

E-commerce and Its Implementation in Iran

Ahmad Farahi (Ph.D.) and Mehdi Yoosefkhani (M.Sc.) *

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Abstract:

This paper deals with the specification of the requirements, advantages, and obstacles of e-commerce as well as approaches of its implementation. The results showed that billions of dollars have been invested on traditional EDI systems with UNEDIFACT and ANSIX12 standards for a couple of decades. This approach of implementation is highly complex, costly and suitable for large companies. However, EDI has also been employed by small and medium companies in different ways of which the four major have been dealt with in this study.

JEL classification: F00

Keywords: e-commerce, advantages of e-commerce, electronic transmission of data, EDI, XML



* Assistant professor and associate professor of economics, respectively, Shahid Chamran University of Ahvaz

1. Introduction

The rapid and astonishing growth of information technology and the development of communication networks during the recent years have opened a new horizon to trading enterprise. Development and progress of the technology of production methods and that of processing and transmission of information have brought about the development of information exchange, and increase of efficiency and utility of information exchange. Nowadays, the application of IT in trading has become so necessary that e-commerce is no longer a choice but an unavoidable necessity. Developing countries are fully aware that any negligence with respect to application and development of e-commerce will immediately expel them from the international trade competition, and they will have to abandon their little share and interest to the industrial and developed countries which act in accordance with e-commerce.

The advent and development of e-commerce during the recent decades has facilitated the provision of services and goods supply and finally resulted in an efficient specification of economic resources. This receives a great importance especially in money and capital market regarding financial and credit resources, since any decrease in the exchange expenses in this market leads to subsequent decreases in investment expenses and finally cheaper financial resources which are themselves a stimulus for a huge economic growth at macro levels.

E-commerce has certain requirements without which effective demand would not be produced, and it cannot function properly. These requirements involve establishment of the needed hardware and software foundations, provision of the required economic structures and appropriate implementation approaches.

This paper includes four sections in addition to the introduction. The second section deals briefly with the definition and advantages of e-commerce. The requirements, obstacles and challenges regarding e-commerce are briefly examined in the third section. The implementation of e-commerce is investigated in detail in the fourth section where the traditional EDI and XML

approaches are compared and contrasted. The final section is devoted to the summary and conclusion.

2. Definition and advantages of e-commerce

E-commerce is the exchange of information, goods and services through computer networks and transmitting electronic signals (especially the Internet) between clients and servers. E-commerce involves finding the suppliers, placing and recording orders, paying accounts in cash, draft or by credit cards and delivering goods at the end. Except for the final part (i.e., goods delivery) which is done in physical environment, all these processes are carried out within network connection and non-physical environment. E-commerce has numerous advantages of which we can point to the possibility of developing the target market as a global market with millions of consumers. Such an expansive territory lets the suppliers rely on the increase of demand instead of price for increasing their profits and obtain a high total profit out of low average profit (Dejpassand, 151). In addition to reducing the expenses of exchange, other advantages of e-commerce involve accelerating exchanges, fortifying the competitive influence on the global market, seizing the fleeting export/import opportunities and consequently enhancing export, employment and production.

With the development of e-commerce, the need for using paper reaches its minimum degree. Electronic catalogs which do not need huge amounts of money for printing and advertisement will replace their traditional counterparts. Also, banking and insurance services will be provided via the internet. This will lead to wiping out any trading boundaries, making an easier access to commercial information, enhancing the exchange between the vendor and costumers, minimally wasting time, providing customers with the best options, eliminating time constraints, and making available a round-the-clock access to the desired resources. All these advantages will undoubtedly boost online investment, employment and production. The amount of electronic exchanges in the US, for example, was 700 billion

dollars in the year 1999 and 2800 billion dollars (which is 25 percent of the whole transactions of all American companies) in the year 2003. The share of e-commerce in international trading is getting larger and larger. Estimations suggest that in the year 2003, 10 to 25 percent of the whole international trading which is worth 1300 to 3250 billion dollars have been exchanged electronically across the globe. However, e-commerce is still in its initial stages in Iran and is facing serious obstacles and fundamental and structural challenges while its requirements have not yet been provided.

3. Requirements, obstacles and challenges

With regard to indices such as the number of subscribers of telephone (mobile and non-mobile), housing services, the number of personal computers and internet users, there is a wide gap between Iran and countries such as the US or Malaysia. It is obvious that a significant development of e-commerce cannot be achieved in the short run without providing its requirements and eliminating the obstacles and challenges it is facing.

