs, using the principles of the microeconomic models.

7. Limitations of Research

7.1 Palestinian corporations are surrounded in their work by the downward economic conditions due to the unstable political environment, which heavily affects their business outcomes and profitability; as a result, this may give distorted research readings.

7.2 The limited time of research which affects the decision regarding the research sample size.

7.3 The limited understanding of the research importance by the Palestinian firms which may cause ill cooperation from the companies.

8. Theoretical Perspective and Previous Studies

8.1 Management information systems role and importance

Management information systems (MIS) are information systems, typically computer-based, that are used within an organization. WorldNet describes an information system as "a system consisting of the network of all communication channels used within an organization". A management information system may also be defined as "a system that collects and processes data (information) and provides it to managers at all levels who use it for decision making, planning, program implementation, and control". An information system is comprised of all the components that collect, manipulate, and disseminate data or information. It usually includes hardware, software, people, communications systems such as telephone lines, and the data itself. The activities involved include inputting data, processing of data into information, storage of data and information, and the production of outputs such as management reports.

As an area of study it is commonly referred to as *information technology management*. The study of information systems is usually a commerce and business administration discipline, and frequently involves software engineering, but also distinguishes itself by concentrating on the integration of computer systems with the aims of the organization. The area of study should not be confused with computer science which is more theoretical in nature and deals mainly with software creation, or computer engineering, which focuses more on the design of computer hardware.In business, information systems support business processes and operations, decision-making, and competitive strategies.

8.1.1 The functional support role

Business processes and operations support function are the most basic. They involve collecting, recording, storing, and basic processing of data. Information systems support business processes and operations by:

- Recording and storing *accounting records* including sales data, purchase data, investment data, and payroll data.
- Processing such records into *financial statements* such as income statements, balance sheets, ledgers, and management reports, etc.
- recording and storing *inventory data*, work in process data, equipment repair and maintenance data, supply chain data, and other production/operations records

- processing these operations records into *production schedules*, production controllers, inventory systems, and production monitoring systems
- recording and storing such *human resource records* as personnel data, salary data, and employment histories,
- processing these human resources records into *employee expense reports*, and performance based reports
- recording and storing *market data*, customer profiles, customer purchase histories, marketing research data, advertising data, and other marketing records
- processing these marketing records into advertising elasticity reports, marketing plans, and sales activity reports
- recording and storing *business intelligence data*, competitor analysis data, industry data, corporate objectives, and other strategic management records
- processing these *strategic management records* into industry trends reports, market share reports, mission statements, and portfolio models

The bottom line is that the information systems use all of the above to implement, control, and monitor plans, strategies, tactics, new products, new business models or new business ventures.

8.1.2 The decision support role

- The business decision-making support function goes one step further. It becomes an integral part -- even a vital part -- of decision -making. It allows users to ask very powerful "What if…?" questions: What if we increase the price by 5%? , What if we increase price by 10%? , What if we decrease price by 5%? What if we increase price by 10% now, then decrease it by 5% in three months? It also allows users to deal with contingencies: If inflation increases by 5% (instead of 2% as we are assuming), then what do we do? What do we do if we are faced with a strike or a new competitive threat? An organization succeeds or fails based on the quality of its decisions. The enhanced ability to explore "what if" questions are central to analyzing the likely results of possible decisions and choosing those most likely to shape the future as desired. "Business decision-making support function" is a phrase likely to quicken the pulse of no one but an accountant, but, in fact, it is all about turned wonderful dreams into solid realities.

- The most basic and most versatile business decision making tool is the spreadsheet, but spreadsheets are not especially user friendly. More sophisticated programs can seamlessly incorporate statistical decision-making tools like sensitivity analysis, Monte Carlo analysis, risk analysis, break even analysis and Bayesian analysis. If, for example, you are using the information system to decide about a new product introduction, the program should incorporate tools like logic analysis, B.C.G. Analysis, conjoint analysis, contribution margin analysis, multi dimensional scaling, G.E. Multi Fact oral analysis, factor analysis, cluster analysis, discriminate analysis, Quality Function Deployment, preference regressions, and preference-rank translations.

8.1.3 The communication decision support system role

Information systems can support a company's competitive positioning. Here are three levels of analysis:

- The supports for help in piloting the chain of internal value. They are the most recent and the most pragmatic systems within the reach of the manager. They are the solutions to reductions of costs and management of performance. They are typically named "Business Workflow Analysis" (BWA) or of "Business Management Systems p2p". Tool networks, they ensure control over piloting the set functions of a company. The real-time mastery in the costs of dysfunctions cause distances from accounts, evaluation and accounting that are presented in the evaluation and qualitative reports.

- All successful companies have one (or two) business functions that they do better than the competition. These are called core competencies. If a company's core competency gives it a long term advantage in the marketplace, it is referred to as a sustainable competitive advantage. For a core competency to become a sustainable competitive advantage it must be difficult to mimic, unique, sustainable, superior to the competition, and applicable to multiple situations. For a small or medium business a nice alternative is a MSP or a Managed Service Provider such as Virtual IT Solution, LLC http://www.virtualitsolution.com .This is a cost effective solution compared to paying for a IT staff or local technicians. Other examples of company characteristics that could constitute a sustainable competitive advantage include: superior product quality, extensive distribution contracts, accumulated brand equity and positive company reputation, low cost production techniques, patents and copyrights, government protected monopoly, and superior employees and management team. The list of potential sustainable competitive advantage characteristics is very long. However, some experts hold that in today's changing and competitive world, no advantage can be sustained in the long run. They argue that the only truly sustainable competitive advantage is to build an organization that is so alert and so agile that it will always be able to find an advantage, no matter what changes occur.

- Information systems often support and occasionally constitute these competitive advantages. The rapid change has made access to timely and current information critical in a competitive environment. Information systems, like business environmental scanning systems, support almost all sustainable competitive advantages. Occasionally, the information system itself is the competitive advantage. One example is Wal-Mart. They used an extranet to integrate their whole supply chain. This use of information systems gave Sam Walton a competitive advantage for two decades. Another example is Dell Computer. They used the internet to market custom assembled PC's. Michael Dell is still benefiting from this low-cost promotion and distribution technique. Other examples are eBay, Amazon.com, Federal Express, and Business Workflow Analysis.

8.1.4 The performance monitoring role

MIS are not just statistics and data analysis. They have to be used as an MBO (Management by Objectives) tool. They help:

- To establish relevant and measurable objectives
- To monitor results and performances (reach ratios)
- To send alerts, in some cases daily, to managers at each level of the organisation, on all **deviations** between results and pre-established objectives and budgets.

8.1.5 The strategic support role

The role of business information systems had now expanded to include strategic support. The latest step was the commercialization of the Internet, and the growth of intranets and extranets at the turn of the century. The information systems provide the needed information to establish and integrate the strategy of the firm to achieve its goals through:

- Working inward: Business-to-employee
- Working outward: Business-to-customer
- Working across: Business-to-business

8.2 Potential benefits of MIS investments

Investing in information systems can pay off for a company in many ways:

- Such an investment can support core competency. Great companies invariably have one or two core competencies, something they can do better than anyone else. This could be anything from new product development to customer service. It is the heart of the business and no matter what it is; information technology can support that core competency. An IT investment in a company's core competency can create a significant barrier to entry for other companies, defending the organization's primary turf and protecting its markets and profits.

- It can build supply chain networks. Firms that are a part of an integrated supply chain system have established relationships of trust with suppliers. This means faster deliver times, problem-free delivery and an assured supply. It can also mean price discounts and other preferential treatment. The inability of new entrants to get onto a supply chain/inventory management system can be a major barrier to entry.

- It can enhance distribution channel management. As with supplier networks, investment in distribution channel management systems can ensure quicker delivery times, problem free delivery, and preferential treatments. When the distribution channel management system is exclusive, it can mean some control over access to retailers, and, once more, a barrier to entry.

- Such an IT investment can help build brand equity. To build a brand, firms often invest huge sums in advertising. A huge brand name is a formidable barrier to entry and sustaining it can be facilitated by investment in marketing information systems and customer relationship management system.

