

INTERNET AND ITS IMPLICATIONS FOR
BUSINESS IN YEMEN

BY

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KULIYYAH OF INFORMATION COMMUNICATION
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ABSTRACT

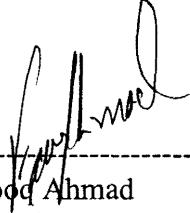
This study examines the use of Internet for business purposes in Yemen. The main sectors observed are banking and private trade organizations. It was assumed that security is a main concern in e-commerce. A survey of the banking industry and private business organizations in Yemen is conducted. Through the survey and interviews a thorough study is performed about the: Internet facilities available in Yemen (the infrastructure, the service providers), the literacy and use of ICT in the above two sectors, the level of e-commerce adopted, the main hurdles in the adoption of e-commerce, and measure required to increase the adoption of e-commerce. The study has concluded that in general the above two sectors realize the importance of e-commerce for their business and they are willing to proceed further with the e-commerce. The main causes in the delay of e-commerce adoption are the discrepancies in the infrastructure (technology, service providers and human resources), high costing of the Internet facilities, bureaucratic hurdles in obtaining the facilities, and the non availability of a secure environment. In spite of the fact that they have a high concern about the Internet security, their awareness about the security hazards and the protection measures is at minimum. It is also observed that the public awareness of the ICT in general is very low. In light of the data collected, the study has come up with certain recommendations for the authorities interested to improve the e-commerce in Yemen.

ملخص البحث

تفحص هذه الدراسة استخدام الإنترنت في الأغراض التجارية في الجمهورية اليمنية. القطاعات الرئيسية التي تم ملاحظتها هي البنوك والمنظمات التجارية في القطاع الخاص. وقد تم فرضاً اعتبار أن قضية الأمن هي الأهتمام الرئيسي في هذه التجارة الإلكترونية. أجريت دراسة ميدانية شملت قطاع البنوك المصرفية ومنظمات قطاع الأعمال الخاصة. من خلال البحث الميداني والمقابلات تم إنجاز دراسة كاملة حول: إمكانيات الإنترنت المتوفرة حالياً في الجمهورية اليمنية (البنية التحتية، مزودي خدمة الإنترنت)، المعرفة والاستخدام لتكنولوجيا المعلومات والاتصالات في كلا القطاعين المذكورين سابقاً، مستوى التجارة الإلكترونية المتبعة حالياً، العقبات الرئيسية أمام اعتماد التجارة الإلكترونية. نتج عن هذه الدراسة ما يمكن القول وبشكل عام أن كلا القطاعين يتفهمون لأهمية التجارة الإلكترونية بالنسبة لأعمالهم التجارية ولديهم رغبة نحو الأستمرار بصورة أكبر مما هو عليه من التجارة الإلكترونية. الأسباب الرئيسية في البطئ للإعتماد علي التجارة الإلكترونية هو الإختلافات في البنية التحتية (التكنولوجيا، مزودي الخدمة، الموارد البشرية)، التكاليف العالية لخدمات الإنترنت، العقبات البيروقراطية في الحصول على خدمات أو تسهيلات أكثر وكذلك عدم توفر بيئة أكثر أماناً. بالرغم من حقيقة أن لديهم قلق شديد على أمن الإنترنت إلا أن وعيهم عن الأخطار الأمنية وإجراءات الحماية هي في الحد الأدنى. أيضاً لوحظ أن الوعي العام لتكنولوجيا المعلومات والاتصالات بصفة عامة منخفض جداً. في ضوء البيانات التي جمعت، الدراسة قد توصلت إلى التوصيات المعيّنة للمسؤولين المهتمين بتطوير التجارة الإلكترونية في الجمهورية اليمنية

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion; it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Management Information Systems.



