The Requirements for Building an E-commerce Infrastructure

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Abstract—**Jordan has been working in improving its internet readiness and infrastructure for several years. Relative to countries in Middle East, Jordan is a pioneer state in having the required network infrastructure to have internet services available to both companies and citizens with high, reliable speeds and in a reasonable cost.**

This paper will present all requirements to build a reliable e-commerce infrastructure in Jordan. E-commerce is one of the main desired outcomes from a state internet readiness. Despite the fact that the requirements for e-commerce are very similar to those for an e-government or an internet readiness in general, however, there are some extra requirements, such as the legal regulations, that should be existed to guarantee the success of this very important economical sector that should contribute largely to improving the economical status for both individual and corporate sectors in Jordan.

Index Terms⸺**E-commerce, e-business, e-billing, e-payments, Public Key Infrastructure (PKI), and digital certificates.**

I. INTRODUCTION

The revolution of the internet has played significant role in commerce and business in the whole world, which connects millions of people as well as millions of computers. Nevertheless, these types of communication are increasing day after day, and it is used in many sectors as well, especially in conducting business on the internet, because internet reduces cost of process, accomplishes and achieves more work without any increasing of costs, and it improves the quality of services as well. However, this does not mean every online business can be successful, as on the other hand the internet and the new technologies encourage and help hackers and online criminals to attack any kind of business and disrupt it. E-businesses are vulnerable for theft in the same way regular businesses are. Privacy and protection are necessary to ensure the smoothness of online transactions. In addition and since the internet gives people the ability to access any web site in any location in the world, people can search for better products or services. This increases the level of competition between companies due to the fact that users have more and easier access to alternatives.

E-Commerce websites allow financial transactions to be executed over the internet. This is necessary to complete the full cycle of buying or selling an item (i.e. shopping, selecting, paying, shipping, and receiving).

II. RELATED WORK

In this part of the study we will take a look at the Jordanian previous experience in the area of E-Commerce.

Jordan started early in studying the possibilities of implementing on-line security. In 2002, a joint effort by Middle East Communications Corporation (MEC) and WISekey Switzerland is initiated to allow MEC issuing digital certificates in Jordan. It was expected to be ready in usage by the year 2004. There are no official documents that indicate why the project was not completed.

In 2003, Jordanian ESKADENIA software solutions worked in a project to be a local dealer for UAE Comtrust to market e-business services in Jordan. However, similar to the earlier trial, it did not reach to a deliverable goal.

III. GOALS AND APPROACHES

A successful e-commerce or e-business infrastructure in Jordan will help several public or private sectors benefit from it. For example, electric power, water and telephone companies may utilize the e-commerce infrastructure to allow their customers check their accounts online for their current amount of usage and will also allow them to pay online. This may help both service providers and consumers. Providers will have less effort and employees to perform accounts checking and billing and will reduce the overhead of customer services tasks. For customers, it will be more convenient as they can track their account status and pay on their convenient time without the need to go to local, usually busy, agencies. Banks are hotels have also large piece of the steak of interest of having a successful e-commerce infrastructure. For hotels, customers can shop their websites and book online without the need for mediators or agencies who usually charge for being the middle man. E-banking is convenient to both banks customers and

employees. It will reduce the amount of customer service calls from customers who usually enquire about their account details or transactions that they can see online.

Requirements for a successful e-commerce infrastructure in Jordan, or any other place, are divided into 3 categories: legal, software and hardware perspectives. We will present the typical requirements for each category, along with what is missing and needed.

1. **Legal perspectives**; E-commerce laws and regulations:

In European Union countries, E-commerce refers to the carrying out of business using electronic means. This generally means over the internet. However, from a legal perspective, the term is often used to include remote selling by telephone and email, as well as online. It is also frequently used to refer to legal issues generally relating to the internet.

There are several types of contracts which are required to exist when a business becomes involved in e-commerce transactions. As a result, laws should regulate each section of those contracts to ensure that online customers transactions will go smooth and that a judge can have clear regulations to rule with once an online dispute occurs. These include:

1. Website development, content and hosting agreements. When a business wishes to set up a website, it needs to ensure that the design and content of the website do not infringe or violate any third party rights.

2. Internet service provider agreements.

Companies who are responsible for developing the e-commerce website can be the same company who provides the hosting service or they can be separate. Similar to the web design companies, web hosting companies should have clear responsibilities regarding their duties and responsibilities.

3. Website usage and privacy policies

This may include the privacy of both owners and customers. Web site design and hosting companies are not supposed to expose their clients' information to their rivals.

4. Website and telephone sales terms and conditions

In some countries, online or telephone sales are governed by the Consumer Protection (Distance Selling) Regulations 2000 and the Electronic

2. **Software perspective**; How to build an infrastructure for a trusted e-commerce websites: This section will focus on the software, websites requirements to implement e-services or business.