- Information systems can mean better production processes. Such systems have become essential in managing large production runs. Automated systems are the most cost efficient way to organize large scale production. These can produce economies of scale in promotion, purchasing, and production; economies of scope in distribution and promotion; reduced overhead allocation per unit; and shorter break-even times more easily. This absolute cost advantage can mean greater profits and revenue.

- IT investment can boost production processes. Information systems allow company flexibility in its output level. Michael Porter claims that economies of scale are a barrier to entry, aside from the absolute cost advantages they provide. This is because, a company producing at a point on the long-run average cost curve where economies of scale exist has the potential to obtain cost savings in the future, and this potential is a barrier to entry.

- Implementing IT experience can leverage learning curve advantages. As a company gains experience using IT systems, it becomes familiar with a set of best practices that are more or less known to other firms in the industry. Firms outside the industry are generally not familiar with the industry specific aspects of using these systems. New entrants will be at a disadvantage unless they can redefine the industries best practices and leap-frog existing firms.

- IT investment can impact mass customization production processes. IT controlled production technology can facilitate collaborative, adaptive, transparent, or cosmetic customization. This flexibility can increase margins and increase customer satisfaction.

- Leverage IT investment in computer aided design. CAD systems facilitate the speedy development and introduction of new products. This can create proprietary product differences. Product differentiation can be a barrier to entry. Proprietary product differences can be used to create incompatibilities between competing products (as every computer user knows). These incompatibilities increase consumers' switching costs. High customer switching costs is a very valuable barrier to entry (it's used by Bill Gates.)

- It means expanded E-commerce. Company web sites can be personalized to each customer's interests, expectations, and commercial needs. They can also be used to create a sense of community. Both of these tend to increase customer loyalty. Customer loyalty is an important barrier to entry.

- Information systems leverage stability. Technologically sophisticated firms with multiple electronic points of contact with customers, suppliers, and others enjoy greater stability.

This monumental appearance of stability can be a barrier to entry, especially in financial services.

- The simple fact that IT investment takes a significant amount of money makes it a barrier to entry. Anything that increases capital requirements is a barrier to entry.

8.3 Historical development

The role of business information systems has changed and expanded over the last four decades.

In the incipient decade (1950s and '60s), **"electronic data processing systems"** could be afforded by only the largest organizations. They were used to record and store bookkeeping data such as journal entries, specialized journals, and ledger accounts. This was strictly an operations support role. By the 1960s **"management information systems"** were used to generate a limited range of predefined reports, including income statements, balance sheets and sales reports. They were trying to perform a decision making support role, but they were not up to the task.

By the 1970s **"decision support systems"** were introduced. They were interactive in the sense that they allowed the user to choose between numerous options and configurations. Not only was the user allowed customizing outputs, they also could configure the programs to their specific needs. There was a cost though. As part of mainframe leasing agreement, the company typically had to pay to have an IBM system developer permanently on site.

The main development in the 1980s was the introduction of **decentralized computing**. Instead of having one large mainframe computer for the entire enterprise, numerous PC's were spread around the organization. This meant that instead of submitting a job to the computer department for batch processing and waiting for the experts to perform the procedure, each user had his own computer that he could customize for his own purposes.

Many users had to use the vagaries of DOS protocols, BIOS functions, and DOS batch programming. As people became comfortable with their new skills, they discovered all the things their system was capable of. Computers, instead of creating a paperless society, as was expected, produced mountains of paper, most of it valueless. Mounds of reports were generated just because it was possible to do so. This information overload was mitigated somewhat in the 1980s with the introduction of **"executive information systems"**. They streamlined the process, giving the executive exactly what they wanted, and only what they wanted.

The 1980s also saw the first commercial application of artificial intelligence techniques in the form of **"expert systems"**. These programs could give advice within a very limited subject area. The promise of decision making support, first attempted in management information systems back in the 1960s, had step-by-step, come to fruition.

The 1990s saw the introduction of the **"Strategic information systems"**. These systems used information technology to enable the concepts of business strategy developed by scholars like M. Porter, T Peters, J. Reise, C. Markides, and J. Barney in the 1980s. The sustainability of these applications has since been called into question by N. Carr, which Piccoli and Ives, among others, have countered.

8.4 Previous studies:

Several previous studies are dedicated to the impact of using information systems on the organizations in the economic environment and the achievement of the goals of these organizations. Nevertheless, there are two types of these studies; the first type supports the use of new technological investments, the second type doubts the benefits of such investments.

8.4.1 A summary of related previous studies that support investments in new technologies:

The study of (Porter, 1985), in which he focus on the strategic dimensions of the new investment in technology using the competitive advantage perspective. In his study, he points the relationship between technological change and competition. According to Porter, from the technology perspective, any modification for the firm in this aspect is considered to be value added as it represents progress. Nevertheless, from the business perspective, technological progress is not always a good thing, it is important according to the extent that it affects competitive advantage or industry structure. He also gives a perspective for the impact of technology through the value chain.

The study of (Kaplan, 1986), in which he points that conventional financial analysis has four major weaknesses when applied to capital investments in technology, they are:

Incorrect assessment of a suitable discount rate:
Companies usually use discount rates in the range of 15 percent to 20 percent, but Kaplan gives a convincing argument based on weighted average cost of capital concept, sixty years of historic actual returns, and risk comparative analysis to prove that the correct real discount rates are closer to the range of 8 percent to10 percent. According to Kaplan using these lower discount rates greatly increase the attractiveness of these technological investments.

Unsuitable optimism when projecting continuous stable returns for the no investment alternatives:
In case that the organization does not accept to use the technological advances, this will lead to the obsolesces of the current technology that it use. This insight can make any projected slight growth or even stable payoff for the new technological investment

more attractive than the current situation. This leads to the notion that rejecting the new advancements is more risky than adopting them.

"Intangible" versus "Tangible" benefits:
Kaplan rejects the concept that quantifying the intangible benefits such as enhanced product quality and manufacturing flexibility is not practical. He argues that quantifying the intangible benefits is possible, which can improve the projected returns of the new technological advancements.

The importance of deploying explicit attention to the over-looked spin-off benefits of the new technological investment:
The investments in computer aided systems in one part of the business will result in noticeable improvements in the other parts of the business especially when the new technology is extended through these parts.

The study of (Bromwich & Bhimani, 1991), in which they discus the lack of explicit attention to the importance of having an integrated "Strategic-Financial" analysis framework . Bromwich & Bhimani give a framework that clearly addresses the strategic benefits that can be achieved from the technological investments, both within the firm and externally through the market of that firm.

The study of (Shank, 1989), in this study he gives three key themes taken from strategic management called the SCM perspective related to the costing of technology. These abbreviations are for the following concepts:

- Value chain analysis.
- Cost driver analysis.
- Competitive advantage analysis.

The paper of (Holden & El-Bannany, 2002), this is a paper that investigates whether investments in information technology systems affects bank profitability in the UK during the period 1976-1996. This paper integrated factors that are considered significant determinants of the bank profitability into the model used to assess the information systems investments impact, with the notion that there are many variables that do affect the overall profitability of the bank. The paper used the number of ATMs as the proxy for the measure of investment in ITs for customer services, it did not include any other ITs components such as computers for managerial controls as well as for customer service as it is used not only for presenting service to customers. The model is developed to take into account the available data that is related to these significant factors, this proposed model is:

$$ROA_{it} = \alpha_0 + \alpha_1 CR_t + \alpha_2 BSIZE_{it} + \alpha_3 MSIZE_t + \alpha_4 GMSIZE_t + \alpha_5 MSHARE_{it} + \alpha_6 RISK_{it} + \alpha_7 ROA_{it-1} + \alpha_8 ATMS_{it} + \alpha_9 NETWORK_t + \alpha_{10} MEMBER_{it} + u_{it}$$

where i refers to the bank and t to the year:
ROA it = profits of bank i in year t measured as after tax return on assets,
Market variables:
CRt = concentration ratio for the industry in year t, measured by total assets,
MSIZE t = the ratio of the size of the market in terms of total market deposits to gross domestic production in year t,
GMSIZE t = percentage growth in market size in terms of total deposits in year t,

Bank variables:
BSIZEit = size of bank i in year t, measured by total assets.
MSHAREit = market share of bank i in year t, measured by total assets
RISKit = equity capital of bank i divided by total assets of bank i in year t,
ROAit-1 = lagged value of ROAit

IT variables:
ATMsit = the number of ATMs for bank i in year t,
NETWORKt = a dummy variable equal to 1 for the existence of the shared-ATMs network in year t for the period from 1987 to 1996 and equal to 0 for the period from 1976 to 1986.
MEMBERit = a dummy variable equal to 1 if bank i in year t is a member at the shared-ATMs network and equal to 0 otherwise.
uit = disturbance term.

