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E-Commerce and E-Technology Contribution in Engineering and Scientific Laboratories Equipments Contracts at Jordanian Universities

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This paper presents the role of E-commerce and E-technology in simplifying operations of preparing quotations and contracts of supporting engineering and scientific laboratories by required equipments and tools at Jordanian universities. The experimental and practical sides of education in scientific colleges in Jordanian universities is very important, so many quotations and contacts are performed and required each year, and E-commerce also offers the required information and specifications to persons responsible to do such contacts by using Business-to-Consumer, Consumer-to-Consumer or Business-to-Business principles. By searching about such equipments using search engines, many companies present their products and their specifications and give you the opportunity to select the suitable devices and tools depending on their specifications and prices. Case studies are discussed for some devices to show how much E-commerce simplifies this operation. It was found that E-commerce and E-technology reduces both time and efforts required to support both engineering and scientific labs with their needs from equipments, catalogs and tools required to such devices.

Keywords: E-commerce, E-technology, laboratories, quotations, contracts

Introduction

Simply E-commerce is buying and selling goods and services over the Internet. E-commerce is part of e-business. E-business is a structure that includes not only those transactions that center on buying and selling goods and services to generate revenue, but also those transactions that support revenue generation. These activities include generating demand for goods and services, offering sales support and customer service, or facilitating communications between business partners. One of the most uses of e-commerce is in preparing quotations for some contracts elements and parts especially for scientific laboratories devices and equipments. E-technology helps in offering all required technical information about the required devices and equipments supported by images, specifications, and diagrams.

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The followings are the business uses of the Internet. These services and capabilities are a core part of a successful e-commerce program. They are either parts of a value chain or are included as supporting activities:

- Buying and selling products and services
- Providing customer service
- Communicating within organizations
- Collaborating with others
- Gathering information (on competitors, and so forth)
- Providing seller support
- Publishing and distributing information
- Providing software update and patches

Traditional commerce is not as E-commerce: In E-commerce there may be no physical store, and in most cases the buyer and seller do not see each other. The web and telecommunications technologies play a major role, in E-commerce. Although the goals and objectives of both ecommerce and traditional commerce are the same—selling products and services to generate profits—they do it quite differently. Traditional commerce presents product information by using magazines, flyers. On the other hand, ecommerce presents by using web sites and online catalogs. Traditional commerce communicates by regular mail, phone yet E-commerce by e-mail.

Traditional commerce checks product availability by phone, fax, and letter. However, E-commerce checks by e-mail, web sites, and internal networks. Traditional commerce generates orders and invoices by printed forms but E-commerce by e-mail, and web sites. Traditional commerce gets product acknowledgments by phone and fax. On the other hand, E-commerce gets by email, web sites, and EDI.

It is important to notice that currently many companies operate with a mix of traditional and E-commerce. Just about all medium and large organizations have some kind of e-commerce presence. The followings are some examples, Toys-R-Us, Wal-Mart Stores, Gold PC, Vatan Computer, Ali-Baba, Edibon, Armfield, and others.

E-Commerce and Value Chain

Typical business organizations (or parts within a business organization) design, produce, market, deliver, and support its product(s)/service(s). Each of these activities adds cost and value to the product/service that is eventually distributed to the customer. The value-chain consists of a series of activities designed to satisfy a business need by adding value (or cost) in each phase of the process. In addition to these primary activities that result in a final product/service, supporting activities in this process also should be included:

- Managing company infrastructure
- Managing human resources
- Obtaining various inputs for each primary activity
- Developing technology to keep the business competitive.

Literature Review

Little papers and studies deal with such issue. Asgarkhani (2005a; 2005b) discussed some of the key aspects of electronic government and E-service. It examines the value and the effectiveness of E-services within the public sector with a focus on four specific facets of effectiveness: the view of management and ICT

strategists; social, cultural, and ethical implications; the implications of lack of access to ICT; and the customers'/citizens' view of the usefulness and success of E-service initiatives. Yasir Saad Al-bayati (2011) clarified the impact of E-commerce on supply chain management and E-marketplace usage in the companies that use B2B (Business-to-Business) E-commerce in Amman city.