3.1. Requirements

The requirements include (Aziz Zadeh, 3):

- a) an accurate, fast and straightforward banking which is accessible through the internet and without any physical presence
- b) issuance of credit cards and employing a system of electronic exchange of documents by the banking network
- c) enactment of interior laws compatible with international laws regarding costume duties, taxation and e-banking
- d) establishment of a standard system of commercial coding of products
- e) establishment of informative systems and definition of abstract possession
- f) providing security of information
- g) defining personal rights with regard to privacy of personal information

h) development of general communication and software engineering in terms of the knowledge needed for supporting e-commerce

i) establishment of fast and secure communication lines with a competitive tariff to reduce the costs of telecommunication services and electronic communication

j) existence of a legal ground for the execution of e-commerce

k) legal system's acceptance of electronic documents as valid as paper documents

l) introducing digital signature issuance authorities in Thailand and confirming the identity of the purchaser and the vendor by these authorities

3.2. Obstacles and challenges

The obstacles and challenges include (Special Informative Commission of Economics, Commerce and E-commerce, 11):

a) legal grounds such as rebutting electronic documents and signatures popular in e-commencing but absent in the current laws of the country

b) absence of a system of electronic exchange of money and credit cards

c) limitation of communication lines and their low speed of transmitting electronic data

d) absence of a principal e-commerce network and its related hardware-software facilities in the country

e) the awareness and understanding of the large and small companies regarding e-commerce and its advantages

f) the relatively high initial cost of using e-commerce in governmental and private companies, especially for small institutions and their lack of appropriate incentives to use this method of trading

g) insufficient knowledge and competence of exploiting e-commerce and the internet

h) ignoring the rights of the consumers in an e-commerce setting

- i) customs tariffs and taxes receivable by e-commerce
- j) proper security for electronic exchanges and information privacy

4. Implementation of e-commerce

Having been briefly acquainted with the advantages, requirements and obstacles of e-commerce, you will now with be acquainted one of the different aspects of e-commerce, namely its implementation. The principal presumption of e-commerce is the quick, cheap and easy access to information. The role of e-commerce regarding business issues is to cover the exchanges between companies and the trading issues within organizations. The framework of e-commerce in this respect includes three levels:

- (i) Substructures including hardware, software and databases as well as communication bases
- (ii) Services which provide the possibility of sending and receiving orders and a broad domain of services which are capable of finding and presenting commercial information and which involve searching for trading partners, as well as negotiation and agreement in terms of commercial exchanges
- (iii) Products and e-commerce structures: at each one of its levels, e-commerce needs different protocols in order to be implemented. This section focuses on comparing EDI and XML with the purpose of implementation of e-commerce.

4.1. Advantages of EDI

Advantages of EDI cannot be construed unless EDI users carry out their entire data exchange by it and remove any paper or handwritten forms from their business. In fact, the inverted traditional rule of 80/20 is relevant. That is, the remaining 20 percent of the trading partners of a company not employing EDI system equals the 80 percent of the total profit from using EDI.

The traditional method of implementing EDI systems has not enjoyed an all-embracing popularity due to its problems.

Therefore, the full advantages of the implementation of EDI would not be available relying on this method (Goldfarb, 2000).

Many solutions have been put forward to modify the drawbacks of traditional EDI and to facilitate its all-embracing implementation. Some of these solutions have only dealt with the simplification of these standards. Some have completely abandoned the traditional method and proposed an entirely new method. Still, some others have attempted modifying the traditional method by means of new technologies.

One of the aforementioned solutions which aims at the simplification of the traditional method of implementing EDI is to create a set of simplified orders of EDIFACT standards. This set has been published as SIMPL-EDI. Generally, by simplifying the orders of EDIFACT standards, SIMPL-EDI is claimed to create orders by virtue of 20 percent of its elements and 80 percent the needs of trading information exchange will be met.

This paper aims to introduce and investigate these methods and then to implement a sample application of a two-way EDI relationship between two trading partners using purchase orders, purchase order responses from SIMPL-EDI.

4.2. The defects of the traditional EDI

The electronic exchange of data in a way explained earlier is called traditional EDI. It has a history over 30 years but due to its defects its growth has been limited, and it has not enjoyed a public popularity. In the following sections, we will examine its most outstanding defects.

4.2.1. Constant transactions set

EDI is now based on constant transactions set which are inherently invariable. For example, the users of this constant transaction set do not have the option of adding or deleting new data fields in this set, and they are only allowed to choose the optional parts of constant transactions set. This inflexibility would never comply the increasing needs of companies which require more services, products and improvement of their processes (Hogan, 1998).