The results of this study show that, when the other factors used in the literature of bank profitability determinates are included, the number of automated teller machines installed by a bank has a positive impact on the bank's profitability.

The paper of (Khosrow-pour, 2000), this paper discuss a general approach to whether corporate America does know how to measure payoff in information technology investment. According to khosrow, the majority of businesses have not developed programs to regularly assess their computer technology returns. The reason he gave is that firms do not attempt to measure the benefits considered intangible such as access to new clients. Also, he indicates that benefits of the technological investments are desirable but the firm must position ITs investments correctly. Khosrow signals that there is no single evaluation that can be applied to every organization, he enforced his opinion on a recent published book for Professors Mahmood and Szewik entiteld "Measuring Information Technology Investment Payoff: Contemporary Approaches" published by Idea Group Publishing (www.idea-group.com) of Hershey, PA. He listed five general steps that Professors Mahmood and Szewczak developed In their book, these five steps should be adopted by

management in evaluating the level of information technology investment payoff in the organization:

Step 1. Adopt a multidimensional view of the IT investment payoff measurement issues.
Step 2. Identify and embrace non-quantitative measures of IT investment payoff.
Step 3. Be open to using a number of approaches to measuring IT investment payoff.
Step 4. Measure IT investment payoff at various levels of the organization.
Step 5. Measure IT investment payoff separately for different types of IT.

The study of (Smallen & Leach, 2002), the two authors marked 7 spending benchmarks (costs) to help campuses evaluate their efforts in supplying IT services, with the notion that there are no absolute measures of how much to invest in IT, but the level should reflect the company goals and the priority given to IT by that specific company. The benchmarks that are used as measures have certain characteristics:
-they could be compared across institutions
-would shed light on budgeting and staffing for IT
-could be normalized for institutional size and resources
-would be similar to benchmarks commonly used by institutional leaders in non-IT areas.

These seven benchmarks are:
-Budget profile: how dollars are allocated across equipment, software and wages.
-Budget support level: total budgets for IT are divided by the number of people supported so as to normalize for institutional size, this is also called the campus population.
-Budget impact: it is the ratio of total IT budget to total institutional budget.
-People supported per IT staff member: total number of supported people divided by total number of IT staff.
-Computers supported per IT staff member: total number of supported computers divided by total number of IT staff.
-Staffing profile by service area : this measure indicates how staff members are distributed among core services.
-Computer availability: it measures the institutional investments in infrastructure, particularly those in desktop and laptop computers.

The study of (Molla & Licker, 2001), those authors presented a model for E-commerce success using a partial extension of the principles used by Delone and Mclean's model of IS Success. This is made by defining an
independent variable called Customer E-commerce Satisfaction (CES). The e-commerce success model presented here is comprehensive and does not make distinctions among different facets of customer satisfaction such as satisfaction with the content and satisfaction with the design characteristics

of the e-commerce system. CES should not be treated as a static, singular dependent variable that compares the extent to which individual expectations were fulfilled on the basis of a single assessment, but rather as an outcome of a continuous process of satisfaction formation and reformulation. Continuous assessments of CES enable the identification of trends and the comparison of CES results for one point in time with what they were one or two years earlier. In addition, CES has to be seen cross-culturally. This is especially very important for companies that do businesses globally.

The study of (Anderson, et al., 2001), in this study, the researchers investigate how divergence from the industry level of investment in information technology (IT) affects firm value. Theoretical arguments suggest that greater investment in IT relative to industry peers may positively affect firm value and that smaller relative investment may negatively affect firm value, but these arguments have not been tested. The researchers perform analysis using data obtained from disclosures of IT spending in preparation for the year 2000. During this period, firms had options to replace legacy applications with new enterprise applications. This year is referred to as the Y2K. The data used in this research is collected from the corporate financial reports, but it does not distinguish between remediation costs for in-place IT and investments in new enterprise systems. This research provides an investigation of effects of relative investments in IT on both the intra-industry and inter-industry. IT may only affect firm value if it affects the competitive profile of the industry (division of the industry) or if it enables creation of value for the industry as a whole (size of the industry). Research hypothesis are:

Hypothesis 1a: Firm value was positively related to the amount by which the level of a firm.s
Y2K spending exceeded that of its industry peers.

Hypothesis 1b: Firm value was negatively related to the amount by which the level of a firm.s
Y2K spending lagged that of its industry peers.
Hypothesis 2: Firm value was positively related to the industry level of Y2K spending.
Hypothesis 3: An observed positive relation between firm value and the industry level of Y2K spending is
greater in magnitude than an observed positive relation between firm value and relativeY2K
spending (the amount by which Y2K spending exceeds the industry level).

The models developed by researchers are Empirical models :

Y2K spending t represents the planned amount of Y2K spending throughout the Y2K preparation
period as projected at time t.3

$$\text{market value}_t / \text{book value}_{t-1} = \alpha + \beta_1 * \text{relative Y2K spending}_t / \text{book value}_{t-1} + \beta_2 * \text{industry median Y2K spending}_t / \text{book value}_{t-1} + \gamma_1 * \text{book value}_t / \text{book value}_{t-1} + \gamma_2 * \text{earnings}_t / \text{book value}_{t-1} + \gamma_3 * \text{R\&D spending}_t / \text{book value}_{t-1} + \varepsilon \quad \text{(Model 1)}$$

$$\text{market value}_t / \text{book value}_{t-1} = \alpha + \beta_1^+ * \text{positive relative Y2K spending}_t / \text{book value}_{t-1} + \beta_1^- * \text{negative relative Y2K spending}_t / \text{book value}_{t-1} + \beta_2 * \text{industry median Y2K spending}_t / \text{book value}_{t-1} + \gamma_1 * \text{book value}_t / \text{book value}_{t-1} + \gamma_2 * \text{earnings}_t / \text{book value}_{t-1} + \gamma_3 * \text{R\&D spending}_t / \text{book value}_{t-1} + \varepsilon \quad \text{(Model 2)}$$

The empirical forms of the hypotheses are:

$$\text{Hypothesis 1a: } \beta_1^+ > 0$$

$$\text{Hypothesis 1b: } \beta_1^- < 0$$

$$\text{Hypothesis 2: } \beta_2 > 0$$

$$\text{Hypothesis 3: } \beta_2 > \beta_1^+, \quad \beta_2 > |\beta_1^-|$$

The researchers concluded that there is a positive relation between firm value, and the amount by which a firm's IT spending in preparation for the year 2000 exceeded the industry median level and a negative relation between firm value and the amount by which the firm's IT spending lagged behind the industry median level. We also find a positive relation between firm value and the industry median level of IT spending, consistent with value creation through the development of IT infrastructure for the industry value chain.

The study of (Silver, et al., 1995), in this paper, the researchers present a teaching model used successfully in the MBA core course in Information Systems at several universities. The model is referred to as the "Information Technology Interaction Model" because it maintains that the consequences of information systems in organizations follow largely from the interaction of the technology with the organization and its environment. Also, the model is intended to connect students with the dynamics of information systems in organizations and to help them recognize the benefits, dangers, and limitations of these systems. The model can be used for proactive and reactive analyses.

The model addresses the interaction of an information system's features with five elements of the organization:

- External environment
- Strategy
- Structure and culture
- Business processes
- IT infrastructure.

The model considers the consequences of this interaction for system use, for organizational performance, for the organization's personnel, and for the firm's future flexibility. Also, the model relates various aspects of the interaction process to the phases of the development and implementation lifecycles.

The essentials of the model are:

- System Effects
- The Organizational Context: The Environment and Elements of the Organization
- The Features of the Information System
- The Fit between System Features and Organizational Context
- The Implementation Process

The IT interaction model can be used in two fundamentally different ways:

- Proactively: to analyze the issues involved in implementing an information system and to make appropriate recommendations for action, or

- Reactively: to analyze what transpired after an information system was introduced into the organization and to make recommendations for improvement.