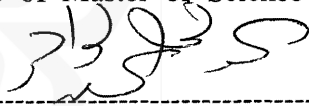
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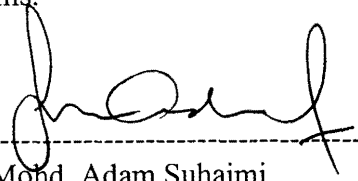
Husnayati Hussin
Examiner

This thesis was submitted to the Department of Information Systems and is accepted in partial fulfillment of the requirement for the degree of Master of Science in Management Information Systems



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Head, Department of Information
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This thesis was submitted to the Kulliyah of Information Communication Technology and is accepted as partial fulfillment of the requirement for the degree of Master of Science in Management Information Systems.

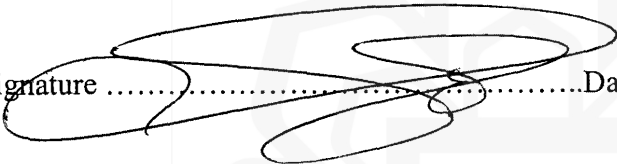


Mohd. Adam Suhaimi
Dean, Kulliyah of ICT

DECLARATION

I hereby declare that this thesis is the result of my own investigation, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references and a bibliography is appended.

Name: Ali Hussein Saleh Zolait

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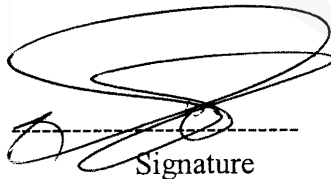
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Internet and its Implications for Business in Yemen

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This study is dedicated to my parents, who taught me to set goals and strive to achieve them: and above all, to continue my higher education in the highest esteem, in addition to teaching me the value of hard work. Their support, prayers and encouragement have given me the real power after Allah to do so.

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May Allah Always bless you in the world and in the hereafter?

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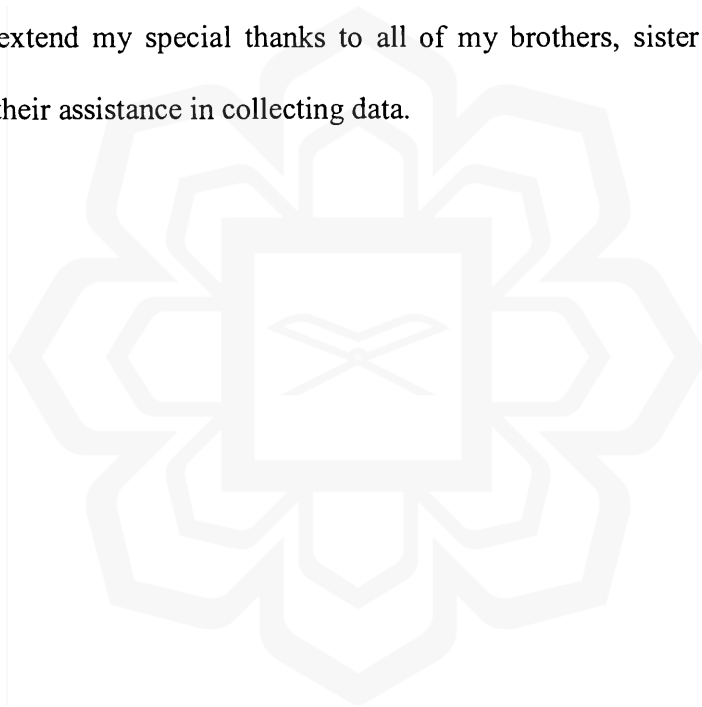