4.2.2. Gradual evolution of standards

The standards of EDI have been established by those organizations which are not capable of adapting their standards with the rapidly changing needs of trading environments. The process of defining standard constant transactions set may take many years, and this is not in conformity with the nature of today's trading environments which call for rapid changes and pressing competitions. The slow and gradual process of defining or changing the above standards is due to the fact that these standards are established in a top-down fashion. That is, after a company has issued a request for changes in its structure or for new definition of a new constant transactions set, the Standard Organization will exert the needed changes or provide the new set and then publish them. Therefore, companies by themselves cannot change or create a new set as soon as they feel the need for doing so (Hogan, 1998).

4.2.3. Regulations of non-standard implementation

Totally designed to meet the needs of commercial and industrial environments, EDIFACT and X12 standards for EDI have many optional parts, and using these parts or in fact precisely specifying the electronic order is dependent on their users. This would create many regulations of implementation along with standards thereby questioning the validity of them, since in this case there will not be a consistent set of orders to be implemented by any company. Therefore, each company, on the basis of its needs and those of its trading partners, will have a distinct interpretation of these standards which is not similar to the interpretation of others. This state is similar to when there was no universal standard for EDI according to which the industries themselves managed to establish standards, and a company having relationships with its trading partners in different industries was obliged to support as many standards as the number of those industries. However, here, instead of supporting different standards, a company has to support different implementation regulations (Bryan, 1998).

4.2.4. The worst case for the small and medium companies

The fixed costs of setting up EDI systems for a company are pretty high, so the profit resulting from EDI should be considerable for the users and compensate for these costs. Due to the great number trading partners and the amount of huge companies' trading, the profit resulting from EDI has overridden the fixed costs of its implementation, so it is economically wise for such companies. However, this is not true with small and medium companies due to their limited trading partners and small amount of trading. That is, in this case, the fixed cost of implementing EDI systems is more than their profit. Therefore, employing these systems is not economic (Hogan, 1998). Aside from these cases, the present approach of implementation of EDI systems is totally disadvantageous for small and medium companies whose financial potentialities are far less than those of large companies. The present approach is such that large companies (so-called 'poles') compile the regulations of implementation for their smaller partners and necessitate them to abide by these regulations for making any exchange with them. Therefore, small and medium companies must provide as many regulations of implementation as the number of poles they have electronic exchange with, and this will double their problems with respect to the implementation of EDI systems.

4.3. Fixed trading regulations

In the traditional approach of implementing EDI, trading regulations are implied in the implementation regulations, and this is contrary to the nature of trading regulations to stay fixed. The trading regulations of a large company may be completely irrelevant for a small company. These regulations are also different across different industries. Even two companies in the same size and belonging to the same industry may employ different trading regulations. These regulations also change over time (Hogan, 1998). The connection of constant transactions set and trading regulations may bring about many problems. For example, if a company changes its policy with respect to accepting the purchase orders that they had already refused to

accept, it will be obliged to manually change the EDI software for each one of its trading partners and not able to exert the necessary changes in general. This course of replacement or upgrading causes a disorder in the overall performance of the systems, since the systems and software of EDI are so interrelated that even slight changes cannot be exerted flawlessly.

4.4. Object-oriented EDI

The open source EDI (OMG, 2000). which is one of the publications of the International Standards Organization is the basis of EDI standards organizations (i.e., X12 & EDIFACT) for the future architectures. This model basically includes guidelines for generating EDI standards, but, in fact, it involves the main concept of Open EDI as well.

In order to benefit from the advantages of object-oriented ness, EDI standards organizations managed to use object-oriented analytic methods in Open EDI approach and this innovative approach was called object-oriented EDI. Object-oriented EDI is in fact considered to be the next generation of traditional EDI standards. Exploiting object-oriented analytic methods and UML (Unified Modeling Language) notations, this approach intends to produce a series of objects model to describe trading processes.

Object-oriented EDI standards are different from traditional EDI standards. To examine the difference between these two, first we deal with the difference between a scenario in Open EDI and in the traditional EDI standards. Most of the traditional EDI standards define those orders that are in fact equivalents of their paper counterparts. These standards have the least amount of information about the parties exchanging these orders or about the trading processes wherein order exchange occurs. Besides, these standards have only one step of order exchange, and they do not contain information of what exchanges would take place before or after the order exchange. In other words, traditional EDI are data-oriented. Furthermore, these standards have been designed with general and multipurpose objectives, and companies have to generate certain implementation regulations

so that these standards are usable and in conformity with their particular processing methods.