The study of (Delone & Mclean, 1992), in their study, they identify six main dimensions for categorizing the different measures of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. They developed an IS success model in which these categories are interrelated shaping a process construct.

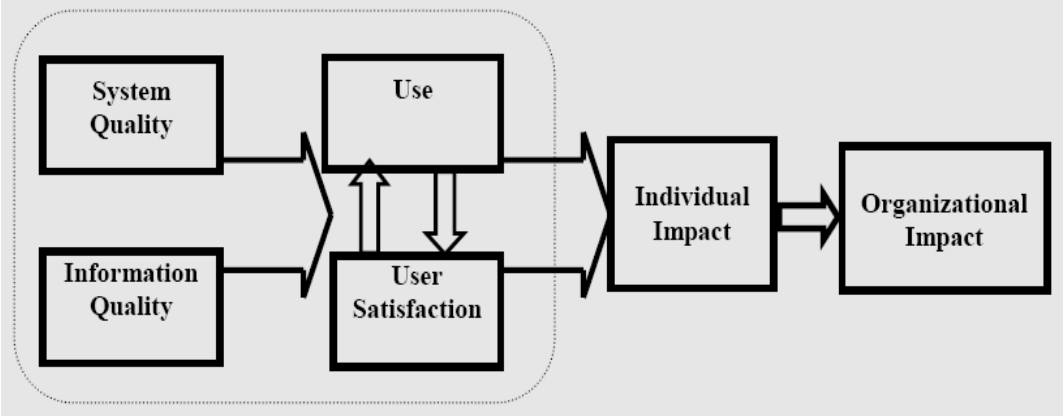

Figure 1: Delone & Mclean IS success model

The study of (Hitt & Brynjolfsson, 1996), in this study, the method used by authors is based on economic theory, they were able to define and examine the relevant hypotheses for each of the following three questions:

- Have investments in IT increased productivity?

Theory of Production: in equilibrium, the theory of production implies the following hypotheses:
H_{1a}: IT spending has a positive gross marginal product (i.e. it contributes a positive amount to output, at the margin)
H_{1b}: IT spending has zero net marginal product, after all costs have been subtracted.
Then researchers apply production function approach to data set using the same methods employed by previous researchers (Brynjolfsson and Hitt 1993, Lichtenberg 1994; Loveman 1994). Using the Cobb-Douglas production function, they relate three inputs, measured in constant 1990 dollars:
Total IT Stock (C),
Non-computer Capital (K)
Labor (L) to firm Value Added (V).
They used dummy variables to control for the year the observation was made (Dt), and the industry (2-digit SIC level) or sector of the economy in which a firm operates (Dj):

$$V = \exp(\sum_t D_t + \sum_{j=1} D_j) C^{\alpha} K^{\alpha_k} L^{\beta}$$

After taking logarithms and adding an error term, the result is the following estimating equation:

$$\log V = \sum_t D_t + \sum_{j=1} D_j + \beta_1 \log C + \beta_2 \log K + \beta_3 \log L + \varepsilon$$

- Have investments in IT improved business profitability?

Theory of Competitive Strategy: On balance, competitive strategy theory does not clearly predict either a positive or negative relationship between IT and profits or market value (which represent the expected discounted value of future profits). This implies the following hypothesis:
H2: IT spending is uncorrelated with supernormal firm profits or stock market value.
The researchers assume firm profitability is a function of the ratio of IT Stock to firm employees. This results in the following equation:

$$\text{Profitability Ratio} = \alpha_0 + \alpha_1 * (\text{IT Stock/Employee}) + \text{control variables} + \varepsilon$$

- Have investments in IT created value for consumers?
Theory of the Consumer: In competitive equilibrium, a decline in the price of an input will lead to an increase in spending on that input and an increase in consumer surplus. If firms are making optimal investments, the additional consumer surplus should be no less than the cost of these investments, which leads to the following hypothesis:
H_3: The consumer surplus created by IT is positive and growing over time.

In order to estimate consumer surplus the researchers use the index number method proposed by (Caves, Christensen and Diewert 1982) and applied by Bresnahan (1986). For a general utility function (the translog), the increase in consumer surplus between two periods (t, t+1) is a function of the ratio of IT Stock to Value Added (s), the Price of IT Stock (p) and Value Added (V) in the reference year, as follows:

$$Surplus_{t+1} = \frac{1}{2}(s_{t+1} + s_t) * \log(\frac{p_t}{p_{t+1}}) * V$$

Researchers concluded that IT value into the three stated dimensions: productivity, profitability and consumer surplus, can look different depending on the advantage point chosen, and they found evidence that IT may be increasing productivity and consumer surplus but not necessarily leading to supernormal business profits. They also showed that there is no inherent contradiction in the idea that IT can create value but destroy profits.

The study of (Roldan & Leal , 2003), those researchers developed a research model adapting the DeLone and McLean's information systems success model to the executive information systems (EIS) field.
The hypothesis that they tested for the conceptual model are:

- System quality and information quality of the EIS singularly and jointly affect both use and user satisfaction:

H1a: EIS system quality will be positively related to EIS use
H1b: EIS system quality will be positively related to EIS user satisfaction
H2a: EIS information quality will be positively related to EIS use
H2b: EIS information quality will be positively related to EIS user satisfaction

- The degree of user satisfaction can affect the amount of EIS use:

H3a: EIS user satisfaction will be positively related to EIS use

- EIS use and user satisfaction are direct antecedents of individual impact variables:

H3b-d: EIS user satisfaction will be positively related to individual impacts of the EIS.
H4a-c: EIS use will be positively related to individual impacts of the EIS.

- This impact on individual performance should eventually have some organizational impact:

H5a-c: Speed of problem identification will be related to organizational impacts of the EIS
H6a-c: Speed of decision-making will be related to organizational impacts of the EIS

H7a-c: Extent of analysis will be related to organizational impacts of the EIS

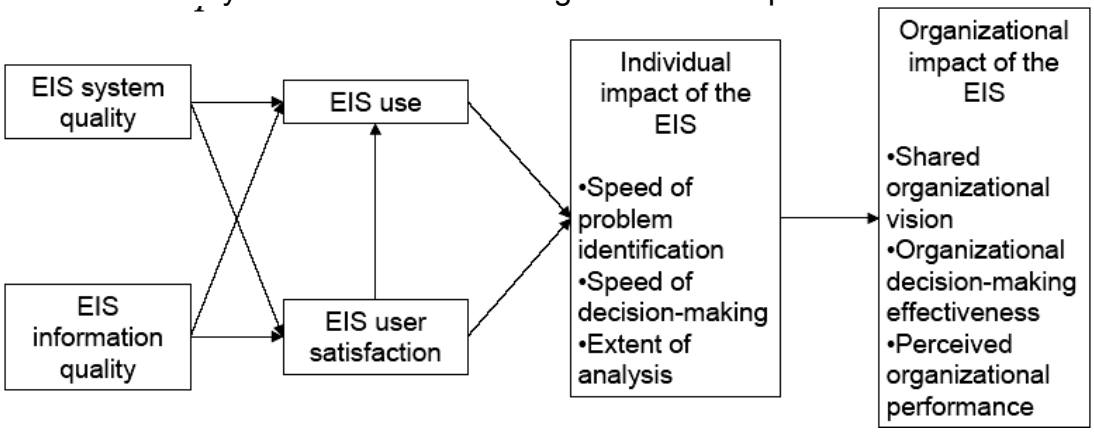

Figure 2: Roldan & Leal model for System quality and information quality of the EIS

The study of (Lagas, 1995), in which he presented the organizational attributes for successful IT investments.
The first attributes he presented was the critical ones which are:
-Senior management attention
-Overall mission focus
-Comprehensive approach to IT investment
Then he presented the phases of investment control process:
-selection
-control
-Evaluation
According to Lagas, using the collective results of post implementation reviews across completed systems, enable to modify the organization's existing investment selection and control processes.

