Use and Effect of Internet in Saudi Arabia

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October 2001

Contents

List of Tables

List of Figures

Arabic Summary

Summary

1 Introduction

2 Social Aspects of Internet Usage

2.1 Introduction

Unlike any other technological phenomenon in the history of humankind, the advent of the Internet has changed the structure of global society in immediate and far-reaching ways, directly or indirectly affecting the lives of every living person and drastically shifting the manner in which humans interact with each other. Though the Internet is based in a technological revolution of the computers, the driving forces behind this revolution have always been socially derived, and the impacts on our society stretch far beyond issues of computerization, automation, and pure technological advancement [1].

Today's new adopters of the Internet face a range of options undreamed of by their predecessors of just a few years ago. With higher connection speeds, a greater variety of access devices, and a broader range of content, today's Internet is different from the Internet of five years ago or even two years ago. Today's Internet user is also different from the typical Web surfer of a few years ago. As the Internet moves out of the home office and into the family room or kitchen, means of Internet access will have to serve people's desires for entertainment, real-time communication with others (either audio or video), and provide a wide choice of information options. Applications such as buying things online and managing personal finances online will continue to be important to Internet users [2].

The rapid evolution of any technology naturally raises questions about both its potential benefits and possible negative consequences. This is especially true of the Internet; its breakneck growth and powerful interactive capabilities have inspired a national dialogue in the media. Issues in this broad discussion of the Internet include questions about children and access to online material, potential online threats to personal privacy, the "digital divide", the effects of the Internet on family involvement and social organizations, gender differences in use and access, credit card security, and the effects of online sales on traditional retailing [3].

These developments affect not only how people work, but also where they work, how much they work, or with whom they interact face to face or electronically. Will future workers continue to share physical proximity with their colleagues, or work largely alone wedded to digital devices with occasional electronic mail or voice communication? What will these changes mean for social trust and social life beyond the family? Will the growing trend of working at home with the aid of IT help strengthen the family or add to the intrusion of the workplace into the home? Will it reduce the hours people work, or increase them by infusing work into every sphere of life, devoring leisure-time and family-life? And how will the Internet affect the role and use of the traditional media? For answers to these questions, we must move from ideological claims to empirical evidence [4]. Our study is an attempt to do just that.

The objective of this section of the report is to analyze the growth of Internet as it is evolving. As it is already known that Internet has developed drastically in the recent years, it has just began to flex the roots so deeply implanted in our society. The Internet in the next five years will certainly be different than what we have today and it can be imagined to some extent. But in fifty years, it cannot be even conceptualized how it will be blended in our society. Therefore, this study will limit us to past and present and some extrapolation can be done for the near future.

2.2 Methodology and Findings

This study is based on the survey that was conducted from [????insert time period...] and the results obtained from over a thousand (1000) respondents during this period.

The questionnaire was designed after a careful study of the developments of Internet technology in the Kingdom. The questionnaire was posted on the web, so the results obtained are related to the people already connected to the Internet.

There were some interesting results that were obtained from this survey. Although the questionnaire was designed in both the languages, Arabic and English, most of the respondents (including native Arabic speakers) filled the English questionnaire. However, more number of people preferred Arabic as language for Internet use. [See appendix 7 for details].

The remaining report is organized as follows: Section 2.3 discusses the social aspects of the use of Internet in the world in general. Section 2.4 gives the statistics obtained from SaudiNIC (Saudi Network Information Center). Section 2.5 summarizes the key findings of the social aspect of Saudi society based on the questionnaire. Appendix 7 given at the end of the report summarizes the findings.

2.3 Social Aspects

2.3.1 Trends in Internet Usage

When Web activities are analyzed from the perspective of the many things users might have done, three major patterns emerge [5].

First, gender gaps become evident in some places. Women are more likely than men to seek health information, get religious information, visit online chat groups, and play games online. Men are more likely to use the Web to get news, shop, seek financial information, get information about product and services, access government Web sites, and search for sports news.

The second major pattern is the generational one. Younger Internet users of both sexes are more likely than older to have used the Internet for "fun" communications via instant messages or chat rooms, to have done school- or work-related research, to have accessed popular culture by downloading music or getting information about movies, books and other leisure activities, and to have performed convenience activities online.

Finally, surveys show that variations in online behavior are also rooted in users' differing levels of experience with the Internet. Veteran users, those who have at least three years experience online, are more likely than newcomers to have done most Internet activities. In addition, veterans are more likely than newcomers to have performed transactions or managed their money online. These users are disproportionately from higher socio-economic groups, so education level and household income also show up as important indicators of the things users have done on the Internet.

2.3.2 Digital Divide

What is Digital Divide?

The term "digital divide" refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. The digital divide reflects various differences among and within countries. The ability of individuals and businesses to take advantage of the Internet varies significantly. Access to basic telecommunications infrastructures is fundamental to any consideration of the issue, as it precedes and is more widely available than access to and use of the Internet [6].

Measuring the Digital Divide

In addition to communications infrastructures, important indicators appear to be computer availability - and potentially the availability of alternative access through TVs or mobile phones - and Internet access (these are "readiness" indicators).

The digital divide among households appears to depend primarily on two variables, income and education. Other variables, such as household size and type, age, gender, racial and linguistic backgrounds and location also play an important role.

Other important indicators concern differences in the profiles of countries, individuals and businesses that use, and make the most use of, the possibilities offered by the new information technologies and the Internet. As with all efforts to measure new phenomena, much of the information included here represents a first effort to obtain data on the dimensions of the digital divide [6].

Overcoming the Digital Divide

The importance of policy and regulatory reform needs to be underlined. The liberalization of telecommunication markets and rigorous implementation of competition in OECD countries have stimulated new investment and increased demand for communications access and services through falling prices and the offer of new innovative products.

The evidence of the benefits of liberalization in this area is mounting in a number of developing countries, which have seen the growth in wireless networks resulting from competition.

Particular attention is paid to policies to improve access in public institutions in OECD countries (libraries, local and regional government facilities, post offices, etc.) so that individuals can access ICTs at low or no cost, build familiarity and develop skills. Policies for making available low-cost and subsidized access in schools seek to build the future skills base of the workforce and to enhance diffusion. Measures have also been taken to improve access for underprivileged groups, the disabled and the elderly, and for rural, remote and low-income areas, for reasons of equity and to enhance overall economic efficiency via network effects [6].

Myth and Reality of Digital Divide

By far the most important factors facilitating or inhibiting Internet access are education and age, and not income - nor race/ethnicity or gender, each of which account for less than 5 percent change in rates of access and are statistically insignificant. By contrast, a college education boosts rates of Internet access by well over 40 percentage points compared to the least educated group, while people over 65 show a more than 40 percentage point drop in their rates of Internet access compared to those under 25. Age really reflects generational differences, and thus shows what to expect in the future [4].

Once people are connected to the Net they hardly differ in how much they use it and what they use it for - except for a drop-off after age 65, and a faint hint of a gender gap. Demographic differences in Internet use involve at most an hour and a half a week, mainly reflecting people's time budgets and work status; and they involve hardly more than half an additional Internet activity, in the latter case reflecting levels of education. Instead - and above all - Internet use increases dramatically, both in terms of amount of time and in terms of range of activities, the longer people have been connected to the Internet, and this fact will make for steady growth in the future [4].

Alternative Internet Access

1. Cable and satellite access may increase demand for the Internet.

2. Digital TV may be a means of diminishing the digital divide.

3. Mobile telephony offers another potential route for access.

2.3.3 What people do online?

Common Activities

Perhaps the most common activity that is done by people connected to the Internet is sending and receiving emails. Other activities include checking sport scores, listen or download music, visit newsgroups or discussion forums, online chat groups, online job-hunting, looking for online maps, checking news, finding medical information, getting financial information, checking travel arrangements, etc.
Table 1 summarizes what people did online in March 2000 throughout the world [2].

Usage proportion to experience

The Internet has been around for about a couple of years now, and the longer people have been web users the more hours and the more activities they report engaging in. While self-selection may be playing a role with early adopters, the results obtained, strongly suggest a model of social change with not only a growing number of Internet users, but with web users doing more and more things on the Internet in the future [4].

Other Activities

People used the Internet more to socialize and celebrate during the holiday and special occasions. People used email to make their holiday plans; they sent online holiday greetings to loved ones and friends; they used the Internet to get ideas on how to celebrate the season; and they sought religious material online [7].

- 53% of Internet users (over 51 million people) sent emails during the holiday season to relatives and friends to discuss the holidays or to make plans.
- 32% of Internet users (over 30 million people) sent e-greeting cards to loved ones and friends.

Activity	**Average(% have done)**
E-mail	91
Fun Activities	
Info on a Hobby	76
Online just for fun	63
Video/Audio Clip	47
Instant Messages	45
Listen/Download Music	36
Sports Scores	35
Play a Game	35
Chat rooms	28
Information Utility	
Product Information	74
Travel Information	64
Weather	62
Info on Movies/Book/Music	62
News	60
Research for School	55
Health Information	54
Work-related activity besides e-mail	48
Government websites	47
Financial Information	44
Look for job	38
Info about politics	35
Look for place to live	27
Religious/Spiritual Info	21
Transactions	
Buy something	47
Made travel reservations	36
Online Banking	17
Online Auction	15

Table 1: What people did online in March 2000?

- 24% of Internet users (over 22 million people) went to the Web to get information on crafts and recipes, and to get other ideas for holiday celebrations.
- 14% of Internet users researched religious information and traditions online.

The just completed Sydney Olympics was one of the most popular Internet events in history. The official Games Web site http://www.olympics.com/ received 8.7 million unique visitors from around the world, according to figures from IBM, which ran the site. It received 11.3 billion "hits", a gigantic number compared to the 634 million received by the official Website of the 1998 Winter Games in Nagano and the 187 million received by a similar site for the 1996 Summer Games in Atlanta Games. IBM also reported that fans from around the world sent about 370,000 email messages to their favorite athletes at the games [8].

2.3.4 Internet and the Hispanics

Fully 50% of Hispanics who are 18 and older have used the Internet. Overall, 11 million Hispanic adults have Internet access and there was a 25% increase in the population in the twelve months from March 2000 through February 2001, which is the month we measured the access rate at 50%. By comparison, 58% of white adults have been online and 43% of African-Americans have been online. More of the Hispanic newcomers are women than men. The overall Hispanic population with Internet access is split evenly between men and women [9].

Hispanics opinion about the Internet

Like many of those who use the Internet, Hispanics have found that the Net has improved some aspects of their lives [9].

- 58% of online Hispanics say the Internet has helped their connection to friends.
- 52% say the Internet has helped their connection to family.

- 52% say the Internet has helped them pursue their hobbies.
- 41% say the Internet has improved their ability to get health and medical information. Some 49% of online Hispanic women say that.
- 37% say that using the Internet has improved their ability to shop.
- 33% say the Internet has helped them manage their finances.

The virtue of email

Online Hispanics say they are pleased with the ways in which email can bring them closer to family and friends. Some 86% of online Hispanics say that email is useful for communicating with family members, and 90% say it is useful for communicating with their friends. Just over half (53%) say that using email has prompted them to communicate more often with a key family member, and 56% say their relationship with a key friend has improved because of email. And 21% of Hispanics have used the Web or email to locate and reestablish contact with an old friend or a family member.

Emailing family members is an important activity for Hispanic Internet users, 69% of whom use email to communicate with other family members. This is about 10 percentage points higher than African-Americans and 10 points lower than online whites who use email to communicate with their families. Hispanics with Internet access cite the speed of email communication as the main reason for using email to communicate with family members. White e-mailers appreciate the convenience factor a bit more.

Online Hispanics are more likely to have used email to communicate with friends than with family members. Almost three quarters (74%) of Hispanics who use email say they employ e-communication to stay in touch with friends. That compares to 80% of email-using whites and 69% of email-using African-American who do that [9].

