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The adoption and diffusion of
internet-electronic data interchange
(I-EDI) by Jordanian SMEs

Anas A. Al-Bakri
University of Wollongong

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**THE ADOPTION AND DIFFUSION OF INTERNET-ELECTRONIC DATA
INTERCHANGE (I-EDI) BY JORDANIAN SMES**

* A thesis submitted in partial fulfilment of the requirements for the award of the
degree

(DEGREE OF MASTER BY RESEARCH)

From

UNIVERSITY OF WOLLONGONG

By

ANAS A. AL-BAKRI

**B.Sc. of Business Administration (coursework)
Master of Banking and Financial Sciences (coursework)
Master of Applied Finance (coursework)**

CERTIFICATION:

I, **Anas A. Al-bakri**, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Master Degree, in the Department of Information Systems, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at other academic institution.

Anas A. Al-bakri

10 August 2007

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Anas Al-bakri

ABSTRACT

Electronic Data Interchange (EDI) is a protocol that enables businesses to exchange information and business transactions via proprietary networks. The early application of traditional EDI was quickly supplanted by an Internet-based (Internet-EDI) version, as this is much cheaper and more flexible.

This research explores both the factors influencing adoption as well as barriers preventing adoption of I-EDI by Jordanian companies, particularly those in the SME sector. These factors include Organizational, Inter-organizational, Technical, Cultural factors, Governmental factors, Perceived benefits, Triggers and Barriers. The research design was an explorative case study of Jordanian SMEs with data collected via interviews. The sample (participants) included a diverse range of companies, employing between 2 and 120 people. The participants of the research interviews came from six Jordanian companies (SME sector). The research was comprised of three stages: Theoretical Analysis (Stage One), Qualitative Data Collection (Stage Two) and Data Analysis and Interpretation (Stage Three).

The analysis of primary data (phone interviews) revealed that many salient factors impacted I-EDI adoption. Benefits of I-EDI, Barriers to I-EDI, Organizational, Inter-organizational Factors, Cultural (Environmental), and Governmental Factors were presented as important issues for I-EDI adoption by the Jordanian SME sector, particularly Cultural and Governmental Factors.

The research also shows that the global competitiveness of Jordanian SME may depend on how quickly they move forward to embrace I-EDI.

Further research is necessary to better understand the status of the I-EDI adoption and diffusion among SMEs in Jordan and the impact of the factors identified here on performance and efficiency.

CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND OF THE STUDY

Information system technologies are playing an ever-increasingly vital role in the management of organizations for their efficiency and profitability. So, it is clear that some companies have boosted technology investment and spending to address revenue, costs and competitiveness concerns. In addition, studies show that a growth in the Electronic Data Interchange (EDI) capability is now becoming a requirement for effectively servicing many large business customers (Frust & Nolle, 1998). Traditional EDI is a protocol that enables businesses to exchange information and business transactions via proprietary networks. Most previous studies show that companies have used EDI just to enhance and attract a large number of customers through high quality services.

E-commerce is the new way or method of doing business using the infrastructure of electronic communication technology, especially the Internet. The early form of traditional EDI was quickly supplanted by Internet based (I-EDI) versions, as these forms are much cheaper and more flexible. Moreover, EDI provides the gateway for organizations, employees, manager, customers (companies' clients) and all trusted business partners to access electronic data applications and all information they need (Akoh, 2001). The business can include consumers to enterprise (B2C), enterprise to partners (B2B), or enterprises to government (B2G). Developments in ICT in the last few years have been

popularized through the use of the Internet (Intranet, Extranet) as a communication and data delivery channel.

This study looks at the Communication Technology and Information Interchange System foundation and other forces and factors, which have driven the rapid development and adoption of the I-EDI over the world (developed and developing countries), particularly in the Jordanian SME sector. This research will examine the current state of the I-EDI, specifically for SME sector's adoption in developing countries in the Middle East (Jordan). The research provides an assessment of the corporate sector's future needs and the challenges facing the adoption of advanced I-EDI services by Jordanian SME.

1.2 PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of this study is to examine some of the emerging issues surrounding the adoption and diffusion of I-EDI by the Jordanian SME sector. In addition, this research aims to provide a contribution in understanding the benefits, usage, and barriers in the adoption of I-EDI among Middle Eastern-Developing Countries, specifically Jordanian SMEs. As such, the main objectives of this research are:

- (1) To provide an overview of the state of I-EDI adoption's factors and implementation around the world especially in the SME sector.
- (2) To highlight the many interesting theoretical questions surrounding the evaluation of I-EDI systems adoption and diffusion.

- (3) To begin to provide an analysis and historical study comparing developed (western countries) and developing countries (Jordanian SMEs) in their adoption and diffusion of I-EDI.
- (4) To delineate some salient features of Organizational, Inter-organizational, Technological (Perceived Benefits), Governmental and Cultural (Environmental) factors that support or hinder the decision to adopt I-EDI systems by the Jordanian SME sector.
- (5) To identify, describe and present an overview of the current state of use, adoption and implementation of the I-EDI for organizations, particularly SMEs in developed and developing countries (Jordanian SMEs).
- (6) To help to fill significant gaps in existing knowledge and adoption of I-EDI in developing countries in the Middle Eastern- (Arab) region, especially in the Jordanian SME sector.
- (7) To assist SMEs by drawing some conclusions and consider possible future scenarios for I-EDI adoption and implementation, especially in developing countries (Jordanian SMEs).

1.3 IMPORTANCE OF THE STUDY

Today's business world is dynamic and constantly changing. Information and its swift communication, Business-to-Business E-commerce and I-EDI systems, are vital to competitive vigor of data transferring between businesses. Today, more than ever before, the success and high performance of one's organization, particularly SME firms, is dependent upon rapid access to accurate, up-to-date information especially data and information exchange between

applications and trading partners in the SME sector. I-EDI systems are the state of the art tools for automating and streamlining the flow of business data – letters, documents, meetings, enquiries, payments, delivery notes, etc. between partners. Moreover, EDI transfer of information and data, between computer systems enables partners to integrate their processes with unprecedented accuracy and speed. As such, the following points are seen as a justification for the importance of the study:

(1) Adoption and diffusion of Technology and I-EDI has allowed companies, particularly small and medium enterprises (especially in developing countries such as Jordan) to use this information and technology to provide their trading partners (TP) with better and wider services, in order to save them time and money (Ernst & Young 2000).

(2) The issue of I-EDI and its adoption and diffusion will continue to be an important information systems and business topic.

(3) There have been no previous studies on I-EDI adoption, diffusion and use in Jordanian organizations (especially the Jordanian SME sector).

(4) Information and data interchange system and communications between trading partners especially EDI, and I-EDI, in SME sector, would lead to higher rates of SME performance and efficiency particularly in developing countries (Middle Eastern and Jordanian SMEs).

1.4 STATEMENT OF THE PROBLEM

Based on the literature review and findings from previous research, this study will explore the Organizational, Inter-organizational, Technological

(Perceived Benefits) factors, Cultural (environmental) and Governmental factors influencing I-EDI system's adoption decisions by Jordanian companies (SME sector). The key research question emerging from the theoretical discussion is: Which Organizational, Inter-organizational, Technological, Governmental and Cultural factors influence the decision to adopt I-EDI systems in Jordanian companies (SMEs)?

The governmental and cultural factors can either encourage or discourage I-EDI adoption depending on what kind of policy is implemented to assist SMEs. So Jordanian SMEs really need to be consulted during the adoption process

On the other hand, benefits (drivers) and barriers of I-EDI adoption within Jordanian SMEs are important factors to successful adoption. SMEs need to be aware of those factors while managing the I-EDI adoption process. The Jordanian SMEs should be able to utilise the benefits and drivers of I-EDI adoption and avoid or reduce the negative impact from the barriers.

The following points and statements were made to describe the research's problem:

- (1) There are several initiatives in developing countries (UAE, Egypt, Bahrain, Kuwait, Lebanon and Jordan), which are creating awareness in the field of EDI, but additional effort is needed in the SME sector, especially in the I-EDI adoption.
- (2) There has been no systematic examination of how Jordanian SMEs adopt and use the Internet for EDI.
- (3) There is no clear documentation of how such I-EDI impacts Jordanian SMEs.
- (4) Adoption of I-EDI in SMEs is different from larger business. So, incorrect I-EDI investment decisions can have devastating effects for SMEs.

(5) Throughout the world, regional differences are enormous, threatening to deepen the future digital divide between developing and developed countries particularly in the domain of I-EDI in the SME sector. It is argued that this study will assist in diminishing that divide.

(6) At the same time, the digital gap is expanding between developed and developing countries (Middle East) in I-EDI adoption and diffusion especially in the SME sector.

Having, reviewed the literature of I-EDI systems in SMEs, some structured questions were developed, and the questions addressed the following:

Research Questions:

- 1- What is the current state of I-EDI Technology?
- 2- How are I-EDI systems adopted and used in western SMEs (Developed countries)?
- 3- How are I-EDI systems adopted and used in Jordanian SMEs Developing Countries in the Middle East?
- 4- What is the difference between SMEs in developed and developing countries?
- 5- What help can be given to Jordanian SMEs (Developing Countries) to advance adoption?

1.5 RESEARCH APPROACHES

This research is an explorative set of case studies examining Jordanian SMEs. It explores both the factors influencing adoption as well as barriers preventing adoption of I-EDI by Jordanian companies, particularly those in the

SME sector. These factors include Organizational, Inter-organizational, Technical, Cultural factors, Governmental factors, Perceived benefits, Triggers and Barriers.

The research is composed of three stages:

(1) Theoretical Analysis Approach (Stage One):

Stage one is primarily concerned with the concept and theory building of I-EDI adoption and diffusion. This portion of the research contributes two major benefits:

- It places I-EDI firmly within the context of inter-organizational, strategic information systems, providing an original definition of I-EDI in terms of its theoretical link with organizational structure and business process redesign.
- It investigates those technical issues that are relevant to I-EDI.

Not only does this answer the first two questions (see section 1.4), it provides the framework for stage two, the qualitative approach.

(2) Qualitative Approach (Stage Two):

The qualitative approach uses the findings of stage one to specifically examine the Jordanian situation. This section is based on individual, open-ended phone interviews (phone interview questions) and theoretical context analysis. The themes that emerge from the phone-interviews are classified according to the following major categories: Adoption stimuli (Triggers), adoption barriers, benefits and I-EDI use, Internet commerce and change agents and complementary factors. The primary data collection method will be phone interviews with the General Manager, managing director and/or owner of the Jordanian SME firms. Each interview will be transcribed and a qualitative content analysis applied in

order to categorize the answers into the themes. Among the advantages of the semi-structured questions are that the interviewees can freely talk about the subject, thus adding useful information from which it is possible to create new themes. Other data collected will include organizational documents and documents from government agencies. The interviews include specific questions on the history of the organization's relationships with its suppliers, its familiarity and knowledge with various forms of I-EDI systems, its current and future plans for adopting and implementing I-EDI systems, and the attitudes influencing their I-EDI related decisions. As SMEs are traditionally below 120 employees in Jordan, the size of companies varies between companies with just 1 employee to a company with 120 employees. The companies that were interviewed include information & communication technology firms, shipping companies, a pharmaceutical firm, a plastic & rubber industry, a textile industry, a printing, paper & carton firm, packaging engineering industry and a construction company. The companies have been selected on the basis of having had an Internet connection for a period of at least 5 years and having a maximum of 120 employees.

(3) Analysis Approach (Stage Three):

This section discusses the emerging themes including adoption and use of the I-EDI (Inter-Organizational, Organizational and Technological factors, Adoption Benefits, Culture (environment) factors, Governmental issues, Internet use, Adoption Barriers, Triggers and Complementary factors), and links them to previous findings in the literature. (Questions 4&5, section 1.4).

1.6 OVERVIEW OF THE THESIS

This research is presented in six chapters. Each chapter is briefly described below. **Chapter one**, the Introduction, provides the objectives and purpose of study. It outlines the importance of the research, describes the research problems, the research questions and the research approaches. **Chapter two**, the literary review, examines the findings of other researchers and authors who have extensive experience in traditional EDI and I-EDI. Many studies exist concerning the diffusion and adoption of I-EDI systems; few have addressed the adoption and diffusion of I-EDI in SMEs. This literature addresses a number of different issues, concerned with the adoption of I-EDI von both sides of the world (developed and developing countries). Characteristics of SME adoption of I-EDI in developing countries are also presented. It also presents the answers to the theoretical questions and concepts of I-EDI adoption and a description of all companies' participating in this research.

Chapter three (methodology) this chapter presents the research methodology, the interview questions, choice of SME firms to be interviewed and the methods of examining responses. Details of all interviews including both emerging similarities and differences are presented. **Chapter four** presents the results of stage two (research methodology); this chapter also categorizes relevant sections of the interviews emerging. Theme headings such that these are intended to be discussed and compared to previous findings from the literature. **Chapter five** presents an analysis and discussion of the emerging categories gleaned from the phone interviews to both compare these to previous studies and to provide a detailed overview of the nature of I-EDI adoption in Jordanian SMEs. **Chapter**

six provides conclusions and recommendation based on the literature review in chapter two and analysis of findings from phone-interviews performed on the collected data in chapter four.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Electronic Commerce (EC) has evolved through various stages of technological development. The growth of the EC is revolutionizing the way businesses (large & small) interact with their partners, client companies and suppliers. Across the world, in developed & developing countries, many organizations are moving or have already moved their main operations to the Internet and EC applications to take advantage of the potential of more automation, efficient business processes, and global visibility. EC applications were among the first to take advantages of advances in computer networking. The Electronic Data Interchange (EDI) business standard is an illustration of such an early adoption of the advances in computer networking. EDI, as an important component of business-to-business (B2B) system, has become a key element of corporate strategies to create value by providing closer linkages among companies (Trading Partners (TP)). So, EDI is defined as a direct computer-to-computer communication between enterprises and its partners of business documents, data and information in a machine-readable, structured format that permits data to be processed by the receiver without re-keying (Premkumar, et al, 1997). In other words, advancements and lower costs in technologies such as EDI allow all trading partners and suppliers in the market to exchange information, automate processes, and integrate information. So, EDI is the transfer of data between

different companies (large, small and medium) using networks such as the Internet (Internet-EDI).

2.2 BACKGROUND OF THE STUDY

For nearly three decades, EDI has been the primary method of conducting online Business-to-Business (B2B) Technology. EDI services allow companies' computers to perform electronic transactions such as purchase orders and invoices without human intervention. EDI was popular among large companies because it saved money that otherwise would be spent on processing paper and re-keying data. Moreover, trading partners can retain existing EDI connections, find cheaper ways to send EDI messages and use the web to reach out to new partners. So, the main purpose of the EDI was to avoid and prevent additional human intervention of reading and processing information between trading partners by establishing a Standard Data Transmission Protocol. EDI has been used to electronically transmit documents such as invoices, purchase orders, receipts, shipping documents, and other standard business correspondence between organization and business partners. EDI has also been used to transmit financial information and payment in electronic forms, which is usually referred to as Electronic Funds Transfer (EFT). With the advent and growth of the Internet, the functions of the EDI have become more and more significant nowadays, especially with the growth of E-Commerce worldwide. Therefore, it is very important to understand how the EDI works, what are the characteristics of EDI, and how EDI improves the traditional way of exchanging information between trading partners, so the productivity and efficiency can be increased.

The research starts with the brief introduction to SMEs, IT adoption in SMEs, and the adoption process. It describes the current characteristics and problems faced by SMEs over the world in their effort to adopt IT successfully. The next part will discuss the IT adoption by Jordanian SMEs. The next part will briefly explain Value Added Networks, definitions and benefits of Vans, and describe the Standards process of EDI. This is followed by an overview of EDI adoption by SMEs, which includes factors affecting SMEs adoption of EDI, and a brief part of EDI adoption in Jordan. After that, the research starts with an overview of I-EDI systems, including definitions, benefits, and strategies of I-EDI. This part is followed by a description of I-EDI adoption by developed and developing countries, I-EDI adoption by SMEs, I-EDI system adoption model, drivers and advantages and disadvantages of I-EDI adoption. The last part of this chapter will describe Internet Technology adoption in Jordan, and briefly provide the research questions.

2.3 SMALL AND MEDIUM ENTERPRISES (SME)

Small and Medium Enterprises (SMEs) are, without doubt, the bedrock of any developing economy. In general, SMEs are the bases upon which future economic and employment growth can be built. SMEs over the world remain buoyant despite mounting economic and social hardships (Fariselli, P.1999). Furthermore, economists agree that SMEs play a vital role in the socio-economic fabric over the world (Fink, D. 1998).

These enterprises need to be profit-making businesses, fully owned by the private sector and not a subsidiary of a company, employing no more than 250 workers,

having regular accounting records and producing standard financial statements. With all the changes and the growing demand for higher quality modern products, many traditional SMEs around the world face closure, or very difficult upgrading. Even modern SMEs in developed countries face very difficult competitive challenges in the emerging setting (Sanjay 2000).

Definition of SME

SMEs include three types of enterprises, medium size enterprises, small size enterprises and micro enterprises.

The definitions of each type of SME are, according to the European Commission, based on three parameters; maximum number of employees, maximum turnover and maximum balance-sheet total. Micro enterprises have a maximum of 10 employees, small enterprises have a maximum of 50 employees and medium sized enterprises employ a maximum of 250 people (www.europa.eu.int/comm/enterprise/consultations/sme_definition). As such, a number of studies have used the number of employees as a measure of company size (see for example Thong 1999). Other studies have calculated company size based on annual turnover (see for example Ramamurthy, 1999), whereas some studies have applied both the number of employees and the revenue as an indicator for company size.

Nature of SMEs

According to the U.S Small Business Administration, there were 23.7 million small businesses in the United States in 2003. Small businesses can be defined in different ways. The U.S. government agency that helps people start businesses is the Small Business Administration or SBA. It categorizes businesses in the United States as small, if it has fewer than 500 employees. The international

communities use the term Small and Medium Enterprises (SMEs), instead of small business. Among SMEs, small enterprises have 1 to 50 people, while medium enterprises have 51 to 500 people.

Features of SMEs

Many previous studies have asserted that SMEs possesses at least two of the following four characteristics:

- 1- Management of firms is independent.
- 2- Capital is supplied and the ownership is held by an individual or a small group.
- 3- The area of operations is mainly local.
- 4- The relative size of the firm within its industry must be small when compared with the biggest units in its field.

IT adoption in SMEs

SMEs contribute to economic growth, social cohesion and employment as well as regional and local development. Rapid technological change potentially brings new opportunities for SMEs, but also risks and problems. Barnet and Mackness (1983) indicated that it is not necessarily the case that the processes and techniques applied in large enterprises would produce the same results in small enterprises. This may lead to the conclusion that small enterprises are more risky (Brigham and Smith, 1967).

Many Small and Medium Enterprises (SMEs) try to adopt IT to support their business. Due to their limited resources, SME IT adoption is different than in larger businesses (Fink 1998; Thong 1999; Welsh & White 1981). An incorrect IT investment decision can have devastating effect for SMEs. Therefore, SMEs need to be very careful in their IT investment decision-making. IT adoption can be

viewed from the diffusion of innovation theory (Fink 1998; Thong 1999; Thong & Yap 1996; Utomo & Dodgson 2001). In this view, IT is perceived as something new that is being introduced to members of a society for a certain period of time (Rogers 1995; Schon 1971).

IT adoption is defined as using IT to support operations, management, and decision making in the business productively (Thong & Yap 1996). Another definition of IT adoption by other researchers is introducing new IT solutions to replace the old existing IT systems or non-IT systems for achieving the same goals or solving the same problem (Jaakkola 1996). It can be concluded that IT adoption is defined as using some form of IT to support business operations and decision making.

The term 'IT' has been widely used in existing literature. Some definitions of IT include the technology side of Information Systems (IS) (Hollander et. al. 2000), the technology that enable computer based information systems (Laudon & Laudon 2000), and collection of computer systems used by an organisation (Turban et. al. 2002). However, the following definition more comprehensively describes what IT is:

“Information technology comprises those technologies engaged in the operation, collection, transport, retrieving, storage, access presentation, and transformation of information in all its forms...” (Boar 1997, p. 28)

Factors affecting adoption

A study by Iacovou (1995) focusing on EDI adoption in small firms found that there was no relation between the size of the company and EDI adoption. However, a number of studies have shown that the size of a company positively

influences adoption of EDI (Thong 1999). The most common explanation for this relationship between size and adoption of EDI system is that higher levels of resources exist due to the size of the firm. Additionally, it has been argued that larger firms may be involved in a greater variety of production activities, and they are thus more likely to find any given innovation applicable to their operations (Tornatzky & Fleischer, 1990).