The study was conducted on 66 companies that use B2B E-commerce in Amman. 130 questionnaires were distributed on executive and purchasing managers and also other employees related to the purchasing function and E-business. The statistical package for social sciences (SPSS) program was used to analyze and examine the hypotheses using different statistical methods such as path analysis and multiple regressions. After executing the analysis to study hypotheses, it is found the moderate level of perceived benefits of E-commerce application in companies that use B2B E-commerce in Amman. The study also indicates the moderate level of E-marketplace usage as well as supply chain management for those companies. Hoekman, Maskus, and Saggi (2004) analyzed national and international policy options to encourage the international transfer of technology, distinguishing between four major channels of such transfer: trade in products, trade in knowledge, direct foreign investment, and international movement of people. A typology of country types and appropriate policy rules of thumb is developed as a guide to both national policymakers and rulemaking in the WTO. Fayyad (2017) discussed the role of E-commerce and E-technology in preparing the quotations of equipments needed by the Jordanian universities, it was proved that there was a reducing in both time and efforts required to such operations.

E-Commerce Relationship

Business-to-Consumer E-Commerce

In B2C (Business-to-Consumer) E-commerce, businesses sell directly a diverse group of products and services to customers. In addition to pure B2C E-commerce players such as Amazon.com and hepsiburada.com, other traditional businesses have entered the virtual marketplace by establishing comprehensive web sites and virtual store fronts. In these cases, E-commerce supplements the traditional commerce by offering products and services through electronic channels. Wal-Mart Stores and the Gap are examples of companies that are very active in B2C E-commerce. Some of the advantages of these E-commerce sites and companies include availability of physical space (customers can physically visit the store), availability of returns (customers can return a purchased item to the physical store), and availability of customer service in these physical stores. Figure 1 illustrates a B2C relationship. In the figure ISP means Internet service provider.

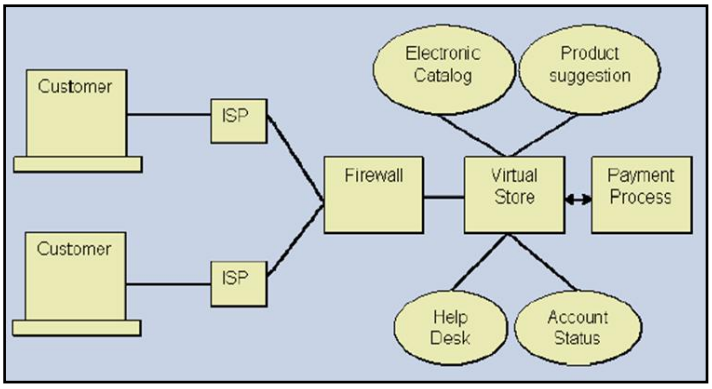

Figure 1. A Business-to-Consumer (B2C) E-commerce relationship.

A Business-to-Consumer E-commerce cycle. There are five major activities involved in conducting B2C E-commerce. The B2B ecommerce model uses a similar cycle, as shown in Figure 2.

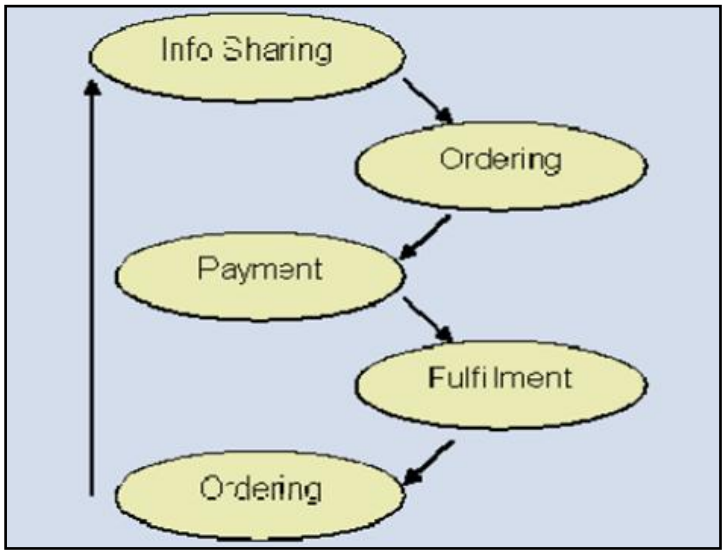

Figure 2. Major activities for B2C E-commerce.

Business-to-Business E-Commerce

Business-to-Business E-commerce holds electronic transactions among and between businesses. The Internet and reliance of all businesses upon other companies for supplies, utilities, and services has enhanced the popularity of B2B E-commerce and made B2B the fastest growing segment within the E-commerce environment. In recent years extranets (more than one intranet) have been effectively used for B2B operations. B2B E-commerce creates dynamic interaction among the business partners; this represents a fundamental shift in how business will be conducted in the 21st century. Figure 3 shows such relation.