How the Internet helps

Like many of those who use the Internet, Hispanics have found that it has improved their lives in some ways. Many appreciate how email has helped relationships with friends and family - 52% of Hispanics say it has helped their connections to family, while 58% say their connections to friends have improved because of their use of the Internet.

The Web has also helped online Hispanics with other aspects of their lives. About 37% of online Hispanics say that using the Internet has improved their ability to shop - whether it is through more product information, lower prices, or something else. Another 41% say the Internet has improved their ability to get health and medical information - some 49% of online Hispanic women say that. Interestingly, 38% of Hispanic women say the Internet has helped them manage their finances, while 29% of male Hispanic Internet users agree. Online Hispanic men are more likely than women to say that the Internet has helped them pursue their hobbies [9].

2.3.5 Internet and Teen-agers

Teenagers' use of the Internet plays a major role in their relationships with their friends, their families, and their schools. Teens and their parents generally think use of the Internet enhances the social life and academic work of children. However, there are aspects of the Internet that cause strain and make children and their parents' worry that these technologies are not an unqualified good in teens' lives [10].

The instant-message generation

Close to 13 million teenagers use instant messaging and this techno-communication has a key place in many of their lives. Talking to buddies online has become the information-age way for teens to hang out and beat back boredom. For most online teens, instant messaging has not replaced the telephone as the principle communications tool they use with their friends. But a fifth of online teens do say that IM (instant messaging) is the main way they deal with friends. A typical IM session for a teenager lasts more than a half hour, involves three or more buddies, and often includes friends from outside her community. And significant numbers of youth have used instant messages for serious kinds of communications such as telling their friends unpleasant things or starting and ending relationships [10].

Many teens manage and play with their online identities

Most online teens use different screen names and email accounts to manage their communications and the information that comes to them. Significant numbers also say they pretend to be different people and that they have been given false information by others. A quarter of online teens have built their own Web pages [10].

At times, parents and teens disagree about Internet and their family

Parents and their children often do not agree about the place of the Internet in their home. Many parents say they enforce time limits on their children's use of the Internet, but most teens do not say they have limits. Many parents say they occasionally check up on the Web sites their children have visited, but most teens do not think that happens. And many parents say they have sat with their children while they were online at least at some point, but teens do not report that. There is also disagreement about how dangerously tempting the online world is [10].

But there are times when parents and teens do see eye to eye

Both generations agree that teens know more than their parents about the Internet. They also agree that there are reasons for concern about the impact of the Internet on all teens.

The Internet helps at school

A tenth of American teens (11%) get their primary or only access to the Internet through their school. There is strong agreement among parents and teens that use of the Internet helps youth at school [10].

Online material is a teaching tool outside school, too

In addition to being a key resource for school, material on the Web teaches children in other ways. It helps establish their tastes and fills in their gaps of knowledge on sensitive subjects [10].

Not all teens use the Internet in the same way

There are significant differences between how boys and girls use the Internet and how young teens and older teens use the Internet. And, just as in the case of adults, experience with the Internet matters. Those who have more experience use the Internet differently from those who are newcomers to the online world [10].

2.4 Statistics from SaudiNIC

In this section we present some of the Internet related statistics for Saudi Arabia. These statistics are gathered from SaudiNIC [11]. Up until September 2001 there were 3437 active domains in the KACST database as shown in Table 2. The number of registered domains over the past six years indicates the continuous increase in most categories. It is also widely believed that there are a large number of domain names registered outside the Kingdom, mainly in the United States.

We are also monitoring the monthly registeration of new domains in Saudi Arabia. These values for the year 2001 are given in Table 3.

KACST has 384 C-Classes out of which 193 are distributed and 191 are currently available. These IP addresses are serving 40 customers, out of which 29 are ISPs and

	All	.com	.edu	.gov	.med	.net	.org	.sch	.pub
1995	1	0	1	0	0	0	0	0	0
1996	8	2	6	0	0	0	0	0	0
1997	24	23	0	1	0	0	0	0	0
1998	186	154	0	3	0	13	16	0	0
1999	1133	1004	11	34	13	17	43	11	0
2000	1470	1279	26	83	9	3	56	14	0
2001	615	500	11	43	7	21	27	6	0
All	3437	2962	55	164	29	54	142	31	0

Table 2: Active Domain names registered in the Kingdom as of September 2001.

	Jan	Feb	Mar	Apr	May
com	81	60	61	89	79
edu	2	1	3	1	3
gov	19	8	7	6	3
med	4	0	1	0	2
net	1	0	3	15	0
org	4	7	2	0	7
pub	0	0	0	0	0
sch	0	0	1	3	1
All	111	76	78	105	95

Table 3: Number of domain names registered in Saudi Arabia during the first five months of Year 2001.

18 educational and research organizations. These statistics are summarized in Figure 1.

	Block 1 (212.26.0.0/17)		Block 2 (212.138.0.0/16)		Total	
	Entities	IP numbers	Entities	IP numbers	Entities	IP numbers
IP numbers for ISPs	15	3.376	4	1.024	19	6.400
IP numbers for ISU	1	768	1	2.304	2	3.072
IP numbers for KACST	1	1536	0	0	1	1.536
IP numbers for Universities	6	18.176	4	13.824	10	32.000
IP numbers for Others	6	4.352	0	0	6	4.352
Total	29	30.208	9	17.152	38	47.360
Free IP numbers in the block	N/A	2.560	N/A	48.384	N/A	50.944

IP numbers Registered by RIPE for ISPs:

	Entities	IP numbers
IP numbers for ISPs	31	223.592

Total IP numbers for Saudi Arabia IP space	270.592

Figure 1: IP numbers registered by SaudiNIC

2.4.1 Estimating the number of Internet users in KSA April 2001

Given and Assumptions: Number of modem ports sold to ISPs 26,633 ports Modem ports to number of subscribers ration is 1:10 Estimated number of users per 64kbps line 16 users Number of leased lines (64 kbps) sold 669 lines Total bandwidth sold to Non-ISPs 20 Mbps User-to-subscriber ratio is estimated at 2.5

Calculations: Estimated number of dial-up subscribers 26,633 x 10= 260 633 users

Estimated number of leased line subscribers 669 x 16= 10 704 users

Estimated number of non-ISPs subscribers 20 x 1024 x 32 / 64= 5 120

Total estimated number of subscribers 260 633+ 10 704+ 5 120= 276 457

Estimated number of users: 276 457 x 2.5= 691 142

Estimated number of subscribers: $\tilde{2}$75,000 Estimated number of users: $\tilde{6}$90,000

2.5 Key Findings

Following are the key findings of the survey obtained from the questionnaire with more than 1000 respondents. Refer to the graphs in the appendix 7 for details.

- Almost 80% of the respondents were in the age groups of 16-35.
- More than 3-quarters were male.
- Almost 40% were students. Professionals and Administrative staffs were 14
- Majority of the respondents were college graduates (39%)
- More than 80% accessed from a major cities i.e., Jeddah, Riyadh or Dammam
- More than 3-quarters were using for 2 years or more.
- About 40% use Internet for 'fun' for 1-5 hours
- More than three-fourths have more than 1 email address.
- Arabic was preferred language for Internet more than English.
- Internet has helped people staying connected to their family (48%), profession (45%) and sharing hobbies (45%).
- Internet was mainly used for (except email), Internet Telephony (44%), Streaming Audio (43%) and Discussion forums (37%).
- Subscription to web-based email is most common. (41%).
- Most used search engine is Yahoo (65%).
- Most organizations use Internet for Training and Development (46%).
- Majority of the people (42%) search Arabic websites for information on personal needs

- However, the major reason not use Arabic language sites were, very few Arabic websites (23%) and lack of content (21%).
- More than two-third of the people feel that they are more connected to similar type of people.
- The most important factors while using Internet were Speed (63%), Accuracy of information (56%) and privacy (47%).
- More than half of the respondents use Internet from their homes daily.
- Most common daily activity is checking news (39%), weekly activity is finding medical information (20%) and monthly activity is getting information about products and services.
- Most people agree that Internet for shopping and banking would make life easier (38%).
- More than half agree that there should be stricter laws ensuring child privacy.
- The biggest problems with the Internet in the Kingdom were as follows in order of difficulty: Slow speed when connected, sites require registration, sites with too many graphics and cannot find information easily.

3 Arab Demographics and Content on the Web

3.1 Introduction

Estimating and measuring Arabic content on the Internet is not an easy task, since there is few statistical data, and fewer organizations that hold such research. There is, though a good number of conducted research on the middleast found in the form of comparisons with other areas rather than dedicated research.

Such a task is considered an inexact science because there is no tangible measurement tool or process to accurately report size of Arabic media such as number if informative Arabic pages and webs, as well as measurements of usage patterns and cultural content. The Internet and the web have been around for nearly two decades by now, and one would expect a big Internet community as well as a large number of pages, users, domain namesetc. Although this is a fact world wide, it does not necessarily apply on Arabic web content, since Arabic presence on the Internet started to take place only in the early nineties (a little bit more than a decade), and mostly in the very late eighties. Here we will present different statistical data and comparisons on different forms of Arabic presence on the Internet. At the same time we are running a questionnaire to reflect and put forth our own study and research, the result of such study will be presented and analyzed in future reports of the project.

3.2 Domain Names and Hosting Statistics

In the last few years number of domain names registered in Arab countries started to increase. Table 4 shows number of domains for selected Arab countries. Compare this with the total number of domains registered worldwide 36,115,715 and the total number of .com domains registered world wide 22,373,097 [1], as reported by DomainStats in their 2000 report.

If we compare results from Table 4, we will notice the largest number of domain names is in Jordan; which is justified by the early introduction of the Internet in the country, and Saudi Arabia, justified by the large number of business in the country who were waiting for Internet to come in.

Internet entered Saudi Arabia in late 1997 and early 1998. Being a conservative Muslim kingdom, Saudi Arabia began allowing public access to the Internet only in early 1999.

[1]NetNames International Ltd., Domain Stats, www.domainstats.com, 2001

Domain	No.
Bahrain (com.bh)	52
Iraq (iq)	2
Jordan (com.jo)	769
Jordan (edu.jo)	53
Jordan (gov.jo)	84
Jordan (jo)	9
Jordan (net.jo)	19
Jordan (org.jo)	69
Oman (om)	14
Qatar (com.qa)	43
Qatar (org.qa)	5
Qatar (qa)	7
Saudi Arabia (com.sa)	2962
Saudi Arabia (net.sa)	54
Saudi Arabia (org.sa)	142
Syria (com.sy)	3
Syria (net.sy)	3
Syria (sy)	3
Yemen (com.ye)	64
Yemen (net.ye)	6
Yemen (org.ye)	18

Table 4: Estimated number of domain names in some Arab countries.

The kingdom has licensed 37 companies on Feb 03, 1999 to provide Internet access, seven are already in operation and 85,000 subscribers were expected to be online by the end of 1999.

Currently there are around 600,000 Internet users in the kingdom and the number is rising by 20 percent every year, 78 % of them are males and 22% females. The average Saudi Internet between 24 to 31 years of age spends 3 and 1/2 hours daily on the Internet. Most users get online through some 200 Internet cafes in the kingdom (DITnet).