Contrary to the traditional EDI standards, Open EDI, by virtue of a concept called 'scenario,' is able to precisely define the parties involved in an exchange and their roles, the data being exchanged, and the trading processes wherein the exchange occurs. These 'Use Cases' are often used to determine the two-way exchanges. For instance, in the purchase orders and responses of X12 and EDIFACT standards, these exchanges exist but are not clearly specified. Such exchanges can be clearly specified using 'Use Cases' and a succession of interactions. This is considered as the most important advantage of Open EDI, and it does not have any equivalent in traditional EDI standards. Finally, by employing 'use Cases', there is no need for implementation regulations, since they completely specify the data to be exchanged. Open EDI scenarios in object-oriented EDI are described objects models in UML notation (OMG, 2000).

Due to the great number of difference between the processing systems of various companies, many UML models will emerge, and it is exactly similar to the traditional standards with many implementation regulations. However, changing UML models to a format which can be processed by a machine in the former case is far easier than changing implementation regulations in the latter (OMG, 2000). It should be born in mind that the exchange of commercial data by using this approach is not based on file transmission as in the traditional approaches to EDI. Rather, data exchange is carried out by establishing relationships between the objects in the distributed environment. In this approach, we use the technology of the distributed objects in order to establish a connection between the object available in the objects models which are defined by UML. There are different technologies for the establishment of connections among objects in the distributed environments. The two most important of such technologies are CORBA and DCOM which act as an interface and serve as a medium connecting the objects in the distributed environment of the object-oriented EDI.

4.5. Business System Interoperation (BSI)

BSI is a simple and automatic way of making a connection between financial systems. It is similar to traditional EDI in that both are file-based. However, features such as not using standard orders for data exchange, exchanging the descriptions of data as well as data itself make SBI different from traditional EDI.

BSI is based on the belief that any exchange between computers should be as convenient as exchanging papers. In the exchange of commercial paper forms, companies do not negotiate over the format and the contents of the form. Rather, they prepare a form of the required data and add titles and explanations so that they could finally adequately interpret the data in the destination. By the same token, BSI intends to adopt a similar approach to the implementation of electronic exchange of data. That is, instead of using the standard format, we should complement the explanations of the data to them, or in other words, we should exchange the data while their metadata describing them.

In BSI, a program extracts the needed data from the applied systems. Using the profile of the transmitter, the BSI server converts the extracted data into a hierarchical format similar to the standards of X12 and EDIFACT, and if the remote receiver has not already the profile of the transmitter, it will supplement the data with their descriptions and then send the combination to the desired destination using a connecting software. The server of the receiver BSI extracts the data out of the received orders and converts them into a format compatible with the applied systems, using the descriptions of the transmitted data that had been already received or supplemented with the data.

4.6. XML/EDI

Any approach that has been investigated so far has attempted to eliminate, in one way or another, the defects of EDI and change it to an approach to be implemented in small and medium companies. However, the needs of today's e-commerce and those of its expected future are well beyond these scales. In the prospect of e-commerce, not only small and medium companies but even individuals can transact goods and services with the

least expenditures. For example, e-commerce is not to be used only by means of computers since there are a great many of people who do not have access to computers. Thus, the only methods and facilities to be sought are those that can provide the opportunity of making transactions via mobile phones and devices of this type. An approach that claims having a comprehensive solution for eliminating the problems of traditional EDI and also meeting the future needs of electronic transactions must provide a comprehensive framework for the participation of companies and individuals in the course of e-commerce.

Having been considered by many people as the next generation language of the web and being expected to replace HTML, XML has been largely proposed as a proper candidate to be used in electronic transactions since its advent. The predicted capabilities of this language and its accessories (e.g., XSL (eXtensible Stylesheet Language), XLINK (XML Linking Language), etc.) have been created to facilitate the process of data exchange between computers generally and commercial data exchange in e-commerce in particular. So far, many languages have been devised by XML for data exchange, the most important of which are CXML (Commerce XML), CBL (Common Business Language), XCBL (Extended Common Business Language) and ebXML (Electronic Business XML). These languages have attempted to emulate XML with respect to electronic exchange of commercial data, yet none has the framework and performance of XML. The approach of using XML for doing EDI is called XEDI which tries to use XML and its complementary components (e.g., XSL, XLINK, etc.) in order to yield a comprehensive elucidation for e-commerce.