2.4 SMEs IN JORDAN

Despite the importance of large companies in Jordan SMEs in Jordan remains a significant factor of Jordanian economy.

SME Definition

In defining SMEs there is a demand for some measurement of its size compared with that of large companies. Various measures have been used, including the number of employees, the volume of sales, the nature of firm ownership, and the area of operations.

According to many studies and economic groups in Jordan, SMEs were defined as companies employing 1-120 people, or between 5 and 100 people. This research will adopt the definition of employing 1 up to 120 people.

There is no generally accepted definition of SMEs in Middle Eastern countries generally, and in Jordan specifically.

As this study is focusing on the adoption of I-EDI in Jordan, The following section briefly sets out the governmental, educational and business uses of IT in SMEs. This is followed by a more specific examination of SMEs in Jordan.

IT adoption in SMEs in Jordan

New Investment opportunities in the IT sector have benefited from this growing sector (IT sector), and have found long-term sustainable business growth, especially in the following fields:

- Data Communication, connectivity services, transmission, and messaging.
- Manufacturing and assembly of electronic parts, IT, and telecommunications products.
- IT and Telecommunications Services outsourcing centres providing value-added networks services.
- Non-conventional Telecommunications Services playing a direct role in enhancing growth in the Jordanian industrial, commercial, and services sectors.

Many studies show that Information and Communication Technologies (ICT) have been widely used in education and training development in Jordan. At the same time, the Jordanian government has realized the importance of education in developing the IT sector and forced radical reforms to introduce computer-based education in public and private schools.

The main project or training program provided by National Fund for Enterprise Support (NAFES) is IT and E-business (E-commerce) applications. The Information Technology Association of Jordan, in cooperation with Arab Advisors Group, is conducting a study on “Internet use among SME in Jordan”. The study aimed to provide decision makers, operating ISPs and investors with a detailed study and assessment of the current use of Internet and Data Com Services and all new technologies within Jordanian SMEs. It also aimed to

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provide an assessment of the corporate sector's future needs and the challenges facing the adoption of advanced E-Commerce applications (I-EDI), and Internet services by Jordanian businesses. Jordanian SMEs showed a satisfactory adoption of Information and Communication Technologies (ICT) by business in the kingdom, according to a report by the Arab Advisors Group. During the comprehensive survey (of close to five percent (5%) of Jordan's SMEs), the Arab Advisors Group assessed the supply and demand side of the Information and Communication Technologies products and services (EDI, B2B & E-commerce) amongst SMEs, through a primary research and survey-based approach. Nonetheless, the report has noted that the Jordanian SMEs still need to have a more focused technology adoption and diffusion approach that would better streamline their businesses. Moreover, the study aimed at enhancing the competitiveness, productivity and efficiency of Jordanian SMEs through management modernization.

Many IT organizations (public and private) in Jordan have been established. The Jordan Information Technology Community Centres (Jaccs) initiative was created with a vision of harnessing the power of information technology in support of a sustainable development strategy for Jordan designed to meet the challenges of the 21st century. However, some studies in Jordan shows that Jordan's IT sector and Information Systems (B2B, B2C, G2B, and Electronic Exchange) are a dynamic value-added aspect of the economy that plays an important role in driving other major economic sectors.

An overview of Internet Technology in Jordan

Nine years ago, Jordan's public experienced its first brush with the Internet. Basically, Jordan's Internet and (Data comm.) Market is divided into two major areas; the larger, Global Operator-backed ISPs, and the smaller, Internet Service Providers (ISPs). The global operators bring to the services table global connectivity, allowing the ISPs to offer a number of global services such as Global Frame Relay. However, in a market that is struggling to pick up due to a limited corporate market size, as well as the larger problem of unaffordable Personal Computer (PC) prices, ISPs are finding it difficult to penetrate into what could be a potentially profitable market.

In 2001, Jordan Telecom began providing the backbone, or physical connection, for Asynchronous Digital Subscriber Line (ADSL), while ISPs may provide the Internet access end of the service to users. Despite Jordan enjoying a liberalized Internet and Data provision market, which is currently served by eight ISPs, it is clearly still facing a number of obstacles that are impeding potential growth. Next table (2.1) provides a summary of ISP services in Jordan.

Table (2.1) summary of ISPs services in Jordan:

Internet ADSL in Jordan

This service is a method to increase transmission speed in a copper cable. ADSL facilitates the division of capacity into channels, with higher speed to the subscriber —typically for video transmission, and a channel with significantly lower speed in the other direction.

Table (2.2) Internet ADSL service providers and rates in Jordan

Internet Dialup in Jordan

This service includes the Internet dialup (post-paid or prepaid) provided via normal phone line or ISDN lines. Normal phone lines connect at speeds up to 56Kbps, while ISDN lines (i.e. digital lines) connect at speeds up to 64Kbps. The ISDN service is provided via the Primary Rate Interface (ISDNPRI), or the Basic Rate Interface (ISDNBRI). Large companies generally use Primary Rate Interface (ISDNPRI or ISDN-30). Smaller organizations (SMEs) or branch offices use Basic Rate Interface (ISDNBRI).

Table (2.3) Internet Dialup services providers and rates in Jordan

Unlimited Subscription

Internet Leased Line in Jordan

Leased lines are two interconnected fixed points across a private network. Leased lines are dedicated circuits that, for example, the Jordan Telecom Operator run directly between two customer sites, providing a permanent connection at a certain speed between the two sites.

A leased line with an Internet connection provides permanent access to the Internet with no interruptions or wastage of time. Currently, leased lines are the most popular method of connecting large corporate networks in Jordan.

Web Hosting & E-mail Server Hosting in Jordan

Web hosting is a service performed by the ISP or a web developing/hosting company, which encourages companies to put their corporate web sites on computers/servers owned by the ISP, or the web developing company. In general, there are three main types of web hosting approaches in Jordan: (1) Shared Server, (2) Virtual Private Server (VPS) and (3) Dedicated Server. E-mail server hosting in Jordan is an ISP that hosts an outside company's e-mail server in its own premises and provides customer support.

Factors affecting adoption in Jordan

As in many western countries, SMEs are important to the economy in Jordan, particularly, and Middle East-Arab region in general. SMEs make up about 98% of the total working enterprises in Jordan. About 92% of these SMEs are not registered at the Ministry of Trade and Industry. Officially approved enterprises make 8%, employing some 12% of the overall workers in Jordan. The SMEs companies are owned by the private sector totally, and they are not a subsidiary of a large company. They have their own regular accounting records and produce standard financial statements. SMEs in Jordan are trying to survive through the adoption of new technologies for innovation purposes (www.1stjordan.net/actuuk).

A recent study by the Arab Advisors Group in Jordan showed that more than 2/3 of the local SMEs in Jordan utilized IT-based infrastructures. The study indicated that these SMEs have boosted productivity and efficiency (www.1stjordan.net/actuuk).

2.5 ELECTROINC DATA INTERCHANGE (EDI)

Greenstein & Feinman (2000) said that Electronic Data Interchange (EDI) refers to the exchange of electronic business documents, i.e., purchasing orders, invoices, etc., between applications. Moreover, they show that the exchange involves no paper, no human intervention, and takes place in a matter of seconds. According to the Chicago Clearinghouse Association (CCA) (2000), 40 percent (40%) of all businesses in USA engaged in EDI systems.

The genesis of EDI can be traced back to the 1948 Berlin airlift, where master sergeant Edward Guilbert of the United States Army was faced with the task of co-coordinating consignments of food and consumables delivered by Air Forces of several countries, arriving 24 hours a day on a single runway. Guilbert designed a paper-based, standard manifest to be filled in by all arriving aircraft before permission to unload was given (Brawn, 1989, cited in Swatman 1993). It was not until the 1960s, however, that this experience was applied within the United States by the rail and road transport industries – the first to think about standardizing documents and replacing paper-based methods of communication. Greenstein and Feinman (2000) show that now EDI documents are formatted using published standards. These standards were developed by large businesses during the 1970s, and are now under the control of the American National Standards Institute (ANSI), and X12 subcommittee, which sets EDI standards in North America. EDI has resulted in significant competitive advantages, including lower costs, links to customers (companies, partners and suppliers), and increased product differentiation. EDI requires a network connection between the two companies exchanging business documents, called trading partners (TP). EDI has

provided great value to trading partners, especially large companies. Unfortunately, these larger firms have been prevented from doing business with much smaller companies that cannot afford the complexities of EDI. In theory, EDI allows all vendors (companies) and their customers (client companies, TP and suppliers) to link their computing infrastructures without worrying about the differences in their respective organizations and systems. However, in practice, EDI has been difficult to use efficiently or inexpensively in developing countries particularly in small companies. Today the Internet provides the communication capabilities for EDI over a Value Added Network (VAN) at a much lower price. So, EDI can be rolled out to small companies, provided that an Internet connection is present. One of the main questions is what exactly does the future hold for EDI? Traditional computerization of a business company has mainly focused on replacing pre-printed business forms with similarly defined electronic forms on computers, such as purchase order, invoices or delivery orders.

Emmelhainz (1993) stated that this kind of traditional information interchange protocol could result in several problems:

- 1- Increase in processing time; in traditional data (papers) interchange, the physical transmission of documents between trading partners caused an increase in processing time to complete a single transaction.
- 2- Low accuracy; due to the traditional information interchange system that requires multiple instances of the same information, data has to be re-entered at various places within the processing life cycle. Repeat entering of the same information increases the possibilities of errors.

- 3- High labour cost; traditional flow of data and information requires data to be entered manually at each step in the processing cycle, such as the input of purchase order, invoice, delivery note, receipt, and so on.
- 4- Increased uncertainty; in traditional paper-based processing systems, the time of receiving documents will be unsure. This kind of uncertainty often resulted in constant telephoning to confirm the reception of documents.

EDI has helped adopters to eliminate or significantly reduce all these problems found in the traditional information interchange system. In short, with the implementation of EDI, the productivity, efficiency and accuracy between businesses and trading partners can be greatly improved.

2.5.1 Definition of EDI

There are several definitions of Traditional EDI. One of the first definitions that appeared in an academic article by (Hanson & Hill 1989):

EDI is the movement of business documents electronically between or within firms in a structured, machine-retrievable data format that permits data to be transferred without re-keying, from a business application in one location to a business application in another location (Hanson & Hill 1989).

In 1992 Pfeiffer listed four criteria for EDI:

- (1) At least two organizations having a business relationship i.e. conducting joint business transaction.
- (2) Data processing at both (all) organizations, pertaining to a transaction supported by independent application systems.
- (3) The integrity at the data exchange between application systems of transaction partners is guaranteed by agreements concerning data coding

and formation rules, eliminating or at least reducing the need for human intervention.

- (4) Data Exchange between the application systems is accomplished via telecommunication links.

In short, EDI allows business partners to make commercial transactions by sending and receiving digital documents over telecommunication networks.

The core purpose of EDI in business-to-business transactions is to transport business documents via electronic means in a format that is reusable throughout the entire organization and beyond (Helle, 2002). From a technical perspective, the electronic movement of information and the means of transportation have improved in speed and quality and also in new types of formats, e.g. XML. There are some common misconceptions about what EDI is. For example, e-mail is not considered EDI. E-mail is used to send information between humans in a form that humans understand, whereas EDI is a computer-to-computer process. Similarly, facsimiles such as electronic bulletin boards and modems are not EDI. Likewise, the sharing of files through a network such as a LAN, WAN, or MAN is not considered EDI. Moreover, sharing files over networks does not conform to the EDI definition because EDI often requires the translation of data into special formats. So, EDI bridges the previous information gap that existed between companies with different computer systems. EDI is also independent of the users' internal computerized application systems, since it interfaces with those systems rather than being integrated with them. However, the degree of effectiveness of the EDI operation itself, as well as the internal management information available from its use, will certainly be greater if application systems are up-to-date and efficient. So, what exactly does that mean?

The best way to understand is to break the elements of EDI down into the following parts (www.ntrg.cs.tcd.ie/undergrad):

(1) STRUCTURED DATA

What is structured data? How is it different from the printed document? Is it the same as electronic mail? Let us look at the last two questions.

Firstly, printed documents and electronic mail are designed for humans. They can be easily created and acted upon by humans. EDI requires that the computer's system itself can easily generate and process messages. So, the data format is designed for computers, which, as usual, implies that it is not readable for humans. Clearly, therefore, EDI is not the same as either printer documents or electronic mail.

(2) MESSAGE STANDARDS

Clearly, trading partners (companies and suppliers) must agree what data is being exchanged, and in what sequence their computer systems should generate the data. But, why have standards? EDI is concerned with exchanging messages in an open environment, so any company can join. In addition, and in order to operate in an open environment, no one company can impose its own data standards on other companies. Therefore, internal data standards are fine for use within an organization, but will not work outside the organization.

(3) ELECTRONIC MEANS

In the early days of EDI, data was put onto magnetic tape and either posted or sent by courier to the recipient, who then loaded the tape on a tape deck, and then the computer read it in the system.

This method was fine for a while, but problems arose:

- The tape was being physically sent, and this took time.

- The number of tapes that any one organization needed to handle was growing, leading to scheduling problem.

Often two identical tapes were produced in case one of them could not be processed by the recipient's computer system, thus creating a serious handling problem.

2.5.2 Structure and Process of EDI system

EDI, the set of hardware-independent data formats standards developed in the 1970s in order to electronically transmit data between businesses, continues to evolve. EDI provides a standard method of communicating business information in an efficient manner. Moreover, EDI is unambiguous, so all trading partners can use it. It reduces the amount of labour-intensive work required to exchange data and it also enables the sender of the data to control the exchange and to know whether and when the recipient received the transaction. On the other hand, it should be noted, there are several approaches to EDI implementation. There is not a best way, but there are some recommended ways.

The EDI server is a platform for developing applications that send and receive EDI transactions. It simplifies the task of creating and consuming EDI documents, and transmits documents via the Internet or the VAN. In addition, it provides a standard interface for processing EDI documents, as well as a variety of communication methods for sending and receiving them. Lastly, EDI servers are designed to communicate with other applications and servers.

Swatman (1993) suggested that the essential elements of EDI are:

- 1-Direct application-to-application communication.
- 2-The use of an electronic transmission medium (VAN) rather than magnetic tapes, disks, or other transmission media.
- 3-The use of electronic mail boxes for “store and collect / store and forward of documents.”
- 4-The use of structured, formatted messages based upon internationally agreed standards.

2.5.3 Factors Motivating EDI Adoption

There are many factors motivating EDI adoption considering:

- (1) The notion that companies considering themselves being well prepared for EDI are more likely to adopt EDI.
- (2) The knowledge that several business partners already using EDI is a motivator for EDI adoption. This factor appears to be the most important statement.
- (3) The prospect of increasing the company's market share is a motivator for EDI adoption.
- (4) The fact that EDI has been recommended by others is a motivator for EDI adoption.

It is generally assumed that the purpose of adoption of an innovation is to improve the effectiveness or performance of the adopting organization.

In addition, ten years of EDI research in the top-five MIS journals^{*} showed and concluded that in most of the studies adopters of EDI had achieved improved operational or strategic performance. However, a number of studies indicated that the non-adopters found EDI to suffer from shortcomings, especially in relation to cost of purchase and cost of integration, which makes it less attractive to adopt. It is now appropriate to examine the use of EDI in business operations.

2.5.4 Usage of EDI

Generally EDI should be used in cases involving the frequent sending of large amounts of critical data in standardized formats between two or more users. Craig Parker (1997), however, said this technology (EDI) has not been taken up by organizations (particularly small to medium enterprises) as rapidly as was anticipated. Many possible explanations exist for the less than optimal growth rate of EDI and a range of possible solutions are being used or investigated, including:

- Internet-based document exchange for lower-cost EDI.
- Implementation guidelines for increased standardization.
- The United Nations Open EDI initiative is intended to define standard business scenarios or trade procedure to facilitate short-term EDI based trading relationships.
- Educational programming for increasing awareness and understanding of EDI amongst smaller trading partners.

^{*} The top-five MIS journals identified by Hardgrave and Walstrom are MIS Quarterly, Communications of the ACM, Information Systems Research, Management Science and Journal of Management Information System.

Emmelhainz (1993) stated that EDI does change the way in which a business operates and relates to other organizations. Managing these changes can be very difficult as it involves the organizational and cultural issues of a company.

A number of studies (see for example Chan, c. 2001 cited in www.hkstar.com) asserted that the following points present a general guideline, which helps to assure the success of EDI implementation:

1. Define a strategy; Without strategic analysis, a system may be implemented that reduces retail order processing time from days to hours only, but has failed to understand that reducing the delivery time from weeks to days is the real problem.
2. Seek objectives of exchanged benefits; Identifying the benefits and advantages of implementing EDI on both sides of organizations and partners are significant. A correct EDI partnership should take this kind of approach to encouraging and developing a true business partnership.
3. Planning and testing carefully; an important aspect of implementation planning is involving all concerned parties and having good communication with them at all steps of the system. A critical step in implementation is the testing process. This must be proven by a carefully constructed testing and validation procedure, especially in the EDI, since data is being transferred to another trading partner.
4. Cost estimation; some of the costs are obvious in EDI implementation, such as the software and hardware. However, besides the computing related costs, legal costs may be required since EDI involves co-operation with other companies. It is always advisable to insure both

parties so that they are protected under a certain kind of contract. The last factor, which has to be considered in EDI, is the cost of training. This includes in-house training for new operating procedures and vendor training for using new software products and hardware equipment. Accurate and correct cost analysis systems can help the company to plan for a smooth EDI implementation progress.

5. Users training; in EDI implementation, job functions will change. Training in the use of technical hardware, software, and operating procedures are critical in the success of EDI adoption and implementation.

2.5.5 Benefits of EDI

Emmelhainze (1993) set forth three EDI implementation levels that generate strategic benefits: at level one, simple data is exchanged without integration into the firms. Internal process: at level two, data is exchanged between applications of the firm at level three, business processes are reengineered, and changing the way the firm performs its activities. By comparison, Massetti & Zmud (1996) classification is comprised of four distinct characteristics of EDI implementation: Volume, Breadth, Diversity, and Depth.

Volume of (EDI) usage was defined as the extent to which an organization's documents exchange are handled using electronic and telecommunication media; reflects the firm's progress toward implementation of electronic operational functions (Massetti & Zmud, 1996). High levels of electronic transaction volume indicate the degree of change the firm is committed to in business process transformation. Massetti & Zmud (1996) defined breadth of EDI usage as the extent to which EDI connections are made with trading partners.

EDI diversity was defined as the number and distinct document types an organization handle via EDI connections. Diversity indicates whether a firm has implemented a comprehensive approach toward handling transaction electronically. The variety of documents used in a firm complicates standardization and measurement issues.

On the other hand, the degree or nature of electronic consolidation between the business processes of the Trading Partners (TP) defined depth. Emmelhainz (1993) asserted that the levels of EDI implementation and depth, establishes a hierarchy of integration complexity relative to the business processes of the firm. EDI brings with it around 30 years of international standardizing work, this is why it is so consistent in its value.

Many of the studies (Swatman & Swatman 1991, Sokol 1995) show the direct and the indirect benefits of EDI, which can be gained from the effective use of this technology. These include: operational costs and savings; increases the sales; customer satisfaction and responsiveness; avoiding a competitive disadvantage; and reductions in lead-time. They concluded that there is a direct impact of EDI benefits in terms of their strategic potential.

Strategic EDI benefits include the ability to (Swatman & Swatman 1991, Sokol 1995):

- Improve certain business services significantly.
- Enable business units to expand the use of computer applications.
- Enable implementation of cost-reduction programs.
- Provide support for maintenance or improvement of market share.
- Faster and more efficient information exchange with trading partners.
- Increased productivity.

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- Reduced out of pocket expenses (labour, postage, faxing, filling, and printing).
- Improved quality-reduction of errors, omissions and lost documents.

So, strategic benefits of EDI depend upon two forms of integration:

- Integration of information received from external sources with existing organizational systems and practices.
- Integration of overall business practice.

It is clear that the benefits offered by internal systems integration, particularly when it is combined with the integration of internal/external document flows are substantial. In addition, many studies concluded that the identifying characteristic of EDI as an “Information Technology” is its ability to link business systems in a seamless fashion. One important advantage of EDI is that it reduces the per-unit cost of processing transactions. Reduced errors from fewer manual-handlings of transactions eliminate the need for costly error correction. These benefits usually increase to the participants. Moreover, previous theoretical and empirical studies shows that over and beyond cost and time savings, EDI makes it easy for participants to exchange transactions; participants tend to do more of EDI system both in volume and in the range of transactions handled. This can result in improved relationships with customers (client companies), and increased switching costs. Also, the improvement in quality and range of data that accompanies inter-organizational systems results in an improved knowledge of customers, and the market allowing faster response to change. From all the previous studies, it had become clear that the standardized and secured formation of the EDI system enables the increasing of the system

users. An other characteristic of the EDI application environment is automatic mass document management and processing. One of the biggest advantages of EDI is the capacity for automatic document management. Frequent data transfers are another characteristic of EDI using environments see (EDI standards and directories cited in www.unece.org/trade/untdid/).