According to Netcraft Survey (http://www.netcraft.co.uk), the number of sites in .sa domain nowadays is 772 sites, and there are 9 sub domain matches. Table 5 and 6 show different kinds of servers being used in Saudi Arabia, compared as reported in February of 1999 and June of 2001 [12]. From this data we can notice that although Apache is not the most favorite server nowadays it is still on the top of the usage list, more on, if we look at server count data introduced in Figure 2[2] , about Saudi Arabia used for different internet services, from this figure we can see that mostly used platforms for running internet services are Unix-based (Linux, BSD, Solaris, AIXetc.) rather than Microsoft platforms as one would expect, the main reason for such findings in 1999, is that most internet services were ran by either armatures who usually provided dial-up BBS services, or companies that use such services as technical corporate solutions in their intranet, but mostly not yet by ISPs and internet businesses who would follow the Microsoft trend in platforms and licensing.
Being a conservative country, Saudi Arabia also runs firewalls and advanced proxy mechanisms that enable it to ban up to approximately 500,000 Internet sites by the year 2001 (Nua Ltd.), these are sites considered as offensive in different aspects. In year 2000 Saudi authorities blocked access to part of the U.S.-based Yahoo portal and

[2]http://www.teleport.com/t̃bchad/stats1.html

Server	Number	Percentage
Apache	65	52.42%
Rapidsite	29	23.39%
Microsoft-IIS	17	13.71%
Netscape-Enterprise	7	5.65%
CERN	2	1.61%
FrontPage	1	0.81%
Lotus-Domino	1	0.81%
IBM-Secure-Export-ICS	1	0.81%
NetNames Apache	1	0.81%

Table 5: Different servers in Saudi Arabia by Feb., 1999

Server	Number	Percentage
Microsoft-IIS	1074	51.19%
Apache	799	38.08%
Netscape-Enterprise	142	6.77%
Rapidsite	24	1.14%
unknown	20	0.95%
Lotus-Domino	12	0.57%
Other	27	1.29%

Table 6: Different servers in Saudi Arabia by June, 2001

Domain: .sa
D-Name: SAUDI ARABIA
Service: ftp+news+www
Date: April `99

Host OS recognized	count	%recog
Linux	88	34.2
BSD Family	45	17.6
IRIX	39	15.2
Windows 95/98/NT	23	9.0
Solaris/SunOS	22	8.5
AIX	3	1.2
Mac/Apple	1	0.3
Digital Unix	1	0.3
HPUX	1	0.3

Domain: .sa
D-Name: SAUDI ARABIA
Service: www
Date: April `99

Host OS recognized	count	%recog
Linux	67	36.8
BSD Family	25	13.8
IRIX	23	12.7
Solaris/SunOS	20	10.9
Windows 95/98/NT	16	8.8
AIX	3	1.7
Mac/Apple	1	0.4
Digital Unix	1	0.4
HPUX	1	0.4

Figure 2: General count statistics on different platform servers used for different Internet service in Saudi Arabia.

America Online to block out sites containing pornography. Saudi Arabia has one of the most advanced systems to curb access to the Internet. Still, 44% of users in the kingdom are successful in gaining access to the barred sites, which can be accessed through proxy servers elsewhere in the world [13, 14].

A new technology and boom in Internet in the Arab world is Arabic Character URL address [15], nearly 75,000 Web Sites to date have registered an Arabic character URL address using any of the several technologies available to bypass the Latin character-based Internet domain name system, noted by Pyramid Research. A frontrunner, NativeNames.net, has already emerged, increasing the likelihood that its technology will become the region's standard.

Pyramid Research claims that the growing prevalence of Arabic character domain names stand to boost Internet adoption across the Middle East and North Africa. Viewed in a broader context, the "Arabisation" of the Web content and computer interface are major drivers of Internet uptake. It is also projected that the market for names within the Arab world alone will be worth US $126 million over the next two years. 45% of the demand will come from Egypt, the most populous Arab country, where the government aims to make dial-up Internet access free by October 2001. Another 43% would come from the GCC states, led by Saudi Arabia and the UAE. Most of the remaining 12% will be divided between North Africa and the Levant, with Morocco and Lebanon contributing the lion's share [15].

3.3 Demographics and Arab Penetration of the Internet (from history to facts)

In the Middle East, there has been a dramatic increase in the number of people accessing the Internet from home, according to a report from DITnet (Dabbagh Information Technology - www.ditnet.co.ae, Aug., 1999), An estimated 72% of users in the Arab world access the Net at home. In contrast, 22% go online primarily at work, 4% at educational institutions and 2% in Internet cafes. In terms of education levels, an estimated 44% of users hold bachelors degrees, while 18% have post-graduate diplomas or master degrees. 3.5% of those surveyed hold PhD or doctoral degrees. While the majority of users remain highly qualified, there was a 10% increase in the number of users that had high-school level education or less at 27%.

The biggest group of users 37.7% are aged between 27 and 35, with 31.9% of users aged between 21 and 26. In the older age groups, 15.7% of users are aged between 36 and 45 with just 4.5% aged over 46 (Table 7). The survey also looked at the distribution of users across the professions. It found that computer and telecom engineers account for 15% of users, with 'other' engineers accounting for 11.1% of users. Computer and technical technicians account for 10% of users with management and technical consultants accounting for 5.4% of users. Overall, an estimated 1.1 million people in the Middle East are online, according to the 1999 report.

The average rate of users to each account holder in the region is 2.5, except Egypt

Age Group	Percentage
21-26	31.9%
27-35	37.7%
36-45	15.7%
Over	4.5%

Table 7: Distribution of Arab age groups using the Internet. (DITnet, 1999)

where it stand at 4, according to estimates made by the research unit of Internet Al-Alam Al-Arabi (IAW - http://www.iawmag.com) magazine, which is published by the Dabbagh Information Technology Group [16]. This unusually high growth rate, which stood at a pan Arab average of 43%, is mainly due to the Saudi Arabian market where Internet connection became locally available only at the beginning that year (1999). Before that, Internet access in 1998 became mainly available in the eastern parts of the kingdom through ISPs in Bahrain. Local access, however, attracted more than 26,000 subscribers in four months, which enlarged the online community to 45,000 accounts - an impressive growth of about 140 percent for the period [16].

Internet access in Egypt, the most populated Arab country, grew by 42% to reach about 52,000 subscribers, or more than 200,000 users. The United Arab Emirates ranked fourth in the growth rate - 34% - but it remained ahead of all Arab countries in hosting the highest number of Internet accounts; about 82,000. Meanwhile, the number of account holders in Kuwait surged to 25,000; 14% growth, followed by Jordan; 20,000 accounts, 21% growth (see Table 8) [16].

A common problem faced when conducting such surveys is to arrive at the most realistic estimates when some of the ISPs tended to inflate the size of their clients to save face with the competition. At DITnet Various techniques were used to take all variables into account, and the result of the survey still offer the most accurate statistics in the Arab Internet market, with an error margin of (5%).

Rank	**Country**	**Subscribers Dec '98**	**Subscribers Apr '99**	**Users Apr '99**	**% Growth Dec'98-Apr'99**
1	UAE	61,200	81,700	204,300	33.5 %
2	Lebanon & Syria*	30,700	52,900	132,200	72.3%
3	Egypt	36,400	51,800	207,200	42.3 %
4	Saudi Arabia**	18,700	45,000	112,500	140.6 %
5	Kuwait	22,000	25,100	62,800	14.1%
6	Jordan	16,600	20,100	50,300	21.1%
7	Oman	12,700	16,000	40,000	26.0%
8	Tunisia	4,700	6,000	15,000	27.7%
9	Morocco	11,200	14,100	32,500	25.9%
10	Bahrain**	11,700	13,000	32,500	11.1%
11	Qatar	8,500	11,000	27,500	29.4%
12	Yemen	2,200	2,500	6,300	13.6%

Table 8: Growth of Arab Internet population when it was introduced to Saudi Arabia and most of the other Arab countries in early 1999 (www.ditnet.co.ae). *Statistics were rounded to the nearest 100. Margin of error: ±5. * Syrian subscribers form a small portion of the combined statistic. They mostly have only e-mail connection. ** Saudi statistics are conservative and could rank much higher. Bahrain statistics include Saudi subscribers - excluded from Saudi statistics.*

On the other hand an in the year 2000, Internet user population in the Arab world has grown to around 1.9 million, according to the latest survey by the Research Unit of Internet Arab World (http://www.iawmag.com) magazine, which was conducted on the first week of February. Analysts at the unit have predicted that the number of users in the region will increase to about 12 million by the end of 2002 [17].

The number of Internet account holders in the region has risen from 338,000 at the end of April 1999 - when a similar survey was made - to 545,000 on February 1, an increase of 62%. Though the growth rate is also high in the number of Internet users, they constitute only 0.7% of the population of the Arab world, which stands at 280 million. However, the annual growth rate in the number of users is expected to slightly increase and average at between 80 and 100% during the next three years.

We can clearly see from the presented data above that the number of Internet users in the Arab world is doubling every year, and it is expected to reach 6 million users by the end of 2002, it is though most feared that the infrastructure would not be able to cope with the pressure. The growth rate for the number of Internet users would then decline in most Arab countries [17].

Table 9 shows the number of internet users in each Arab country as well as the average number of users per one internet account, as found in year 2000, we can see that United Arab Emirates has the biggest internet population, while if we look at the average number of users per account is highest in Egypt, this we justify by the fact that Egypt has the biggest average of individuals per household, also other countries have a high average of Internet users per account (more than or equal to 4) due to the fact that the Internet is still considerably expensive in these countries.

The survey conducted by DITnet also showed that there are about 500 leased lines used in Arab countries, which reflected the findings of a user profile survey conducted in 1999 by the Research Unit which showed that Internet use in the Arab world was much more prevalent at home than in the office. The majority of respondents in that survey, 72%, said home was the primary place where they accessed the Internet, while only 22% said it was the office.

Table 10 shows the latest survey of Arab web users made by Ajeeb.com in March, 2001 [18].

If one is to compare the growth of users in Saudi Arabia for example, since 1999, when the Internet started; one would notice that in 1999 the number was 112,500, in 2000 it grew to 300,000 and recently in 2001 it is 570,000 (a growth of 500% since 1999). From the same table we can also notice how the total number of users in the Arab world increased from 1 million in 1999 to 2 million in 2000 and to now near 4 million by the end of 2001.

From Table 10 we can notice also that Internet penetration is highest and fastest in the United Arab Emirates, according to Ajeeb.com study carried on March 15, 2001 [18], within a period of one year, since mid-March 2000, more than 1.5 million new users have joined the Arab Internet community. By the end of the current year 2001, Ajeeb.com predicts that the five-million-user mark, which is almost two percent of the entire Arab population, will be crossed. Further forecasts by the portal see that by the end of 2002 the count to reach some 10 to 12 million.

The UAE, meanwhile, achieved the 22nd ranking worldwide in the number of Internet users as compared with country population, thus outranking Central and Southern Europe and even some of the highly industrialized West European countries like France. The growth rate represented one of the highest in the world. The United States still leads the Cyber world, with 60 percent of its population accessing the Internet, according to Nielsen/NetRatings, a leader in Internet surveys. Other leading countries in descending order include Sweden, Norway, Iceland, Canada, Hong Kong, Denmark, Holland, Singapore, Australia, Finland, New Zealand, Austria, South Korea, Switzerland, United Kingdom, Japan, Taiwan, Ireland, Belgium and Germany. The UAE, however, outranks Italy (24), France (19) and Spain (15) [18].