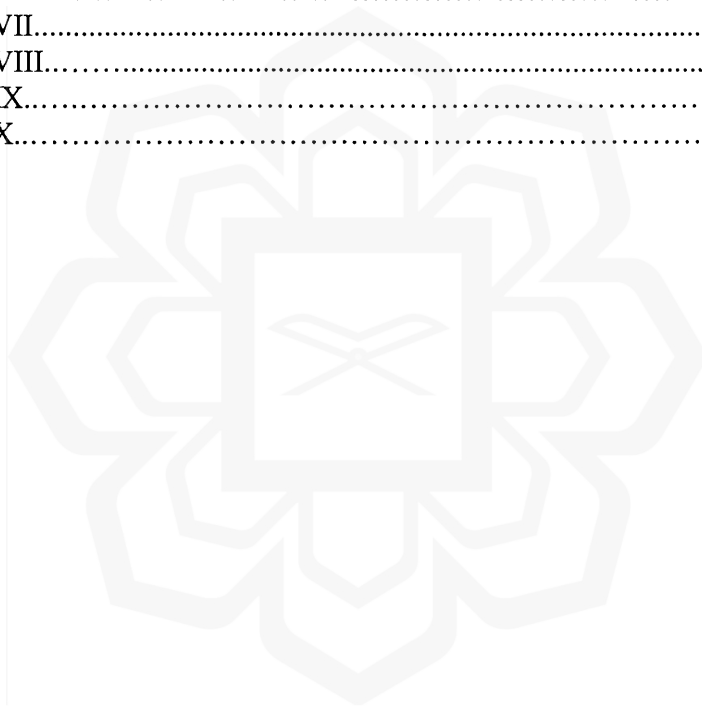
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LIST OF ABBREVIATIONS

BIND	Berkeley Internet Name Domain
B&BO	Banks and Business Organization
CERT	Computer Emergency Response Team
CIDF	Common Intrusion Detection Framework
CIS	Center of Internet Security
CISSP	Certified Information Systems Security Professional
C&W	Cable & Wireless British Company
DES	Data Encryption Standard
3DES	Triple DES (3DES)
DIT	Dabbagh Information Technology Group
DNS	Domain Name System
DoS	Denial of Service
DSL	Digital Subscriber Line
ERP	Enterprise Resource Planning
FBI	Federal Bureau of Investigation
FNC	Federal Networking Council
GIAC	Global Information Assurance Certification
GTI	General Telecommunication Institute (Republic of Yemen)
IDD	International Direct Dialing
IMF	International Monetary Fund
IT	Information Technology
IP	Internet Protocol
ISP	Internet Service Providers
ISS	Internet Security Systems
IAW	Research unit of Internet Al-Alam Al-Arabi issue a magazine.
METT	Middle East Technology Team
MOC	Ministry of Communications
MPD	Ministry of Planning & Development)
MTA	Mail Transfer Agent
NASS	National Agricultural Statistics Service
NIC	National Information Center in Republic of Yemen
OURS	Open User Recommended Solutions
PKE	Public Key Encryption
PKI	Public Key Infrastructure
POP	The Post Office Protocol
PTC	The Public Telecommunications Corporation
PWS	Personal Web Server
ROY	Republic of Yemen
RPC	Remote Procedure Calls
SATAN	Security Administrator Tool for Analyzing Networks
SMTP	Simple Mail Transfer Protocol
SPSS	Statistical Package for the Social Sciences
SSCP	Systems Security Certified Practitioner certifications.
TCP	Transmission communication protocol
TLD	Top Level Domain
VPN	Virtual Private Network

Glossary

Terms used and their definitions

AppShield	An HTTP proxy filters that sits in front of a Web-based e-commerce application. It keeps crooks out by refusing to process any bogus character inputs, such as long Common Gateway Interface buffer overflows, that can hijack the server.
Backbone Network	A large network to which many networks within an organization are connected. It is a network that interconnects all networks on a single site, but it can be larger if it connects all the organization's terminals, microcomputer, mainframes, LANs, and other communication equipment.
BIND	package that is the most widely used implementation of Domain Name service (DNS), the critical means by which we all locate systems on the Internet by name (e.g., www.sans.org) without having to know the specific IP addresses
CIS	a nonprofit cooperative enterprise, interested in the area of security and have plans to release a series of global benchmarks that will let firms measure and monitor the security status of systems connected to the Internet.
Computer	is a box hooked up to the net. Usually having one or more processors.
E-mail	Electronic mail is a networking application that allows users to send and receive mail electronically.
Ethernet Card	a piece of hardware, which is usually in a computer, which knows how to talk the Ethernet protocol on a wire. This is a kind of network interface.
Firewall	is a program that monitors the port associated with Internet connection. It is a combination of hardware and software, placed between a company and the Internet.
FNC	The Federal Networking Council FNC membership consists of representatives from 17 US Federal agencies (e.g., NASA, National Science Foundation, Dept. of Education, and Department of commerce's NTIA) whose programs utilize interconnected Internet networks.
Foundstone	A name for school investment in teaching security, "hacking school" teaching student hacks. The school has four-day sessions, which are scheduled to take place in Boston, the San

Francisco Bay area, Seattle, and Virginia, priced at \$3,500 per student.