Greenstein & Feinman, (2000) show that the most widely recognized benefits of EDI are:

- (1) Reduced lead-time from placing the order to receiving the goods for manufacturing and retail firms, and reduced lead-time in processing claims for insurance and medical professions and other service organizations.
- (2) Reduced errors in providing manual documents and data entry.
- (3) Reduced processing costs, and
- (4) Increased inventory supplies and claim processing information for customers.

Moreover, they said that the EDI-internet systems are capable of providing the following benefits:

- (1) Universal connectivity.
- (2) Lower entry cost.
- (3) Greater sharing of information.
- (4) Greater tracking of market data.

Indeed, the advantages which can be achieved by EDI can be summarized in four categories. These are:

(1) Less Errors:

In a computerized economy without EDI, the occurrence of duplicate information entered in a computer is highly possible. Besides the typing errors, chances are that errors are made by wrong interpretations. Usage of international standards and detailed agreements on information structures also prohibit this kind of error.

(2) Higher Speed:

It is evident that EDI makes just-in-time policies realizable and decreases the lead-time of products. At the same time, transport companies even claim that EDI enables them to deliver data faster, because the receiving company can prepare order on the arrival of the goods, which leads to faster processing.

(3) Lower Costs:

The initial costs of EDI can be very high, but in most cases these costs are earned back by the benefits of EDI. There is a lot of information-interchange between companies: papers for customs, buying orders, delivery orders, insurance papers, etc. Moreover, the development in management techniques points out that just-in-time policies are rewarding. Besides that, the speed and accuracy of EDI enables one to adopt just-in-time management.

(4) New Services:

The advantages mentioned above offer possibilities for new activities and potential products or services. Many studies also show that internal statistics, lists of debts and credits can automatically be updated, which leads to better control of processes (www.cs.vu.nl). Furthermore, Iacovou et al. (1995) categorized the

benefits from EDI into two classes: Direct and Indirect. Direct benefit results from the fact that information is sent electronically from one application to another without human intervention. So, both the receiving and sending companies benefit from a reduction in errors and reduced human handling cost. They also suggest that indirect benefits arise from leveraging EDI to enable the technology to change the way organizations do business. Indirect benefits include increased operational efficiency, better customer service, improved trading partners relationships and an increased ability to compete. Moreover, Iacovou et al (1995) anticipated that small businesses that recognized the benefits of EDI were more likely to adopt EDI and enjoy higher impacts than small businesses that did not recognize the benefits of EDI.

Hirsch (1997) identified the following areas in which costs savings as benefits could be achieved with adoption of EDI:

- (1) Time needed to exchange information is greatly reduced. EDI messages replace paper-based forms and can be transmitted instantaneously between computers.
- (2) With EDI systems, personnel do not need to re-key information contained in paper-based documents. As a result, EDI can enhance the quality and consistency of transaction processing.
- (3) Reduced staff levels resulting from the elimination of data re-keying, error correction and collecting paper documents. So, since messages are sent electronically, EDI streamlines the order /delivery cycle, further reducing the mailing and ordering cost included in overhead.
- (4) Reduction in inventory levels and consequent reduction in the cost of holding and storing inventory.

- (5) EDI complements just-in-time (JIT) systems. With EDI, orders are rapidly processed, and this allows companies to order materials as they are needed.
- (6) Reduction in costs of special handling and express freight caused by delays in paper work receipt and inefficient processing.
- (7) Reduction in telephone costs.
- (8) Reduction in mailing costs.
- (9) Reduction in transportation expenses.
- (10) Improved relationships with suppliers, customers and trading partners.
- (11) Improved ability to compete internationally; this is a result of reduced communication times and reduced errors.

2.5.6 Risks and Barriers of EDI

EDI practitioners have put forward a variety of reasons as to why this technology (EDI) has not been adopted. The EDI literature (1988-2002) provided a discussion of a range of EDI barriers from the perspective of large and/or small companies, and from the viewpoint of small and medium sized enterprises. More specifically, the barriers of EDI adoption by SMEs during this period (1988-2002), which were identified most consistently, were:

- 1. The lack of awareness of the benefits of EDI (Iacovou et al 1995).
- 2. The lack of willing EDI trading partners (Howells & Wood 1995, Paradi et al 1996, Steele 2000).
- 3. The difficulty associated with integrating the EDI with the firm's internal systems (Iacovou et al 1995).

4. The high initial/set-up costs associated with EDI (Permkumar et al 1995, Iacovou et al 1995, Paradi et al 1996, Howells & Wood 1995).
5. The lack of technical/financial resources required implementing EDI (Howells & Wood 1995).
6. The standards of EDI are used differently by trading partners (Howells & Wood 1995).
7. The lack of EDI know-how in the company (Iacovou et al 1995).
8. The lack of management commitment to and/or support for EDI (Iacovou et al 1995).
9. The incompatibilities between hardware and software when firms try to integrate EDI with their internal systems (Howells & Wood 1995, Paradi et al 1996, Permkumar et al 1995).
10. The lack of customers and EDI education and/or acceptance of EDI (Permkumar et al 1995).

On the other hand, Riggins (1999) emphasized that organizations typically implement EDI for a variety of reasons, including: a reduction in the time and cost to generate and transmit documentation, a reduction in document transaction costs, elimination of data entry tasks, improvement to data integrity and reduction to work, institute electronic document error reconciliation, and the establishment of closer trading partner relationships.

Moreover, Riggins (1999) said that a later survey of 229 adopters of EDI found that initiators tended to be larger companies that carefully planned how to use the technology and therefore were willing to invest more capital in the technology,

achieving a higher level of internal integration with other applications, and subsequently achieved greater benefits from the network.

2.6 VALUE ADDED NETWORK (VAN)

Most of the today's third-party networks began as time-sharing networks that provided the basic service of transmitting messages between two points (computers). Basically, the growing demand from sophisticated end-users has turned this original state into 'a land of opportunities' for more value added products. These newer services termed, Value Added Networks (VANs) provide an electronic mailbox where messages are routed, stored, and forwarded. They support reliable connectivity to trading partners via varying communication speeds and protocols. They also provide security and technical support for transactions, including audit trails. VANs are responsible for the delivery of documents. EDI messages are provided in standardized formats. These are forwarded on to trading partners.

Many previous studies simply stated that the VANs are structured into three main components:

- 1- The technical component, which provides message formatting, establishes communication protocol, and determines and maintains line speeds.
- 2- The mail components, which establish the electronic mailbox in which EDI transactions are held before they are forwarded their intended destinations.
- 3- The link component, which coordinates the transmission of data through the VAN.

VANs offer added value in a number of ways:

- (1) They sometimes provide additional services, such as E-mail.
- (2) They provide a high level of security.
- (3) Many also provide software, constancy and training.
- (4) They have a wide geographical coverage.
- (5) They can provide audit trails, so that the sender knows when a message has been received and read.

2.6.1 Benefits of VANs

Basically, because telephones cannot provide the additional features and services those (VANs) can provide, VANs have the advantage over using telephones in terms of communication. In addition, why not directly connect both parts involved in the communication with a point-to-point connection? The answer is that not all partners use the same computer environment, and the VAN can easily make all these necessary conversions. So, the main benefit of VANs is their flexibility.

Moreover, VANs basically provide the following features:

- A direct communication link to any trading partner.
- Knowledge of EDI standards and evolving EDI technologies.
- Ability to support multiple data formats standards.
- Ability to support varied protocols and access methods.
- Ability to provide tracking and control information.
- Value-added component training, software, and consulting.
- 24-hours a day message transmission.
- Mailbox services.

- Dial out services to connect to companies that do not subscribe to the VAN.
- Economy of scale (see www.ntrg.cs.tcd.ie).

2.7 EDI ADOPTION BY SMES

The original Technology Acceptance Model (TAM) posits that two salient variables, perceived usefulness and perceived ease of use and determine technology acceptance behaviour (Davis, Bagozzi, and Warshaw 1989), and proposes that people use technology in response to both extrinsic and intrinsic motivation. Extrinsic motivation arises when the technology is perceived to be instrumental in achieving valued outcomes that are distinct from the specific activity. Intrinsic motivation arises when the task by itself reinforces the activity performance process. In addition, they asserted that extrinsic and intrinsic motivations may also arise from trust and risk perceptions that may extrinsically moderate the task, or they may become intrinsically reinforced by the process.

IT acceptance has been studied extensively. Significant theories and models include the technology acceptance model (TAM) (Davis, 1986; 1989), theory of reasoned action (TRA) (Fishbein & Ajzen, 1975), and innovation diffusion theory (IDT) (Rogers, 1995). In MIS research, both IDT and TRA serve as theoretical foundations for technology acceptance models, such as the TAM model.

In the well known TAM model, Davis (1986; 1989) validated two key determinants of technology use: perceived usefulness (PU) and perceived ease of use (EOU). These two constructs constitute the major determinants of user

attitude, which mediates the relationship between the two beliefs and user intention. There is also a direct link between perceived usefulness and behavioural intention. TAM has been extended and modified extensively. However, extant literature is limited to testing TAM and other technology acceptance models in North America. TAM in particular is found less applicable or predictive in other countries, such as Japan and Arab countries (Rose & Straub 1998). Furthermore, the non-U.S. studies test only a sub-set of the constructs of TAM. This research develops a more comprehensive model and tests it in the cultural context of Jordan (Hofstede model 2001). The model combines TAM's perceived usefulness, ease of use, attitude and behavioural intention constructs, and Hofstede cultural context factors.

TAM of Davis (1989, 1993) represents an important theoretical contribution toward understanding IS usage and IS acceptance behaviour. TAM has been applied in a variety of end-user studies on the world-wide-web (Heijden, 2000 and Straub, 2000). These studies investigated the application of TAM in conjunctions with one or more factors (i.e., experience, motivation, and usage frequency). Recent studies suggest the TAM model also applies to adoption of e-commerce and to the internet technology. To further enhance the model Hofstede (2001) suggested, one is to use an adjustment-based theoretical model, including determinants of cultural context and emotion as variables within the ease of use dimension of TAM construct.

Davis (1989) himself argues that future technology acceptance research needs to address how other variables affect usefulness, ease of use and user acceptance. Though there exists a large body of literature in understanding the

technology adoption process, very little of this research focuses on cultural context factors, particularly in Arab countries.

On the other hand, research by Iacovou et.al. (1995) focused on major factors that influence the adoption and impact of EDI on small business: (1) Perceived Benefits of EDI, (2) Organizational Readiness, and (3) External Pressure (See Iacovou et.al. 1995). Figure 2.1 shows the relationships of all model's factors (Iacovou et al, 1995), which influence EDI adoption in SMEs in western countries.

Figure: (2.1) The Relationships of factors that influence the adoption and impact of EDI on small business.

EDI adoption is the process that provides small businesses the capability to send and receive business documents electronically in a standard format (Iacovou. et.al.1995). EDI integration (internal and external integration) is the process by which a company alters its business practices and business applications to interface with its EDI applications.

I-EDI Adoption by Jordanian SME

- Internal Integration refers to the business applications interconnected through EDI (Invoicing, billing and payments transfer).
- External Integration refers to the number of Trading Partners (TP) that the company can do business with through EDI (Suppliers, government's agencies and financial institutions).

Following are the factors and relationships that influence the adoption and impact of EDI on Small Businesses (SMEs); see (Iacovou et.al.1995):

(1)- Organizational Readiness for EDI. Organizational readiness refers to the level of financial and technological resources of the company.

- * Financial Readiness refers to financial resources available to pay for EDI installation costs, implementation, communications charges and usage fees.

- * Technological Readiness concerned with the level of IT usage and IT management in an organization (Steele, 2000).

Iacovou (1995) considered this factor as important since many small businesses lack the resources necessary for EDI and other IT investments. He also anticipated that small businesses with highly integrated, computerized processes were better prepared to undertake integrated EDI systems, which increased the impact of the technology and provided greater benefits. Therefore, the low computerization level of small businesses makes integration of sophisticated Information Systems (EDI) difficult, requiring costly expenditure of capital, people and technology (Steele, 2000).

(2)- External Pressure. The two major sources of external pressure to adopt EDI are:

- * Competitive Pressure: Iacovou concluded that as more competitors and trading partners become EDI capable, small business would be more inclined to adopt EDI in order to maintain their own competitive position.

- * Trading Partners Pressure: it does refer to large trading partners that do not give suppliers a choice. So, to do business with large trading partners Small and Medium Size Companies (SMEs) must be EDI capable.

(3)- Perceived Benefits; the discussion on benefits of adoption of EDI often takes the starting point in the perceived benefits by the potential adopters during the adoption decision, or perceived benefits after the adoption.

Iacovou, et al (1995) reported in their study of small Canadian firms that a number of factors influenced adoption of EDI .These include low levels of IT sophistication, lack of resources, weak market positions and the network nature of the technology. EDI Impact, however, refers to the actual benefits adopters receive from utilizing EDI. Integrated systems offer both direct and indirect benefits such as increased operational efficiency and improved inter firm relationships, while non-integrated EDI systems will offer adopters direct benefits only, these include reduced transaction costs and higher information quality (see Steele 2000).

As such, EDI initiators achieve high impact because they own the necessary resources for the development of an integrated system. As already noted, the impact of EDI technology is largely determined by its level of integration within business processes and with other computer applications (Iacovou et al 1995). Furthermore, Iacovou et al (1995) hypothesized a model that included three factors as determinants of EDI adoption and impact in small and medium-sized

enterprises (SMEs): perceived benefits (Technological), organizational readiness (Organizational), and external pressure (Inter-Organizational). However, this model has not been empirically tested outside developed countries (SMEs), thus its applicability to countries such as Jordan remains unclear. In a similar study, Premkumar & Ramamurthy (1995) found that the Organizational factors (internal need and top management support), as well as the Inter-Organizational factors (competitive pressure and exercised power), influence whether a firm's EDI adoption decision is proactive or reactive. Saunders & Clark (1992) examined the impact of perceived benefits and perceived costs (Organizational factors), as well as dependency and trust (Inter-Organizational factors) on the intent to adopt EDI. They found that increased perceived costs reduced the intent to adopt EDI, as does, somewhat surprisingly, higher levels of trust. However, Premkumar, Ramamurthy, & Crum (1997) examined EDI adoption in the European trucking industry found that firm size and top management support (Organizational factors), as well as competitive pressure and customer support (Inter-Organizational) were significant in predicting the adoption of EDI.

Hart & Saunders (1998) have developed a theoretical framework, positing relative power and trust between trading partners as determinants of EDI adoption and usage.

Their overall empirical findings are mixed, showing that:

(1) Increased supplier trust leads to increased diversity of EDI use; and (2) increased customer (companies) power, leads to reduced diversity of EDI use. Moreover, Crook & Kumar (1998) examined EDI use in four diverse industries, using a grounded theory approach to explain types of use in different contexts, strategies for encouraging EDI, and its consequences. They derived a model that

includes factors that are part of perceived benefits, external pressure and readiness, as described in the Iacovou et al (1995) before.

2.7.1 Factors affecting SMEs adoption of EDI

Researchers have identified a variety of factors that affect technology (EDI) adoption in small business as following (Van Akkeren & Cavaye, 1999: cited in www.asahi.webcentral.com.au):

1. Perceived Benefits in terms of easy of use and/or usefulness.
2. Computer Literacy; adoption has to be easy for SMEs, as formal training can be time consuming.
3. Organizational Readiness; regarding the level of technology currently incorporated into business processes in the firm.
4. Dependency on Customer; client companies/suppliers, if a major suppliers or customers adopt IT and/or IS (E-commerce); a small business will also trend to adopt the same technology.
5. Fear of Alienating Intermediaries, such as suppliers.
6. External Pressures to adopt (IT, IS and EDI) from the industry sector; if trading partners are adopting EDI, small business are more likely to do this.
7. The Level of Information Intensity; large data amounts and transactions are likely to make a business adopt technology to streamline operations and processes.
8. Return of Investment and Costs; firms need to focus on both medium-term survival and long-term viability.

2.8 EDI ADOPTION IN JORDAN

Information Technology is considered one of the greatest developments in the world of business. Information Technology applications such as e-commerce, B2B, and EDI system are so exciting that many companies in the world could be affected. 'How will IT applications change my business?' is a question that disturbs managers around the world, across every industry.

As already noted, EDI adoption can lead to efficiency gains through reduced time to complete transactions and lower services costs. Effective gains can accrue through better service quality and increased sales as a result of better and wider marketing of products. So, if EDI is to play an integral part in the Jordanian market and development strategies, Jordanian companies (market) need to understand assess and use this technology so that benefits are maximized and disadvantages are minimized. So, the emphasis must be on Business-to-Business (B2B) and later Business-to-Government trading where opportunities for involvement in the global supply chains via strategic alliances or partnerships with corporations in the developed countries can be seized.

Doing business electronically is the newest, and perhaps the most promising ,business strategy that many companies can pursue-commerce is a multifaceted concept, ranging from electronic transfer of funds between buyers and suppliers, to internet-based marketing, to intranet- and extranet-based information networks for both inter- and intra-organizational support (Turban et al,2001).

The following section introduces a background for EDI technology based on the Internet (I-EDI); it includes definitions, benefits of I-EDI adoption, barriers to I-EDI, organizational factors influencing I-EDI adoption and drivers and success factors of I-EDI. So, qualified companies and managers who can deal with this emerging technology (I-EDI) and implement them wisely would only achieve its huge benefits.

2.9 INTERNET-ELECTRONIC DATA INTERCHANGE (I-EDI)

Today, businesses must compete in the electronic market place. Businesses must deliver quality products at the best price and on time. To achieve these goals, the literature indicates that businesses should embrace and adopt IT such as EDI (Iacovou, Benbast & Dexter, 1995).

2.9.1 EDI and the Internet

In December 1993, an e-mail list was started by the Internet Engineering Task Force (IETF) to ascertain if enough interest existed in the Internet community to attempt to design protocols for the carriage of EDI objects over the Internet. Due to low cost and high availability, coupled with an easy addressing mechanism, the Internet offers a great deal to EDI communications. In many cases, companies will already have the hardware available to connect directly to the Internet, and no extra expenditure is required to use this for EDI as well. So, the ease of addressing other customers (client companies, partners) over the Internet, using either hostname or Internet Protocol (IP) addresses, means that it is possible to maintain a large community of trading partners for end to end EDI

transmission with no more difficulty than maintaining an e-mail address book. This removes the requirement for VANs, and the ongoing costs these causes, but without introducing significant workload into the EDI team.

The advantages of the VAN technique is the simplification in communications, as each trading partner only has one point of contact, which can reduce maintenance costs for a large EDI community. This is particularly the case if the point-to-point communications options available are complex and take time to set up for each trading partner. However, Paul (2000) said, disadvantages include the cost of the VAN mailboxes, the reliance on a third party, difficulties in confirming the delivery of a message, and the inherent time delay caused by this type of asynchronous operation. This makes VANs inappropriate for some EDI requirements. With the advent of the World-Wide Web, many companies over the world (developed countries) wishing to engage in B2B (E-Commerce) have switched from their proprietary traditional EDI networks to the I-EDI as the mediator between business and trading partners.

The advantages of I-EDI are the low initial cost of the IT infrastructure and the sheer number of potential business partners. So, the real opportunity depends upon the original analysis of the business and how EDI has been implemented so as to change the way the organization does business.

2.9.2 Origin and Definition of I-EDI

The continuously accelerated rate of I-EDI proliferation in recent years has prompted a growing number of researchers to examine some of the emerging issues surrounding the adoption, implementation, and diffusion of I-EDI.

I-EDI has revolutionized business communications around the world. In our changing business environment, the only way to accurately and quickly transfer information is the computer to computer method. This method lets us send data around the world as easily as we send it down the hall.

I-EDI has become a fundamental part of information management in many organizations over the world. But I-EDI is more than just new technology, something you “plug-in” and watches work. I-EDI is new way of thinking about an old business function. It is the belief in the ability to modernize and streamline business practices.

The complexities of I-EDI are centred on the definition of the trading partner relationships and the data integration with supporting business application systems. I-EDI provides businesses with the ability to exchange business documents easily between trading partners without the laborious, time consuming, error movement and handling of paper.

2.9.3 Benefits of I-EDI Adoption

I-EDI can provide benefits and advantages to the organization. Benefits are both direct and indirect in nature. Direct benefits include operational cost savings and other internal efficiencies arising from, for example, reduced paperwork, reduced data re-entry, and reduced error rates. Likewise, indirect benefits are opportunities that emerge from the use of I-EDI, such as improved customer services and the potential for process reengineering (Paul, 2000).