Country	**No. of Subscribers**	**No. of Users per Account**	**Total No. of Users**
UAE	160,000	2.5	400,000
Saudi Arabia	100,000	3	300,000 growth rate 160% (highest in the region)
Bahrain	15,000	2.5	37,500
Libya	1,500	5	7,500
Sudan	2,000	5	10,000
Qatar	18,000	2.5	45,000
Oman	20,000	2.5	50,000
Kuwait	40,000	2.5	100,000
Egypt	55,000	8	440,000
Yemen	3,000	4	12,000
Lebanon	65,000	3.5	227,500
Syria	4,000	5	20,000
Jordan	25,000	3.5	87,500
Morocco	15,000	3.5	52,500
Tunisia	22,000	5	110,000
Total	545,500	3.5 (total average)	1,899,500

Table 9: Breakdown of Internet Users Numbers in Arab World in year 2000 (DITnet)

Rank	Country	Subscribers	Users per Connection	Total Users	% of Population
1	UAE	220,000	3	660,000	24.44
2	Bahrain	35,000	3	105,000	16.67
3	Qatar	25,000	3	75,000	10.27
4	Kuwait	55,000	3	165,000	8.25
5	Lebanon	75,000	3.5	262,500	6.56
6	Jordan	35,000	6	210,000	4.57
7	Palestine	12,000	5	60,000	3.53
8	Oman	28,000	3	84,000	3.36
9	Tunisia	70,000	4	280,000	2.89
10	**Saudi Arabia**	**190,000**	**3**	**570,000**	**2.59**
11	Egypt	70,000	8	560,000	0.82
12	Morocco	55,000	4	220,000	0.73
13	Algeria	45,000	4	180,000	0.6
14	Libya	4,000	5	20,000	0.4
15	Syria	8,000	4	32,000	0.18
16	Yemen	3,500	4	14,000	0.08
17	Sudan	7,000	4	28,000	0.08
18	Iraq	500	25	12,500	0.06
	Total	**938,000**		**3,538,000**	**1.29**

Table 10: Number of Internet subscribers and users in the Arab world - March 15, 2001 in a research conducted by Ajeeb.com

Among the interesting findings of the survey were excessively high numbers of users per account such as in Jordan, which was mainly due to the popularity of Internet cafes among the majority of the population who could not afford the relatively high access rates at home, while in Egypt, universities serve as a gateway for thousands of students and staff. Due to the absence of Internet accessibility from home and a host of other reasons, mainly resulting from the sanctions imposed by the United Nations, Iraq had by far the highest rate of 25 users per account [18]. There are also 500,000 native Arab-speakers online in the U.S [19].

All those 3.54 million internet users in the Arab world, in addition to Arab communities living abroad, are able to access the very latest news and information most relevant to them in either Arabic or English languages; because of the availability of websites in their native language. Global Reach (http://www.glreach.com/gbc/en/english.php3), an advertising company, has made a survey of languages used on the Internet in July of 2000, Table 11 shows the percentage of web pages by language [20]

Language	**Web Pages**	**Percent of Total**
English	214,250,996	68.39
Japanese	18,335,739	5.85
Chinese	12,113,803	3.87
French	9,262,663	2.96
Turkish	430,996	0.14
Greek	287,980	0.09
Hebrew	198,030	0.06
Arabic	127,565	0.04

Table 11: Web Pages By Language

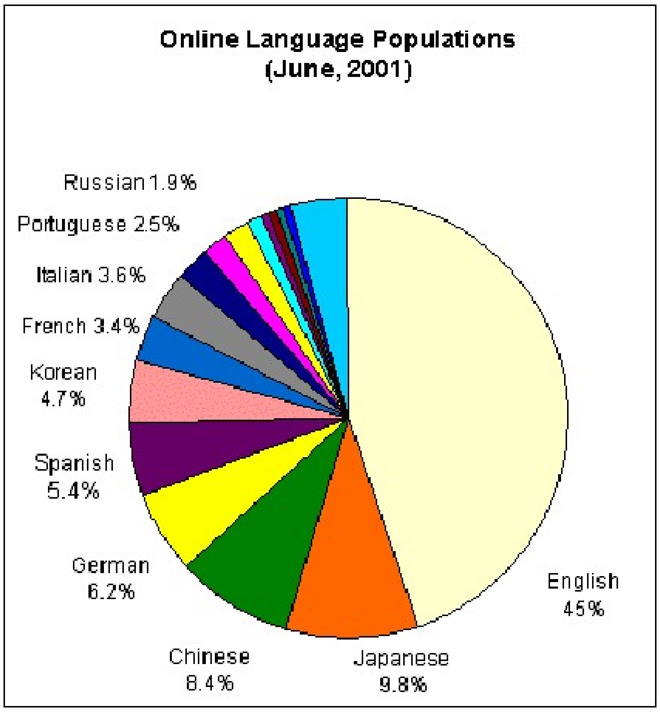

Figure 3: Online Language Population in 2001 (Global Reach - www.glreach.com).

Compare the data in Table 11 to data in Figure 3, which shows Internet population by language rather than the usual case, by country. This pie chart is generated by Global Reach in June 2001, and it shows that Internet Arabic-speaking community is less than 1.9% of the overall online population in 2001 [19, 21].

Internet penetration in the Gulf Co-operation Council (GCC) region is more than fifteen times higher than in the Arab world as a whole, according to new findings from Insights Research. The GCC region includes Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Emirates. Although these countries account for less than 12 percent of the Arab world's population, more than 60 percent of the region's Internet users live in these countries. This information is unsurprising as the general population of the GCC countries tends to be high earning and well educated. The GCC countries also have well-developed banking and communications infrastructures in place. Taking these factors into account, the Insights Research report predicts that prospects for B2C E-commerce and online trading in the GCC region are healthy. Meanwhile, Internet penetration rates in the Arab world in general (also known as the MENA or Middle East and North Africa region) tend to be quite low, as are credit card penetration rates and consumer purchasing power rates.

3.4 Case Study

A perfect example of a successful Arab business on the Internet, is the well-known portal Maktoob.com. Launched in Oct., 1998 in Jordan with only 992 registered users, this portal company has been growing very fast and setting a perfect study case for both an Arab Internet business model (including e-commerce) and a model Arab Internet community.

Starting with only a simple web-based Arabic email service that enabled users to send and receive email in Arabic language, Maktoob.com now provides a variety of services including: e-cards, votes and polls, web search engine, games, chat, weather, job center and search engine, online radio, e-shopping and e-commerce and a many other services that cover most of what Arabs would really like to see on the Internet. Maktoob.com now supports a community of 1,554,619 registered users (registration for free) increasing at an amazing rate of 3500 users per day, for example 103,720 people signed up between 01-31 August of 2001. Table 12 shows the distribution of Maktoob.com users from different countries in the Arab world[3].

Although Maktoob.com started in Jordan, we can notice its popular growth in Saudi Arabia from Table 12, mostly attributed to providing an Arabic interface. Also, they are now using different business methods and advertising to target the GCC area. An amazing figure also is that of Libya which made it in the top 10 list of Table 12, when it just started having Internet access this year (2001).

[3] *AllstatisticsonMaktoob.com(Makstats)arecourtesyofMr.MarwanIbrahim, SalesManagerofMaktoob.com*

Rank	Country	Percentage
1	Saudi Arabia	17.93
2	Egypt	13.06
3	Jordan	9.05
4	UAE	6.52
5	Kuwait	6.28
6	Morocco	5.72
7	Palestine	3.76
8	USA	3.11
9	Libya	2.88
10	Oman	2.63

Table 12: Percentage of Maktoob.com portal users ranked according to country. The countries that rank 11-20 are as follows (in order): Lebanon, Sudan, Algeria, Yemen, Bahrain, Syria, Canada, Qatar, United Kingdom and Australia. (maktoob.com), Oct., 2001.

When the service started it had an English interface only. Now having both interfaces, users started shifting from using English to using Arabic interface slowly, and now 71.2% of the users use the Arabic interface of the site, while the other 28.8% use the English one. Subscribers using the Arabic interface have a higher frequency of log-ins to the portal site.

Of all the maktoob.com population 76% are males and 23% are females (see Table 13), which is very fair, provided the fact the females make up 20% of Internet users in the Arab world (Maktoob.com, 2001). Looking at Tables 11 and 12, we notice that the largest group of Maktoob users are students, constituting 28%, and the largest age group would be from 18 to 25, constituting 41% , which goes very well with fact from Table 13 that most users are students.

Gender	**Percent Users**
Male	76.03
Female	23.14
Not yet defined	0.83

Table 13: Distribution of maktoob.com users based on gender (Oct., 2001).

Acknowledgements

We would like to acknowledge the great help offered by Mr. Ziad Al-Masri, Mr. Marwan Ibrahim of Maktoob.com, Miss Natasha Twal and Mrs. Nadine Toukan of Arabia.com, and the great contributions of Mr. Abdullah Hamzah and the encouragement and support of Miss Rania Abu-Samaha. Thank you all.

Occupation	Percentage
Student	27.83
College/Graduate Student	10.37
Computer Technical/Engineering	7.45
Professional (doctor/lawyer, etc.)	6.14
Executive/Managerial	4.96
Sales/Marketing	4.92
Academic / Educator	4.45
Other Technical/Engineering	3.89
Banking	2.72
Other	27.27

Table 14: Maktoob.com users distribution by occupation (Oct., 2001).

Age	Percent
Users Under 18	14.82
18-25	41.14
26-35	27.30
36-45	6.86
46-55	3.14
56 and Over	3.84
Not Defined	2.9

Table 15: Maktoob.com users distribution by occupation (Oct., 2001).

4 E-Commerce

Internet is enormously changing the way we interact and it is also creating immense opportunities for socio-economic development of a country. Electronic Commerce (e-commerce) is the capability of buying and selling products and information over the Internet and on-line services by automating the business transactions and work flow. It is the application of Internet technology to help foster business process and communications for cost effectiveness, efficiency and improved relationships between partners. These partners can represent business organizations, government departments, customers, suppliers, or citizens. An e-commerce system can be categorized as either a retail system (business to consumer) or a business-to-business.

In this section we report our study of E-commerce in Saudi Arabia. First we cover the e-commerce benefits. As e-commerce is a global imperative, therefore we analyze global, regional and local environments. We also report preliminary results of our survey.

4.1 E-Commerce Opportunities

E-commerce offers enormous opportunities for business organizations, government departments, and citizen for improving their relationships, and adds value to their interactive processes. The key benefits of e-commerce are as follows:

- **Market development**: Markets are being developed and tapped as awareness grows among the local entrepreneurs about the potential of e-commerce and connectivity progresses. In the Middle East, Arabic software companies expect to generate 33% of their sales through the Internet over the next 2-3 years. One Egyptian ISP estimates that the growth rate of e-commerce in Egypt will be 1000% in the next 12 months [22] (Source: Internet Arab World , IAW). Multinational companies expect revenue from e-commerce to grow 100% in the same period.

- **Reduced Costs**: Anyone can become an online merchant with a modest investment in basic PC equipment and connectivity costs. Actually, it is much more expensive to open a physical store than a cyberstore which provides access to the global markets, fewer variable costs and a 24 hours a day operation. Moreover, it will not be necessary to build a separate distribution network which has prevented small and medium sized entities in developing countries from exploring markets abroad. Moreover, Internet based procurement helps companies to save costs with added advantage of speed.

- **Diversification**: According to several studies, e-commerce growth outside the US, Europe and East Asia is picking up. It is expected that languages used online will be diversified along with the increase of non-English Internet users. In fact, more and more websites offer other language options than English. It is expected that language barriers will gradually recede and the content created in local languages will increase.

- **Technological innovations**: Technological innovations and breakthroughs can help the poor in the developing countries to leapfrog into e- commerce. Video conferencing and online telephony are powerful tools to communicate with buyers located far away.

- **Global Reach**: Internet technologies reduce the importance of time and distance by speeding up processes and allowing companies to operate regardless of their geographical location. Moreover, the Internet gives rise to the emergence of virtual, worldwide companies taking advantage of time differences to organize worldwide interlocking shifts and relays which allow projects to be completed in a fraction of time and costs.

- **Convenience**: E-commerce enables consumers and citizens to access information and services at any time from anywhere at their own convenience.

- **Competitive Pricing**: New technologies will favor competitive prices by companies in developing countries. E-commerce also gives consumers in developing countries a wide range of product selection from among products and services with transparent, competitive prices.