XEDI was first propounded in 1997 after the introduction of XML (Bryan, 1999). This approach does not seek presenting a new standard for doing EDI. Rather, it attempts to employ the existing standards, methods and their integration for presenting a comprehensive framework for e-commerce. This approach is in fact a mixture of the following concepts and technologies:

- (i) XML: a super language for generating new coding languages used in order to code the exchanging data
- (ii) EDI: characterizes the components of the exchanging data according to X12 and EDIFACT standards
- (iii) Templates: describe the structure of the exchanging data
- (iv) Agents: are used for the automatic performance of some of the processing procedures
- (v) XSL: are used for showing the contents of the orders and converting different XML and non-XML formats
- (vi) Global repository: for the maintenance of the shared commercial components

5. Comparison and evaluation

The notable approaches for implementing EDI systems were discussed in the previous sections. In this section, these approaches will be compared and contrasted so that the best one will be chosen. In general the following points can be articulated regarding the proposed approaches for replacing traditional EDI (Copeland, 1997).

BSI and OO-EDI are still idea-like and need a great many investigations to yield EDI systems that are economically implementable.

- XEDI is characterized by the following features:
 - This approach uses XML for generating exchange orders. XML is a language designed by the web consortium (the most authoritative organization for setting the standards of the web) relying on the experience of exchanging data for several years. The purpose of its design is creating a standard and flexible language for exchanging different types of data.
- By means of accessories of XML (e.g., XSL), there have been attempts to standardize different ways of using XML orders such as info extraction and conversion.
- Using data elements of the traditional EDI and preserving the structure of its orders, XEDI makes possible the access to EDI-

based systems though this approach comprehensive and does not need traditional EDI.

According to the above-mentioned points, XEDI is the main rival for the traditional EDI. Thus, in this section, we will compare these two approaches based on the EDI evaluation criteria. The evaluation criteria used here are chosen according to the experiences and familiarities gained from the section dealing with the investigation of different approaches of implementing EDI systems, and the justifications are based on implementation experiences. The results are depicted in Table 1.



Table 1: Comparing EDI with the traditional EDI

Methods		Traditional EDI	XEDI
Benchmark factors			
1	Able to process content	+	+++
2	Backward compatibility	+++	++
3	Ease of deployment	++	+++
4	Low cost of adding a new trading partner	+	++
5	Ease of maintenance and change distribution	+	+++
6	Global reachability	+	+++
7	Handling multiple trading partners (scalability)	+	+++
8	High volume transaction environment support	+++	++
9	Low transaction costs	+	+++
10	Low cost of implementation	+	+++
11	Strong datatyping	+++	++
12	Universal availability of software tools	+	+++
Final Score		++	+++

Key: +=Not capable , ++=Average , +++=Excellent

The definition of the above criteria and the justification of the scores given to each are briefly indicated here:

1. The capability of the contents of the employed orders in terms of processing and intelligently searching for information: Due to its use of XML wherein the data are supplemented with the metadata for coding its orders, XEDI receives a good score on this criterion. The orders used in the traditional EDI are as much concise as possible, hence it lacks this capability.

2. The capability of the implemented EDI system based on the intended approach in terms of interacting with (i.e., backing up) the existing EDI systems: The existing EDI

systems are based on the traditional EDI. Thus, it is obvious that the implemented systems based on this approach have the capability of interacting with each other provided that they use the same standards. XEDI approach backs up the existing EDI systems using XML to EDI converters.

3. The use of deployment of an EDI system based on the intended approach (The need for a particular expertise): The implementation of EDI-based systems calls for creating a unique translator software program which needs specialists of the traditional EDI whereas the implementation of XEDI-based systems, due to the standard medium and the simplicity of XML programming, is simple and does not need that much specialty. XML to EDI and EDI to XML converters which are used in this approach are not unique and can be purchased for a low price.

4. The costs and the ease of adding a new trading partner to an existing EDI system: Adding a new trading partner in the traditional EDI systems requires creating a unique set of translator software program, so the cost of doing this is high. This can be accomplished with a relatively lower cost in XEDI, since in this approach the simple and standard medium of XML is used for programming, creating and extracting the orders. Therefore, in XEDI the costs of providing the medium program are not noticeable due to its standard medium. Sometimes, XML to EDI and EDI to XML converters are needed, and this can be taken care of without much effort, since these are available in the market and can be purchased for a low price.