At the same time, benefits are distinguished into operational benefits and strategic benefits. Operational benefits are related to the internal efficiency of an organization and include reduction of transaction errors, improvement in data

accuracy, decreased transaction costs, and speed-up application processes. Strategic benefits should contribute to tactical and competitive advantages and are related to the impact of I-EDI on business processes and business relationships (Chan, 2001).

Moreover, it is clear that IT such as I-EDI can remove many of the competitive advantages of larger companies and provide opportunities for smaller organizations; it can also include a cost effective way for SMEs to market their business, launch new products, improve communications and information, and identify potential partners (Van Akkerton & Cavaye, 1999).

The following show some I-EDI benefits:

(1) I-EDI adoption improves operational performance in terms of operation efficiency, cost saving and inventory control:

A-Improves Operation Efficiency: I-EDI enhances business transaction processing and information exchange. A consequential advantage is that I-EDI reduces the huge expense involved in being electronically hooked up to a traditional data exchange network (Wilding & Newton, 1996).

B-Improves Cost Saving: I-EDI innovations aim to reduce the cost of procurement before, during and after the transaction. By reducing clerical procedures and eliminating paper handling, I-EDI can accelerate ordering, delivery, and payment for goods and services. Companies, especially Small and Medium-Sized Enterprises (SMEs), increasingly rely on international networks of suppliers, distributors and customers, frequently via the Internet, to improve their global competitiveness through reducing fixed and operating costs (Graham & Hardaker, 2000).

C-Improves Inventory Control: inventory reduction can be achieved through closer integration with suppliers. Focusing on the flow of information in the supply chain often brings opportunities to improve response time dramatically and hence reduce inventory, working capital and therefore costs (Wilding & Newton, 1996).

(2)- I-EDI improves performance of Supply Chain Management (SCM): Shared and exchange information between supply chains partners can only be fully leveraged through process integration. The main objective of (SCM) is to integrate all key business activities through the improved relationships at all levels of the supply chain including internal operation, supplier's networks and distribution channels (Wilding & Newton, 1996).

(3)- I-EDI adoption can help a company to maintain a better relationship with its suppliers: Traditionally, EDI provided integrated solutions on data exchange and enhanced business transaction processing. This improves supplier-company relationships and creates a competitive advantage. I-EDI is also affecting the traditional roles between organizations and suppliers.

For example, I-EDI is allowing purchasing professionals to move from merely clerical activities, such as invoice processing and expediting, to more interesting and complex tasks such as integrating suppliers into new product development processes and joint involvement in total cost analysis (McLover et al., 2000; cited in www.firstmonday.dk/issues7-9).

Today, many larger companies across the world (developed & developing countries) offer discounts to trading partners who use I-EDI. I-EDI as a timesaving system whose ability enables companies to use just-in-time inventory

programs. However, using I-EDI to facilitate a just-in-time inventory program would allow a company to wait until the very last minute before sending a document electronically. So, I-EDI can improve a company's overall performance level both within the company itself and amongst its suppliers. Therefore, adopting an I-EDI system should greatly benefit any company, no matter what its size.

On the other hand, in order to derive all those benefits from I-EDI it is necessary to have both External and Internal I-EDI connections. Several studies have found that I-EDI gives the opportunity to secure short transaction time for messages, high data quality, and integration of data (McLover et al, 2000).

2.9.4 Strategies of I-EDI

According to Make & Johnson (1998), the direct connection type requires additional front-end translation software to transmit and display documents or interface with existing in-house applications. So, Mak & Johnson (1998) divided I-EDI adoption strategies into three categories:

- (1) Strategies not requiring third party involvement using additional front-end software; in these strategies, data exchange is dependent on the front-end software used by both trading partners.
- (2) Strategies requiring third party involvement without using additional front-end software. Third party (in this strategy) may be a VAN wanting to establish a web presence.
- (3) Strategies requiring third party involvement using additional front-end software. In this strategy, trading partners also require additional front-end-formatting software provided by the third party (I-VANS). This strategy is

implemented in two ways; the first is Internet Value Added Servers (I-VAS), and the second, Multipurpose I-VANS. The Internet Value Added Servers (I-VAS) strategy is most suitable for EDI-capable trading partners that desire a high level of EDI control. I-VAS provides Value Added Services such as time stamping, archiving, mailbox protection and certificate authority service to ensure EDI documents can be sent to trading partners or to other traditional VANS in a secure manner (Mak & Johnston, 1998).

In the second way, Multipurpose I-VANS, non-capable EDI trading partners use additional front-end software as a document's entry system to prepare business documents. Multipurpose I-VANS provide non-EDI capable trading partners an easy way to conduct EDI over the Internet. Therefore, some industrial businesses, companies and financial institution around the world have started to compare EDI data flow over the Internet with data flow over a VAN, and they have experimented with EDI over the Internet (Kosiur, 1997). Figure 2.2 shows a process of web based exchange.

Figure (2.2): Web-Based exchange.

TP = Trading Partners

I-VAN = Internet value Added Network

“One the non-EDI capable trading partner completes the Web based form the information is translated by the Internet Value Added Network (I-VAN) into a standard EDI document and sent to the EDI trading partner. For return EDI documents, the third party site (I-VAN) translates them to the web pages and puts them into the secure section of the web site for the non EDI enabled trading partners to retrieve using their web browser” (Steele, 2000, p 45).

So, the Web based exchange strategy permits non-EDI capable trading partners to exchange business documents over the Internet. In addition, business documents that have been sent or received are retained for a fixed period, and they can be printed out using the web browser.

2.10 INTERNET-EDI ADOPTION BY DEVELOPED COUNTRIES

The Internet is a worldwide collection of computers, routers, and networks connected together using the Transmission Control Protocols (TCP), and Internet Protocols (IP). According to Senn (1998), the Internet appears to be the best method for putting online business-to-business trading within the reach of any business large or small.

In I-EDI, the idea is to form a close relationship between two firms that will make some sort of complementary investment to enable one another's EC strategy. This relation involves the adoption of similar standards, extensive inter-firm communication and collaboration and joint Information Technology IT investment. One of the main advantages of I-EDI is the reduction in costs

associated with using an Internet standard rather than a proprietary standard (Riggins & Mukhopadhyay, 1999).

The research on Internet Commerce adoption by SMEs and especially on I-EDI is also limited. Faris Elli (1999) looked at the three inter-related issues of globalization, SMEs and EC, concluding in the analysis that there are important synergies between virtual EC networks and real production networks.

Urwin (2000) discusses how I-EDI and B2B, between partners and applications, can help SMEs to get the right flow of information to their organization. At the same time, Engsbo (2001) developed a framework of B2B adoption in SMEs that focuses on the relative power of the participants in a network and the type of product involved in the exchange.

Jeffcoat (2000) interviewed 27 SMEs in UK to understand their approach to I-EDI and B2B in terms of the strategies adopted, the objectives sought, and the factors that they considered to be critical to their success in achieving these objectives. Steinfield & Whitter (1999) made an analysis of the influences and impact of EC and I-EDI on local communities. They also concluded that while EC and the Internet contribute to the SME's Internationalization Process, it also contributes to strengthening the relationship between trading partners (firms) in local communities. Furthermore, In the US automobile industry, for instance, there is a strong competitive pressure where delays in the transit of information and goods need to be eliminated in the industry's Just-In-Time (JIN) environment (Kurokawa & Manabe, 2002). For example, GM (in US market) has a substantial track record in supplying complete automation systems using I-EDI to it is

vendors. In addition, the company runs a global network called EDSNET linking more than 30 GM data processing centre with over 2,000 suppliers via I-EDI.

On the other hand, Ford launched the Ford supplier network (FSN) in 1998, which consists of 80 custom applications, supports more than 4,200 suppliers, and has approximately 42,000 end users globally (Messmer 2002). Recently, Ford is said to be converting FSN to a new web-based and XML-based application, called “EVEREST” (Messmer, 2002). At the same time, Chrysler has the Extended Enterprise Network, an Internet-based system that allows suppliers to access information on purchasing, delivery schedules, invoices, and products. Chrysler is also considering the new Web-Based and XML-based application, instead of traditional communication methods (Zuckerman, 2002). Another example of I-EDI adoption in developed countries: Japanese automakers have been members of integrated groups known as Keiretsu for decades. In the traditional concept of Keiretsu, manufacturers and suppliers still often share the cost of technological improvements, and suppliers provide high standards of quality and delivery performance in order to minimize the need for inspection and finished components inventory on the part of auto manufacturers (Dyer, 1997).

I-EDI systems promise to deliver greater efficiency, lower transaction processing cost, fewer mistakes in order processing and a tight integration across the supply chain management, allowing suppliers and all trading partners to replenish on a real-time basis.

In the auto industry, the big three automakers (GM, Ford, Chrysler) have joined forces to create what could be the largest I-EDI exchange called COVISINT. All suppliers and trading partners will be required to conduct their transactions via COVISINT, forcing a downward pressure on prices (Venkat,

2000). Similar trends are visible in the computer industry, where Compaq, Gateway and HP have joined together to create an online exchange in computer parts. The grocery industry has recently completed a pilot test of an I-EDI system, which provides retailers and Direct Store Delivery (DSD) suppliers with the ability to show pricing, promotions, sales, inventories, invoices, and other data via the Internet. Venkat, in his study (2000), concluded that Canadian firms are still not taking full advantage of I-EDI. Only 3.9% of the participants in his study said that their organization was taking full advantage of I-EDI. Many are apprehensive about security issues, cost and technical issues. Many organizations are suffering from a lack of vision and direction from senior management.

2.11 I-EDI ADOPTION BY SMEs

As mentioned before, Iacovou et al., (1995) found that SMEs in general tend to resist adopting EDI because of a lack of understanding, lack of technical support and limited financial resources. In addition, Mak & Johnston (1998) concluded that adopting EDI using the traditional approach requires an in-depth understanding of EDI, agreement on transactions standards between business partners, modification of existing systems and the development or purchase of translation software.

Many researchers of I-EDI (Senn, 1998; Mak & Johnston, 1998) focused on the factors that make the Internet very attractive for I-EDI adoption by SMEs:

- (1) The Internet's global Internet work connections offer the potential to reach the largest possible number of trading partners (Hraska, 1995).

- (2) Flat-rate charges for Internet transmission do not depend on the amount of data transferred (Hraska, 1995).
- (3) I-EDI can compliment or replace current EDI strategies (Senn, 1998).
- (4) Using the Internet to exchange EDI transactions is consistent with the growing interest of business in delivering a variety of products and services electronically using the Internet (Senn, 1998).
- (5) The Internet is a publicly accessible network with few geographical constraints (Hraska, 1995; Senn, 1998).
- (6) New and powerful tools that make it feasible to interconnect traditional business applications to the Internet with a minimum of challenge are becoming widely available (Senn, 1998).
- (7) Internet Service Providers (ISP) provides many of the services formerly purchased at a greater cost from traditional VANs.
- (8) The Internet provides simple and widely understood new methods for information exchange.

Non-EDI capable trading partners can use a web browser to fill in a form-based web-page representing business documents to reach their EDI capable trading partners without investing in additional systems (Mak & Johnston, 1998). In addition, companies can make use of Internet connections to transfer normal e-mail messages and access information on the Internet; they do not have to be limited by single purpose use only (Chan 2001). Furthermore, many SMEs see the I-EDI markets as a way that large buyers can put additional pressure on suppliers to lower their prices. They also can see the advantages of broader access and exposure (UNCTAD, E-commerce and development report, 2001).

Clearly, to understand the adoption and use of I-EDI in Jordanian SMEs, it is important to determine the role of these factors.

The different theoretical concepts and factors influencing adoption and use of I-EDI are briefly presented in next paragraph. These factors are:

(1). Adoption Benefits

Benefits are distinguished into operational benefits and strategic benefits (Chan, 2001). As mentioned before, Operational Benefits are related to the internal efficiency of an organization and include reduction of transaction errors, improvement in data accuracy, a decrease in transaction costs, increased speed application processes. Strategic benefits should contribute to tactical and competitive advantages and are related to the impact of electronic commerce on business processes and business relationships, with business trading partners. This study focuses only on the benefits that have been realized either operationally, or strategically, since the company has started using (I-EDI) E-commerce.

(2). I-EDI Use

Traditionally I-EDI has mainly been used for communication purposes.

(3). Adoption triggers

Engsbo (2001) has identified four triggers that might initiate the adoption process of (I-EDI) E-commerce in SMEs: strategic opportunities, strategic necessity, forced decision and just-by-chance (JBC). Triggers are defined as the reasons that lead a small company to adopt I-EDI. Therefore, strategic opportunity examines why companies might adopt (I-EDI) systems in the active search for ways to improve their position in the market (competitive advantage). Just-by-chance (JBC) includes situations where SMEs, without any rational choice or process, find themselves dealing with the adoption of electronic commerce (I-EDI).

(4). Adoption Barriers

In understanding I-EDI electronic commerce adoption and diffusion behavior of small business, a key aspect is to look at the factors that inhibit such adoption (see Chan, 2001, www.csulb.edu/jweb/journals).

1. Organizational Readiness is the extent to which an organization feels ready to adopt new electronic technologies (I-EDI, B2B). The factors determining an organization's readiness are skills and knowledge technology, internal IT support, and external parties support such as IT vendors.
2. External Environments are other types of Inter-Organizational Systems in the adoption of I-EDI and B2B (EC).
3. Perceived Costs include financial investment, administrative changes and the time it takes to put the system in place.
4. Complementary Factors. The value that adoption and diffusion of new technology can bring to SMEs might remain limited unless other complementary factors are adopted as well. Milgrom (1992) suggests that these lead to higher added value of each single factor to the company, and ultimately to an increase in the company's profitability.

2.11.1 I-EDI System Adoption's Model and Factors

A brief review of conceptual literature, provided below, discusses some of the most important factors that might affect I-EDI adoption decisions.

(1) Organizational factors and I-EDI adoption

It has been widely recognized that the support of top management is crucial as a success factor in I-EDI systems adoption decisions (Ramamurthy, Premkumar,

1999). On the other hand, the level of IS and IT sophistication and organizational readiness has often been identified as a predictor of successful I-EDI adoption. The size of the organization has also been identified as a predictor of IS, IT and more specifically, I-EDI, B2B, and Supply Chain Management (SCM) systems adoption.

(2) Perceived Benefits

Perceived Benefits (direct and indirect) to SMEs are the extent to which SMEs perceive that there are benefits to be derived from participating in an electronic network. Perceived benefits (direct and indirect) may include identifying trading partners (TP) for cooperative, sourcing and bidding; the ability to improve trading partner relationships; reduced inventory costs and an increase in operational efficiency. Therefore, SMEs receiving external data and information concerning the benefits of I-EDI will be more likely to perceive business opportunities. On the other hand, the two main sources of External Pressure to adopt I-EDI come from pressures from competitors and/or impositions by trading partners. As more firms within an industry adopt I-EDI technologies, SMEs will require I-EDI as a strategic necessity to stay competitive. SMEs will begin to feel the impact of participation in an electronic marketplace. Impact on small firm success refers to the actual benefits SMEs receive after adopting I-EDI technologies that allow them to participate in EC networks.

(3) Extra-organizational factors and I-EDI adoption

Extra-organizational factors involve three types of factors: first, industrial factors; some researchers argue that companies must choose a SCM, B2B, an I-EDI strategy that balances efficiency and responsiveness (Chopra & Meindl, 2001). Companies that choose responsiveness will decide to adopt an I-EDI system;

those that choose an efficiency strategy may place less emphasis on I-EDI because it may increase their costs. On the other hand, industry pressure could involve a dominant company pressuring its suppliers to implement relationship specific IS and IT new technology investments. Secondly, Governmental factors; national policies for training and maintaining an adequate workforce may induce new IS and IT technology adoption such as (I-EDI, B2B, SCM). Burn (1995) suggests that differing rates of EDI adoption in Asian countries stems partially from the extent of government intervention. The adoption of EDI in Singapore was extremely successful due to the government's control of IS and IT developments, and by launching a major educational program exposing the business community to EDI and success stories from other nations (Burn, 1995).

Thirdly, National Cultural factors; national culture refers to the idea that a group of people will feel, think, and react similarly in a given context. Culture has been defined as the shared values of a particular group of people and as the collective programming of the mind which distinguishes the members of one group or category of people from another (Hofstede, 2001, 1991, 1980).

Cultural factors have a significant impact on IT users and should be considered when theories are applied cross cultures. It is also important to recognize that cultural factors influences bear a strong impact on why people adopt technologies in certain cultures. In this case, managers need to provide channels to encourage social exchange of IT experiences.

On the other hand, Christiaanse & Huigen (1997) found that in a case where an Inter-Organizational System (IOS) was successfully implemented, the implementation process occurred in an egalitarian fashion that reflected the cultural biases of both the users and the producer of the software. Goodman &

Green (1992) argue that the cultural and political factors are the main explanations for the lack of new IS technologies adoption and IT diffusion in the Middle East, because the western assumption that a free movement of information have positive connotations violates the cultural environments of many middle Eastern countries.

Based on a survey of 160 000 employees for 40 countries, Hofstede (1980) found that national culture explained greater differences in work-related values than title, gender or age. The five dimensions found in Hofstede's study are: Power Distance, Uncertainty Avoidance, Individualism vs. Collectivism, Masculinity vs. Femininity and Time Orientation. Hall & Hall (1990) have also studied cultures using a dimension of High Context vs. Low Context (the amount of information that surrounds an event, inextricably bound up with the meaning of that event).

Researcher found Hofstede's dimensions more accessible and relatively more than other studies, which tested cultural factors, such as Davis's model (1986), Technology Acceptance Model II (TAM II). Therefore, the research model for this study combines both the TAM model plus an extension derived from Hofstede's 2001 processes of cultural influence, containing the impact of cultural influence processes on user's behavioural intentions and attitudes toward using technology.

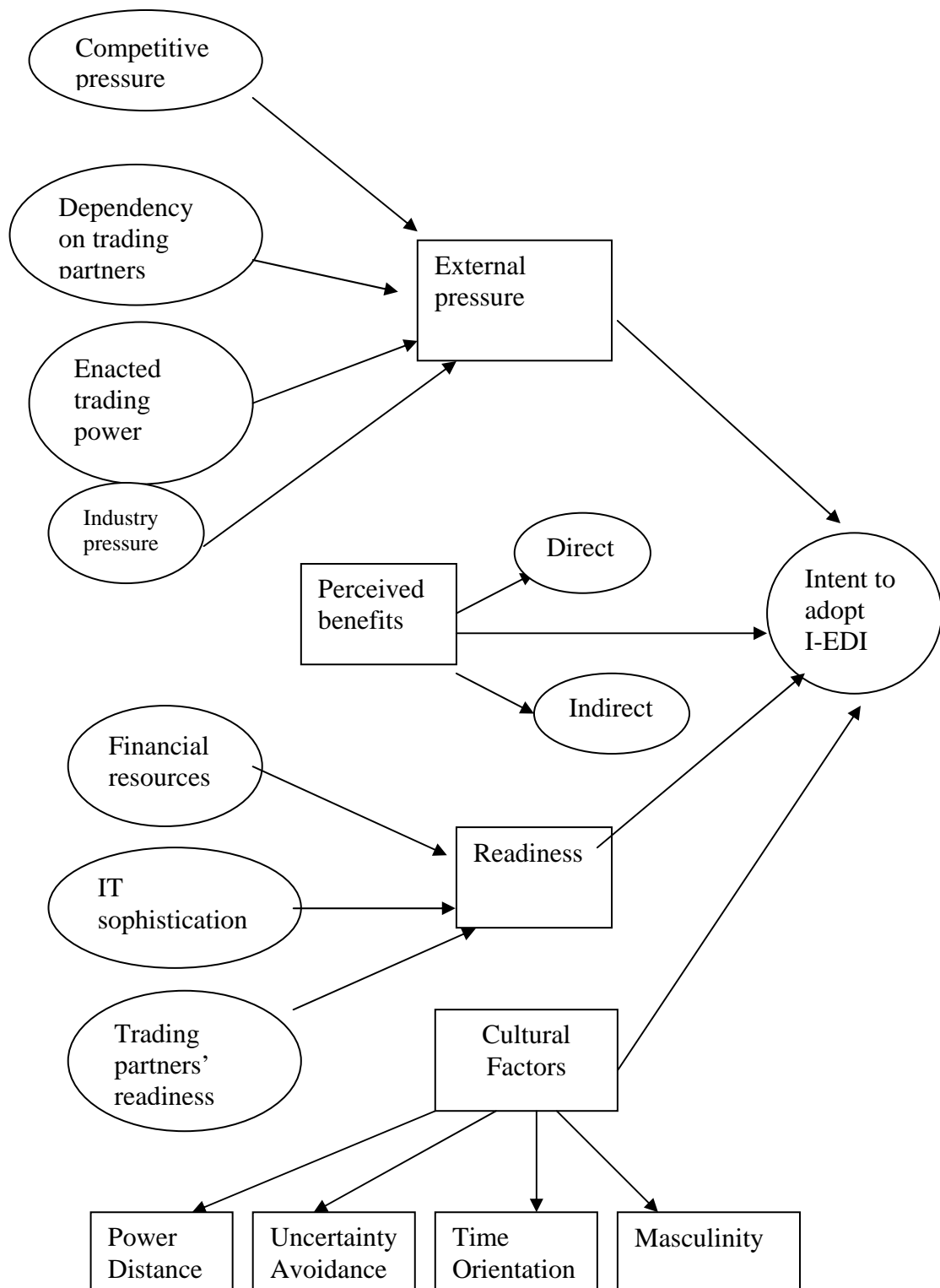
Based on the literature review and findings from previous research and studies, this research explores the Organizational, Inter-organizational, Technological, Governmental and Cultural factors influencing I-EDI adoption and diffusion decisions in Jordan (SMEs sector). The research will test all these factors in chapter five (analysis and finding results).