- **Higher Productivity and Efficiency**: E-commerce helps organizations in reducing cycle times of their services with less resource consumption.

- **New employment opportunities**: E-commerce will be able to bring about new employment opportunities. These opportunities arise with the introduction of new products, expanding demand for goods and services, tapping into and creation of new markets, the emergence of new type of services (viz. ISPs or content providers for software or programming in local languages) and related secondary and tertiary effects.

4.2 E-commerce Challenges

The potential benefits of e-commerce for the developing world are immense. Any company can enter global markets where size and location have become rather irrelevant. Although conditions and costs for market entry have been lowered, obstacles still exist for actors from developing countries. This section will focus on some of the challenges and constraints.

- **Awareness**: There is currently a lack of awareness and knowledge in developing countries about e-commerce especially among the private sector. There are regional differences in the level of awareness.

- **Infrastructure and access**: Lack of telecommunications and Internet connectivity, access to hardware and software are few of the major bottlenecks to the expansion of e-commerce to the developing world. Indeed, the gap between industrialized and developing countries in terms of infrastructure and access is huge and growing.

- **Human Resources**: Another major constraint in developing countries is the availability of trained and skilled manpower. It should become one of the priorities of developing countries to promote computer literacy and Internet-related skills among the workforce. This should be complemented by programs to train and retain skilled IT professionals.

- **Legal and regulatory framework**: A proper regulatory framework must be in place for e-commerce to prosper. Existing laws and regulations might not be applicable as some of the online services do not exist in the physical world and boundaries between services as well as industries have become blurred.

- **Taxation**: Taxation is another issue of concern and contention. If there will be the projected dramatic shift from physical transactions, normally subject to sales and other taxes, to virtual online transactions, free from any transactional tax, the tax base of local, state and federal governments might become eroded.

- **Financial institutions and intermediaries**: So far, financial institutions and banks in developing countries are some what reluctant to take an active role in promoting e-commerce. Merchants need the involvement of banks to broaden the reach and appeal of e-commerce and to help prevent fraud and potential losses due attributable to credit card fraud. For countries where credit cards are not common place, banks are challenged to develop alternative modalities for secure and reliable online transactions. This may require the development of smart and/or cash card operations based on biometric user identification.

4.3 Global E-Commerce Trends and Directions

The Internet is already changing the way that many companies conduct their business. As that influence grows and more companies use the Internet, the possibilities for conducting business-to-business (B2B) and business-to-consumer (B2C) commerce on the Internet will expand greatly, and become more of a routine part of commerce than it is today. The availability of information, the speed of access to sources of information as well as the links with global markets is revolutionizing people's way and quality of life in conducting businesses. With developments in e-technology, more people and governments are increasingly using the Internet to conduct their day-to-day activities. This is becoming essential for all societies in order to be able to interact with the world at large in an efficient and convenient manner.

4.3.1 Online Population

Estimating the worldwide Internet population is, at this point in time, an inexact science. There are many estimates with varying count. Internet users have soared from 171 million in 1999 to 304 million in March 2000 [23]. This phenomenal growth of Internet is enabling e-business around the world as shown in Figure 4 [24].

Current predictions indicate that Internet users could exceed the 1 billion mark by 2005, with 700 million located outside North America [23]. Although home users predominantly use the Internet for information and entertainment, as shown in Figure 5, its usage for business is also growing where e-commerce is becoming the fastest growing sector on the Internet.

Internet by nature is non-geographical. Yet its geography could be defined by users and the information exchanged and posted on the web. Over the last decade US users and English language content have defined the Internet as a U.S.-centric environment (Figure 3 [19]). However, as more and more users become on-line in Europe and Asia,

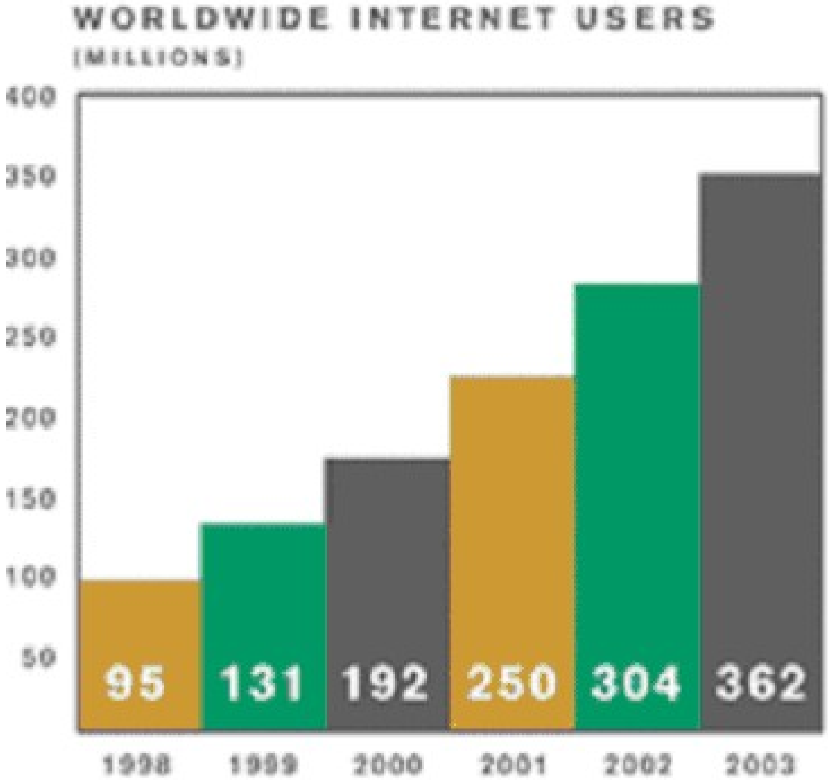

Figure 4: Growth in World Wide Internet Users. Source Nielsen/Netrating 2001.

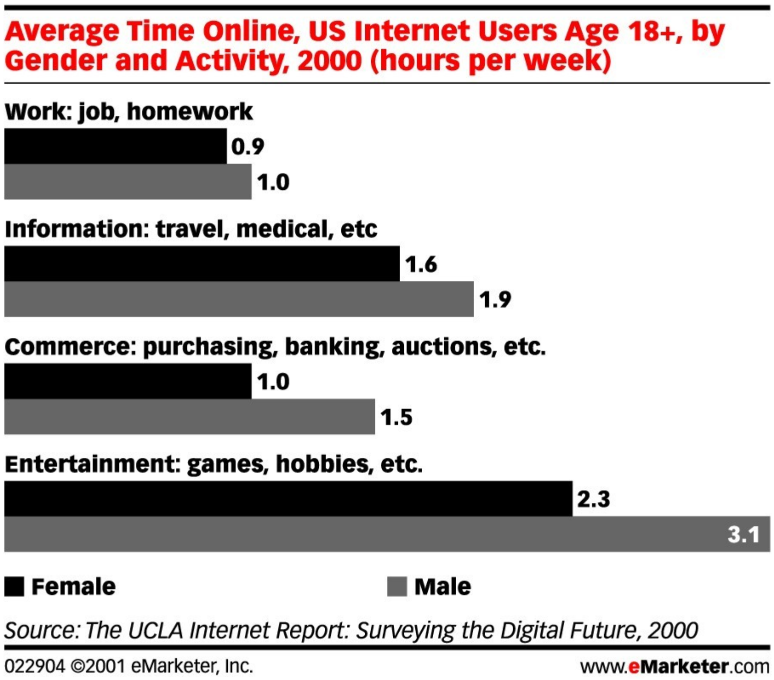

Figure 5: Average time on-line, US Internet Users and their activity. Source eMarketer.com.

Internet is becoming multi-cultural, multi-lingual and multi-polar. It is predicted that English will loose its dominant position on the World Wide Web in favor of increased linguistic diversity.

4.3.2 Global E-Readiness

World economic growth increasingly depends on information and communication technologies and the abilities of countries to collect, process and use this information. "E-Readiness" describes the extend to which a country's environment is conducive to the Internet-based commercial opportunities. It is a concept that spans a wide range of factors, from the sophistication of the telecoms infrastructure to the security of credit-card transactions and the literacy of the population. An advanced state of national E-Readiness is needed wherever business is to flourish and economies are to grow. Detailed national level analysis creates opportunities for business and government to come together to improve the nation's ability to participate in the digital economy.

The Economist Intelligence Unit (EIU) and Pyramid Research have carried out an extensive E-readiness ranking of sixty countries [26]. The have quantified the e-readiness of a country on the basis of six categories. These six categories and their respective weight in the final model are given below.

- **Connectivity (30%)**: "Connectivity" measures the access that individuals and businesses have to basic fixed and mobile telephony services, including voice and both narrow-band and broadband data. Afford-ability and availability of service (both a function of the level of competition in the telecoms market) also figure as determinants of connectivity.

- **Business environment (20%)**: This evaluation is based on criteria such as the strength of the economy, political stability, the regulatory environment, taxation, and openness to trade and investment. The resulting "business environment rankings" measure the expected attractiveness of the general business environment over the next five years.

- **E-commerce consumer and business adoption (20%)**. Payment and logistics systems form the backbone of this set of criteria. It evaluates the extent of credit-card ownership as well as the existence of secure, reliable and efficient electronic payment mechanisms, the ability of vendors to ensure timely and reliable delivery of goods, and the extent of website development by local firms.

- **Legal and regulatory environment (15%)**: The legal framework governing e-business is a vital factor than can enhance or inhibit the development of electronic trading. The extent of legal support for virtual transactions and digital signatures. Ease of licensing and the ability of firms to operate with a minimal but effective degree of regulation are other criteria.

- **Supporting e-services (10%)**: This criteria include portals and other online intermediaries, web-hosting firms, application service providers (ASPs), as well as website developers and e-business consultants. The rankings assess the extent to which local companies and organizations have access to these services.

- **Social and cultural infrastructure (5%)**: It covers the education and literacy that are necessary preconditions to a populations ability to navigate the web and drive future domestic Internet development. Furthermore entrepreneurship and risk-taking play such an important role in building new e-commerce models, which measure the national proclivity to business innovation and receptiveness to web content.

This e-readiness ranking of EIU draws some important conclusions:

- **Policy**: The Internet has evolved so successfully precisely because it escaped government notice and thrived on self-regulation. A prerequisite to affordable Internet access, for instance, is a competitive telecoms market. So for countries where a monopoly provider has traditionally supplied a large chunk of state revenues, e-business cannot take flight unless the government moves boldly and firmly to liberalize the sector.

- **Agility vs Size**: The size of the country doesn't mean a high rank for e-readiness. India, for instance, ranks 45th, despite a world-class cadre of software programmers and a booming outsourcing industry for everything from call centers to medical transcription. The same is true for China as well. The two countries score poorly despite such pockets of promise because poverty, illiteracy and infrastructure inadequacies prevent e-business from gaining critical mass.

- **Wealth**: Wealth does not automatically translate into e-business prowess; this is clear if the rankings are compared with figures on GDP per head. A strategic embrace of high-tech industries and broadband Internet access can help a nimble economy like Taiwan leap-frog a GDP heavyweight such as Japan in "e-readiness", and puts South Korea ahead of wealthier Italy.

- **Diversity**: North America and Western Europe are easily the leaders in E-Readiness ranking, but elsewhere the outlook is more ambiguous. Asia is a study in contrasts, with stand-outs such as Singapore, Hong Kong and Taiwan and laggards like Pakistan and Vietnam. More uniform regions offer contrasts as well. Although countries in Latin America and Eastern Europe cluster at the middle of the rankings, Hungary is a far cry from Ukraine and Chile is a world away from Ecuador. Even Africa and the Middle East, where scores are generally low, boasts aspiring digital economies such as Egypt and South Africa.

