The Global Diffusion of the Internet Project

THE HASHEMITE KINGDOM of JORDAN

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Executive Summary

Dimension	Level	Explanation
Pervasiveness	*(3)* ESTABLISHED	While the number of users in Jordan is at the lower bound for this level, the Internet has clearly taken hold well beyond use by communications technicians only
Geographic Dispersion	(1) *Single Location*	All ISPs and points of presence are in Amman and all international links emanate from that city.
Sectoral Absorption	(2) *Moderate*	The academic, commercial, and public sectors all exhibit this level of absorption. Only in the health services sector is absorption rated *Rare*. Thus, overall, sectoral absorption in Jordan is moderate.
Connectivity Infrastructure	(1)	Some aspects of connectivity infrastructure are at Level 0 and others at Level 1. Overall, Jordanian infrastructure is at, or tending towards Level 1.
Organizational Infrastructure	(2) *Controlled*	The organizational infrastructure in Jordan is rated Level 2 because of formal and economic restrictions on ISP establishment and because of monopolization of the local and international connectivity infrastructure.
Sophistication of Use	*(1)* MINIMAL	The nature of Internet use in Jordan is characterized by personal use mainly for social interaction and organizational use for information display. There is no evidence of Internet use for executing transactions and the Internet has not yet had a transformational effect.

Table 1. Internet Dimensions for Jordan

Introduction

Jordan, officially The Hashemite Kingdom of Jordan, is an Arab kingdom on the East Bank of the River Jordan in the heart of the Middle East. The country is bordered by Syria, Iraq, Saudi Arabia, Israel, and the West Bank. Amman is Jordan's capital and largest city.

Much of Jordan's modern history has been shaped by events in the area designated after World War I as The League of Nations Mandate of Palestine. This region today comprises Jordan, Israel, the West Bank, and the Gaza Strip. The most recent events affecting Jordan profoundly are the peace treaty with Israel (1994), the death of King Hussein and the succession to the throne of the present king, Abdullah II (1999).

Jordan has a rapidly growing population. About 55 percent of the people are native Jordanians. Most of the others are Palestinians. About 95 percent of the people are Muslims. Christians make up a small minority group in Jordan. About 5% of the population are nomadic Bedouin.

Jordan is a constitutional monarchy and the king of Jordan has widespread powers. He appoints a prime minister to head the government, as well as members of the Council of Ministers, or cabinet. The king also appoints a 40-member Senate to four-year terms. The Senate is one house of the National Assembly, Jordan's legislature. The other house is the Chamber of Deputies. Its 80 members are elected by the people to four-year terms. As a monarchy, the views of the king have a major impact on decision making and this has clearly had an impact on the development of the Internet in Jordan, as will be described below.

Jordan is a small country with inadequate supplies of water and other natural resources. It mines phosphates and potash but lacks the petroleum deposits of its Arab neighbors. Service industries, such as government and commerce, employ the largest number of workers in the country.

Jordan benefited from increased Arab aid during the oil boom of the late 1970s and early 1980s, when its annual real GNP growth averaged more than 10%. In the remainder of the 1980s, however, reductions in both Arab aid and remittances of workers abroad, especially from the Gulf states, slowed real economic growth to an average of roughly 2% per year. Imports—mainly oil, capital goods, consumer durables, and food—outstripped exports, with the difference covered by aid, remittances, and borrowing. In mid-1989, the Jordanian Government began debt-rescheduling negotiations and agreed to implement an IMF-supported program designed to gradually reduce the budget deficit and implement badly needed structural reforms. The Persian Gulf crisis that began in August 1990, however, aggravated Jordan's already serious economic problems, forcing the government to shelve the IMF program, stop most debt payments, and suspend rescheduling negotiations.

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Encyclopedia Map

Figure 1. Map of Jordan

Aid from Gulf Arab states, worker remittances, and trade contracted; and refugees flooded the country, producing serious balance-of-payments problems, stunting GDP growth, and straining government resources. The economy rebounded in 1992, largely due to the influx of capital repatriated by workers returning from the Gulf, but recovery was uneven in 1994-97. The government is implementing the reform program adopted in 1992 and continues to secure rescheduling and write-offs of its heavy foreign debt. Debt, poverty, and unemployment remain Jordan's biggest on-going problems. These facts are reflected in the statistical data for Jordan (Table 1).