In most e-commerce infrastructures, to secure access to e-commerce websites, we should include two basic components in order to allow users to securely perform online transactions:

1. Digital certificates for web servers, providing guarantees of authentication, privacy and data integrity through encryption. Digital certificates can be issued by mediators called Certificate Authorities (CAs) to authenticate the seller to the buyer and vice versa.

2. Secure e-payment system and management, to allow e-commerce sites to secure and automatically accept, manage and process online payments. This can be usually organized with owners' banks. Websites will be securely connected to the buyers' bank accounts. Once an online transaction is secured executed, the money should be directly transferred from the seller to the buyer account. This process should be performed in a fast, reliable and secure way. Those 3 elements (i.e. reliability, performance and security) are vital to the success of any e-commerce website.

3. **Network and hardware perspective; Internet readiness**.

A closely related requirement to the software and websites' requirements is the existence of a network or hardware infrastructure. This may include the routers, fiber optics or wireless communication channels, firewalls, etc.

Since both (software and hardware perspectives) may include hardware and software elements, we will distinguish them through the location. This perspective represents any requirements outside the user machine.

4. Extra requirements for a successful e-commerce business.

Another major player in the e-commerce world is the sipping companies. In order to compete with normal shops and businesses, shipping should be also secure, reliable and quick. Laws should regulate the terms for shipping, such as costs, types, and who is in charge in case of products defects. Products defects may due to buyers or shipping issues.

4. Research Experiments

Jordan has been working in making governmental websites e-ready. To evaluate those websites from a security standpoint, several e-governmental websites are selected for the purpose of security evaluation. The selected websites are: MOICT (i.e. Ministry of Information, and communication technology), foreign affairs, industry, planning, finance, education, and interior ministry. Those are selected as they are expected to provide more relevant e-services to citizens. Several vulnerability and security scanning tools are selected for the evaluation purpose. Tools assist those websites looking for vulnerabilities or security weaknesses that can be candidates for security violations.

The classification that is considered here is based on the effect of the vulnerability or risk. If the effect is

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on the operating system, it is considered as High. If it is on the database, it is considered as medium, and if it is on the software, it will be considered as low risk or vulnerability.

The first table compares all selected websites depending on the number of high, medium and low vulnerabilities.

TABLE1. NUMBER OF RISKS IN THE TESTED WEBSITES.

Website	No. of high risks	No. of medium risk	No. of low risk
http://www.moict.gov.jo/	73	157	14
http://www.mfa.gov.jo/wps/portal/FMArabicSite	41	18	15
http://www.mit.gov.jo/	43	18	13
http://www.mop.gov.jo/	75	18	19
http://www.mof.gov.jo/	42	18	14
http://www.moe.gov.jo/	72	19	19
http://www.mop.gov.jo/	42	18	14

Surprisingly, MOICT which is leading the e-government initiative is one of the highest in number of high and medium vulnerabilities. Perhaps without knowing the number of pages in each website, those number may not be good metrics. As such, we used a tool called The website utility to gather some metrics about each one of those websites

TABLE2. SELECTED WEB METRICS FOR THE TESTED WEBSITES.

Website	No. of main pages	Total No. of links	No. of Java script lines	Size Kb
http://www.moict.gov.jo/	346	1196	1097	14961
http://www.mfa.gov.jo/wps/portal/FMArabicSite	NA	NA	NA	NA
http://www.mit.gov.jo/	49	1860	1025	3262
http://www.mop.gov.jo/	5	102	1093	210
http://www.mof.gov.jo/	58	346	571	2736
http://www.moe.gov.jo/	NA	NA	NA	NA
http://www.mop.gov.jo/		05	093	07

The websites of MOICT and MOE are much larger than the other websites (MOE took very long time till interrupted. This is because probably it is connecting all country schools through web pages.

Vulnerabilities should be normalized on the size or number of pages to reflect the relative risk.

I. CONCLUSION AND FUTURE WORK

In this paper, we presented the general requirements for a successful e-business or e-commerce transactions. Jordan is going forward and investing in its e-government initiatives to allow citizens to have access to public services online. There are several meetings and seminars held to discuss the current barriers existed against fully having the capabilities of perform e-commerce transactions for both public and private sectors. This is expected to improve the local economy as it will open several new possible jobs and opportunities.

The cultural dimension is very important to ensure the success of this track. Customers and sellers need to consider e-businesses in the same manner they consider regular ones. Sellers need to improve their customer services and their willingness to ensure customer satisfaction even if this was on the expense of accepting returns and refunds. On the other hand, buyers, shipping companies and all other partners should give the e-commerce services the opportunity to live and prosper. This will eventually benefit them and all other business sectors.

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