EIU has divided the countries into four groups as shown in Table 16. United States is the most e-ready country listed in the World. Both the Egypt and Saudi Arabia are among the e-commerce followers group. These groups are described as follows:

- **E-business leaders**: These countries already have most of the elements of "e-readiness" in place, though there are still some concerns about regulatory safeguards.
- **E-business contenders**: These countries have both a satisfactory infrastructure and a good business environment. But parts of the e-business equation are still lacking.
- **E-business followers**: These countries–the largest group in our rankings–have begun to create an environment conducive to e-business, but have a great deal of work still to do.
- **E-business laggards**: These countries risk being left behind, and face major obstacles to e-business growth, primarily in the area of connectivity.

As shown in Table 16, US is the most e-ready country followed by Australia and UK. Both Egypt and Saudi Arabia who represent the Arab countries are among the e-business followers group. Saudi Arabia stands 44^{th} rank out of 60 countries.

4.3.3 Internet Business Models

Traditionally Internet business models have revolved around two basic designs, on-line retailing or content providers. The emphasis on the content providers is to capture and retain users to leverage either advertising fees or service charges. Contrary to this, online retailers have a more traditional approach by transferring retail operations on the Web. Business-to-Business (B2B) market has grown faster than Business-to-Consumer (B2C) (Figure 6). This is due to the creation of B2B exchanges and the advantage of existing electronic information exchange standards such as Electronic Data Interchange (EDI). Figure 7 shows the projected growth in B2B commerce world wide. The potential B2C market is nonetheless impressive. According to Angus Reid group nearly 40% users have made transactions on-line.

Leaders	Contenders	Followers	Laggards
US (8.73)	Ireland	Greece	Bulgaria (3.38)
Australia	France	Czech Republic	China
UK	Austria	Hungary	Ecuador
Canada	Taiwan	Chile	Iran
Norway	Japan	Poland	Romania
Sweden	Belgium	Argentina	Ukraine
Singapore	New Zealand	Slovakia	Algeria
Finland	South Korea	Malaysia	Indonesia
Denmark	Italy	Mexico	Nigeria
Netherlands	Israel	South Africa	Kazakhstan
Switzerland	Spain	Brazil	Vietnam
Germany	Portugal (6.21)	Turkey	Azerbaijan
Hong Kong (7.45)		Colombia	Pakistan (2.66)
		Philippines	
		Egypt	
		Peru	
		Russia	
		Sri Lanka	
		Saudi Arabia (3.80)	
		India	
		Thailand	
		Venezuela	

Table 16: Grouping of countries by E-Readiness Ranking reported by EIU. The ranking is based on a country's score out of 10 points.

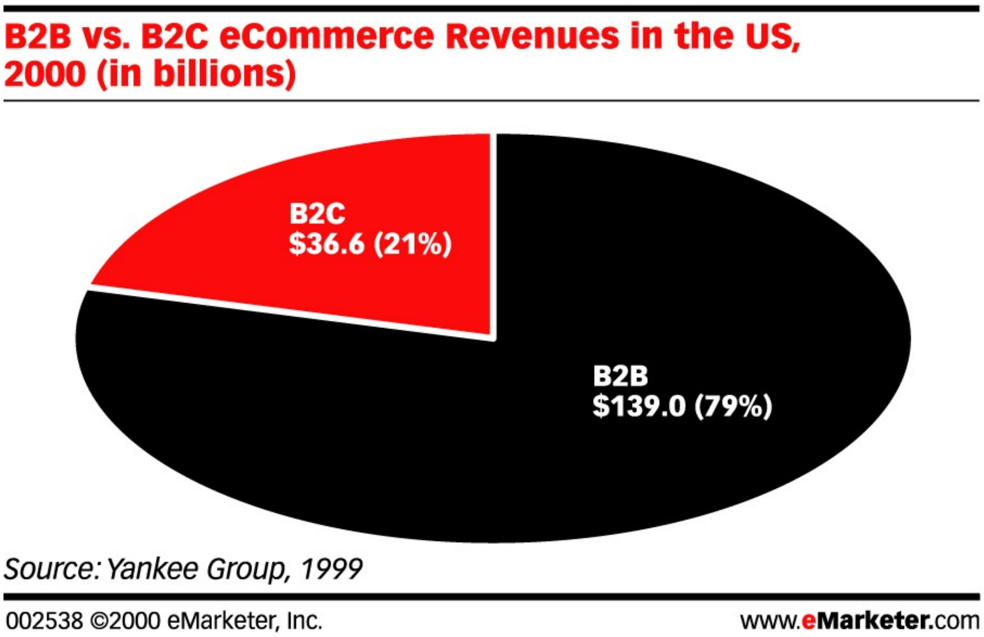

Figure 6: B2B vs. B2C E-Commerce Revenues in the US, 2000. Source Yankee Group.

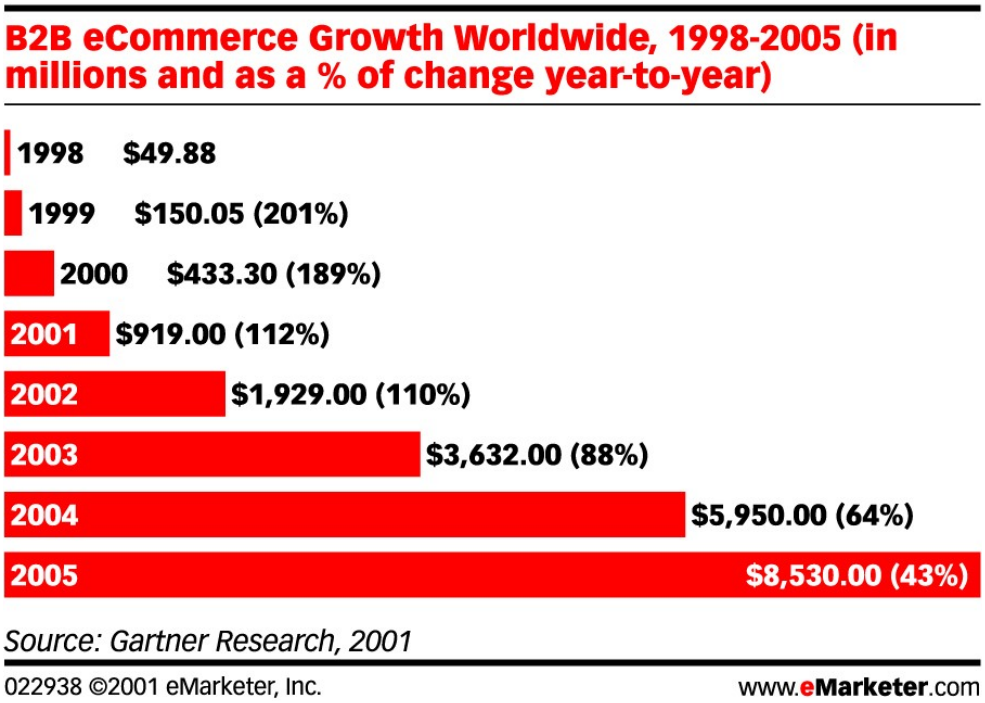

Figure 7: B2B e-Commerce Growth Forecasts.

One of the most promising new Internet business model is the Application Service Provider (ASP). ASPs offer both corporate and private clients software services on demand over the web, without the need to invest in specific software and hardware products. They provide technology and applications in a targeted fashion and create substantial cost savings for users. According to Gartner Group that by employing web-based application support, cost-savings could be as high as 80 percent.

4.3.4 The Internet and E-commerce Penetration in Arab Region

According to a survey released in March 2001 by Ajeeb.com Research Unit (sponsored by Tejari.com and Visa International, Dubai) the number of Internet users in the Arab world stands at 3.54 Million [18]. The survey, carried out by the portal's research unit, found that Internet penetration was the highest and fastest in the United Arab Emirates. Also from the above report, the number of Internet subscribers in Saudi Arabia is 190,000 and the number of users is 570,000 (only 2.59% of the population are subscribers as compared to 24.44 in the UAE) as shown in Table 10.

According to DITnet, consumers in Arab countries have spent up to USD 95 million on goods purchased on the Internet in the year ending April. (June 1999)

- The average spent per shopper was $1,056.
- 48% of shoppers bought computer programs.
- 28% of shoppers bought books.
- 26% of shoppers bought computers and peripherals.
- 11% of shoppers bought Audio CDs and CD-Rom.

A recently released report from the Arab Advisors Group (Jan 24 2001) indicates that there is a strong future for E-commerce in the Arab world, as long as start-ups carefully develop and execute their business plans.

The Arab Advisors Group reached this conclusion after examining what it terms the "E-commerce pillars" in the region. These "pillars" include Internet penetration levels, infrastructure development, education levels and the penetration of credit and debit cards.

It is difficult to gauge the metrics and earnings of Arab online businesses as none are publicly traded. According to the report, however, online businesses in this region tend to have lower burn rates than those in Europe and the US and so can reach profitability on lower revenues. The report is based on research conducted in Saudi Arabia, UAE, Kuwait, Oman, Qatar, Bahrain, Jordan and Egypt.

On average, depending statistic on Jul 05 1999, Arab consumers spent USD 1,056 online over the year, however, the mean amount may be much less than this, as some shoppers spent up to USD 95,000 in that time. In 82 percent of cases, payment was made using a credit card, with 11 percent of consumers preferring to pay by bank transfer and 3 percent by check.

Largely in keeping with global trends, the most popular products to buy online were software, purchased by 48 percent of those who bought online, followed by books (28 percent), PCs and peripherals (26 percent) and audio CDs and CD Rom (11 percent). Gifts were purchased by 7 percent of those that bought online, followed by travel (5 percent) and food products (1 percent). Of those who bought online in the past year, 33 percent made just one purchase, with 26 percent making two online purchases and 23 percent making three purchases. Just 18 percent of those who bought online made more than three online purchases.

The findings are based on a survey of 1,000 Internet users across the region, conducted in April 1999.

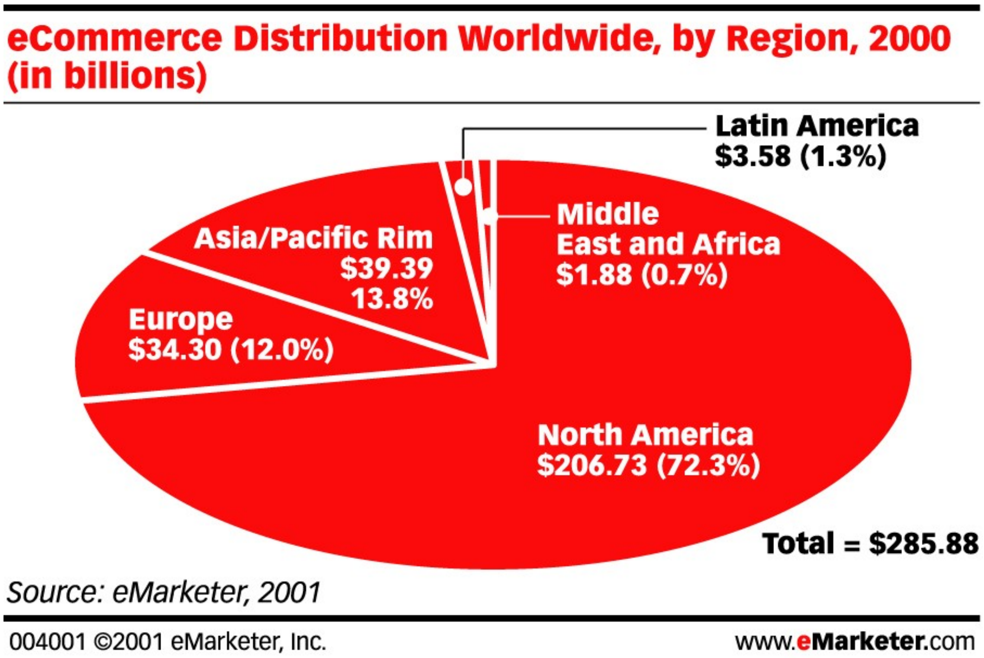

Figure 8: E-Commerce Distribution World wide, by Region, 2000.