The study of (Garven & Grace, 2003), in this study, they examined the relationship between investments in information technology and efficiency, and second the efficiency and profitability of insurer distribution systems. They used a profit measure derived from Varian's Weak Axiom of Profit Maximization to be able to overcome some shortcomings in the empirical literature. The paper examines efficiency using two methods:
- The first is based on the Rat
- The second is based on a transformation of Rat that assigns a value of 1 if the firm is efficient or 0 if the firm is not efficient.
R_n is the *n*th firm's total revenue, R_k is the *k*th firm's total revenue, Z_n is its vector of factor prices and W_n is the vector of firm *n*'s input prices, then firm k dominates firm n if $Rn \leq Rk$ but $W_nZ_n > W_nZ_k$.
The ratio of the number of firms dominating firm *n* over the number of firms with greater revenue because the number of firms by itself is sensitive to outliers.

$$RAT = \frac{\#(D(n))}{\quad}.$$

$$\#\ (\{k|\ R_k > R_n\})$$

Rat is the efficiency estimate bounded by 0 and 1. A lower ratio implies a more efficient firm and the # sign denotes the count of firms satisfying the condition.

The study of (Daud & Kamsin , 2004), This study investigate the impact that information systems have on organizational performance in Malaysia and the causes of this impact. It has been shown that changes in organization procedures, workflows and management require knowledge based workers. They presented recommendations on how the organization can nurture their knowledge workers.

The study of (Euripidis & Ioakim, 2004), In this paper, researchers presented the first study of the impact of information systems (IS) investments on business performance in Greece, based on firm-level data collected through a questionnaire-based survey in cooperation with the Federation of Greek Industries. They examine whether there are complementarities between IS investment and a set of IS management factors. Also, using econometric models based on the Cobb Douglas production function, they examined the IS investments in Greece and it's contribution to firm output and labor productivity. They used three business performance measures as dependent variables:
- Firm output (total sales revenue), as a basic business performance measure,
- Labor productivity (total sales revenue per employee), as an intermediate business performance measure,
- Return on assets, as financial business performance measure.

In this direction, they developed the following hypotheses H1 to H3:
H1: IS investment makes a positive contribution to firm output
H2: IS investment makes a positive contribution to labor productivity
H3: IS investment makes a positive contribution to the return on assets

The Cobb Douglas production function they used is:

$$Q = e^{\beta_0}\, CK^{\beta_1}\, K^{\beta_2}\, ISL^{\beta_3}\, L^{\beta_4}$$

Where Q is the firm output and CK, K, ISL and L are computer capital, non-computer capital, IS labor and non-IS labor respectively (firm inputs), while the $\beta 1 - \beta 4$ are the (partial) output elasticities with respect to these four inputs.

8.2.2 A summary of a previous study that doubts the benefits of investments in new technologies:

According to (Gourvennec,Y.) based on a summary of Nicholas Carr's "IT doesn't matter" article, he presented the following points:

Ubiquitous computing reinforces the triviality of IT:

- IT has deeply transformed today's business world and all businesses use information technology on a large scale. Consequently, capital expenditure devoted to IT has increased dramatically over the years and is still tremendous in spite of the current economic situation. Besides IT tools are no longer considered for low-level employees, but are used intensively by top managers who openly value the supposed competitive edge that they can derive from its usage. Behind all that is the thought that the pervasiveness of IT usage has led to it's becoming more strategic. On the contrary, Nicholas Carr shows us that IT has in fact become the latest item in a list of commodities that helped shape business and industries as we know them. Being a commodity, *IT also becomes transparent to its users*.

Proprietary vs. infrastructural technologies:

- Proprietary technologies may generate a competitive advantage to their owners provided adequate protection of their investors' rights. Conversely, Nicholas Carr proves that Infrastructural technologies are more productive when they are shared, although owning them may prove more cost-effective at the beginning of their existence. Once standards are in place, that type of infrastructural technologies is more effective when shared. Nicholas Carr uses the striking examples of electric power production or trains to prove his point, showing that no company would benefit today in purchasing and maintaining its own railway network.
- In addition, one of the major pitfalls that managers fall into is the belief that competitive advantages brought by infrastructural innovations will last forever. At the end of the build out phase of a new infrastructural technology, new standards will emerge, competition will rise dramatically and prices will fall. *Even the usage of the new technology will become standardized*. Therefore, the advantage of infrastructural technologies will shift from the micro to the macro-economical level for when they become pervasive, only countries and regions benefit from their presence, whereas individual companies are all competing on the same level.
- Likewise, infrastructural technologies are often subject to overinvestment therefore causing a lot of sweeping economic trouble. What we have witnessed with the 'Internet Bubble' happened in a similar fashion with the overinvestment in railroads in the 1860s. The analogy shows that there is a risk for deflation to settle on our 21st century economies as in 1860. N Carr would like the analogy to end here but the risk cannot, in his mind, be overlooked.

Information Technology: this new commodity

Despite appearances, IT is truly an infrastructural technology and according to Nicholas Carr, it is particularly prone to commoditization due to the following characteristics:

- IT is a Transport vehicle for information and is greatly standardized. Software customization is therefore fast becoming a non-starter for cost-effective IT implementations,
- IT is highly replicable, not just in terms of software (reusable objects) but also in terms of business processes. The Internet has acted as an accelerator upon this standardization

and Web-based services will impact this trend even more, therefore turning application software into a commodity too.

- IT prices are subject to sharp deflation. As more computing power and more network infrastructure are made available, more servers are being connected to the Internet, and this technology is sold at more and more ridiculous prices.

Throughout the build out of the IT infrastructure, a myriad of companies have been able to derive significant competitive advantages from IT. Some have been able to establish a durable competitive edge (e.g. Dell Computers, Wal-Mart) whereas others have only been able to generate a temporary advantage. But the ability to generate a competitive advantage from IT is becoming very rare nowadays, as is always the case with infrastructural technologies according to Mr. Carr.

Whereas it is not possible to predict the end of the build out of an infrastructural technology, there are many signs that the ramp-up of IT infrastructure is nearing its completion:

- IT is now delivering more power than is required for business.
- IT prices are so low that they have almost become affordable to all.
- There is (far) more network capacity available than is required.
- IT vendors are now positioned as utilities, mainly with their plans for selling web-based services.
- The Internet bubble has burst.

The incentive for customization will now be marginal and reserved to a few niche vendors, which offer some highly specialized software.

What should companies do?

According to Mr. Carr, the more an infrastructure becomes pervasive, the more it emphasizes risk as opposed to generating competitive advantages. As soon as an infrastructure is shared and open, its non-availability is more crucial than its intrinsic value. Consequently, all organizations should focus on trying to avoid the risk of the non-availability of this infrastructure. Yet, very few have analyzed the threats that could paralyze their whole businesses. IT managers, according to Mr. Carr, should focus on:

- Spending less: This is made necessary by the fact that IT is no longer considered strategic and because overspending is the biggest threat to companies. Apart from the requirement to look for cheaper alternatives, it is also necessary that IT managers cut out waste, mainly with regards to personal computing which is mostly used for standard tasks and do not require much computing power. Should vendors balk at reducing costs, Mr. Carr suggests that IT managers resort to Open source software packages and bare-bone network computers.

- Following reasonable innovating: It should no longer be necessary to be on the cutting edge of technology, most requirements are being fulfilled by existing software and equipment.

- Focus on risks because IT is mostly judged on what does *not* work as opposed to its vanishing competitive advantage.

Mr. Carr goes on with a study of the 25 companies with the highest economic returns and shows that they are spending far less on IT than the average. He therefore encourages managers to focus on costs and get back to basics, however boring it may prove.

9. Research statistical model:

According to the research variables determined, the statistical model is:

$$Y = a + b1HW + b2\ SW + b3ET + b4TS + b5SS + e$$

Y: is a dependent variable that points the Palestinian firms' performance which is going to be resembled by operating income, non operating income and net income.
HW: is an independent variable that points hardware costs.
SW: is an independent variable that points software costs.
ET: is an independent variable that points employee training costs.
TS: is an independent variable that points technical support costs.
SS: is an independent variable that points information staff salaries costs.
a is the constant
b1, b2, b3, b4, b5, are the coefficients of the independent variables.
e is the standard error of measurement

10. Research community and project information:

The researchers will use a nonprobability sample resembled by a convenience one of the corporations that are listed at PSE Palestinian securities exchange and any other working company in the industrial field only. The firms that work in information technology sector and in banking are not included in this research.