The Jordanian culture is rated as relatively high on the dimensions of power distance, uncertainty avoidance, and time orientation and relatively low on the dimension of masculinity compared to other countries. So, this research will depend on this dimension and factor to test the culture's factor as one of the factor's influence on I-EDI adoption in Jordan.

In recent research, Iacovou's model (EDI factors model) justifies uses as I-EDI system adoption model. The I-EDI model of adoption recognizes both Organizational and Extra-organizational factors.

The followed figure (see figure 2.3) shows briefly the factors of I-EDI adoption model, which was used in this study to examine the adoption and diffusion of the I-EDI system by Jordanian SME. The interview questions from this research depend on these factors to test and answer all research questions. This model includes competitive pressure, dependency, and industry pressure (External pressure), financial resources, IT sophistication, and trading partners' readiness (Readiness), perceived benefits (direct and indirect), and cultural factors (national cultural factors).

Figure (2.3): I-EDI Adoption Model's Factors.



2.11.2 I-EDI Drivers in SMEs

Technology is driving the development of I-EDI, and is also a sequence of technological and organizational trends that seem to stimulate Internet-EDI evaluation in the SME sector—developed, and developing countries (see E/ESCWA, 2003).

The first driver is *Virtualization* – the distance is minimized by new technologies and the market is pushing companies to adopt more flexible organizational structures to be able to react quickly to new market opportunities. Second, *Integration*: all methods – “(Time-to-marked, Lead-time, just-in-time, one-stop-shopping, etc.) are business benchmarks, which require cooperation and business integration (standards, data, information, business operations, product development, marketing, etc), among trading partners along the supply chain. Hence business integration is increasingly becoming critical competitive parameters for companies” (E/ESCWA, 2003). The third driver for the development of I-EDI, *Globalization*, the removal of traditional trade, risks and barriers has pushed companies to leverage on technological innovations to expand in the global economy. The forth driver is *Flexibility*. The market requires increased flexibility, and all companies are increasingly forced to remain flexible to meet new changes in suppliers’ requirements, trading partners preferences, demands, etc. The last driver is *Innovation*. Innovation and change are spurred by new technologies, which deliver information about trading partners and suppliers’ requirements, market developments, competition, etc. in real time.

2.11.3 Advantages and Disadvantages of I-EDI adoption by SMEs

Senn (1998) identified the following advantages and disadvantages of using the Internet for EDI:

Advantages of using Internet EDI (I-EDI):

- 1.No special software is required if trading partners are already using the Internet.
- 2.Submission of EDI transactions is template driven.
- 3.Converting new users to Internet EDI is relatively quick when transactions are transmitted using a familiar Web browser or E-mail format.
- 4.The convenience and safeguards offered by Value Added Services Providers (VASPs) can be incorporated into Internet-EDI.
- 5.VAN's can build and maintain on screen templates for use by company staff.
- 6.Companies can easily change business rules by adjusting the EDI templates or altering translation and processing routines on their server.
- 7.Internet-EDI can be integrated with traditional EDI as transactions are received from a VAN.

On the other hand, Senn (1998) also has identified the following disadvantages of using Internet for EDI:

- 1.Transmission delays over the Internet are not predictable.
- 2.If VANs are not involved, transaction pickup and delivery actions are not logged nor are receipt notifications generated.
- 3.If VANs are involved, charges for their services may be incurred.
- 4.File transmission protocol can be used to transmit EDI transactions, but additional steps are required to accumulate and transmit batch files

2.12 INTERNET-EDI ADOPTION IN DEVELOPING COUNTRIES (JORDAN)

The adoption of Electronic Data Interchange EDI applications based on the Internet (I-EDI) and the World Wide Web is being promoted in some quarters as offering producer firms in developing countries new exchange mechanisms that enable them to compete on a more equal basis in world markets. For example, the E-commerce and development report (UNCTAD) 2001 states that enterprises in developing countries that are, or plan to be involved in international trade need to start incorporating Information and Communication Technology (ICT) and the Internet into their business model in order to stay competitive.

According to Malone & Laubacher (1998), the adoption of I-EDI is expected to result in a reduction of the transaction costs that are incurred by these firms, thereby lowering barriers to their participation in international trade. It also is expected to provide opportunities for producers' firms in developing countries to enhance their international buyers and sellers. Its significance lies in the fact that it is a tool used by economies to enhance productivity, as well as an increase in performance value added by creating a knowledge-based economy and improving educational outputs. Hence, currently ICT and E-commerce are a top priority on the government of Jordan's agenda, aiming to improve, develop and enhance its Information and Communication Technology cluster, both as an economic activity and as a means of achieving sustainable development affecting economic, social and environment aspects (WSIS, 2003).

"78% of Jordanian SMEs utilizes computers, and two-thirds use the Internet" (see www.intaj.netnews). Moreover, the Arab Advisors Group study

showed that in regard to Internet use, more than 66 percent (66%) of the companies use the Internet; this percentage reaches more than 85 percent (85%) of the companies that have PCs. Approximately 50 percent (50%) of the companies that use the Internet started using it more than 3 years ago. On the other hand, more than 75 percent (75%) of the companies that use the Internet have Internet dial up accounts, with only 15 percent (15%) having Internet Asynchronous Digital Subscriber Line (ADSL). A little more than a quarter of Jordanian SMEs have a web page. Electronic Data Interchange (EDI) is the universally accepted terminology for describing business practices conducted solely over the Internet (I-EDI). This economic activity encompasses advertising, buying and selling of products, services and financial transactions. To conduct business between trading partners through the Internet, business firms and government agencies alike must ensure that their websites are not only user friendly yet also secure as well.

I-EDI allows businesses to conduct their transactions with other business (trading partners) online, thus cutting the costs related to physical infrastructure and operating expenses. It is now evident that the fast diffusion of Information and Communication Technology between firms and the influences it creates on economic systems in both the developed and developing countries has increased during the last two decades. More recent theoretical and empirical studies in the literature (Steele, 2000; Harding et al, 1999; Riggins & Mukhopadhyay, 1999) discussed the positive impacts of ICT and mainly I-EDI systems on productivity, growth and development, work place organization, human capital development and skill upgrading. On the other hand, some studies (Senn, 1998; UNCTAD report, 2001) raised the controversy that the I-EDI system could impose some negative impacts for developing countries particularly, because the developed

countries will have some more advantages in their ability to raise their competitiveness in the global world at the expense of the developing countries (such as the Jordanian market).

The world is experiencing an information and technology knowledge revolution that is fundamentally transforming the way in which business (private and public sectors) and governments operate and interact. Information advances and Communication Technologies (ICT) such as I-EDI, B2B, E-commerce and E-government and especially Internet use have sharply driven down businesses operating costs and are allowing small and Medium Enterprises (SMEs) to compete on an even basis with large firms in EDI applications through Internet usage. An adoption of an I-EDI system within SMEs is different from larger businesses. SMEs have limited resources to be allocated for managing the I-EDI adoption process. Therefore, SMEs around the world need to be more conservative in their technology investments, such as I-EDI. The existing literature seems to concentrate more on drivers, barriers and benefits of I-EDI adoption within SMEs. Moreover, there is a lack of strategy on how to manage and control technology such as the I-EDI adoption process. The existing literature review showed that there are many factors affecting I-EDI adoption around the world. Of these factors affecting I-EDI adoption, cultural factors play an important role in any technology adoption (I-EDI), be it national or organizational culture.

Currently, in this research, multiple case studies in Jordan are preparing further interviews and investigations into this technology adoption and diffusion. This study will collect more data from Jordanian SMEs to improve the understanding of I-EDI adoption process within Jordanian SMEs. The collection

of I-EDI adoption and diffusion processes by Jordanian SMEs and specific data from interviews proposed in this research would be of great benefit for future decisions that Jordanian SMEs have to make.

The purpose of this study is to examine some of the emerging issues surrounding the adoption and diffusion of I-EDI by Jordanian SMEs sector. In addition, this researcher's aim is to provide contribution in understanding, What are the Benefits, Usage, and Barriers in the adoption of I-EDI among Middle East-Arab region countries specifically Jordanian SMEs?

Based on the literature review and finding from previous research, this research will explore the Organizational, Inter-organizational, Technological (Perceived Benefits), Cultural (environmental) and Governmental factors influencing I-EDI system's adoption decisions by Jordanian companies in the SME sector. Therefore, the key research questions emerging from the theoretical discussion are: Which organizational, inter-organizational, technological, governmental and cultural factors influence the decision to adopt I-EDI systems in Jordanian companies (SMEs)? What are the perceived barriers?

This can be achieved by coming the findings of Iavovou et al (1995), Ramamurthy, Premkumar (1999), Chopra & Meindl (2001), Burn (1995), Hall & Hall (1990), Hofstede (1991)(1980). Christiaanse & Huigen (1997).

A model (see figure 2.3) was used in the following chapters as the basis for developing questions related to I-EDI use in Jordan, in order to examine the adoption of I-EDI in SMEs in Jordan. It was also used to analyze replies to those questions.

I-EDI Adoption by Jordanian SME

Jordanian SMEs have practices in different industries such as marketing, computer software/hardware, consultants etc.; these enterprises in Jordan are booming, mainly in rural areas where rates of poverty and unemployment are highest. Economists agree that Jordanian SMEs play a pivotal role in the socio-economic fabric of Jordan.

The reason for choosing Small to Medium Enterprises in Jordan is that because the majority of companies in Jordan are regarded as SMEs, most of these companies did not adopt I-EDI solutions until now. So, the size of companies that have been chosen varies between companies with just 2 employees to a company with 120 employees. The companies that were interviewed have information & communication technology, and are shipping companies, pharmaceutical, plastic & rubber industries, textile, printing, paper & carton, packaging, engineering and construction industries.

Six companies were chosen. The companies were chosen because they were considered to have the highest level of IT and IS sophistication of all Jordanian SMEs. A brief description of the six companies is shown below.

The characteristics of these companies are summarized in the table below:

Table (2.4) Companies description

Company Number	Type of business	NO. Of Employee	Type of Internet connection
C1	ICT, IT Consultants	50	Homepage and permanent Internet connection
C2	IT Consultants	1(Family driven)	Telephone access to Internet
C3	Pharmaceutical & Distributor	25	Home page & permanent Internet connection
C4	Textile Business Distributor (Business agent)	Family driven)	Permanent Internet connection, no Web site
C5	Production & Seller of Textiles	120	Home page & permanent access to Internet (I-EDI)
C6	Distributor of Furniture's	15	Static Home Page & permanent access to Internet

The first company (**C1**) interviewed is a software and information communication technologies house, offering consulting services to government, service sectors such as banking, insurance, and to SMEs. They have employees (50) and are one of the first companies to offer software services in the area (Jordan market); they are considered to have a very good knowledge of the Jordanian market. Only recently they have started implementing Internet-Electronic Data Interchange (I-EDI) systems as Electronic Commerce solutions.

At the time of the interview, they had implemented 4-5 I-EDI or/and B2B electronic commerce systems in the area. The clients had been mainly distributors, shipping companies, textile industry and pharmaceutical industries. One of the systems they had implemented allowed the client company to customize the design of the product they wanted, to send the product specifications to the producer and then to pay the bill from the web page. They have had a home page since the web was created. So, for all reasons above, the researcher nominated this to be one of the study's samples.

The second company (**C2**) is a single employee consultancy firm offering consulting services only to SMEs, and has been in business since 1990. The owner has a very good understanding of the local situation, being in contact with SMEs attempting to get into electronic business on a daily basis. He does not have a home page himself, believing more in personal contacts and word of mouth to attract and deal with new trading partners or suppliers and his customers.

The third company (**C3**) is a pharmaceutical distributor; it employs 25 people, and has a turnover of three hundred thousands (300 000.00) Australian dollars per year. This company imports products from European countries and resells them to 400 client companies all over Jordan and abroad. In order to show the product sample to the clients, they have 5 business agents that cover different parts of Jordan. This company has a home page connected with the inventory system. It is possible for the client companies to log into the company's system with a password, look at the daily inventories, choose the type of product, the quantity wanted and then submit the order through the web site. The company has had a static home page presenting their products for the last four years and has been using e-mail for communication purposes for many years. At the time of the

interview it had been offering the possibility of buying through the web site for only four months. Already, approximately 5% of the business was done through the Internet – but with already existing company clients (customers).

The fourth company (**C4**) is a family owned business. They are middlemen in the textile business. They mainly do business abroad. They import the raw materials and export the finished product, which is produced by a local SME. They do not have a web site because they believe that they cannot implement one the way they want. They are not satisfied with the static web site, which is a shopping window. They also showed concern about building a web site giving access to their product collection because they are afraid that the competitors can copy what they are doing. Therefore, they use the Internet daily for (EDI) or/and (B2B) e-commerce operations such as receiving and fulfilling orders, sending digital images of their products, communicating with their clients company, and doing Internet banking. The Internet has contributed to an increase in the number of buyers they have per each client company, with an increase in the final product sale.

The fifth company (**C5**) is a producer and seller of textiles. The company has approximately 120 employees with a turnover of 800 000.00 Australian dollars per year. The company was founded in 1991 by merging three different companies, which were owned by three brothers. They have been using the Internet since 1998, and they are using it a lot, both in the internal and external processes, which are interconnected. They have had a home page since 1999, which provides basic information about the company. They do not use the home page as a buying and selling tool because they are worried about decreasing their competitive advantage by giving away information about their collection of

products to competitors. The company had started using the Internet at a time when none of their clients company was using it. They have their own Electronic Data Base department consisting of three full time engineers, and they do not believe in outsourcing, if the Internet has to be used to achieve competitive advantage.

Company number six (**C6**) is a distributor of furniture, kitchens and doors. They employ 15 people and have a turnover of approximately 500 000.00 Australian dollars per year. They presently import products from all over Jordan and distribute and sell to local small companies (clients) and private individuals. After they started using the Internet and e-commerce they have been able to establish contacts with foreign companies. They are planning to start importing from abroad from in the near future. They have a static home page, but they are planning to advance their business performance and efficiencies. One way is through an online catalogue of their products in order to sell on the Internet. They have had an Internet connection for the last three years, but it has only been a year and a half since they really started using it because previously they did not know what to use it for. They have been mainly using Internet for communication (e-mail) purposes. More recently, they have also used it for sending and receiving orders. They use the Internet (EDI) system mainly in connection with the suppliers. Their use is limited to 2-4 messages per day.

CHAPTER THREE

METHODOLOGY

3.1 PURPOSE OF STUDY

The purpose of this study is to examine some of the emerging issues surrounding the adoption, diffusion and implementation of Internet-Electronic Data Interchange (I-EDI) by the Jordanian SME sector. In addition, this research aims to provide an understanding of the benefits, usage, and barriers in the adoption of Internet-EDI among SMEs, specifically Jordanian SMEs.

3.2 PURPOSE OF THE CHAPTER

Chapter two of this research, the literature review, examined and provided an overview of traditional-EDI and I-EDI. This chapter provides details of the research methodology, including methods of collection, measurements and analysis of the data needed to answer the research's questions. At the conclusion of chapter two, five questions were posed. These are listed below:

Research's questions:

1. What is the current state of I-EDI technology?
2. How is the I-EDI system adopted and used in western SMEs (developed countries)?
3. How are I-EDI system adopted and used in Jordanian SMEs (developing country)?
4. What is the difference between SMEs in developed and developing countries?
5. What help can be given to Jordanian SMEs (developing country) to advance I-EDI adoption?

3.3 RESEARCH METHODS AND TECHNIQUES:

Sampling Technique:

A number of approaches to the research are possible, including the development and use of research questions and the use of statistics to fully analyse the responses. This approach is rejected, as the number of I-EDI adopters in Jordan was considered too small to adequately justify any use of statistical analysis. An alternative method was the use of in depth interview questions, analysed qualitatively.

The telephone interview method of gathering data was best suited to this research, due to the researcher's location and limited resources. In addition, the time schedule for this research did not permit extensive travel to gather data.

The method chosen will be individual, open-ended interviews (telephone interview questions) and theoretical context analysis. Chapter four (results of stage two) will present full answers for this stage, including the interview's

questions, and a brief discussion of the overall companies' positions, and the adoption of I-EDI.

The participants of this study are individuals from a wide variety of organizations covering the key sectors of the economy in Jordan. Thus, the individuals targeted by this research's interview had the knowledge and the qualifications to answer very specific questions.

3.4 STRUCTURE AND EVALUATION OF THE INTERVIEW'S QUESTIONS

As mentioned above, telephone interviews were conducted when a face-to-face meeting could not be arranged, and for follow-up questions and probes. All sections of the interviews were transcribed before the data were analysed, in order to ensure consistency and reliability, the interview protocol guide used for all interviews. In addition, the interviews included a number of open-ended questions to allow the participants flexibility in their answers.

Using the interview items developed, each firm, based on the written narrative, have been scored (see 3.3).

So, the first two questions have been addressed in chapter two. Indeed, chapter two has provided a number of outcomes:

- It has placed EDI firmly within the context of inter-organizational, strategic information systems, providing an original definition of I-EDI in terms of its theoretical link with organizational structure and business process redesign.
- It investigates those technical issues that are relevant to I-EDI.

Not only have the first two questions been addressed in the preceding chapter (chapter two), but the findings have allowed the development of a model through which the I-EDI is used, and the impact in Jordanian SMEs might be examined (see figure 2.3).

As indicated, this model was developed from an earlier approach by Iacovou et al (1995) and Hofstede (1991) (1980), but also included a number of more recent studies (Hofstede 2001). As was pointed out in chapter two and can be seen in figure 2.3, a number of factors appear to impinge on the adoption and use of I-EDI in SMEs.

These are:

<u>List of factors</u>	<u>Authors</u>
1- Organizational readiness, External pressure and Perceived Benefits	Iacovou et al (1995)
2- Supported top management (1999)	Ramamurthy, Premkumar
3-Level of IS & IT sophistication and (1999) Organizational readiness	Ramamurthy, Premkumar
4- Industrial factors & pressure	Chopra & Meindl (2001)
5- Governmental factors & national policies	Burn (1995)
6- National cultural factors	Hofstede (1991) (1980)
7- Cultural and Political factors	Goodman & Green (1992)
8- Cultural factors	Hall & Hall (1990)

I-EDI Adoption by Jordanian SME

As such, a series of questions was developed. These are:

- 1- Do you have a corporate web site?
- 2- Do you have a corporate intranet for employees to access vendor or supplier information?
- 3- Do you have an extranet connecting with your suppliers?
- 4- Do you use Electronic Funds Transfer (EFT) or other electronic payments?
- 5- Do you have access to the electronic catalogues of major suppliers?
- 6- Do you have conduct online negotiations with your suppliers through the Internet?

Q2: Do you believe your organization is taking full advantages of I-EDI or/and B2B E-commerce adoption?

Q3: What do you see as the major benefits of E-commerce (I-EDI) systems to your organization?

Q4: How would you rate the dynamism of the business environment in which you operate (environmental factors, technological, competition, culture, supplier's preferences and regulation of governmental institution's forces)?

Q5: Does your organization have long-term relationships with the majority of suppliers?

Q6: What are the benefits and problems encountered by Jordanian SMEs in the adoption and diffusion of I-EDI e-commerce? How do they use it?

Q7: Which Organizational, Inter-organizational, Technological, Governmental and Cultural factors influence the decision to adopt I-EDI e-commerce systems in Jordanian SMEs (companies)?

Q8: Yes and No Questions.