Currently the share of Middle East region in the global e-Commerce distribution in nominal. In Year 2000, this share accounts for 0.7% of the global market (Figure 8). The prospects of growth of e-commerce in this region are bright. According to an estimate reported by eMarketer Inc, by the year 2003 this segment will touch the USD 7 billion mark (Figure 9).

4.4 Saudi Arabian E-Commerce Scenario

4.4.1 Internet Infrastructure

According to a recent estimate by King Abdulaziz City for Science and Technology (KACST), there were 275,000 Internet subscribers in the Kingdom as of June 10, 2001. It is also estimated that there are 2.5 users per subscriber, and hence number of Internet users are 690, 000 in the Kingdom. These numbers are higher that those reported

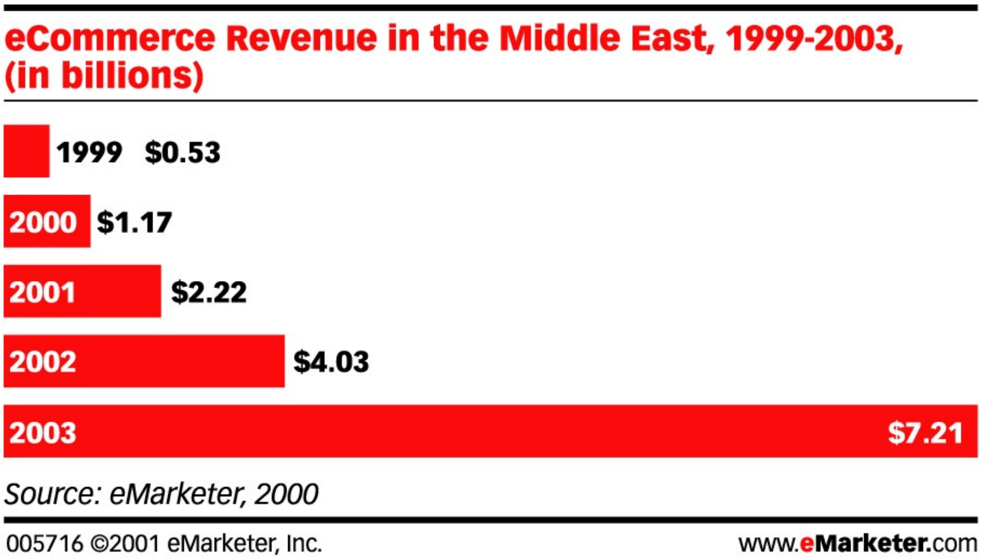

Figure 9: B2B E-Commerce in the Middle East and Africa.

in March 2001 as illustrated in Table 10 earlier, which is an indication of the rapid increase in Internet subscription and use in the Kingdom as expected.

There are 29 Licensed Internet Service Providers in the Kingdom and 18 educational/other organizations. All ISPs access to the Internet is controlled by a central node at ISU. ISPs main locations are connected to the ATM network. 14 ISPs are connected via fiber optic backbone, 8 ISPs have STM-1 links to the ATM network and 7 have not yet installed their fiber cable yet. Moreover 15 ISPs have point of presence (POP) with an average bandwidth of 256Kbps. Average bandwidth allotted per ISP is 6 Mbps and to educational institutions and others are 2 Mbps.

The number of ISPs in a country is often taken to be an index of market liberalization. Competitive ISP markets tend to reduce usage prices, enhance availability of different services and improve quality, all of which impact access. They provide their subscribers access to the national and international networks. Almost all the ISPs' market target is the corporate sector, Internet cafe, and individuals. Some ISPs have foreign partnership and other ISPs are managed by the Saudi corporate sector. The total number of ISPs at the regional level is illustrated in Figure 10. This shows the ISP market liberalization in Saudi Arabia when compared to other countries in the region.

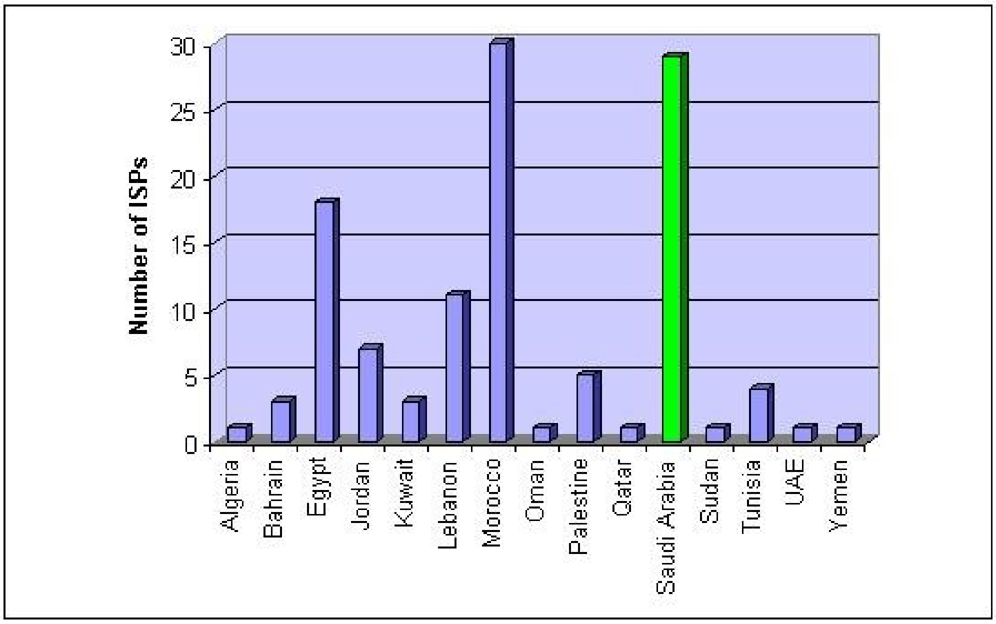

Figure 10: Status of Internet service providers in the region (Source: arab.net, ISU)

Leased lines are one of the main building blocks used by business to construct networks for e-commerce. The growth in number of leased lines allotted by STC is evident from Figure 11. It is expected that the current number will surpass 10,000 lines in the year 2003 and 30,000 in the year 2005. This is a good indication of Internet growth in the Kingdom (Source: STC).

Broadband refers to a capacity to transmit information electronically. It allows for fast transmission of large amounts of information, which enables bandwidth hungry technologies, such as full-motion video or CD-quality audio. Broadband services enabled by the STC include Digital Subscriber Line (DSL). DSL is a broadband access technology that allows transmission at bandwidths from 144 Kbps to 1.5 Mbps. Many

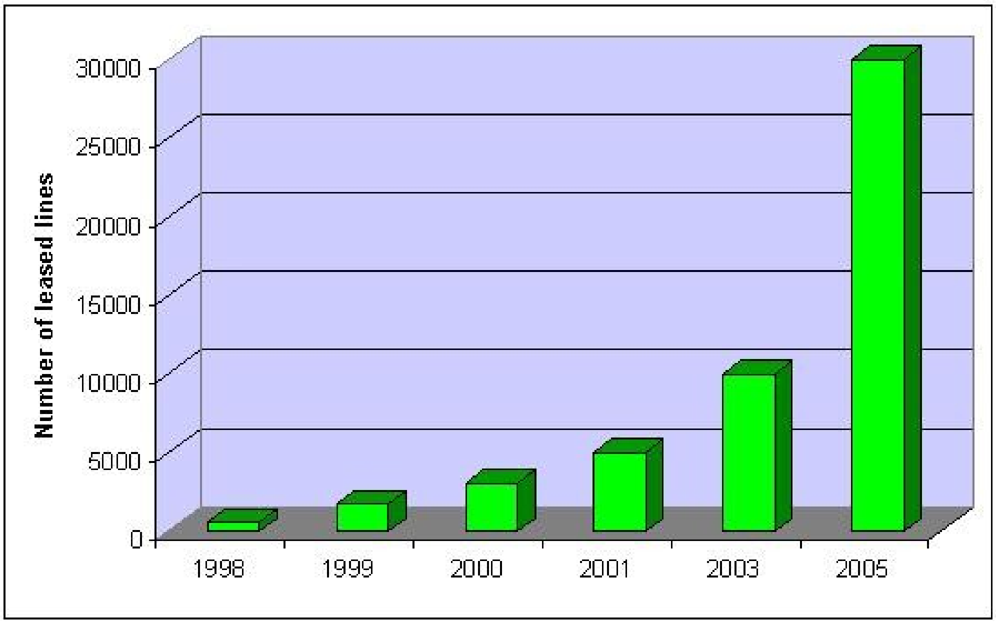

Figure 11: Growth in leased lines in the Kingdom (Source: STC)

ISPs are approved for DSL services.

One of the most common Internet access methods is the fixed telephone access. The number of fixed access lines stood at 2.9 million at the end of 2000 and is expected to reach around 5 million in 2005. Teledensity (number of standard access channels per 100 inhabitants) is another good indicator. Figure 12 gives the growth of teledensity of the Kingdom. while Figure 13 gives the rate of growth of Internet subscribers when compared to the growth of telephone lines.

Up until September 2001 there were 3437 active domains in the KACST database as shown in Table 2. The number of registered domains over the past six years indicates the continuous increase in most categories. It is also widely believed that there are a large number of domain names registered outside the Kingdom, mainly in the United States.

The number of Internet hosts is one of the most commonly used indicators of the

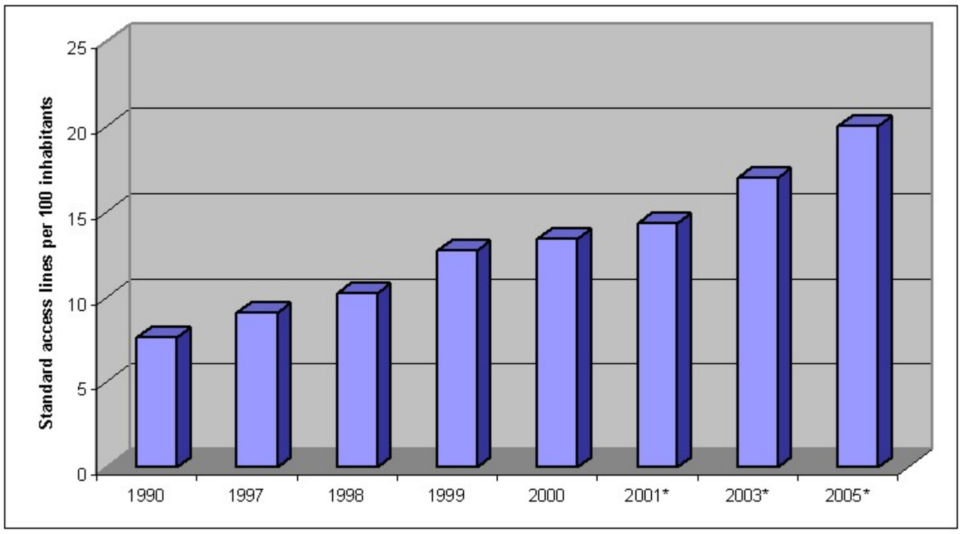

Figure 12: Growth of teledensity in Saudi Arabia (Source: STC, US Census Bureau)