11. Methodology of research:

11.1 Tools of the study: a two part questionnaire is developed to gather the needed data for the period 2000-2005 and is disseminated through research community. The first part is to gather the quantitative data and the second part is used to gather the qualitative data regarding the investment in ISs and the effect on performance of Palestinian companies.

11.2 Procedures of the study: after collecting the relevant data, it is analyzed and entered to the statistical model
using SPSS application to find results for the established hypothesis. The resulting information is used to develop recommendations by researchers

11.3 Design of the study: The study includes these variables
- The independent variables:
The cost of SW, HW
The average cost for training the employees to use ISs
The average cost of technical support
The average information staff salaries costs
- The dependant variables:
Operating income
Non operating income
Net income

11.4 The used statistical tests:
- Mean and Stander Deviation
- Pearson correlation
- Linear Regression

12. Research results:

12.1 The Results for the qualitative data:

The researchers use these levels of agreements on the qualitative data for information systems
From:-

80% and more = very big
79.9%-60% = big
59.9%-40% = middle
39.9%-20 = little
19.9% and less = very little

The table below shows the result of the qualitative data questionnaire for information systems

Table (1)

The means, standard deviations, percentages and the agreements levels of the qualitative data for information systems

N	The Q. no	The Question	Mean	Std. Deviation	%	agreements levels
1	4	The company trains her employee on using the ISs that it use	4.88	0.34	98%	very big
2	3	The employee is satisfied from the ISs that it use	4.81	0.40	96%	very big
3	13	The use of ISs increased the number of finished business transactions	4.81	0.40	96%	very big
4	17	The information system positively affected the employees and their efficiency	4.75	1.00	95%	very big
5	18	The use of ISs decreased the time needed to perform the complete task for the business	4.69	0.48	94%	very big
6	16	The used ISs presents all the functional requirements for which was used	4.56	1.09	91%	very big
7	14	The company supplied all employees with the necessary equipment for using ISs	4.31	0.70	86%	very big
8	11	The use of ISs enhanced the supply process from suppliers	4.00	1.32	80%	very big

9	1	The use of ISs increased the company profitability and enhanced its competitiveness efficiency	3.94	1.57	79%	big
10	9	The use of ISs decreased the cost of the products and services	3.94	1.77	79%	big
11	10	The use of ISs enhanced the customer relationships	3.94	1.57	79%	big
12	8	The use of ISs increased sales	3.88	1.78	78%	big
13	7	The quality of the current products and services is enhanced due to the use of ISs	3.75	1.48	75%	big
14	6	New products and services were added due to the use of ISs	3.69	1.35	74%	big
15	12	The use of ISs decreased the waiting time to get the service of product for customs	3.38	1.71	68%	big
16	5	The employee complain from the ISs used by the company	2.81	0.83	56%	middle
17	15	The presence of Israeli occupation negatively affected the of ISs effectively	2.69	1.45	54%	middle

18	2	One of the reasons for the company losses is the use of ISs	2.06	.68	41%	middle
AVEARGE			3.94	.61	79%	big

From the table above we notice that:-

- The percentage of agreement for the qualitative data of information systems is (79%) which is big.
- The questions which have very big agreements are respectively (4, 3, 13, 17, 18, 16, 14, 11)
- The questions which have big agreements are respectively (1, 9, 10, 8, 7, 6, 12)
- The questions which have middle agreements are respectively (5, 15, 2)

12.2 The results for the quantitative data hypothesis:

12.2.1 Testing the hypothesis against operating income:

12.2.1.1 The result of the main hypothesis:

In order to study the truth of the hypotheses “There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost HW the average cost for training the employees to use ISs, the average cost of technical support, average ISs staff salaries cost and operating income.” We use linear regression test, the table below show the result of the test.

Table (2)

Linear Regression test between the cost of HW, the cost SW, the average cost for training the employees to use ISs the average cost of technical support, the average ISs staff salaries cost and total operating income

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	330802092.304	5	66160418.461	.871	.569(a)
	Residual	303791239.657	4	75947809.914		
	Total	634593331.961	9			

Since the level of significance (0.569) is bigger than 0.05, we accept the hypothesis and conclude that " There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost of HW the average cost for training the employees to use ISs the average cost of technical support, average ISs staff salaries and total operating income ".

Table (3)
The value of R and R square of the variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.722(a)	.521	-.077	8714.80407

Since the R equal (0.722) and R square (0.521) there is a middle correlation between the cost of SW, the cost of HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries cost and total operating income.

Table (4)
The equation of the regression is shown in table below.

Model		un-standardized Coefficients		t	Sig.
		B	Std. Error		
1	**(Constant)**	-61530.524	50019.796	-1.230	.286
	Hardware cost	661.707	478.286	1.383	.239
	Software cost	-.661	.680	-.972	.386
	Average ISs staff salaries	-.174	2.156	-.081	.940
	Average of technical support	-2.619	2.339	-1.120	.326
	Average cost of training	11.701	8.491	1.378	.240

The equation of the regression is:-
Y = 661.71 HW - 0.66 SW - 0.17 SS - 2.62 TS + 11.70 ET - 61530.52
Y: is total operating income
HW: hardware cost
SW: software cost
SS: average ISs staff salaries
TS: average of technical support
ET: average cost of employees' training to the use ISs

12.2.1.2 The result of the first hypothesis (H01):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and operating income.” We use Pearson correlation test, the table below shows the results of the test.

Table (5)
Pearson correlation test between the cost of SW, HW and operating income

		total HW and SW cost	total operating income
total HW and SW cost	**Pearson Correlation**	1	-.188
	Sig. (2-tailed)	.	.603
	N	10	10
total operating income	**Pearson Correlation**	-.188	1
	Sig. (2-tailed)	.603	.
	N	10	11

Since the level of significance (0.603) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and operating income".

12.2.1.3 The result of the second hypothesis (H02):

In order to study the truth of the hypotheses “There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and operating income.” We use Pearson correlation test in the variable of the study, the table below show the result of the test.

Table (6)
Pearson correlation test between the average cost for training the employees to use ISs and operating income

		average cost of training	otal operating income
average cost of training	**Pearson Correlation**	1	.123
	Sig. (2-tailed)	.	.734
	N	10	10
total operating	**Pearson Correlation**	.123	1

income	**Sig. (2-tailed)**	.734	.
	N	10	11

Since the level of significance (0.734) is bigger than 0.05, we accept the hypothesis and conclude that " There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and operating income".

12.2.1.4 The result of the third hypothesis (H03):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average costs of technical support and operating income” We use Pearson correlation test, the table below show the result of the test.

Table (7)
Pearson correlation test between the average cost of technical support and operating income

		average of technical support	**total operating income**
average of technical support	**Pearson Correlation**	1	-.340
	Sig. (2-tailed)	.	.337
	N	10	10
total operating income	**Pearson Correlation**	-.340	1
	Sig. (2-tailed)	.337	.
	N	10	11

Since the level of significance (0.337) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the average cost of technical support and operating income".

12.2.1.5 The result of the fourth hypothesis (H04):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average ISs staff salaries and operating income.” We use Pearson correlation test, the table below show the result of the test.

Table (8)
Pearson correlation test between the average ISs staff salaries and operating income

	average ISs staff salaries	**total operating income**

average ISs staff salaries	**Pearson Correlation**	1	-.327
	Sig. (2-tailed)	.	.356
	N	10	10
total operating income	**Pearson Correlation**	-.327	1
	Sig. (2-tailed)	.356	.
	N	10	11

Since the level of significance (0.356) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between average ISs staff salaries and operating income".

12.2.2 Testing the hypothesis against non operating income:

12.2.2.1 The result of the main hypothesis (H0):

In order to study the truth of the hypotheses “There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries cost and total non operating income.” We use linear regression test, the table below show the result of the test.

Table (9)
Linear Regression test between the cost of SW, the cost HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries and total non operating income

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	**Regression**	2939092.947	5	587818.589	3.583	.120(a)
	Residual	656262.390	4	164065.598		
	Total	3595355.338	9			

Since the level of significance (0.120) is bigger than 0.05, we accept the hypothesis and conclude that " There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost of HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries cost and total non operating income ".

Table (10)
The value of R and R square of the variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.904(a)	.817	.589	405.05012

Since the R equal (0.904) and R square (0.817) there is a very strong correlation between the cost of SW, the cost of HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries cost and total non operating income.