Table 1: Jordan in Statistics

Metric	Value	year	source
Population	4,600,000[8]	1997	4
Area	89329 sq. km.		
Population density	62 per sq. km.	1998	1
GDP	US$ 7.1b	1997	1
GDP per capita	US$1221	1997	1
Telephones	402600	1997	1
Teledensity	6.97 per 100	1997	1
Cellular subscribers	70,500	1998	2
Cellular density	1.18 per 100 population	1998	2
PCs	50,000	1997	3
PC density	0.1 per 100 population	1997	computed
Television receivers	250,000	1997	3
Television density	4.3	1997	computed
Life expectancy at birth (females)	69.5 years	1997	4
Life expectancy at birth (males)	66 years	1997	4
Literacy	86.2%	1997	4
Infant mortality	32 per 1000 live births	1997	4

Sources:

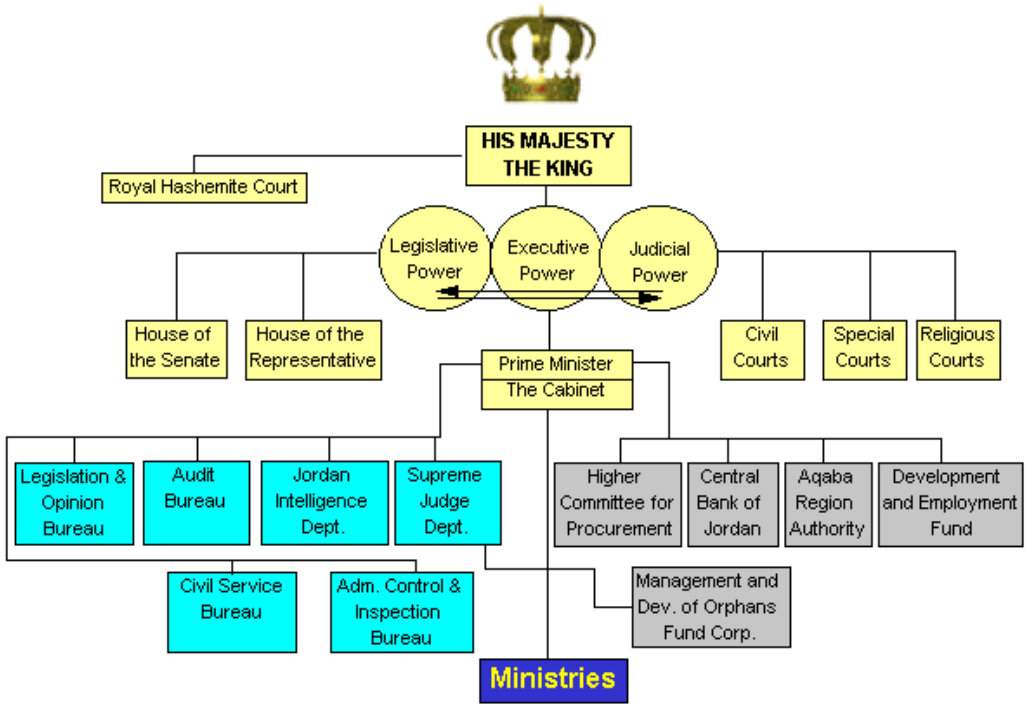
- International Telecommunication Union http://www.itu.int/ti/industryoverview/at_glance/basic98.pdf 17-Jun-99.
- International Telecommunication Union http://www.itu.int/ti/industryoverview/at_glance/cellular98.pdf 18-Jun-99.
- International Telecommunication Union. Yearbook of Statistics: Telecommunication Services Chronological Time Series 1988-1997. January 1999.
- Department of Statistics, Jordan http://www.dos.gov.jo:8000/ 3/7/1999.

[8] The population figure given by the ITU for 1998 is 5,970,000. The population Division of the United Nations department of economic and Social Affairs puts the number for 1998 at 6,304. We have no explanation for these discrepancies. The one-year lag between the 1997 and 1998 numbers cannot explain all the difference.

Background

As Jordan is a constitutional monarchy, the views of the royal family have a profound impact on developments. The King is the top of the government hierarchy and actively fulfils that role with all other branches of government reporting to him. The Structure of the government is exhibited in Figure 2. Thus, as the late King Hussein was very interested in promoting the development of technology, and as his successor King Abdullah seems to be even more interested, such developments are considerably facilitated and arouse interest in the decision making hierarchy.