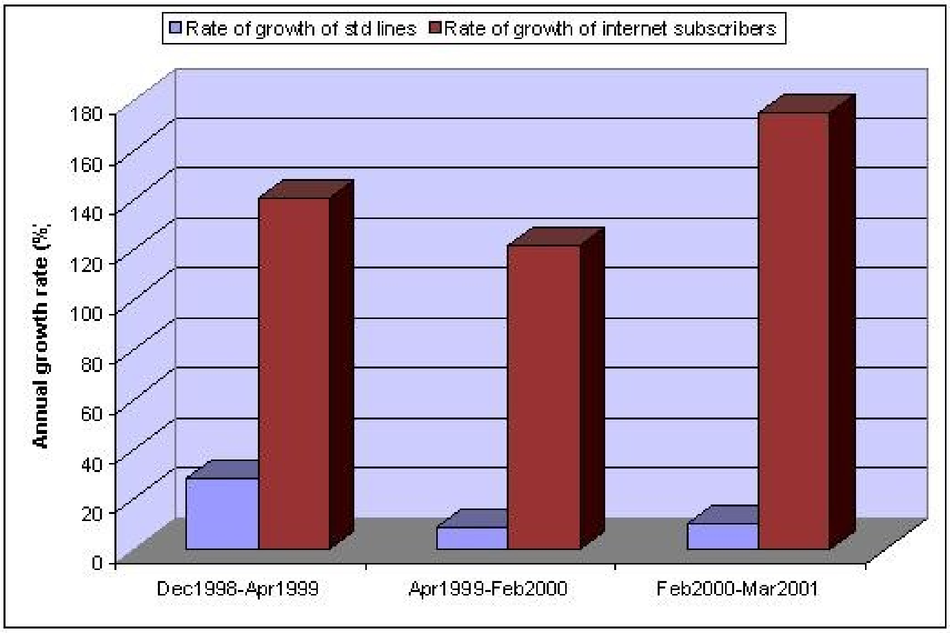

Figure 13: Rate of growth of standard lines and rate of growth of Internet subscribers for Saudi Arabia (Source: SaudiNIC, STC)

growth of the Internet. A host is a domain name that has an IP address "record" associated with it. Internet surveys of hosts and servers provide one indicator of comparative Internet development between countries. The main limitations are not reaching all hosts or servers, and the structure of the domain name system being such that there is no guarantee that all hosts under a particular domain are located in a certain geographic location. Kingdom of Saudi Arabia has 293 hosts declared officially online (Source: ISU, KACST). There has been a sharp increase in number of hosts during the last three years (Figure 14) but these are hardly any figure when compared to USA where there are over 80 million hosts and in Japan, which has over 4.6 million hosts.

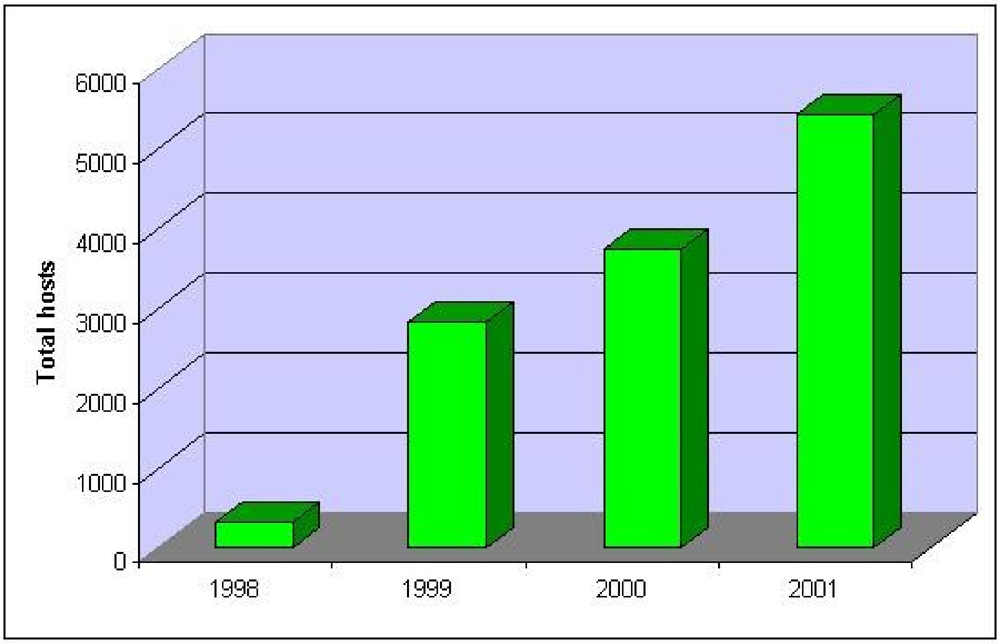

Figure 14: Growth of total hosts in the Kingdom (Source: ITU)

E-commerce requires high security levels to protect user sensitive information. Internet servers facilitating E-commerce transactions are also required to be highly secure with strong encryption techniques. Currently there are only 7 servers in Saudi Arabia employing strong encryption algorithms (40 bit or more) while 4 other servers employ weak encryption algorithms (less than 40 bit). This is attributed to the lack of emphasis on security in the private sector. Figure 15 compares the number of secure servers in the Middle Eastern countries.

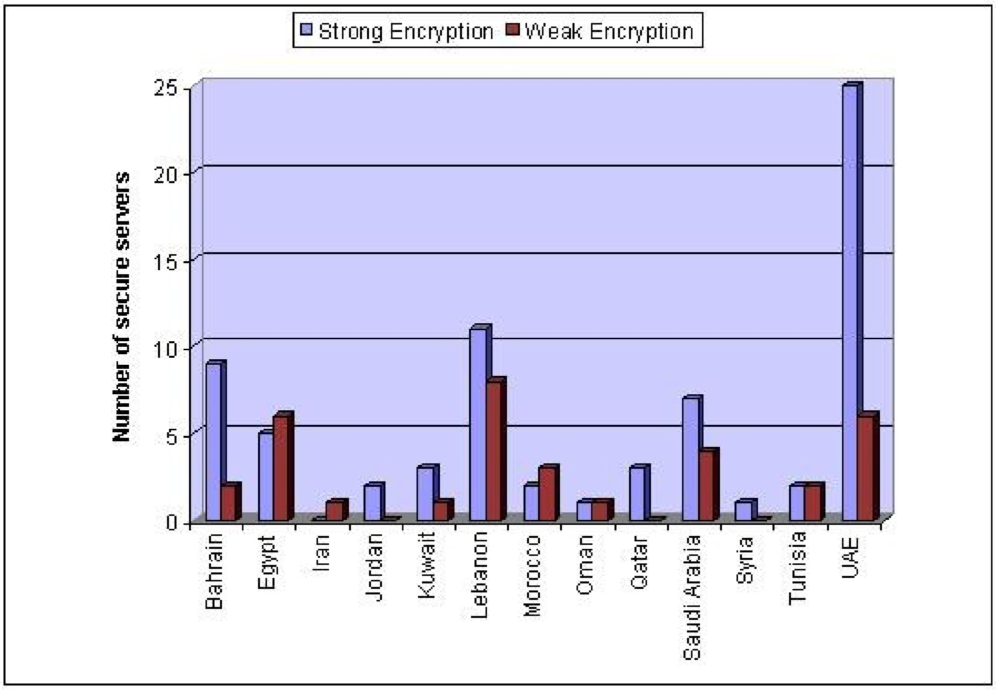

Figure 15: Status of the secure server in the region (Source: Netcraft)

The community and tools for illegal access are getting well organized and sophisticated. However, widely deployed defense systems like fire-walls are moving toward isolating networks and sites. Attackers and intruders can be anywhere on the earth and deploy collaborating agents to attack any site on the Internet. KACST is planning to put in place a public key infrastructure (PKI) system that will enable secure Kingdom-wide e-commerce transactions. Saudi Arabian Monetary Agency (SAMA) is piloting an online payment system for business-to-business (B2B) e-commerce based on the widely used SWIFT technology. It is also developing a new electronic securities trading system that will deliver straight through processing of payment and share transfers. Ministry of Commerce is planning to come up with the rules and regulations to govern e-commerce in the Kingdom (Source: ITP).

4.4.2 Strategic Analysis of Saudi E-Business Environment

In Table 17 we have summarized the strategic analysis of E-commerce in Saudi Arabia. The strength of the Saudi e-business market lies in the Kingdom being the center of the Islamic World with the largest economy ($168 billion) in the Arab world (Saudi American Bank Report, 2001) with virtually no direct taxes. The GDP per capita income is high with 9000 Purchasing Power Parity (PPP) compared to 6,167 and 7,416 (PPP) regional and global averages, respectively. The rapid Saudi population growth estimated at 3.4% year is expanding consumer base and, therefore driving growth in the private sector and e-business supported by the high Saudi youth population (Icon Group International 2000). There is also a relatively good teledensity with about 2,884,900 fixed telephone lines in the country at end- 2000 that is 14.4 per cent of the population (Pyramid Research Report, 2001).

The large Saudi population compared to other Arabian Gulf Countries and the presence of large IT companies based in Saudi Arabia give Saudi e-business an advantage and a competitive strength in the region. With more openness towards direct foreign investment, it is inevitable that large foreign investors would also bring and utilize latest technology to conduct their businesses. Local companies are expected to get inspiration and follow suit.

The overall business environment of the Kingdom gives e-business great potentials of success as a regional leader in e-commerce. However, the success of e-commerce in Saudi Arabia requires substantial improvements in telecommunication infrastructure with easy and affordable Internet access supported by trained and skilled local IT professionals to meet the demand for human resources in the information technology era. The enactment of e-business laws and regulations is also a pre-requisite for successful implementation in the Kingdom. The rapid implementation of e-business and the continuous updates and improvements are necessary steps against the threats of lagging

Strengths	**Weaknesses**
Center for Islamic World	Lack of local IT professionals
The largest Arab economy	Lack of education and training facilities
Free market with minimum taxes	Very high cost of Internet
High per capita income	Telecom operator monopoly
High growth in PC penetration	Non existence legal environment for e-commerce
The largest IT market in the region	Lack of basic secure infrastructure
Opportunities	**Threats**
Access to global market places	Regional E-Commerce initiatives from Dubai, UAE and Egypt
Economic Growth	Admission to WTO will lower the legal barriers, exposing the local firms to international competition
Reduces the cost of doing business	Cultural backlash
Lower trade barriers making e-commerce environment conducive	

Table 17: Strategic Analysis of Saudi Arabian E-Business Environment

behind regional as well as international competitions resulting from WTO lower trade barriers.

4.4.3 Consumer Responses for E-commerce

In this subsection we give raw results of our survey conducted to measure the consumer responses for opportunities for e-commerce. Refer to the graphs in the appendix 7 for details.

- More than 70% respondents agree that the use of Internet for shopping and banking will make life easier. Only 9% of respondents feel otherwise while the rest (21%) are uncertain.

- Only 30% of the respondents feel that the security of their sensitive information is most important while shopping on the net. This may be attributed to the lack of knowledge among the Internet users of possible potential threats which may originate due to compromise of sensitive information.

- While shopping on the Internet, consumers give importance to the availability of information about products and services. They prefer detailed product specifications, price comparison, availability and location of store.

- For net shoppers in Saudi Arabia, many features are important while doing shopping. These features are: variety of choice, quality of information, easy order placement and payment procedures, lowest price, security of sensitive information and time. Surprisingly internet vendor reliability is not considered as a very important feature.

- The use of Internet for interaction with clients and business partners is still limited. Only 26% of the respondents feel that their company is using the Internet for this purpose.

4.5 Summary

This section has given an insight into the trends and future directions of e-commerce world wide and in the region. We have also covered the current status of IT infrastructure and strategic analysis of E-Commerce environment in the Kingdom. The statistics indicate that the Kingdom lags behind the developed countries in the e-commerce whilst maintaining a competitive position in the region. Results of our findings of consumer behavior are also presented which shows a promising future for e-commerce in the country.

5 Conclusion and Recommendation

6 Future Work

7 Problems

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APPENDIX: Results of Our Survey