Table (11)
The equation of the regression is shown in table below.

Model		un-standardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	-4390.518	2324.840	-1.889	.132
	Hardware cost	57.164	22.230	2.571	.062
	Software cost	-3.295E-02	.032	-1.043	.356
	Average ISs staff salaries	6.192E-02	.100	.618	.570
	Average of technical support	6.749E-02	.109	.621	.568
	Average cost of training	-.151	.395	-.384	.721

The equation of the regression is:-
Y = 57.16 HW - 0.03 SW + 0.06 SS + 0.07 TS - 0.151 ET - 4390.518
Y: is total non operating income
HW: hardware cost
SW: software cost
SS: average ISs staff salaries
TS: average of technical support
ET: average cost of employees' training to the use ISs

12.2.2.2 The result of the first hypothesis (H01):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and non operating income.” We use Pearson correlation test, the table below show the result of the test.

Table (12)
Pearson correlation test between the cost of SW, HW and non operating income

	total hw and software cost	otal non operating

total hw and software cost	**Pearson Correlation**	1	.241
	Sig. (2-tailed)	.	.502
	N	10	10
total non operating	**Pearson Correlation**	.241	1
	Sig. (2-tailed)	.502	.
	N	10	10

Since the level of significance (0.502) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and non operating income".

12.2.2.3 The result of the second hypothesis (H02):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and non operating income.” We use Pearson correlation test in the variable of the study, the table below show the result of the test.

Table (13)
Pearson correlation test between the average cost for training the employees to use ISs and non operating income

		average cost of training	**otal non operating**
average cost of training	**Pearson Correlation**	1	-.363
	Sig. (2-tailed)	.	.303
	N	10	10
total non operating	**Pearson Correlation**	-.363	1
	Sig. (2-tailed)	.303	.
	N	10	10

Since the level of significance (0.303) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and non operating income".

12.2.2.4 The result of the third hypothesis (H03):

In order to study the truth of the hypotheses “There exists no significant relationship, in the significant level 0.05, between the average cost of technical support and none

operating income" We use Pearson correlation test, the table below show the result of the test.

Table (14)
Pearson correlation test between the average cost of technical support and non operating income

		average of technical support	otal non operating
average of technical support	Pearson Correlation	1	.277
	Sig. (2-tailed)	.	.439
	N	10	10
total non operating	Pearson Correlation	.277	1
	Sig. (2-tailed)	.439	.
	N	10	10

Since the level of significance (0.439) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the average cost of technical support and non operating income".

12.2.2.5 The result of the fourth hypothesis (H04):

In order to study the truth of the hypotheses, "There exists no significant relationship, in the significant level 0.05, between the average ISs staff salaries and non operating income." We use Pearson correlation test, the table below shows the results of the test.

Table (15)
Pearson correlation test between the average ISs staff salaries and non operating income

		average ISs staff salaries	otal non operating
average ISs staff salaries	earson Correlation	1	.345
	Sig. (2-tailed)	.	.329
	N	10	10
total non operating	earson Correlation	.345	1
	Sig. (2-tailed)	.329	.
	N	10	10

Since the level of significance (0.329) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between average ISs staff salaries and non operating income".

12.2.3 Testing the hypothesis against net income:

12.2.3.1 The result of the main hypothesis (H0):

In order to study the truth of the hypotheses “There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries and net income.” We use linear regression test, the table below show the result of the test.

Table (16)
Linear Regression test between the cost of SW, the cost HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries cost and net income

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	153756337.539	5	30751267.508	.249	.920(a)
	Residual	493869466.908	4	123467366.727		
	Total	647625804.447	9			

Since the level of significance (0.920) is bigger than 0.05, we accept the hypothesis and conclude that " There exists no significant relationship, in the significant level 0.05, between the cost of SW, the cost of HW the average cost for training the employees to use ISs the average cost of technical support the average payoff of employees supplied with computer it system cost and net income".

Table (17)
The value of R and R square of the variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.487(a)	.237	-.716	11111.58705

Since the R equal (0.487) and R square (0.237) there is a weak correlation between the cost of SW, the cost HW the average cost for training the employees to use ISs the average cost of technical support the average payoff of employees supplied with computer it system cost and net income.

Table (18)
The equation of the regression is shown in table below.

Model		un-standardized Coefficients		t	Sig.
		B	Std. Error		
1	(Constant)	3066.990	39094.855	.078	.941
	Hardware cost	.322	2.823	.114	.915
	Software cost	-.178	.780	-.228	.831
	Average ISs staff salaries	-.493	2.948	-.167	.875
	Average of technical support	-1.497	3.031	-.494	.647
	Average cost of training	4.434	8.978	.494	.647

The equation of the regression is:-
Y = 0.322 HW - 0.178 SW - 0.493 SS - 1.497 TS + 4.434 ET + 3066.99
Y: is net income
HW: hardware cost
SW: software cost
SS: average ISs staff salaries
TS: average of technical support
ET: average cost of employees' training to the use ISs

12.2.3.2 The result of the first hypothesis (H01):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and net income.” We use Pearson correlation test, the table below show the result of the test.

Table (19)
Pearson correlation test between the cost of SW, HW and net income

		total hw and software cost	total income
total hw and software cost	Pearson Correlation	1	-.168
	Sig. (2-tailed)	.	.642
	N	10	10
otal income	Pearson Correlation	-.168	1
	Sig. (2-tailed)	.642	.
	N	10	10

Since the level of significance (0.642) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the cost of SW, HW and net income".

12.2.3.3 The result of the second hypothesis (H02):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and net income.” We use Pearson correlation test in the variable of the study, the table below show the result of the test.

Table (20)
Pearson correlation test between the average cost for training the employees to use ISs and net income

		average cost of training	total income
average cost of training	Pearson Correlation	1	.095
	Sig. (2-tailed)	.	.794
	N	10	10
otal income	Pearson Correlation	.095	1
	Sig. (2-tailed)	.794	.
	N	10	10

Since the level of significance (0.794) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the average cost for training the employees to use ISs and net income".

12.2.3.4 The result of the third hypothesis (H03):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average cost of technical support and net income” We use Pearson correlation test, the table below show the result of the test.

Table (21)
Pearson correlation test between the average cost of technical support and net income

		average of technical support	total income
average of technical support	Pearson Correlation	1	-.316
	Sig. (2-tailed)	.	.374
	N	10	10
otal income	Pearson Correlation	-.316	1

	Sig. (2-tailed)	.374	.
	N	10	10

Since the level of significance (0.374) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between the average cost of technical support and net income".

12.2.3.5 The result of the fourth hypothesis (H04):

In order to study the truth of the hypotheses, “There exists no significant relationship, in the significant level 0.05, between the average ISs staff salaries and net income.” We use Pearson correlation test, the table below show the result of the test.

Table (22)
Pearson correlation test between the average ISs staff salaries and net income

		average ISs staff salaries	**total income**
average ISs staff salaries	**Pearson Correlation**	1	-.298
	Sig. (2-tailed)	.	.402
	N	10	10
otal income	**Pearson Correlation**	-.298	1
	Sig. (2-tailed)	.402	.
	N	10	10

Since the level of significance (0.402) is bigger than 0.05, we accept the hypothesis and conclude that "There exists no significant relationship, in the significant level 0.05, between average ISs staff salaries and net income".

12.3 Summary of the results

12.3.1 Summary of the qualitative results

1- It is found that there is a big agreement from the sample of the study for the qualitative data of information systems.
2- It a bears that there is very big agreement from the sample of the study for the qualitative data in the answers of the questions that state the following: the company trains her employees on using the ISs that it deploys, the employees are satisfied from the ISs that they use, the use of ISs increased the number of finished business transactions, the information systems positively affected the employees and their efficiency, the use of ISs decreased the time needed to perform the complete task for

the business, the used ISs provides all the functional requirements for which was used, the company supplied all employees with the necessary equipment for using ISs, and the use of ISs enhanced the supply process from supplier.

3- It is found that there is big agreement from the sample of the study in the answers of the questions that state the following: the use of ISs had increased the company profitability and enhanced its competitiveness efficiency, the use of ISs decreased the cost of the products and services, the use of ISs enhanced the customer relationships, the use of ISs increased sales, the quality of the current products and services is enhanced due to the use of ISs.