Hacker:	A person who sleuths for password or a way to gain illegal access to important computer files. Hackers may rummage through corporate trashcans looking for carelessly discarded printouts.
Host	A fuzzy term usually meant as a synonym for either 'computer' or 'IP address', which often does not matter, as there is typically one IP address per computer.
Hostname	A name that can be resolved (using a name server) into an IP Address
IFCC	The Internet Fraud Complaint Center (IFCC), which began operation on May 8, 2000, is a partnership between NW3C (National White Collar Crime Center) and the Federal Bureau of Investigation (FBI). IFCC's mission is to address fraud committed over the Internet by facilitating the flow of information between law enforcement agencies and victims.
IP Address	A set of four numbers (each between 0 and 255, with some restrictions), separated by periods that uniquely identifies an address on a network.
METT	Middle East Technology Team is a group of students of university of Colorado in Denver .they published several statement of technology for the Middle East countries.
Modem	A piece of hardware that allows the computer to talk over a phone line. A modem is often used as a network interface.
Name Server	A machine on the network that allows you to resolve hostnames into IP addresses.
NASS	International Programs Office NASS specialists provide technical assistance and training in all phases of sample surveys. The address: Room 4112, South Agriculture Building Washington, D.C. 20250-2013
Network Interface	A thing inside a computer that knows how to send information over a wire (or fiber, or whatever) usually, one for each computer.
PKE	Public Key Encryption is one of the most secure encryption techniques available .it uses two keys. The public key is used to encrypt the message and a second, very different private key is used to decrypt the message, once it is encrypted the message cannot be decrypted without the private key.

PKI	The Public Key Infrastructure is the process of using public key encryption on the Internet. PKI begins with a certificate authority (CA), which is a trusted organization that can vouch for the authenticity of the person or organization using authentication (e.g., VeriSign). The CA issues a digital certificate that is the requestor's public key encrypted using the CA's private key as proof of identifies. This certificate is then attached to user's e-mail or web transactions. The receiver then verifies the certificate by decrypting it with CA's public key and must contact the CA to ensure that user's certificate has not revoked by the CA.
RPC	Remote procedure calls allow programs on one computer to execute programs on a second computer. They are widely used to access network services such as shared files.
Sadmin	An application which allows remote administration access to Solaris systems, providing graphical access to system administration functions
SATAN	Security Administrator Tool for Analyzing Networks is a software tool that can be used by system administrators.
Swift	Electronic system used by banks to carry out the financial transactions among them.
Triple DES	3DES is a symmetric encryption technique that involves using DES three times, usually with three different keys, to produce the encrypted text, which produces a stronger level of security than DES because it has a total of 168 bits as the key (i.e., 3×56bits)

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Information Technology (IT) today touches every aspect of our lives, no matter where we live. Everyone's daily activities are affected in one way or another by computer. As computerized routines replace mundane human tasks, more and more businesses, industries, economies, hospitals and governments are becoming dependent on computers. Computers are not only used extensively to perform the industrial and economic functions of society but are also used to perform many functions according to the daily demands of human life. This dependence of human life on IT brings up some very real issues that must be addressed. One of them is security.

At every level of society, there are good people and bad people. This aspect also spills over into the computer world. Many people enjoy the finer things in life like typing, e-mailing and using the Internet and some enjoy the darker side of the computer, to hack into the computer resources of others. The subject of this research is Internet security and how private sector companies can manage the threat from the World Wide Web if they are conducting or contemplating business online.

Many private sector firms, worldwide, are moving from traditional physical sales and service operations toward conducting their businesses electronically. Electronic Sites in today's world of business are considered as the real face of today's companies. There are a lot of companies and banks in Yemen, which are still indecisive regarding conducting business online. These companies have their own perspectives regarding security.