- 1- In your organization, have I-EDI systems been made a top priority by senior management.
- 2- Are E-commerce new technologies (I-EDI) crucial for maintaining competitiveness in your industry?
- 3- Are your main competitors utilizing Internet-based applications?
- 4- Is lowering costs an important reason for adopting I-EDI systems?
- 5- Have Security concerns delayed, or are they delaying your adoption of E-commerce new technologies (I-EDI)?
- 6- Is your legacy system constraining your ability to adopt the new Internet-based technologies?
- 7- Is the Cost of setting up an Internet-based procurement system too high for your organization?
- 8- Is the lack of skilled people in your organization a barrier to adopting I-EDI E-commerce systems?
- 9- Is The Internet making information management easier?
- 10- Do most departments in your organization require internal change or process re-engineering to make effective use of E-commerce (I-EDI) systems?
- 11- Does the Internet allow for information sharing across the supply chain?
- 12- Has the Internet and E-commerce systems (I-EDI) required new procedures?
- 13- Do you have to ensure that your systems are compatible with that of your suppliers?

14- Will the Internet-based and EDI systems reduce dependence on any one suppliers?

15- For your organization, will the Internet-based (I-EDI systems) reduce the number of suppliers?

16- Will (I-EDI) E-commerce increase your global sourcing?

17- Are important decisions, such as adoption of new technologies, often made in a top-down manner?

Q9: Are technology people (IT or MIS) in your organization supportive of the adoption of I-EDI and B2B E-commerce?

Having reviewed the literature of I-EDI systems in SMEs (see chapter two), some semi-structured questions and points were developed (see index B); the questions and all the issues addressed the following: SMEs' use and adoption of Internet-Electronic Data Interchange; benefits derived; the changes in the business processes due to the I-EDI adoption. Following semi structured questions:

Q1: Organization questions

- 1- Have a corporate web site?
- 2- Corporate intranet for employees to access vendor or suppliers' information?
- 3- Have an extranet connecting with your suppliers?
- 4- Use Electronic Funds Transfer (EFT) or other electronic payments?
- 5- Have access to electronic catalogues for major suppliers?
- 6- Conduct online negotiations with your suppliers through the Internet?

Q2: Does your organization use the Internet for purchasing products, making payments online, identifying potential vendors, posting requests and identify products /suppliers?

Q3: Does your organization use Electronic Data Interchange (EDI), and/or Web-enabled EDI?

Q4: Does your organization use EDI through a private network, or through the Internet? *(If use through private networks, do you plan to migrate to an internet-based EDI? And if so, why do you prefer to use EDI through a private network or VAN rather than the Internet)?*

Q5: Do you believe your organization is taking full advantages of I-EDI or/and B2B E-commerce adoption?

Q6: Are you satisfied with how your organization is currently using I-EDI E-commerce? (If you are dissatisfied, explain why).

Q7: What issues in the Business-to-Business (I-EDI) E-commerce area are of concern to your organization?

Q8: What do you see as the major benefits of E-commerce (I-EDI) systems to your organization?

Q9: How would you rate the *dynamism of the business environment* in which you operate? (This includes environmental factors; technological, competition, culture, supplier's preferences, and governmental-regulatory and institutional forces).

Q10: Does your organization have long-term relationships with the majority of suppliers?

Q11: Does your organization dependent on your suppliers?

Q12: Does your organization trust your suppliers?

Q13: For how many years has your organization been using I-EDI systems?

Q14: What are the benefits and problems encountered by Jordanian SMEs in the adoption and diffusion of I-EDI e-commerce? And, how do they use it?

Q15: Which Organizational, Inter-organizational, Technological, Governmental and Cultural factors influence the decision to adopt I-EDI e-commerce systems in Jordanian SMEs (companies)?

Q16: Yes and No Questions:

- 1- In your organization, have I-EDI systems been made a top priority by senior management?
- 2- Are E-commerce new technologies (I-EDI) crucial for maintaining competitiveness in your industry?
- 3- Are your main competitors utilizing Internet-based applications?
- 4- Is lowering costs an important reason for adopting I-EDI systems?

I-EDI Adoption by Jordanian SME

- 5- Have security concerns delayed, or are security concerns delaying your adoption of E-commerce new technologies (I-EDI)?
- 6- Are the legacy systems you have constraining your ability to adopt the new Internet-based technologies.
- 7- Is the cost of setting up an Internet-based procurement system too high for your organization?
- 8- For your organization, is a lack of skilled people a barrier to adopting I-EDI E-commerce systems?
- 9- Is the Internet making information management easier?
- 10- Do most departments in your organization require internal change or process re-engineering to make effective use of E-commerce (I-EDI) systems?
- 11- Does the Internet allow information sharing across the supply chain?
- 12- The Internet and E-commerce systems (I-EDI) have (or will) required (require) new procedures?
- 13- Have you ensured that your systems are compatible with that of your suppliers?
Will the Internet-based of EDI reduce dependence on any one supplier?
- 14- For your organization, will the Internet-based (I-EDI systems) reduce the number of suppliers?
- 15- Will (I-EDI) E-commerce increase your global sourcing?
- 16- Are important decisions such as the adoption of new technologies often made top-down?

If one's Organization does not use any type of I-EDI (E-Commerce):

Q17: Do you change any of your internal procedures in order to migrate to an Internet-Based system?

Q18: Do you adopt Electronic Commerce in small steps?

Q19: Are technology people (IT or MIS) in your organization supporting the adoption of I-EDI and B2B E-commerce?

Each interview will be transcribed and a qualitative content analysis applied in order to categorize the answers into the themes. Among the advantages of the semi-structured questions and points are that the interviewees can freely talk about the subject, thus adding useful information from which it is possible to create new themes.

Open-ended phone interview were coded separately, after reviewing all the open-ended questions responses. In addition, some open-ended questions were used to gain further understanding of certain issues. Most of the Interview questions were structured using a five-point scale showing the items or categories. The Five points scale and coding (5= strongly Agree, 4= Agree, 3=Neutral, 2=Disagree, 1= strongly disagree) are included in appendix B.

The research's interviews were in the Arabic language, and were translated into the English language.

CHAPTER FOUR

RESULTS FROM STAGE TWO:

Data from Telephone Interviews

4.1 PURPOSE OF THE STUDY

The purpose of this study is to examine some of the emerging issues surrounding the adoption, diffusion and implementation of Internet-Electronic Data Interchange (I-EDI) by the Jordanian SME sector. In addition, this research aims to provide a contribution in understanding, concerning the benefits, usage, and barriers in the adoption of Internet-EDI among SMEs, specifically those in Jordan. Then the study will display a comparative and descriptive analysis between selected companies (Jordanian SME).

4.2 OVERVIEW AND DISCUSSION

The Phone interview used for data collection contained scales to measure the various constructs depicted in the research model. These scales are shown in appendix B. The scales for all the main model's factors were adapted from prior studies, many of which have already established their reliability and validity (Davis 1989, Venkatesh & Davis 1996, Taylor & Todd 1995).

The constructs were operationalized using existing scales from previous studies. Fully anchored 5-point Likert scales were used with end points being “strongly

disagree” and “strongly agree”. The items with perceived benefits, external pressure and readiness ease of use) were adapted from Davis (1989, 1996). The cultural context factors were from Hofstede (1980, 1991 & 2001).

This chapter presents the empirical data gathered from interviews that were conducted with SMEs in Jordan. Its also shows the adoption and use of I-EDI in developing countries such as Jordan and barriers of I-EDI adoption as other E-Commerce options in Jordan .

A series of research questions were developed. These were:

1. What is the current state of I-EDI technology?
2. How are I-EDI system adopted and used in western SMEs (developed countries)?
3. How are I-EDI systems adopted and used in Jordanian SMEs (developing country)?
4. What is the difference between SMEs in developed and developing countries?
5. What help can be given to Jordanian SMEs (developing country) to advance adoption?

As already indicated, chapter two gave rise to a model (see figure 2.3) whereby the adoption and use of I-EDI might be examined (research question three).

In order to fully examine the adoption, use and role of I-EDI in Jordanian SMEs, an approach involving in-depth phone interviews was considered the most appropriate.

Six SMEs were chosen as target firms to which these questions would be applied. The details of these companies are presented in section (3.3).

The following six sections provide answers of each firm to the questions used in the telephone interviews, together with a summary and analysis of each firm on issues pertaining to I-EDI. An overall summary and analysis of the six firms is then presented.

(1) **Company One**

- Perceived benefits. This company agreed that time saving; increasing clients and suppliers, contributing to internationalization, reducing costs and improving business competitiveness are the main benefits of I-EDI adoption.
- Triggers. This company agreed that just-by-time method, knowledge, competitive pressure and education are good reasons to adopt or/not adopt I-EDI. This company also said, because we don't really know much about it (I-EDI); this is why we prefer our standard procedure in placing order.
- Barriers and risks. This company agreed that security reasons are one of the most reasons to adopt or not adopt new technology such as I-EDI, and asserted that interacting face to face with suppliers gives access and more information.
- Organizational factors. This company agreed only that top management support is one of the main organizational factors influencing I-EDI adoption.
- Culture factors. This company asserted that context, relationships and other Jordanian cultural factors are influenced by I-EDI adoption.

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- Governmental factors. The company agreed that the Jordanian government could contribute to adopting I-EDI through its policies and roles. However, C1 said, many Jordanian SMEs feel that the lack of a formal plan and policies by the government has hindered there more than I-EDI system, despite monetary incentives such as tax deductions.

(2) **Company Two**

- Perceived benefits. This company agreed that time saving contributes to internationalization, reduce cost and improves business competitiveness; these are the main benefits of I-EDI adoption.
- Triggers. This company agreed that the just-by-time method is good reason to adopt I-EDI. It is also asserted that adoption of I-EDI is completely casual. The director of C2 believes that the lack of knowledge and trust in Internet (I-EDI) security may become the reason why c2 has not adopted as an online transaction activity into the business.
- Barriers and risks. The company agreed that security reasons are one of the main reasons to adopt or not adopt a new technology such as I-EDI, and agreed that interacting face to face (relationships) with suppliers creates more access and information.
- Organizational factors. This company agreed that top management support is one of the main organizational factors influencing I-EDI adoption.
- Culture factors. There was no answer from company 2 regarding this issue, and there was no comment.
- Governmental factors. This company agreed that the Jordanian government could contribute to the adoption of I-EDI through its policies and roles.

(3) **Company Three**

- Perceived benefits. This company agreed that time saving, increasing clients and suppliers, contributing to internationalization, reducing costs and improving business competitiveness are the main benefits of I-EDI adoption.
- Triggers. This company agreed that all of the just-by-time method and lack of education are good reasons to adopt or not adopt I-EDI. Company three also asserted that I-EDI adoption is just by chance and IT consultants cannot explain what the I-EDI adoption benefits are.
- Barriers and risks. This company agreed that security reasons are one of the main reasons to adopt or not adopt a new technology such as I-EDI, and asserted that interacting face to face with suppliers creates more access and information. Of all the companies, only C3 asserted that poor communication through and between companies is the main barrier to I-EDI adoption.
- Organizational factors. This company agreed only that firm size and changes are a good organizational factors influenced of I-EDI adoption.
- Culture factors. This company asserted that context, and relationships through Jordanian culture are the main factors influencing I-EDI adoption. C3 also said, Doing business and contacting other firms directly will reduce the risk associated with doing business, without the influence of the government and industry polices.
- Governmental factors. The company agreed that the Jordanian government could contribute to adopting I-EDI through its policies and roles.

(4) **Company Four**

- Perceived benefits. This company agreed that time saving, contributing to internationalization, reducing costs and improving business competitiveness are the main benefits of I-EDI adoption. C4 also said that the number of clients for each small business they represent has been increasing with the use of the Internet, thus increasing the total number of trading partners (client companies and suppliers).
- Triggers. The company agreed that all parts of the just-by-time method and knowledge are good reasons to adopt I-EDI. Company four also asserted that I-EDI adoption is just by chance.
- Barriers and risks. This company agreed that security reasons are one of the main reasons to adopt or not adopt a new technology like I-EDI, and asserted that interacting face to face with suppliers gives more access and information. The manager of C4 said, In conjunction with the benefit that the company obtained by adoption I-EDI, there are also problems that arise from the web implementation, such as the breach of copyright when another company tries to copy his product design and data and information on its web site.
- Organizational factors. This company agreed only that top management support is one of the main organizational factors influenced by I-EDI adoption.
- Culture factors. The company agreed particularly that many Jordanian culture factors are influenced by I-EDI adoption. C4 also said that the context of relationships was important, but there were different outcomes with regard to adoption decisions across different Jordanian industries.

- Governmental factors. This company agreed that the Jordanian government could contribute to adopting I-EDI through its policies and roles.

(5) **Company Five**

- Perceived benefits. This company agreed that time saving, increasing clients and suppliers, contributing to internationalization, reducing costs and improving business competitiveness are the main benefits of I-EDI adoption. More than that, C5 believed their main concern would be the cost saving, as it is really expensive to call Jordan from overseas (overseas clients and suppliers). So, the manager of C5 asserted that we have no other choice but to adopt it (I-EDI)
- Triggers. This company agreed that all parts of the just-by-time method and knowledge are good reasons to adopt I-EDI.
- Barriers and risks. This company agreed that security reasons are one of the main reasons to adopt or not adopt a new technology like I-EDI, and asserted that interacting face to face with suppliers creates more access and more information.
- Organizational factors. This company asserted that firm size and changes are the main organizational factors influenced of I-EDI adoption. Manager of C5 also asserted, our company started to promote the company by registering its website in several search engines and some international online directories.
- Culture factors. This company asserted that context and relationships are influenced by I-EDI adoption in Jordan.
- Governmental factors. This company agreed that the Jordanian government could contribute to adopting I-EDI through its policies and roles. **The**

company also said, “The government’s program (Electronic Government) has been very useful to moving our company forward”.(Manger of company 5).

(6) **Company Six**

- Perceived benefits. This company agreed that time saving, contributing to internationalization, reducing costs and improving business competitiveness are the main benefits of I-EDI adoption. Company six did not agree that I-EDI adoption will increase their clients and suppliers. In addition, the manager of C6 said, I-EDI adoption makes me work faster; he also said that I-EDI facilitates me to make faster decisions (accept or reject the order).
- Triggers. This company agreed that all parts of the just-by-time method, knowledge and strategic necessity are good reasons and triggers to adopting I-EDI.
- Barriers and risks. This company agreed that security reasons are one of the main reasons to adopt or not adopt a new technology like I-EDI, and asserted that interacting face to face with suppliers gives access and creates more information.
- Organizational factors. Company agreed with the statement that top management support is one of the main organizational factors influencing I-EDI adoption.
- Culture factors. The company asserted that context, relationships and other Jordanian cultural factors are influenced by I-EDI adoption. In addition, the manager of C6 also expressed the hope that I-EDI would enable them to

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improve their personal and direct relationships with the suppliers and other companies in the market (locally and globally).

- Governmental factors. The company agreed that the Jordanian government could contribute to adopting I-EDI through its policies and roles.

So, through the network of the SME market and by making use of the Internet, I-EDI system and modern management, company 6 could change the gloomy picture of the Jordanian SME.

An overall summary and analysis of the six firms

Regarding the question, which are the Adoption Benefits (perceived benefit of I-EDI)?

- Time saving: all 6 companies agreed that time saving was the main benefit of I-EDI adoption. Companies also asserted that things go much faster and quicker with I-EDI.
- Increasing clients and suppliers: C1,C3 and C5 noted an increase; C2,C4,C6 did not.
- Contributing to Internationalization: 6 interviewed companies agreed. C6 asserted that it is already starting using it to explore the global market.
- Reduced cost: companies planning to adopt I-EDI in the future agreed that reduce costs was the most important benefit.
- Improved business competitiveness: all 6 interviews companies agreed.

C4 asserted that for SMEs planning to adopt I-EDI in the future, the important benefit is reduced cost followed by an expansion into existing markets.

Responses from 6 interviewed companies regard the question, which are the main Adoption's Triggers of I-EDI?

- Just-by-Time: 6 companies agreed that the just-by-time method was the main reason and trigger to adopt I-EDI and Internet technology.
- Knowledge: C1, C5 and C6 agreed that knowledge was still lacking. C4 and C3 said the adoption of I-EDI was just by chance and C2 agreed that adoption was completely casual.
- Strategic necessity: only C6 agreed that strategic necessity was one of the adoption triggers.
- Suppliers & IT adoption: C1 agreed competitive pressure was a good reason to adopt. C2, C4 and C5 gave no answer for question. C3 said IT consultants can't explain what the I-EDI adoption benefits were. C3 also said that if most of the clients (companies) or suppliers would use I-EDI for Data and Information transfer and exchange in the long run, then they could consider not conducting business with the client companies or suppliers (trading partners) that do not use their online (Internet) networks to make an order and exchange their data and information.
- Education: C1 and C3 asserted that there is a lack of education methods regarding new technology adoption. C2, C4, C5 and C6 did not answer this question.

On the other hand, responses from interviews with regard the question, "which are the Barriers and Risks of I-EDI adoption?" are as follows:

- Security reasons: all interviewed companies except C6 agreed security reasons are one of the main reasons to adopt a new technology.

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- Communication: only C3 said that a poor communication through and between companies is the main reason to delay adoption.
- Relationships: all 6 companies agreed that interacting with suppliers face-to-face gave greater access to more information.

Further, unofficial remarks from the interviewees also indicated clear perceived barriers, which includes:

- 1- Most of the customers (clients), trading partners and suppliers don't use I-EDI.
- 2- Doing business face-to-face is very important.
- 3- Technologies are unstable and are always changing.
- 4- Most Jordanian SMEs don't need I-EDI, they are only marketing locally.
- 5- I-EDI required a lot of ongoing training.
- 6- Computers and networks require maintenance to deal with viruses.

The responses from 6 companies with regard to the question, "which are the main Organizational factors influencing I-EDI adoption?" are as follows:

- Top management support: C1, C2, C4 and C6 agreed that top management was one of the main factors influencing I-EDI adoption. C3 and C5 gave no answer.
- Firm size and changes: C3 and C5 agreed that size & changes was a good factor influencing adoption of I-EDI. C1, C2, C4 and C6 gave no answer.

At the same time, responses from the 6 companies with regard to the question, "which are the Culture factors that influence I-EDI adoption?" are as follows:

- Context & relationships: C1, C3, C5 and C6 agreed that context factor was a good reason to adopt I-EDI. C2 and C4 did not answer this. C3 said, "So far we do not adopt or use I-EDI system because in Jordan personal relationships or contact is very important in doing business between two or more companies". Manger of company 3.

- Other cultural factors: C1, C4 and C6 agreed that many other Jordanian cultural factors influenced the adoption of I-EDI.

For the question "which Governmental factors and policies influenced I-EDI adoption?" the results reveal:

- Responses to this question show that all 6 Jordanian SMEs agreed that the Jordanian government can contribute to I-EDI adoption through many ways, including policies and roles.

The I-EDI adoption model identifies those firms willing to adopt I-EDI into their business processes. This research found, as mentioned above, that the factors of perceived benefits, cultural factors and organizational readiness factors influence I-EDI adoption by Jordanian SMEs.

Results from this stage are generally consistent with the findings of Iacovou et al. (1995), which says identifying indirect benefits (presence, new business relationship, and the ability to scan new and remote markets) is important for EDI adoption. On the other hand, the most significant difference from Iacovou et al's. (1995) I-EDI adoption model is the seemingly important influence of cultural and governmental factors.

CHAPTER FIVE

ANALYSIS OF THE RESULTS OF STAGE

THREE:

Case Studies Analysis

5.1 INTRODUCTION

As already indicated, studies have shown that I-EDI could affect companies' (SMEs) marketing performance, as it provides great benefits and opportunities. SMEs may use I-EDI to gather information concerning buying and selling, providing information about products and services and presenting help and support for suppliers and clients.

In spite of the great benefits and opportunities of I-EDI adoption, I-EDI is still not being used by most Jordanian SMEs.

However, from the interviews, the majority of interviewees (Jordanian SME) indicated their willingness to learn and benefit from this technology (I-EDI). Additionally, there are intentions from managers of Jordanian SMEs to adopt I-EDI in the near future. In fact, some of these companies are using e-mail and computers in dealing with some of their suppliers and clients.

In order to achieve the aims of this chapter, it is important to analyse and consider the following issues:

- The benefits of I-EDI, which drive and encourage Jordanian SMEs to adopt I-EDI.

- The main organizational factors affecting the adoption of I-EDI in Jordanian SMEs.
- The Barriers of using I-EDI, and the barriers to change to I-EDI by Jordanian SMEs.
- The cultural factors that influence the adoption of I-EDI in Jordanian SMEs.
- The Governmental policies, which encourage Jordanian SMEs to adopt I-EDI system.