Figure 2 : The structure of government in Jordan[9]



This interest fostered the development of a national information policy and appropriate institutions. The concept of a National Information System (NIS) was presented to, and approved by, the Cabinet and the Crown Prince - in his role as head of the Higher Council of Science and Technology (HCST) - on March 21. Formulation of By-laws required three years and they were approved in 1989. The National Information Centre (NIC) was established in 1993 "to take the responsibility of developing and managing a national information system."[10] This is interpreted as data management at the national level; the NIS was to be "A distributed information system at the national level linking information generating centres in the public and private sectors."[11] The structure of the

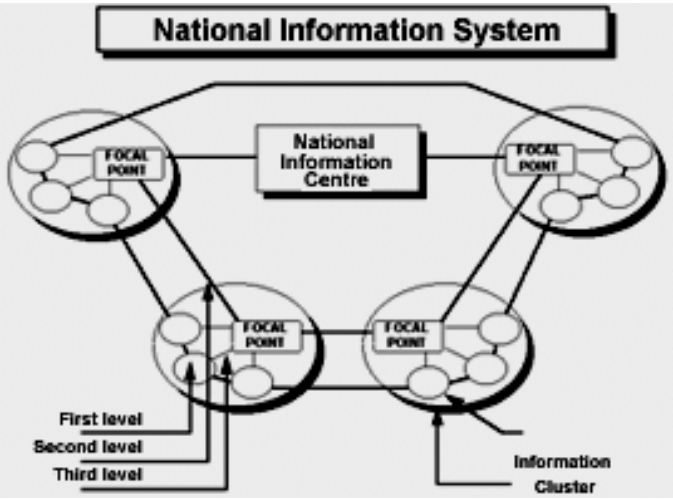
[9] Source: NIC. http://amon.nic.gov.jo/orgstruc/eorgchrt.htm
[10] NIC. http://amra.nic.gov.jo/nic.html (1996)
[11] *ibid.*

NIS comprises 17 sub-networks, each focusing on a content area such as agriculture, economics, and education. Each sub-network is to group eight to ten organizations and the sub-networks are to cluster around focal points (see Figure 2).

The NIC provided initial Internet service in Jordan, beginning in 1995, but only for government and academia; a policy decision was made not to provide access for the private sector. Private service began in 1996. Eleven ISP licenses have been granted, but only seven have been exercised. The role of government in private Internet development has essentially been a benign but passive one. While not actively supporting development of the Internet in Jordan, the government has not imposed any restrictions either, beyond the need for an ISP license. As there is no single gateway and no backbone, gateway control of content cannot be implemented, as in Saudi Arabia for example. Nor does there seem to be any great pressure to introduce controls.

The question of pornography and other undesirable content is of concern, but has not led to official restrictions. However, JTC recently began disconnecting international calls to satellite television stations that invite viewers in the Arab World, including Jordan, to phone the stations that normally screen pornographic and indecent scenes.[12] Privacy is another issue that has been debated; national security concerns have not. There is at present no regulatory authority for the internet. There is a move toward the establishment of such an authority and it will probably be regarded as a communications problem to be handled by the Telecommunications Regulatory Commission (TRC).

Figure 3.[13]



The government believes that it will be very difficult for the younger generation to take part in international economic development if it is not part of the Information Society.

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[12] "JTC clamps down on phone sex lines" *Jordan Times.* May 17, 1999.
[13] NIC. *op. cit.*

Thus, a policy decision has been made to participate in encouraging Internet development, for three reasons:

- The information society is seen as a lever for economic development.
- A desire to join the global information society.
- A desire to participate in the economics of the global network – e-commerce etc.

This policy emanated from the NIC, and was approved by the royal court even before establishment of the first Internet connection as part of the NIS initiative.

Given the fact that Internet use is too expensive for the average citizen, broadening the scope of technology use has devolved to the school system. All schools now have computers – about one per 20 students. The private schools (about 700) generally have Internet connectivity already while a plan to provide connectivity to all public schools (about 4000) is to be implemented incrementally beginning in the current academic year (1999-2000).