4- It is found that there is middle agreement from the sample of the study in the answers of the questions that state the following: the new products and services are added due to the use of ISs, the use of ISs decreased the waiting time to get the service of product for customs, the ISs used by the company, the presence of Israeli occupation negatively affected the of ISs effectively, one of the reasons for the company losses is the use of ISs.

12.3.2 Summary of the results for the quantitative data hypothesis:

12.3.2.1 Summary of the hypothesis' results with operating income:

1- It is found that, there exists no significant relationship between the costs of SW, HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries and operating income.

2- It is found that, there exists no significant relationship between the cost of SW, HW and operating income.

3- It is found that, there exists no significant relationship between the average cost for training the employees to use ISs and operating income.

4- There exists no significant relationship between the average cost of technical support and operating income.

5- It is found that, there exists no significant relationship between the average ISs staff salaries and operating income.

12.3.2.2 Summary of the hypothesis' results with non operating income:

1- It is found that, there exists no significant relationship between the costs of SW, HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries and non operating income

2- It is found that, there exists no significant relationship between the cost of SW, HW and non operating income.

3- It is found that, there exists no significant relationship between the average cost for training the employees to use ISs and non operating income.

4- It is found that, there exists no significant relationship between the average cost of technical support and non operating income.

5- It is found that, there exists no significant relationship between the average ISs staff salaries and non operating income.

12.3.2.3 Summary of the hypothesis' results with net income:

1- It is found that, there exists no significant relationship between the costs of SW, HW, the average cost for training the employees to use ISs, the average cost of technical support, the average ISs staff salaries and net income

2- It is found that, there exists no significant relationship between the cost of SW, HW and net income.

3- It is found that, there exists no significant relationship between the average cost for training the employees to use ISs and net income.

4- It is found that, there exists no significant relationship between the average cost of technical support and net income

5- It is found that, there exists no significant relationship between the average ISs staff salaries and net income.

13. Discussion of the results:

The result of the qualitative data questionnaire asserts the existence of relatively big benefits from the usage of the information systems by the Palestinian firms working in the industrial sector. However, the quantitative results gave no significant relationship between investments in information systems with operating income, and no significant relationship for it with non operating income, and also, no significant relationship for it with net income.

The difference between the qualitative and quantitative results indicates that there is gab between the evaluations of the industrial Palestinian firms for there deployed information systems, and the actual numeric benefits that they achieved in reality.

There are three main explanations for these conflicting results:

1- This gab between planned and actual benefits of the information systems may be due to the fact that most industrial Palestinian firms made small investments in these

information systems that even with a positive outcome did not have a significant effect on the firms' performance.

2- This gab between planned and actual benefits of the information systems may be due to the miss use of the current deployed ISs, or the obsolescence of these systems, or the bad selection for a system that does not provide the critical needed functional requirements and many other reasons.

3- This gab is due to a combination of the relatively modest investments in ISs and the miss use for an information system that does not suite the firm's goals and procedures.

In our opinions as researchers, we cannot completely be positive and accurate about the size and the most important reasons of this gab because the companies did not fully cooperate with us in providing the information needed.

This gab is increased under the current economic recession and the effect of occupation, but, this constitutes a general condition that must not be taken as an excuse to accept these results without taking the necessary steps to correct the ISs investments situation in this important industrial sector.

Comparing the results of this research with a study made in Saudi Arabia that was made on the industrial firms, the results of the study provided a middle correlation for the investments made in ISs with the performance of the firms and provided that the benefits of these investments were increased with the support of top management and the training of the employees on using the systems.

This comparison provides a powerful clue that a more difficult and wider technological gab exists between Palestine and the rest of the technologically advanced countries, and unless the government interferes to help reducing it, our small current place on the technological new business foundation will no longer exist.

14. Recommendations:

Each industrial Palestinian firm should reevaluate the ISs used currently by the company to make sure that it provides the benefits for which it was used at first.

The top management in each firm must develop a strategy to overcome the barriers that it faces in the effective use of this important investment in ISs, disseminate it through the company, establish a shared vision and must take into consideration the relevant aspects of information systems such as the obsolescence issue, the source code agreements and other critical success factors.

The company can use an expert to help her in crossing the current gab to have the effective results of ISs. If the company have limited resources to spend and wants to

use them on ISs without making expensive researches, it can use the help of the academic personnel and students for symbolic fees.

The efforts of the individual firms must be enforced by the government sponsoring for both, the information technology sector and the economic sector by providing them with the factors that they need for success.

The Palestinian government must develop a strategy with time limits to reduce the information system technological gap between Palestine and advanced countries. Such a strategy must have obvious aspects that include:

1- Mission:-

Developing the Palestine information technology sector through building a qualified human and institutional base with suitable resources that has the ability to create and initiate to reduce the gab between Palestine and the other developed countries in information system.

2- Long term goals to be achieved in 6 years:-

- Luring local and foreign capital to invest in information system's sector in Palestine.
- Global marketing for Palestinian capabilities in the information system's sector.
- Establish a high quality IT infrastructure including HW, SW, and networks.

3- Short term goals to be achieved in 3 years:-

- Establishing laws for tax exemption to encourage investment in IS.
- Activating the rule of the specialized ministries in building the economic infrastructures that support the investment in IS in Palestine with the help and participation of the private sector.
- Preparing the financial funds necessary to support the information systems in Palestine.
- Providing academic scholars that provide high qualification levels in and outside Palestine.
- Making agreements with developed countries and institutions to support the needs of Palestine in IT.

4- Procedures:-

- Effective participation in the conferences and exhibitions on the regional and worldwide level.
- Establishing the specifications and measures that govern the industry of information systems in Palestine.
- Encouraging the small Palestinian ISs firms make mergers to stand up in the face of competition and rapid evaluation of IS technologies.
- Providing low cost but high value training programs for the Palestinian workers in the different sectors that relates the benefits of IT to theses sectors.

5- Policies:-

- Encouraging creative students to study and specialize in IS technologies, by providing them with the proper incentives.
- Preparing the Palestinian environment to embrace the information system's culture that supports technological evaluation from the first educational level through providing the schools with the necessary means.
- Supporting the local creative technological firms to innovate technological products and customize the existing ones to the special needs of the economic Palestinian sectors under the occupation challenges.
- Encouraging the firms to have the increase in there investments in ISs based on careful studies with the help of the specialists.

15. Appendix

Corporate accounting information from its consolidated statements for the following years:

Currency unit: company sector:

Item	Year										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Operating income											
Operating expenses											
Non operating income											
Non operating expenses											
IT system cost TCO											
Total Number of employees											
Number of sales personnel											
Total production capacity											
Number of finished products											

Number of services presented											
Item	**Year**										
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total assets											
Total liabilities											
Total current assets											
Total current liabilities											
Working capital											
Number of new products											
Working hours per day per employee											
Cost of employee training programs											
Number of firm competitors											

Net profit / loss for the year											

Total cost of ownership (TCO) of IT systems used by the company

Currency unit:

Item	Description	Base Year of acquisition	Item Cost			
			once	More than once	Number of payments	Last payment date
Hardware						
Software						
Training						
Technical support						
IT administration staff						
Total						

The qualitative data questionnaire for information systems:

Item	Agreed	Strongly agreed	Disagree	Strongly Disagree	No opinion
The use of ISs increased the company profitability and enhanced it's competitiveness efficiency					
One of the reasons for the company losses is the use of ISs					
The employee is satisfied from the ISs that it use					
The company trains her employee on using the ISs that it use					
The employee complain from the ISs used by the company					
New products and services were added due to the use of ISs					
The quality of the current products and services is enhanced due to the use of ISs					
The use of ISs increased sales					
The use of ISs decreased the cost of the products and services					
The use of ISs enhanced the customer relationships					
The use of ISs enhanced the supply process from suppliers					
The use of ISs decreased the waiting time to get the service of product for customs					
The use of ISs increased the number of finished business transactions					
The company supplied all employees with the necessary equipment for using ISs					
The presence of Israeli occupation negatively affected the use of ISs effectively					
The used ISs presents all the functional requirements for which it was used					
The information system positively affected the employees and their efficiency					

The use of ISs decreased the time needed to perform the complete task for the business					

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