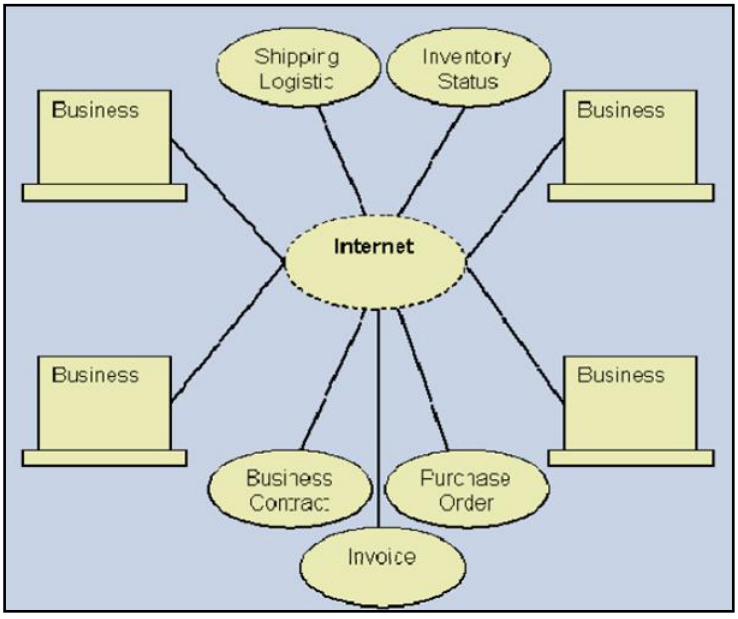

Figure 3. A Business-to-Business (B2B) E-commerce relationship.

Consumer to Consumer Relationship

Using C2C (Consumer to Consumer) E-commerce, consumers sell directly to other consumers using the Internet and web technologies. Individuals sell a wide variety of services/products on the web or through auction sites such as eBay.com and gittigidiyor.com through classified ads or by advertising. Figure 4 illustrates a general C2C E-commerce relationship. Consumers are also able to advertise their products and services in organizational intranets and sell them to other employees.

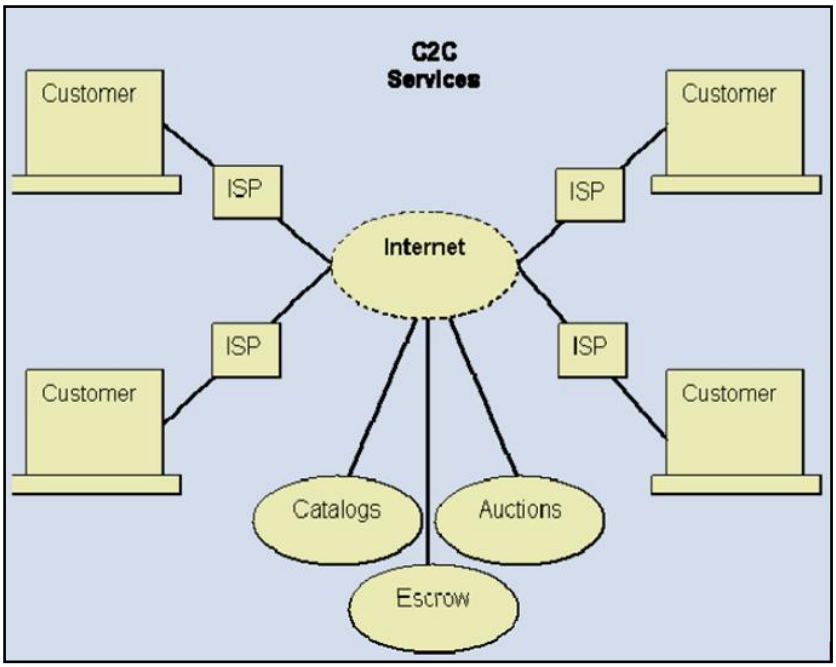

Figure 4. A Consumer-to-Consumer (C2C) E-commerce relationship.

Results and Discussion

The E-commerce in all of its forms helped in offering many quotations and so the final laboratories' devices for many cases of tenders at Jordanian universities. To illustrate this here is a case study.

Case study: preparing quotations for some mechanical engineering contract at a Jordanian university

To prepare any quotation for any scientific laboratory in any Jordanian university, E-commerce and E-technology are used to perform and prepare such contracts.

Figure 5 below shows a sample of some devices quotation. The devices are all for mechanical fluid mechanics lab. Figure 6 represents the supported for such devices. All delegations are performed using internet and E-commerce principles.

The contract had about 300 elements; it took about one month to make communication with supporters and offer quotations, comparing with traditional communications with such companies: E-commerce and E-technology decrease the time needed to prepare such contracts and offer more choices and the ability to select the suitable specifications of the devices. E-commerce reduces the time and effort required for preparing and buying lab devices comparing with traditional method. For example in last contract it takes about one month while in traditional methods of communication it needs about six to nine months. Figure 7 shows this comparison.