It is also valuable to state the critical success factors surrounding the adoption of I-EDI so as to encourage Jordanian SME to change and adopt I-EDI successfully. All of these points and issues are detailed below.

5.2 ANALYSIS RESULTS

5.2.1 Perceived Benefits

The great development of communication and network technology brings applications and benefits to companies, their suppliers and clients such as information exchanges (I-EDI), E-commerce and e-mail. However, these benefits require planning, knowledge and deep understanding. Additionally, this technology (I-EDI) comes with a lot of barriers that need to be overcome such as security, infrastructure, and legal issues, etc. Therefore, it is important to investigate and analyse the movement regarding the benefits of I-EDI adoption, which definitely affect the marketing behaviour of SMEs and its suppliers and clients in the near future.

The existing literature has documented some of the benefits of I-EDI adoption within SMEs (Thong 1999; Thong & Yap 1996). Much of the previous

literature has illustrated that benefits are the positive influences for I-EDI adoption.

The literature also asserts that benefits may come from two different sources, those from within the SMEs and those from outside the SMEs. Further, and in order to know the trends and behaviour of SMEs towards the I-EDI adoption and in order to identify the most important benefits of I-EDI adoption to Jordanian SMEs, the following benefits have been documented in the existing literature (see 2.10.3 & 2.13.2):

- Suppliers and clients demand it.
- To expand market.
- High competence and good suppliers and clients services.
- To reduce costs.
- To reduce time.
- To improve coordination with suppliers and clients.

Table (5.1) shows summaries of the interview findings. Concerning the operational benefits, there was unanimous agreement regarding operational benefits, particularly in terms of time savings, as things go much faster with the Internet (I-EDI). Regarding internet connection, the interviews show that companies 1, 3 and 5 had the Internet connected with their internal system. Companies 2, 4 and 6 did not feel threatened by having the two systems, and preferred to keep the internal information systems separated from the external Internet connection (I-EDI) with other client companies or suppliers; this is due to security reasons. In order to increase clients and suppliers as a benefit of I-EDI adoption, company 4, for example, said that the number of clients for each small

business they represent has been increasing with the use of the Internet, thus increasing the total number of trading partners (client companies and suppliers). Interviews show that the I-EDI is mainly used as a communication medium to exchange data and information.

On the other hand, another benefit of I-EDI adoption is all the interviewed companies agreed that I-EDI is definitely contributing to an internationalization of their business, and they are already starting using it to explore the global market both in terms of suppliers and buyers (Trading Partners). However, all companies indicated that the Internet is becoming more and more common in EDI and that all transactions between trading partners, such as sending the information and data relative to the inventory, sending invoices, taking and confirming orders and market research to find suppliers of products is internet-based. This is especially done when the product is new. New suppliers outside of the established network of partners (clients companies) have to be found; see the response given by (C5). Additionally, for SMEs that are planning to adopt I-EDI in the future, the most important benefits in adopting I-EDI is in reducing cost, followed by the expansion to existing markets, and to improve business competitiveness.

Indeed, I-EDI offers SMEs huge opportunities to improve their business performance.

5.2.2 Organizational Factor

It has been widely recognized that the organizational and inter-organizational factors, such as the support of top management, firm size, and exercised power as well as competitive pressure and customer support were crucial as success factors in I-EDI system adoption decisions (Ramamurthy,

Premkumar, 1999). On the other hand, the level of IS and IT sophistication and organizational readiness has often been identified as a predictor of successful I-EDI adoption.

In the US automobile industry, for instance, there is a strong competitive pressure where delays in transit of information and goods need to be eliminated in the industry's Just-In-Time (JIT) environment (Kurokawa & Manabe, 2002).

Recent I-EDI research has incorporated both inter-organizational and organizational factors, and this has had an influence on the Jordanian SME adoption of I-EDI.

There was a major consensus among the companies interviewed that top management support, competitor's pressure, knowledge and just-by-chance (JBC) factors are the main reason why most SMEs in Jordan get acquainted with I-EDI and Internet commerce generally. Knowledge about this type of new technology and business between trading partners locally, or internationally, are still generally lacking. Therefore, according to company two (C2), especially in the case of the family driven business, the adoption and initial discovery of I-EDI is completely casual. Moreover, company three (C3) and company four (C4) have adopted Internet Just-By-Chance (I-JBC). Company five (C5) has been motivated by strategic opportunity; it had in fact been pioneering the adoption and diffusion of I-EDI in their sector (Jordanian SME Sector). The Sixth company (C6) has adopted I-EDI due to strategic necessity. That is, they had adopted it because other companies (suppliers) and all trading partners in their sector started using it, even though they could not really fully understand the potential. Only after experimenting with it, did they realize the benefits. However, C3 said that if most of the clients (companies) or suppliers would use I-EDI for data and information

transfer and exchange in the long run, then they would consider not conducting business with the client companies or suppliers (trading partners) that do not use their online (Internet) networks, in order to make an order and exchange their data and information. So, these results, that Jordanian SMEs embrace I-EDI mainly because of Just-By-Chance, contrasts with findings in other studies in developed countries (Ramamurthy, Premkumar 1999; Ramamurthy, & Crum 1997; Steele, 2000; Van Akkeren & Gavaye, 1999) about the impact of I-EDI on organizations in western nations.

5.2.3 Barriers and Risks

I-EDI has become widespread across the world. On the other hand, it is obvious that there are serious barriers to deployment of IT, EC, and I-EDI especially in developing countries such as Jordan. So, there are a number of barriers that need to be overcome in order to create wider adoption of I-EDI to SMEs. These barriers must be identified and analysed in order to know whether they will prevent SMEs from the adopting or not.

The traditional EDI and I-EDI literature “between” (1988-2002) (Wood 1995, Paradi et al 1996, Steele 2000, PermKumar et al 1995, Iacovou et al 1995, Riggins 1999) provided a discussion of a range of traditional EDI and I-EDI barriers from the perspective of large and/or small companies, and from the viewpoint of small and medium sized enterprises (SMEs). All these studies illustrated a list of different potential barriers that could limit the adoptions and emergence of I-EDI, or put business on the WEB. The list contains the following factors: privacy & security issues, skills & expertise, customer’s (clients) & suppliers readiness, legal & regulatory environment, infrastructure, business

strategies, cost, and awareness and knowledge. So, the decision to adopt I-EDI for most of the companies depends on reducing those barriers. However, most of the managers are not aware of some of the barriers to I-EDI such as security, legal issues and infrastructure.

Risks and barriers are very important in understanding the adoption behaviour of Jordanian small business (SMEs). The following risks within the Organizational Readiness category have been identified. First of all, the companies have access to Internet; they do not use it (I-EDI) in an effective and efficient method. Second, barriers regarding organizational readiness included lack of new education methods, information and knowledge. Two of the companies interviewed (C1 and C2) believe that Jordanian SMEs have neither the competencies to understand the full potentials of I-EDI, nor do they understand what competencies are required both to start and to use I-EDI.

Furthermore, all the companies interviewed did not believe that cost was an issue in starting I-EDI. Most Jordanian SMEs have little or no competitive stress to use I-EDI, since most suppliers, customers and other competitors do not seem to promote I-EDI. On the other hand, from the informal comments gathered and from the interviews it seems that there is a lack of knowledge of the benefits and barriers of I-EDI adoption to both companies and trading partners. Therefore, it is very important to talk about the need for plans and strategies to capitalise on benefits, applications and advantages of I-EDI both for individual companies and people generally.

At the same time, the barriers within the Environmental category were as follows: Companies 3,4,5 and 6 all experienced what the Information Technology Consultants and the Internet Providers (IP) could not explain, in simple terms, to

Jordanian SMEs, what I-EDI can be used for (Perceived Benefits). So, the main environmental barrier is poor communication between the information systems consultants and SMEs in Jordanian market. In addition, company five (C5) explicitly stated that even though they had been using the internet from the outset, they were unable to use it (Internet) for data and information exchange between their clients' companies and business because their clients, suppliers and all trading partners (locally) did not use it. They added that they have been using I-EDI effectively only within the last year. The same opinion was also stated by C4.

It is, however, important to note that most respondents in the interviews want to use the Internet more in the future to search for information on products and services. Also, most of them are using e-mail for communicating with some suppliers, clients and trading partners. So, this would increase the knowledge of the benefits of the Internet and I-EDI and thus may overcome some of the barriers to I-EDI adoption in the near future.

5.2.4 Cultural Factors

Cultural factors refer to the idea that a group of people will feel, think, and react similarly in a given context. Culture has been defined as the shared values of a particular group of people and as the collective programming of the mind that distinguishes the members of one group or category of people from another (Hofstede, 1991).

As additional information comes from interviews, research suggests that Jordanian cultural factors do indeed influence adoption decisions, but that culture seemed to have differential effects on adoption decisions regarding the I-EDI system, depending on the interviewee's industry type affiliation (ICT companies,

shipping, pharmaceutical, textiles printing, packaging, engineering, supply and food, construction, furniture, chemical, agriculture, legal services and educational sectors). However, within the sectors such as ICT, and pharmaceutical, textiles, chemical industries as well as the educational sector, there has been little movement by the government, industry associations and/or top management in making crucial decisions affecting I-EDI adoption decisions. Many of the managers interviewed, especially in MIS departments, saw the benefits of I-EDI systems and knew that in order for their company to survive they would need to make some decisions. However, they felt that they were not in a position to make the right decisions. C2 and C3 asserted that the decision of whether or not to adopt I-EDI depends on the owner of the company. So, because of the realities of competitive pressures, many companies interviewed feel that they are unable to take the risk of not automating their process (I-EDI). Companies interviewed in the textile industry (Jordanian SME sector) also discussed the uncertainty associated with doing business electronically (I-EDI), rather than face to face. Managers believe that by interacting with suppliers directly they have access to more information.

One interviewee stated:

“So far we do not adopt or use I-EDI system because in Jordan personal relationships or contact is very important in doing business between two or more companies (Trading Partners)”.

Another interviewee said,

“Doing business and contact other firms directly will reduce the risk associated with doing business without the influence of the government and industry policies”.

However, I-EDI systems between companies (SMEs) was something that Jordan's government, its industry, and the individual Jordanian companies (SMEs) were committed to from the top management on down. In addition, some managers interviewed expressed the hope that I-EDI would enable them to improve their personal skills and have direct relationships with the suppliers and other companies in the market (locally and globally). However, others still worried that electronic interactions (I-EDI) across and between companies reduces the amount of friendships that were so important in business in Jordan. Thus, some respondents from the SME companies interviewed (C1, C6) expressed concern for their employees and their business partners (suppliers) as they contemplated the move to I-EDI system adoption. Moreover, others felt that the adoption of an I-EDI system would enable them to play a different role in the future of the SME sector in Jordan. As mentioned earlier, some of the decision makers felt that adopting I-EDI systems allows better personal relationships because administrative issues would have been automated by the new system. In research interviews with SME managers (Jordanian SME), there was a sense of awareness about the I-EDI system, because it was believed that they would not support high context relationships. So, they felt that the adoption of new technology such as the I-EDI system and automating their processes may not be effective since they will be unable to rely on the personal relationships that have been nurtured over a period of years.

Indeed, there was a common agreement among the interviewees (Jordanian SME managers) that the context of relationships was important, but there were different outcomes with regard to adoption decisions across different Jordanian industries.

5.2.5 Governmental Policies Factors

Governmental factors and national policies for training and maintaining an adequate workforce may induce new IS and IT technologies adoption such as I-EDI, B2B, SCM. So, the adoption of I-EDI required deep changes in government regulations, business structuring, and human experience.

Governmental policies and incentives are influential in encouraging or discouraging Jordanian SMEs to adopt and implement the I-EDI system in Jordanian sectors. In contrast to the US government, the Jordanian government has been heavily involved in encouraging I-EDI between trading partners in some industries. The majority of the SMEs interviewed agreed that the Jordanian government and public administration could play the role of catalyst to increase the adoption and diffusion of the I-EDI system among Jordanian SMEs. This could be achieved, for example, by starting to use the Internet regularly for their operations both within the individual citizen and the small and medium enterprises (SMEs). In addition, managers from the companies interviewed did feel that the government incentives and plans influenced their decision to use and adopt the I-EDI system. For example, one individual said, "The government's program (Electronic Government) has been very useful to moving our company forward".

Another emphasized, "Money help".

However, some of companies interviewed felt that the lack of a formal plan and policies by the government has hindered their move to I-EDI systems despite monetary incentives such as tax deductions.

Further, in one of the interviews, a question was asked to measure whether ensuring security would aid in the adoption of I-EDI. Most of the interview respondents agreed that it would probably improve their decision to adopt or not adopt I-EDI.

Nevertheless, the companies interviewed emphasized that the Jordanian government can contribute to the adoption and diffusion of I-EDI between trading partners through Education and State Support Programs (ESSP). These programs have to be carefully targeted in order to have a positive effect. Table (5.1) shows the summaries of the interview findings. Concerning the Perceived Benefits, there was unanimous agreement regarding operational benefits, particularly in terms of time savings, as things go much faster with the Internet (I-EDI). The table also shows summaries of adoption triggers, barriers of I-EDI adoption, Organizational factors, Cultural factors and Governmental factors.

Table (5.1) Summaries of Interview Findings

Interviews points	Factors	C1	C2	C3	C4	C5	C6
<u>Adoption Benefits (perceived benefits)</u>	Time savings	Agree that Time saving is the main benefit of EDI adoption	Agree that Time saving is the main benefit of EDI adoption	Agree that Time saving is the main benefit of EDI adoption	Agree that Time saving is the main benefit of EDI adoption	Agree that Time saving is the main benefit of EDI adoption	Agree that Time saving is the main benefits of EDI adoption
	Preferred Internal & external integration	The preferred Internet integrated and connected internal system will be more efficient	Preferred separated two systems (internal & external); this will be more efficient	Preferred Internet connected. Internal system will be more efficient	Preferred separated two systems (internal & external); this will be more efficient	Preferred Internet connected within internal system; this will be more efficient	Preferred separated two systems (internal & external. will be more efficient
		Having two connected systems	N/V	Having two connected systems	N/V	Having two connected systems.	N/V
		I-EDI contributing to internationalization	N/V	N/V	I-EDI contributing to internationalization	I-EDI contributing to internationalization	I-EDI contributing to internationalization

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Interviews points	Factors	C1	C2	C3	C4	C5	C6
<u>Triggers and behaviour (Inter-organizational factors)</u>	1- Just-in-time	Its main reason to adopt internet technology between partners	Its main reason to adopt internet technology between partners	Its main reason to adopt internet technology between partners	Its main reason to adopt internet technology between partners	Its reason to adopt internet technology between partners	Its main reason to adopt internet technology between partners
	2- Knowledge	Knowledge about I-EDI still lacking	Adoption of I-EDI completely casual & lacking knowledge	Have adopted internet – JBC (just by chance)	Have adopted internet & I-EDI – JBC (just by chance)	Knowledge about I-EDI still lacking	Knowledge about I-EDI still lacking.
	3-Strategic necessity	N/V	N/V	N/V	N/V	N/V	Adopted I-EDI due to strategic necessity.
	4-Suppliers & IT adoption	Competitive pressures (partners & suppliers) good reason to adopt I-EDI	N/V	IT consultant & Internet providers can't explain to SMEs, what are the perceived benefits of I-EDI adoption	N/V	N/V	Adopted I-EDI due to suppliers had adopted it
	5- Education	Lack of new education methods	N/V	Lack of education methods & organizational readiness	N/V	N/V	N/V

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Interviews points	Factors	C1	C2	C3	C4	C5	C6
	6- Costs	Did not believe that costs were an issue in adopting I-EDI	N/V	N/V	Didn't believe that costs were an issue in adopt I-EDI	N/V	N/V
<u>Barriers and Risks</u>	1-Security reasons	Security as a good reason to adopt or not adopt I-EDI	Security as a good reason to adopt or not adopt I-EDI	Security as a good reason to adopt or not adopt I-EDI	Security as a good reason to adopt or not adopt I-EDI	Security as a good reason to adopt or not adopt I-EDI	N/V
	2 Communication	N/V	N/V	Poor communication between traders and partners with IS-consultants and SMEs leads to different adoption methods	N/V	N/V	N/V
	3-Relationships	Internet connection will reduce the amount of friendships between companies	Interacting with suppliers face-to-face gives greater access and more information	Interacting with suppliers face-to-face creates greater access and more information	Interacting with suppliers face-to-face creates greater access and more information	Internet connect-ion will reduce the amount of friendships between companies	Internet connection will reduce the amount of friendships between companies

I-EDI Adoption by Jordanian SME

Interviews points	Factors	C1	C2	C3	C4	C5	C6
<u>Organizational factors</u>	1- Management support	Top management support is one of the main factors influencing I-EDI adoption	The impact and direction of top management to adopt I-EDI	N/V	The impact of direction by top management to adopt I-EDI	N/V	The impact of direction of top management leads to adopt I-EDI.
	2- Management process and changes	N/V	N/V	Some changes in business process with trading partners & suppliers through the Internet leads to adopting I-EDI	N/V	Restructured the swing operations as consequence of E-commerce will lead to adopting I-EDI	N/V
<u>Cultural factors</u> (Environment)	1- Context & relationship	Context of relationships very important for adoption	N/V	Context of relationships very important for adoption	N/V	Context of relationships very important for adoption	Context & relationships very important for adoption
	2-Culture factors	Culture factors hampered the degree of adoption	N/V	N/V	Culture factors hampered the degree of adoption	N/V	Culture factors very important for adoption

I-EDI Adoption by Jordanian SME

Interviews points	Factors	C1	C2	C3	C4	C5	C6
<u>Governmental factors and policies</u>		The government play the main roles as motivators in adopting or not adopting I-EDI	The Jordanian government can contribute to the adoption of I-EDI through education	The government play the roles as motivators in adopting or not adopting I-EDI	Jordanian government can contribute to adoption I-EDI, through education.	Government play the roles of motivators to adopt or not I-EDI.	Jordanian government can contribute to adoption I-EDI, through education & country support program.

5.3 DISCUSSION OF RESULTS

Information technology (IT) changes have caused the growth of I-EDI technology that provides companies with opportunities to enhance existing business activities.

In this research, some findings, especially regarding benefits and barriers, are similar to those found in studies conducted in different developed (western) countries or different geographical regions (Steele 2000, PermKumar et al 1995, Iacovou et al 1995, Riggins 1999, Thong 1999, and Thong & Yap 1996; (see 5.2.1 and 5.2.3). As has been shown in previous studies in Western Countries (Ramamurthy & Crum 1997, Steele 2000 and Van Akkeren & Gavaye, 1999), organizational and inter-organizational factors do matter in the adoption process (see 5.2.2). This is one of the first studies to examine these factors in Jordanian SMEs. This research analysis showed that 'cost' is not a major factor preventing Jordanian SMEs from adopting I-EDI system.

SMEs are in general willing to make the investment necessary to adopt and implement I-EDI if they understand what the operational and strategic benefits that can be gained out of this expenditure (costs). However, the major problem of the companies interviewed was how to use the Internet in a proper way to improve competitiveness, while putting as little information as possible on the web.

Nevertheless, all the companies interviewed, except (C5), did not consider their Internet business (Internal, External Internet System) to be so huge that it could justify the collection of a human resource specifically aimed at conducting I-EDI systems. On the other hand, it is clear that culture and government pressure are to be considered in the case of Jordanian SMEs. As a matter of fact, the companies that decided to start using I-EDI systems only because of the Jordanian government's support often did not finish the project (I-EDI adoption) when the money ran out; even though they finished it they might not use it in a proper way. So, a new factor was found in this research: the role of the Jordanian government and public administrations policies in the diffusion and adoption of I-EDI between companies in Jordan's market. At the same time, the interviews from managers of the SME sector reflected the idea that cultural factors hampered the degree to which companies have decided to engage in the I-EDI system. Therefore, the diffusion and adoption of I-EDI in the public sector is seen almost as a precondition for I-EDI system adoption among small and medium businesses in Jordan. Moreover, Jordanian SMEs believe that the Jordanian government and especially the public administration policies should take the role of change agent by being early adopters of I-EDI, and by providing information targeted to SMEs about its potential benefits. However, SMEs in Jordan, in fact, prefer to meet in a

face-to-face meeting after the first contact has been established through the Internet. In addition, three of the companies interviewed stated that either they or their client's companies were still afraid of connecting to the Internal and the External Systems, mainly due to security problems.