Dimension Determinants

A number of factors clearly determine the dimensions of Internet diffusion in Jordan. Some of these factors are positive and encourage diffusion, however there are also many negative factors that dampen the level of use. First the encouraging factors:

- There is a fairly high level of awareness of the Internet and its possibilities among the population at large.[14] This is a factor that obviously supports broad diffusion. Evidence of this is the widespread existence and use of Internet cafes – a means of achieving access by those who are aware but are unable to afford access from their homes.
- Government policy is quite enlightened in that it does nothing directly to impede the diffusion of the Internet or to control access, even in controversial areas. In some instances, policy is even proactive, as in the establishment of the National Information System and the National Information Center to implement it. Among its goals, the NIC is promoting the availability of Internet connectivity in the public school system; as about one third of the population is currently in the public schools, this should have a beneficial effect in eventually promoting use.
- A Telecommunications Law was enacted in 1995 with the objectives of "expanding the scope of coverage of telecommunications networks" (Article 3 a.) and "promoting investment in the telecommunications sector in the Kingdom and create an atmosphere of competition among those who provide such services to ensure the provision of developed telecommunications services at acceptable costs and agreeable rates." (Article 3 b.) The Telecommunications Regulatory Commission was also established to oversee implementation of the law
- The telecommunications infrastructure is being privatized and this should introduce elements of cost reduction. Cellular telephone services and public telephones are privatized and competitive. It has also been the intent to privatize the Jordan Telecommunications Company which provides traditional telephone services; this
- Another positive factor is the interest and encouragement of the Royal Family. The late King Hussein made the Hashem 1 ground satellite station available for use by ISPs. King Abdullah is continuing in this direction and is actively promoting the development of hi tech enterprises in Jordan, including the Internet. Her Majesty Queen Noor[15] and HRH Prince El Hassan bin Talal[16] have their own web sites which are quite elaborate and informative. The NIS site contains a genealogical tree of the Hashemite Family with links to biographical information on many of its members[17].

Opposed to the positive elements outlined above, there are a number of factors impeding Internet diffusion in Jordan. Following are the main hindrances:

- The poverty of the country which makes personal computers a luxury is an obvious impediment to Internet diffusion. This limits the user base and so affects the

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[14] Zeid Nasser. "Three and a half years of Internet. So?" *The Star: On Line* (http://star.arabia.com/). 26 August 1999.
[15] http://www.noor.gov.jo/
[16] http://www.princehassan.gov.jo/
[17] http://www.kinghussein.gov.jo/rfamily_immediate.html

profitability of ISPs. Thus poverty both deters users and limits the viability of ISPs; it is predicted that one or two of the present ISPs will discontinue service..

- The viability of ISPs is further affected by the high cost of providing service. These costs were detailed in a special joint announcement of the ISPs in March 1999[18]. The cost elements are detailed in the following quotation from the announcement:

"1. The high costs paid by the ISPs for International connectivity, which exceeds JD 75,000 per month for some ISPs.
2. The high cost paid by the ISPs for local telephone lines, which amount to JD 335 per line, knowing that ISPs use hundreds of these lines to provide the Internet service.
3. The 15% revenue sharing tax which is levied by the TRC on all ISPs.
4. The 10% value added tax which is levied by the government on all Internet Invoices."

Furthermore, ISPs pay an initial licensing fee of JD25,000.[19]

Finally, the level of service provided is dependent on that provided by JTC. "There were improvements in the Jordan Telecommunications Corporation (JTC) services over the last year, however there still remains bureaucracy and frequent delays in obtaining International connectivity and local phone lines from the JTC. These delays exceed three months in some cases, if not more."[20]

- A third factor affecting Internet diffusion in Jordan is uncertainty faced by ISPs. The major source of uncertainty is developments relating to JTC. When JTC was granted a license to provide data communication services it was not required to pay the JD25,000 fee levied from the private ISPs. As the ISPs are dependent on JTC for all connectivity, both local and international, they are naturally worried that JTC will exploit this situation in competition against them should it decide to offer Internet services. As noted above, the ISPs already complain that JTC's rates are exorbitant.

  Although the government is making efforts to privatize JTC, and recently decided to sell 40% of the company to a single consortium by October 15. The plan would allow the company exclusive rights to operate fixed-line telephones until 2003, with tax exemption over the same period.[21] Thus, there is no indication that privatization will involve competition in the near term and the privatization plan does nothing to alleviate the fears of the ISPs.