	QUOTATION ALTU0122.10A			
ITEM EQUIPMENT	QTY.	DESCRIPTION	UNIT PRICE(EUR)	TOTAL PRICE (EURO)
EC-BHI WRH-1	1	Hydraulic Bench	8100.00	
EC-FME00 WRH-2	1	Hydraulic Bench	2021.40	
FME10	1	Accessories Dead Weight calibrator	739.80	739.80
FME05	1	Hydrostatic pressure	729.00	729.00
FME02	1	Flow over weires	539.10	539.10
FME11	1	Metacentric Height	438.30	438.30
FME03	1	Bernoulli's Theorem Demostration	1039.50	1039.50
FME01	1	Impact of Jet	1163.50	1163.50
FME17	1	Orifice and free jet flow	1587.60	1587.50
FME04	1	Orifice discharge	1974.60	1974.60
FME07	1	Energy losses in pipes	1152.00	1152.00
FME09	1	Flow visualization in channels	1885.50	1885.50
FME06	1	Osbrone-Reynolds Demonstration	1386.00	1386.00
FME1S	1	Flow meter Demonstration	1859.40	1859.40
FME05	1	Energy losses in bends	1724.40	1724.40
AFT/P	1	Fluid friction in pipes	5670.00	5670.00
FME14	1	Free and forced Vortices	2739.60	2739.60
FME19	1	Cavitation phenomenon demonstration	1650.60	1650.60
FME16	1	Pelton turbine	2873.70	2873.70
FME12	1	Series-parallel pumps	2129.40	2129.40
FME13	1	Centrifugal pump characterstics	2799.90	2799.90
FME15	1	Water Hammer	3163.50	3163.50

Figure 5. A sample of quotation using E-commerce.

Figure 6. The quotation support company.

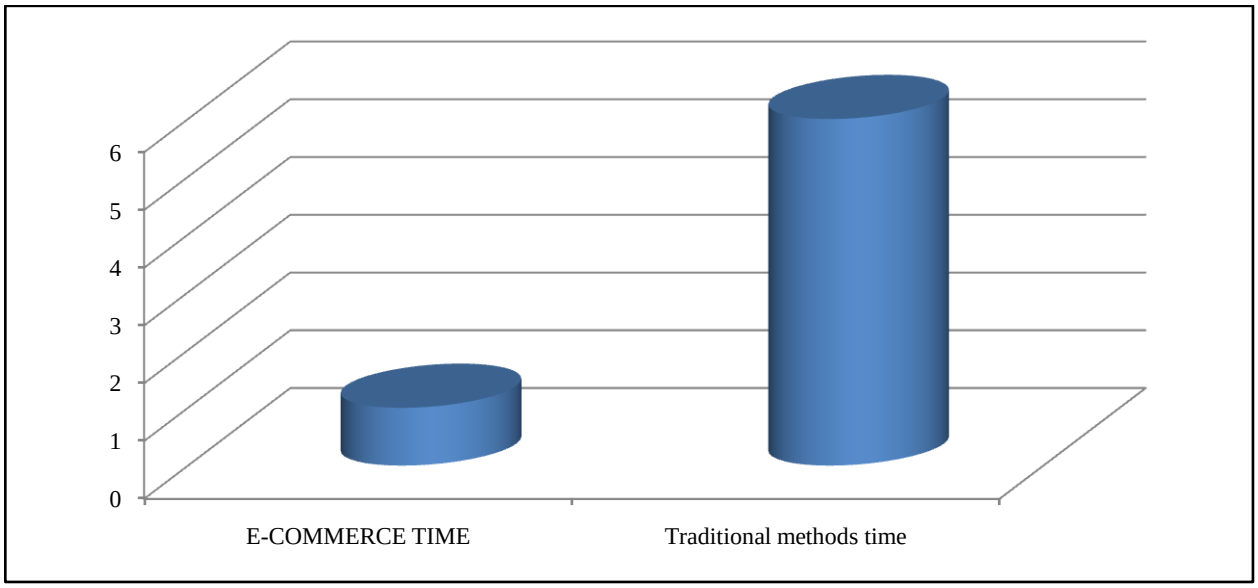

Figure 7. Time (in months) needed for performing the contract.

Conclusions and Recommendations

This paper talks about a very important issue that helped in servicing the labs contracts of devices. It is clear from the results and discussion that E-commerce reduces both time and efforts and may be costs of such contracts. It is recommended to search more deep in such issue and compare many contracts at different places to make sure that E-commerce is more efficient, safe, and trusted tool.

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