On the other hand, C3 has experienced some changes in the business process, especially in the way they provided the pictures and images of their products to the client's companies (trading partners). C5 has restructured sewing operations as a consequence of Internet commerce (I-EDI) adoption. Two managers interviewed, C5 & C6 (internet commerce adopters), stated: "After Internet Commerce adoption, it had become cheaper and quicker, and involved fewer people and fewer steps, with a consequent increase in efficiency". Furthermore, I-EDI adoption may be driven among Jordanian SME particularly and all market sectors generally by many factors: (1) switching costs involved in adopting I-EDI, (2) Managers and decisions makers (SME management) commitment to adopting I-EDI (3) Security concerns, (4) Size of the organization (SME, Large), (5) Relationship with existing suppliers, and (6) Market Orientation (Infrastructures and how well the company listens to and addresses the needs of its client's companies, suppliers and all trading partners). In conclusion of these factors, Jordanian companies (SME) that are lagging behind did not have top and/or senior management support or direction. So, unless management sees the I-EDI system adoption as a priority, nothing tangible is likely to happen. Therefore, qualified management, infrastructure and legal issues are the most critical success factors for I-EDI.

Furthermore, the Government should play an important role in increasing investments in the communication infrastructure and organizing the buying and

selling on the Internet by creating rules, which regulate the way of doing business on the Internet, such as electronic signature, electronic contract and privacy.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 BACKGROUND AND PURPOSE OF STUDY

The adoption of I-EDI is likely to allow developing countries to become more integrated into the world economy. SMEs in developing countries are still facing many challenges in terms of using I-EDI in their businesses. Many of these challenges include the lack of experience to deal with such technology, or the fear of the security provided by I-EDI. In light of this, this research examines the extent of SME adoption of I-EDI in their businesses to become more integrated with the world economy.

As such, the purpose of this research was to examine some of the emerging issues surrounding the adoption, diffusion and use of I-EDI by the Jordanian SME sector. In addition, this research aims at providing a contribution to the understanding the benefits, usage, triggers and barriers in the adoption of I-EDI among SME, specifically those in Jordan.

One research methodology that appeared best suited to the purposes of this research was interviews. Interviews made it possible to collect information about the challenges and the obstacles that face SMEs in Jordan using I-EDI in their businesses. A list of SMEs in Jordan was prepared and six representative SMEs were selected to run this research. The interviews were divided into several categories. These categories included: the benefits of adopting I-EDI in SMEs, organization behaviour concerning I-EDI in SMEs in Jordan, barriers and risks,

cultural factors that affect the adoption of I-EDI, and the governmental factors and policies that affect the adoption of I-EDI in Jordan.

6.1.1 Major Findings in the Literature

An extensive literature review showed that for nearly three decades, I-EDI has been the primary method of conducting online (I-EDI) services allowing companies' computers to perform electronic transactions such as purchasing orders and invoices without human intervention. I-EDI was popular among large companies because it saved money that otherwise would be spent on processing paper and re-keying data. Moreover, trading partners can retain existing I-EDI connections, find cheaper ways to send EDI messages and use the web to reach out to new partners. So, the main purpose of the I-EDI was to avoid and prevent additional human intervention of reading and processing information between trading partners by establishing a Standard Data Transmission Protocol. I-EDI has been used to transmit documents electronically including invoices, purchase orders, receipts, shipping documents, and other standard business correspondence between organization and business partners. I-EDI has also been used to transmit financial information and payment in electronic forms. These are usually referred to as Electronic Funds Transfer (EFT). With the advent and growth of the Internet, the functions of the I-EDI have become more and more significant nowadays, especially with the growth of Electronic Commerce worldwide. Therefore, it is very important to understand how I-EDI works, what the characteristics of I-EDI are and how I-EDI improves the traditional way of exchanging information between trading partners, so that productivity and efficiency can be increased.

The literature showed that Jordan, as a developing country, has achieved forward steps in introducing the Internet to the different sectors of life. The adoption of the electronic tools in business became governmental targets in the last year to make it possible for SMEs to be able to continue to achieve success in their business.

The thesis aimed to provide a model that predicts SME adoption of I-EDI by explaining intentions to adopt I-EDI technology for SME business and transactions.

In addition, this thesis has tested a justified model, partly based on the Iacovou and Dexter (1995) study and Hofstede's (1996) work, of the factors influencing the adoption of I-EDI by SMEs.

6.1.2 Overall Findings

EDI was and is expensive and beyond the reach of smaller companies. Internet based procurement and web-based EDI (I-EDI) require less investment. The Internet, with its open architecture, does not tie a firm to a specific supplier. I-EDI offers the opportunity for global sourcing. There is a vast potential for improving operational efficiency, transaction and administrative cost saving, and overall better business performance.

In general, it was found that small firms can successfully adopt I-EDI technology into the processes of their firms to scan for partner and clients. Success is not obtained without effort, planning, or an understanding of I-EDI technology. And most importantly, adoption of I-EDI is a long-term commitment and may not show immediate bottom-line impacts.

Furthermore, in order to foster international business and favor the globalization of Jordanian small business, it is important not only to foster the adoption of I-EDI, but also to increase their knowledge of the English language.

The major finding reached by this study can be summarized as follows:

- 1- If the company has a strong relationship with suppliers, that seems to inhibit adopting new technology methods such as the I-EDI system.
- 2- Companies that are responsive to client companies (trading partners) are perhaps working backwards to improve their business processes. Such improvement can lower costs, improve efficiency and even enable just-in-time contact with clients.
- 3- Cost was a major barrier to I-EDI adoption.
- 4- I-EDI adoption is strongly affected by management and management support.
- 5- SMEs in the service sector (Jordanian sample) show a greater inclination towards I-EDI adoption than SMEs in the manufacturing sector.

Attitudes towards I-EDI system adoption consist of several dimensions. These are all key considerations in I-EDI adoption, and include: benefits, risks and barriers, financial and technical considerations, culture and environment, security, competition and governmental issues.

Overall, the thesis found support for examining the adoption of inter-organizational systems using factors addressing three levels. At the first level of technology, the perceived benefits captured the anticipated benefits of I-EDI

adoption. The level of organization and IT sophistication affected the SME's ability to adopt I-EDI. At the inter-organizational level, competitive pressure enacted trading partner power; readiness and cultural factors also influenced adoption of I-EDI.

The thesis empirically validated the model in that it found strong support for the factors leading to the intention to adopt I-EDI by Jordanian SMEs. These results support the findings of previous research differentiating adopters from non-adopters, particularly Premkumar et al., (1995).

6.2 LIMITATIONS AND CONTRIBUTION

Several variables such as internet experiences, expertise, and cultural factor attributes could enrich our understanding of I-EDI adoption by Jordanian SMEs.

The results and implications of this research are constrained by the research method employed and the small sample size. Though the results generally support the proposed theoretical framework, it is also possible that a different sequence of relationships is present. Therefore, longitudinal research could further enhance or refute these empirical findings.

The research does provide an adequate sample size, drawn from a wide variety of industries and covering some regions of Jordan, to afford reasonable generalisability. This research is a snap shot of the status of I-EDI in Jordan. It also does not provide any indication of trends, even though the interview contains some questions regarding future plans. So, the limitation faced by this research is the small number of interviewed companies. Another limitation was the lack of

knowledge of some of these SMEs had about the applications of I-EDI in business, which made the contact with these foundations difficult to some extent.

On the other hand, the primary contribution of this thesis is the integration of important variables associated with external factors (Cultural and Governmental factors) with the two basic I-EDI model factors (Perceived benefits and Inter-organizational factors).

The proposed model of SME adoption of I-EDI has received substantial empirical support, engendering several new findings regarding the importance of certain variables in I-EDI adoption.

6.3 CONCLUSION

This research has discussed a number of issues that should be central to the development of national and regional Arabic Internet and Information Technologies applications (I-EDI), especially with Jordanian SMEs. The results of the analysis of collected data sources sufficiently proved that there is a difference in traditional EDI and I-EDI. This research identifies I-EDI as an alternative to traditional EDI. Collected data also showed a strong trend of businesses wanting to move towards to adopt I-EDI. Furthermore, consistent with previous research on I-EDI adoption, the results from this research's interviews with general managers and MIS managers of Jordanian companies (SME) have concluded that:

1- Organizational, Inter-Organizational, Technical and governmental forces exert powerful direct effects on the decision to adopt I-EDI adoption decisions in an indirect manner. In 'stronger' economies like United States, UK, Canada and Australia, I-EDI is rapidly developing into the SME sector. Less

developed and developing countries are sorely lagging in their I-EDI development. Much needs to be done to correct this situation for many developing countries such as Jordan. For them, SME lack of interest in the I-EDI and its relevance in regards to everyday activities is often cited as a reason for the minimal activity taking place on the emerging markets Internet sites.

2- SMEs in less advanced countries such as Jordan will have stronger Governmental and cultural influences in I-EDI adoption decisions than SMEs in more advanced countries. However, C6, C5 and C3 asserted that in order to set Jordan on the right course to develop an I-EDI system, the government, public and private sectors' representatives are now preparing to wage a public information and awareness campaign to show the general public that I-EDI systems are of great benefits: time and cost savings, less paper work, increased effectiveness, streamline processes, less order process time, less transaction time and costs, empowerment of middle managers, clients (companies) services and more time for strategic initiatives.

3- Public authorities and the public administrations in Jordan can contribute to the diffusion of I-EDI systems by functioning as change agents. This can be done by adopting I-EDI first and by slowly educating the citizens and Jordanian SMEs to use I-EDI through informational and educational campaigns by requiring and encouraging them to use I-EDI for information exchange purposes with the other private and public administrations.

4- Government policies to support I-EDI among the SME sector needs to take into account organizational, technical and cultural factors when making decisions.

5- This study (particularly the interview responses) shows that the government of Jordan's policies and plans to launch E-government services will have positive impact on IT and I-EDI system adoption from Jordanian SMEs.

6- The government of Jordan plays a crucial role in the economy. The private sector (SME) must take the lead in the development of IT applications such as I-EDI and business practices.

7- Electronic Government (EG) can assist Jordanian (SME) businesses by eliminating unnecessary paperwork and thus reducing operating costs when doing business with government agencies. The government can also use the Internet to post information online and offer services to the general public and private companies (SME).

8- The study asserted that the introduction of traditional EDI and advanced I-EDI benefit activities (e-government) and applications will play a direct role in improving Jordan's economic performance. C6 said:

“One of the main core development objectives of Jordanian governments is; stimulate the introduction of IT applications such as I-EDI, between all trading partners, by embracing Internet in all transaction with private sector and SME”.

9- The study shows that the cost of I-EDI adoption by Jordanian SMEs is not a critical factor.

10- The adoption of technology, such as I-EDI, will improve accuracy. I-EDI reduces errors resulting from repetitive and manual data input.

11- Adoption of I-EDI enables Jordanian SMEs to better manage, respond faster and increase the speed of their information processing.

12- Jordanian SMEs asserted that the adoption of I-EDI would lead to pro-activeness towards competitive advantage, and expand and formalize relations between Trading Partners (TP).

13- There is an impact on decision-making (top management) and support systems, which I-EDI provides, particularly the ability for comprehensive MIS for utilization by the support activities to assist in greater control and efficiency in decision-making processes.

The researcher found that many SME managers felt that participating in this study's questions about the future of I-EDI adoption and diffusion by Jordanian SMEs would give away valuable business knowledge. In addition, many of them view their knowledge as a competitive advantage in itself. However, I-EDI has not grown or been adopted as quickly as was forecast among Jordanian SMEs. Furthermore, they encourage SMEs to introduce technologies permitting them to pay and get paid online and to enter Internet based credit and performance risk databases.

6.4 RECOMMENDATIONS

It is important to note that this was just one study, limited in scope, time and resources. However, the researcher makes the following recommendations.

(1). Organizational, Inter-organizational, Government, Technical and National Culture are all important factors in I-EDI adoption decisions by Jordanian SMEs.

(2). Companies, particularly SMEs in developing countries (Jordan), will have stronger governmental and cultural influences in I-EDI adoption and diffusion than companies (SMEs) in developed/advanced countries.

(3). Jordanian large companies and government administrations that made a heavy investment in ICT and systems may increase their market share by adding Jordanian SMEs as trading partners through the use of I-EDI.

(4). This research provides the target audience with multiple sources of information from which to base decisions about the adoption and diffusion of I-EDI by Jordanian SMEs.

(5). The international community, especially in developed countries, could play a supportive role in efforts to develop and implement national strategies to adopt, use and diffuse I-EDI application by Jordanian SMEs.

(6). There is a need to do comparative work looking at the role of culture and government in I-EDI adoption and diffusion decisions in other countries (developed countries).

(7). The Jordanian market, especially the SME sector, needs more research into the interaction of industry, culture and government factors influencing I-EDI adoption and diffusion decisions.

(8). Most Jordanian companies, particularly the SME sector, are grappling with issues ranging from lack of management or direction to security, cost and technical issues.

(9). Further research is necessary to better understand the status of Internet adoption and diffusion among SMEs in Jordan, and efforts of their performance and efficiency. Furthermore, it could be interesting to replicate the research in one

or more different developing countries-middle east region, e.g. in Gulf area, Egypt, in order to compare the results.

6.5 FUTURE RESEARCH

The topic of I-EDI system adoption is very wide and the area, especially in Jordan (developing countries), is just in its beginning of exploration. This research tries to provide some insight into the benefits, drivers, triggers, barriers and factors influencing I-EDI adoption in SMEs in Jordan.

SMEs in Jordan could grow and become larger companies, supporting the national economy. Thus, it is very important to develop and grow Jordanian SMEs by doing more research.

Any future research examining I-EDI adoption in SMEs in Jordan needs to take a' wider approach, through survey techniques. Such research should examine facets such as E-commerce, I-EDI and B2B approaches and should focus on potential uses of these in enhancing performance, efficiency, market share, etc. The new research can benefit the findings of this research to build a questionnaire to survey a large number of SMEs in Jordan from a variety of sectors.

It can be seen, from this research, that a lot of questions still need to be investigated and answered such as; what are the impact of I-EDI, B2B and EC adoption on SME performance and efficiency.

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APPENDIX:

A: GLOSSARY: DEFINITION OF TERMS

ADSL: Asynchronous Digital Subscriber Line.

ANSI: American National Standards Institute.

ASC: Accredited Standards Committee.

B2B: Business-To-Business.

B2C: Business-To-Customer.

BRI: Basic Rate Interface (ISDN).

CAB: Cyber Assisted Business.

CCA: Chicago Clearing House Association.

DISA: Data Interchange Standards Association.

DSD: Direct Store Delivery.

EC: Electronic Commerce.

EDI: Electronic Data Interchange.

EFT: Electronic Funds Transfer.

FSN: Ford Supplier Network.

G2B: Government-To-Business.

G2C: Government-To-Customer.

G2G: Government-To-Government.

ICT: Information & Communication Technology.

I-EDI: Internet-Electronic Data Interchange.

IETF: Internet Engineering Task Force.

INT@J (ITAJ): Information Technology Association of Jordan.

IP: Internet protocol.

I-EDI Adoption by Jordanian SME

IS: Information System.

ISP: Internet Services Provider.

IT: Information Technology.

I-VAN: Internet Value Added Network.

IVAS: Internet Value Added Servers.

JETL: Jordan's Electronic Transaction Law.

JCS: Jordan Computer Society.

JICA: Japan International Cooperation Agency.

JIN: Just In Time.

JITCC: Jordan Information Technology Community Center.

JT: Jordan Telecom.

JTC: Jordan Telecommunication Company.

JUST: Jordan University for Science and Technology.

HML: Hypertext Markup Language.

LAN: Local Area Network.

MAC: Message Authentication Code.

NAFES: National Fund for Enterprises Support.

NIC: National Information Center (Jordan).

NIS: National Information System (Jordan).

NTU: Network Terminal Unit.

PC: Personal Computer.

PRI: Primary Rate Interface (ISDN).

RSS: Royal Scientific Society (Jordan).

SCM: Supply Chain Management.

SME: Small & Medium Enterprise.

I-EDI Adoption by Jordanian SME

TCP: Transmission Control Protocol.

TNS: Toyota Network System.

TP: Trading Partner.

TRC: Telecommunications Regulatory Commission.

UN/EDIFACT: United Nations Electronic Data Interchange for Administration, Commerce and Transport.

UN/JEDI: United Nations Joint Electronic Data Interchange.

VAN: Value Added Network.

VPS: Virtual Private Server.

XML: Extensible Markup Language.

X12: Standards of EDI (Accredited Standards Association ASC, 1979).

WAP: Wireless Application Protocol.

WAN: Wide Area Network.

B: INTERVIEW QUESTIONS AND POINTS

Notes:

The interview was concerned with Internet-based Electronic Data Interchange e-Commerce systems.

Even if organization have not yet adopted any I-EDI technologies initiatives in businesses, research would still like to know your opinions.

For the purpose of this interview, the terms *EDI*, *E-commerce* and *B2B* are defined as follows:

Electronic Data Interchange (EDI): a way of passing structured documents, such as purchase orders, forecast data and invoices, from one company to another. Internet-EDI; a way of passing structured documents, such as purchase orders, forecast data and invoices, from one company to another electronically, using internet web-based services and structured standards.

Electronic Commerce (EC): conducting or enabling all departments (purchasing, marketing, financing inventory and selling goods or /and services) through electronic networks.

Business-to-Business (B2B): the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks (Zwass, 2000).

All responses have been anonymous and strictly confidential. No individual or organization will be identified in the interview's result.

Scale for Yes and No Questions: **Yes-2** **No-1**

Scale for other Questions: 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree

Q1: Does your organization?

- 1- Have a corporate web site?
- 2- Have corporate intranet for employees to access vendor or supplier's information?
- 3- Have an extranet connecting with your suppliers?
- 4- Use Electronic Funds Transfer (EFT) or other electronic payments?

5- Have access to electronic catalogues of major suppliers?

6- Conduct online negotiations with your suppliers through the Internet?

Q2: Does your organization use the internet for; purchasing products, making payments online, identifying potential vendors, posting requests and identify products /suppliers?

Q3: Does your organization use Electronic Data Interchange (EDI) and/or use Web-enabled EDI?

Q4: Does your organization use EDI through a private network, or through the Internet? *(If used through private networks, do you plan to migrate to an internet-based EDI? And why do you prefer EDI through a private network or VAN to the Internet)?*

Q5: Do you believe your organization is taking full advantages of I-EDI and/or B2B E-commerce adoption?

Q6: Are you satisfied with how your organization is currently using I-EDI E-commerce? (If you are dissatisfied, explain why).

Q7: What issues in the Business-to-Business (I-EDI) E-commerce area are of concern to your organization?

Q8: What do you see as the major benefits of E-commerce (I-EDI) systems to your organization?

Q9: How would you rate the *dynamism of the business environment* in which you operate including Environmental factors; Technological, competition, culture, supplier's preferences and regulation-governmental institutions forces?

Q10: Does your organization have long –term relationships with the majority of its suppliers?

Q11: Is your organization dependent on your suppliers?

Q12: Does your organization trust your suppliers?

Q13: For how many years has your organization been using I-EDI systems?

Q14: What are the benefits and problems encountered by Jordanian SMEs in the adoption and diffusion of I-EDI e-commerce? And, how do they use it?

Q15: Which Organizational, Inter-organizational, Technological, Governmental and Cultural factors influence the decision to adopt I-EDI e-commerce systems in Jordanian SMEs (companies)?

Q16: Yes and No Questions

- 1- In your organization, have I-EDI systems been made a top priority by senior management?
- 2- Are E-commerce new technologies (I-EDI) are crucial for maintaining competitiveness in your industry?
- 3- Are your main competitors utilizing internet-based applications?
- 4- Is lowering costs an important reason for adopting I-EDI systems?
- 5- Have security concerns delayed, or are they delaying your adoption of E-commerce new technologies (I-EDI)?
- 6- Are the legacy systems you have constraining your ability to adopt the new internet-based technologies?
- 7- Is the cost of setting up an Internet-based procurement system is too high for your organization?
- 8- For your organization, is lack of skilled people a barrier to adopting I-EDI E-commerce systems?
- 9- Is the Internet making information management easier?
- 10- Do most departments in your organization require internal change or process re-engineering to make effective use of E-commerce (I-EDI) systems?
- 11- Does the Internet allow for information sharing across the supply chain?
- 12- Do the Internet and E-commerce systems (I-EDI) have (or will) required (require) new procedures?
- 13- Do you have to ensure that your systems are compatible with that of your suppliers?
- 14- Will the Internet- EDI reduce dependence on any one supplier?
- 15- For your organization, does the Internet-based (I-EDI systems) reduce the number of suppliers?
- 16- Will (I-EDI) E-commerce increase your global sourcing?
- 17- Are important decisions, such as the adoption of new technologies often made top-down?

Organization Does Not Use Any Type of I-EDI (E-Commerce):

Q17: Do you change any of your internal procedures in order to migrate to an Internet-Based system?

Q18: Do you adopt Electronic Commerce in small steps?

Q19: Are technology people (IT or MIS) in your organization supported the adoption of I-EDI and B2B E-commerce?