- A last problem to be mentioned here is that of the ISPs in maintaining qualified employees for development. Most of the technical and managerial employees of the ISPs have been trained abroad and have good skills. Following a period of

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[18] "Clarification from the Internet Service Providers in Jordan" Mar. 15, 1999 http://www.go.com.jo/main/Announcm4.htm

[19] Ahmed Nasser. "TRC approves lower rates on JTC international circuits." *Jordan Times*, August 11, 1998.

[20] See footnote 10.

[21] "Partial Privatization of Jordanian Telecoms." Arabia Online (http://www.arabia.com) August 1, 1999.

"learning the trade" after returning to Jordan, many are enticed to work elsewhere, especially in the Gulf States, for much higher salaries than are usual in Jordan. The ensuing shortage of workers further impedes the diffusion of the Internet.

Networks in Jordan

Computers

As a relatively poor country, a large proportion of citizens cannot afford the cost of a PC. As a consequence, Jordan is not well endowed with computers. Furthermore, the diffusion is uneven. For example, there is about one computer for every 20 university students versus about one per 1,000 of the population at large, as noted in Table 1.

As determined by RIPE Network Coordination Center, the number of delegated domains found below the .jo iTLD, i.e. the number of separate subdomain nameservers on September 10, 1999 was 965.[22] This measures the number of computers providing external access via the Internet in Jordan. Thus, there is one domain name server for about every 5,000 of the population.

The paucity of PCs immediately reflects on the degree of diffusion of the Internet and the manner in which it is used. In particular, much of the use is shared at educational institutions and at other public facilities such as Internet cafés. Government policy envisages the provision of computers to all public schools. Most private schools are already computerized and have network connections.

Communications Networks

Telecommunications in Jordan are largely privatized. Thus, public phones, cellular phones, and data transmission are in private hands. However, landlines are still monopolized by the Jordan Telecommunications Company (JTC) which is, at present, one hundred percent Government owned. The government has decided to sell 40% of its ownership. By law, ISPs cannot build their own infrastructure or provide telephony services and must obtain connectivity from JTC. There are no dedicated links except for the military network. Telecommunications activity is regulated by the "Telecommunications Law of 1995". This law also established the Telecommunications Regulatory Commission. The main functions of the commission, as defined in the law, are (see also above):

- Regulate the telecommunications sector in the Kingdom by implementing the policy set for the provision of effective telecommunications services to the beneficiaries in line with the development of telecommunications technology and in such a way as to meet the requirements of those wishing to benefit from such services on non-monopoly bases, and the encouragement of investment and competition in the telecommunications sector.
- Spread public awareness of the importance of the telecommunications utility and endeavor to provide all types of telecommunications services in such a manner as to meet the requirements and wishes of the beneficiaries throughout the Kingdom … .
- Protect the interests of those benefiting from telecommunications services, and control the performance of the parties licensed to provide telecommunications services, and take the necessary measures to oblige those parties to abide by the

[22] http://www.RIPE.net/statistics/hostcount.html#dnsdomain

terms of the license, including the quality and standard of the services and endeavors to develop the same.

There is currently no Internet backbone in Jordan and there does not seem to be any policy to establish one. Consequently, each ISP arranges its own international links via JTC. The current state of the network (July 1999) is as exhibited in Figure 4. The reasons for these connections are as follows:

Hashem 1 is a satellite earth station originally established in order to facilitate transmission of medical data to the Mayo Clinic. In 1998, King Hussein directed that the station be made available to ISPs at rates lower than those of JTC in order to encourage Internet access[23]. However, the ISPs have expressed wariness about dependence on Hashem 1 as the future of the connection is uncertain.

Teleglobe (http://www.teleglobe.com/) is a Canadian communications corporation providing extensive intercontinental networks and Internet backbones. Jordanian ISPs like it for its local sales presence, quality of service, and relatively cheap rates.

Sprint (http://www.sprint.com/). Only Global One is connected to the Sprint network – presumably because Sprint is one of its major shareholders.

Internet Service Providers

There are currently eight ISPs in Jordan – NIC which provides service to government and public institutions and seven private service providers. The Seven private companies are, in alphabetical order: Destinations, First Net, Global One, Index, Join Net, MEC/ABN, and NETS. In August, 1999, JTC was granted a license to provide data communications. The possible ramifications of this development are discussed later. Some data on ownership, licensing and service initiation dates, number of subscribers, international links, and bandwidth are listed in Table 4.