5. The ease of exerting any change to EDI systems: Applying any trivial change to the traditional EDI calls for changing the implementation regularities used for all the trading partners. Besides, more fundamental changes by standards organizations producing orders must be exerted. Thus, this approach is hardly open to any change. However, in XEDI approach, prior to any change, the DTD should be changed, and these are automatically

performed in case of using global repository. Hence, changes are easily applied in this approach.

6. The access of all companies (including large & small) as well as individuals to EDI: This is a very important criterion for evaluating EDI approaches, since as indicated earlier, the full advantages of implementing EDI systems can only be obtained when these systems are employed in an all-embracing fashion. The traditional EDI cannot be employed as such due to the high costs, but XEDI approach is not so because of its low cost of implementation.

7. The capability of being implemented with many trading partners (Scalability): The traditional EDI system requires a series of preliminary agreements between the trading partners and also deployment of a unique translator software program for each trading partner. In other words, for each pair of trading partner a unique clarification is needed in this approach. Therefore, the traditional EDI approach is not scalable. XEDI approach, on the contrary, does not entail these problems and is highly flexible and thus scalable.

8. The capability of supporting high volume interaction environments: The volume of orders in the traditional EDI approach is high due to the orders' being very concise. As a result, this approach receives a high score according to this criterion. The volume of orders in XEDI approach, however, is several times higher than that of the traditional EDI. Consequently, XEDI is less effective than the traditional EDI with respect to this criterion.

9. The expenditures of transactions: The traditional EDI makes use of surplus value networks which work out the expenditures based on the volume of the transacted order. However, XEDI carries out the transaction of orders via the internet which involves very low expenditures.

10. The expenditures of implementation. As indicated earlier, the expenditures of implementing EDI systems are much lower than those of the traditional EDI.

11. The capability of limiting the data of the orders: The traditional EDI is greatly capable of doing this. However, XEDI exploits DDT for limiting the data, and it lacks the needed capabilities of determining the types of data such as digits, date, etc.; therefore, based on this criterion the traditional EDI is more robust.

12. The commercial availability of the implementation tools: Huge software companies such as Microsoft, Netscape, and IBM have considered supporting XML in their products. Therefore, XEDI gets a good score regarding this criterion. The traditional EDI, on the other hand, needs deploying a unique translator software program and thus does not get a good score in this regard.

6. Conclusion

Overall, the following points can be stated with respect to the above-mentioned approaches of replacing the traditional EDI:

- BSI and the traditional EDI are, for the time being, more idea-like and call for a great amount of investigations so that the EDI systems based on which could be commercially implementable.
- XEDI has the following features: this approach uses XML for constituting the transaction orders. XML is designed by the web consortium (the most authoritative organization of the web standards) after several years of data exchange, and it has been aimed to be a standard flexible language for exchanging data of different types.
- Using the accessories of XML (e.g., XSL), it has been attempted to fulfill the various demands of XML orders such as information extraction and conversion in a standard way.

- Using the data element of the traditional EDI and preserving the structure of its orders, XEDI makes it possible to be connected to EDI-based systems albeit this approach is by itself complete and does not need the support of the traditional EDI.

According to these points, XEDI is the main rival of the traditional EDI. Based on the comparison between these two approaches which is depicted in Table 1., XEDI has been chosen to be the superior approach.



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تجارت الکترونیکی و روش اجرای آن در ایران

دکتر احمد فراهی و مهدی یوسفخانی*

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چکیده:

این مقاله به تبیین پیش نیازها، مزایا و موانع تجارت الکترونیکی پرداخته و روش پیاده سازی تجارت الکترونیکی را مورد بررسی قرار داده است. نتایج تحقیق نشان داد که بیش از چند دهه است که میلیاردها دلار در زمینه سیستم‌های EDI سنتی با استانداردهای UN/EDIFACT و ANSIX12 سرمایه گذاری شده است. این روش پیاده سازی بسیار پیچیده، پرهزینه و مخصوص شرکت‌های بزرگ است. با این وجود روش EDI برای شرکت‌های کوچک و متوسط نیز به صورت‌های مختلف به کار رفته است که به طور خلاصه چهار روش اصلی آن در این مقاله بررسی و مقایسه شده است.

طبقه بندی JEL: F00

واژه‌های کلیدی: تجارت الکترونیکی، مزایای تجارت الکترونیکی، مبادله‌ی الکترونیکی داده‌ها، EDI، XML

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