This new way of conducting business has appeared recently. While the global system of communication, known as the Internet, was being invented, most of the companies started to publish and have their own sites on the World Wide Web and started using them to communicate with current customers as well as the potential ones. These firms have now started to realize the danger that comes from using this modern method of business. They face one of the most serious disadvantages of the Internet, which is the difficulty of having secure business. Non-secure operations of a firm can cost the firm by losing their resources or losing successful business.

As the e-business relies on the Internet, so we should understand the threat caused by the Internet. We should realize the importance of Internet security to the success of businesses because with the quick increase of the world's population and the size of business world under the system of globalization and open market, without doubt e-commerce will be the common way of conducting business. As mentioned, e-commerce or e-business is dependent on an open system Internet as a gateway for transactions between the firm and its customers; thereupon firms realize the importance of Internet security as reported by Regan (2003) that security remains one of the biggest impediments to speedier transfers to e-commerce.

1.1 E-commerce in Yemen

The Yemeni government is moving towards e-commerce & e-government. This is evident from a specialized conference held in Yemen ("e-commerce in Yemen", jointly Organized by Ministry of Planning and Ministry of Commerce & Industry, Government of Yemen, Sana'a, May 27-31 1999). It is also obvious from the speech of the Minister of Communication in which he discussed the Internet gateways project

in Yemen. The meeting workshop was held on 30 December 2001. The Alriyadh newspaper (2002) reported that the Yemeni government allocated the amount of 60 million US dollars to be invested in establishing the basic necessary requirements of e-commerce & e-government. This is to join the other Arab countries that had a successful experiment in this field. All these steps and attitudes mean that Yemen is ready to join the ranks of the e-commerce member countries.

What is the stand of the Yemeni business sector regarding this kind of business? Part of the research interest is to identify the role Internet security can play and contribute to the success of any online business. As from the outset we can see that the implications of Internet on the Arab countries in general and the Republic of Yemen in specific are very negligible at the moment.

Therefore, the study is concentrating more on the exploration of situation before the arrival or adoption of the Internet for business rather than the after effect of the Internet or e-commerce. So the study will try to identify the readiness of the Yemen business sector for the e-commerce, the factors which could be creating barriers, and the factors which can encourage them to proceed to the e-commerce activities. Indeed, in this effort we will study those organizations (pioneering) that are already using Internet and e-commerce. To achieve these tasks, the work has to look at the topic from the global perspective and the local prospective.

Yemeni businesses in both perspectives will be influenced by the others from outside the country and by the internal environment too. How much is Internet secure in Yemen? How does the business community consider the security of the Internet in their work over the Internet? Thus, we would like to know how the Yemeni firms treat

the security aspect when they work online. In addition, we would like to understand the real use of Internet technology in Yemen by those firms.

1.2 Problem Statement

The non-professionals, executives, public sector organizations and private sector companies in Yemen have realized that the Internet has become the new medium of interaction between humans. Many appreciate the facilities, which the World Wide Web offers to business especially the Internet. Even though some Internet users feel that conducting business online is not easily attainable, they have started applying this method as a new means for conducting business. Yementimes, a private newspaper, reported in their 17th April 2000 issue that, “We are finding difficulty in dealing with the thousands of emails we get in one month. We are feeling that our presence online has become a major positive point for us, and will continue to grow, and maybe someday exceed the significance of the hard copy”.

In Yemen, the private sector is looking into avenues that can broaden their market. Internet is providing an opportunity but there is still reluctance in the use of this technology by business organizations. There is a rapid growth of the Internet centres (cyber cafés), which have become a good investment area in Yemen. This is an evidence of the acceptance of the Internet in the Yemeni community as a modern way towards progress and development (Gawth 2003). Many, however, are still not using this technology for business. There is something stopping them. Can we say the reason is that the technology is difficult to be applied in Yemen? Or is the cost of conversion and subscription too high?

Another aspect of the problem is that there is misuse of this technology in Yemen by hackers who break in and use the accounts of others, creating loss. In addition, some