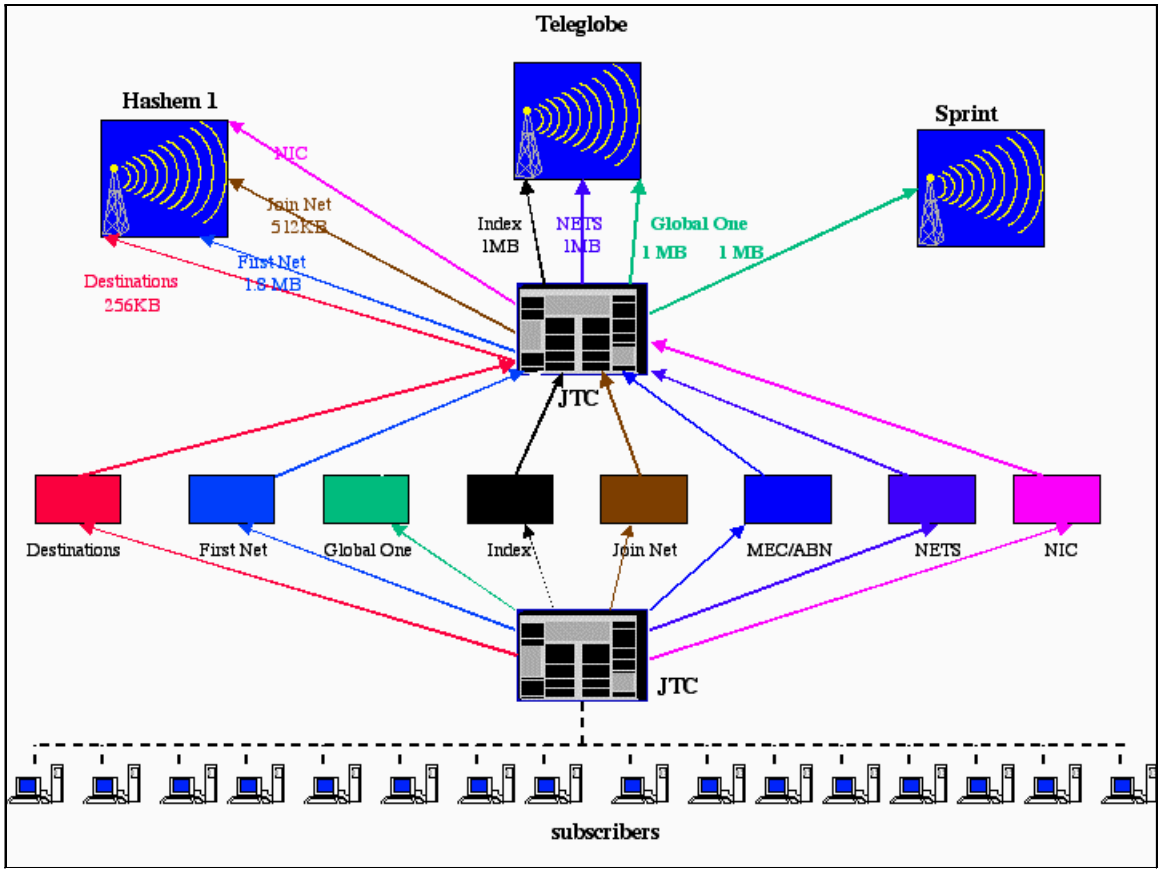
[23] Ahmed Naser, "King's website launched", *Jordan Times,* Saturday, September 19, 1998.

Table 4. Internet Service Providers in Jordan

ISP	Owners/strategic partners	licensed	Initiated Internet service	Subscribers	International links	bandwidth	comments
NIC	Jordan government – Higher Council for Science and Technology		1993		Hashem 1		
Global One	Global One (International), & ASAS Trade & Investment Co. (Arab Bank & other major companies	7/4/1996	Mar. 1996[1]	6000-6500	Sprint, Teleglobe		
NETS	UUNET	29/9/1996	Early 1994	3000-3500	Teleglobe	768mbps	
Index	International Data Exchange	13/2/1997	?	2500	Teleglobe	1 MB	
First Net	leading Financial & Investment institutions, AT&T Internet Solution Partner in Jordan	13/7/1996	?	1500	Hashem 1	1 MB	
Join Net	Jordan Electronic Network Services	11/5/1998	late 1997	2000	Hashem 1	512 KB	
MEC/Advanced Business Networking	Middle East Communications (?)	MEC 14/5/1996	Aug. 1998	<400			
Destinations	Al Muttajahat Co.	16/9/1996	Aug. 1998	1000	Hashem 1	256 KB	

1. Service began before the Telecommunications Law required licensing. The license was granted when the Law came in to effect.

Figure 2. Structure of Internet service in Jordan.



Number and Types of Servers

Domain names in Jordan are administered by the NIC. A list of registered names is provided by NIC on its web site.[24] When accessed on September 13,1999, this site showed 553 servers, broken down as in Table 5:

iTLD	TLD	Domain Name Servers
.jo	.com	430
.jo	.edu	29
.jo	.gov	54
.jo	.net	3
.jo	.org	37

[24] http://amon.nic.gov.jo/dns/owa/jo_domains/

.jo	**all**	**553**

Table 5. Breakdown of Domain Name Servers in Jordan

It should be noted that the site is updated continually so that the data might change at any time. However, these numbers do tally with those of the Internet Software Consortium for July 1999 which puts the number at 551[25].

Clearly, this is not the total number of Jordanian servers as companies and other institutions frequently do not utilize the international TLD or maintain duplicate DNSs. One good example is Aramex, a large, global Jordanian company whose DNSs are www.aramex.com and aramex.com.jo. Most of the medical service facilities with Internet connectivity are in the US .com domain rather than in .com.jo. (For further details see *under Health Sector Absorption* below.)

[25] http://www.isc.org/

Internet dimensions for Jordan

Pervasiveness

At the time of writing, the number of Internet subscribers in Jordan is of the order of 16,000-17,000. Assuming two users for each subscription, this would put the number of users at about 35,000. However, this is clearly a lower bound and does not consider the structure of Internet use particular to Jordan. Three factors need to be considered in arriving at a more reasonable estimate – the number of business subscriptions with multiple users, the number of government and academic users served by NIC, and the fact that Jordan has a large number of Internet cafes serving multiple users.

Jordan has nearly 1000 hosts. Of these, about 430 are business customers; if we assume that these average 5 users each, this would imply 2,150 users from this sector.

There are about 120 Internet cafes in the country, the largest of which have about 200 subscribers. Altogether, there are about 2200 subscribers. Assuming a similar number of occasional users, tourists, business travellers, etc., this would also total to roughly 4.400 users.

Businesses and Internet cafes utilize about 1500 of the subscriptions outstanding. This leaves about 15,000 other subscriptions. Assuming and average of two users per subscription, this adds another 30,000 users.

Finally, NIC claims to have 25,000 users. There is a feeling that this number may be somewhat inflated so assume 15,000 users. In all, the number of users would then total to 61,000 as in Table 5:

Table 5: Estimated number of Internet users by categories

ISP subscribers	30,000
Business users	2,150
Internet café users	4,400
NIC	15,000
Total	51,550

As this number is very close to the commonly quoted figures of something more than 50,000 users, we are fairly confident that it reasonably represents the number of users at the time of this writing.[26]

Given that the population of Jordan is about 5 million, the user to population ratio is about 1%. This puts Jordan at the bottom edge of level 3, common, in terms of pervasiveness. This finding is

[26] Zeid Nasser ("Three and a half years of Internet. So?" *The Star: On Line*. 26 August 1999.) puts the number of Internet users in Jordan at 54,000. Ahmed Nasser, a freelance journalist writing on technology topics put the number in August at three times the number of subscribers – about 51,000 (Personal communication.)

quite robust because even if we assume the lowest estimate of 50,000 users, this still implies a 1% usage rate – the lower bound for level 3 pervasiveness.

Geographic Dispersion

All Jordanian ISPs are located in Amman. As one interviewee put it "Amman is Jordan." Access from points outside Amman is by long distance dial-up and all international links emanate from Amman. Thus, in terms of geographic dispersion, the Internet in Jordan is at level 1, defined as "Internet points-of-presence are confined to one major population center. There is an international IP link from only one city."

SECTORAL ABSORPTION

Academic sector.

All Jordanian universities have internet links and some provide access to all students. At the primary and secondary level, most private schools already have Internet connectivity; in the public schools, universal connectivity is planned with implementation to begin in the current academic year (1999-2000). Thus, certainly more than 10% of academic institutions have Internet connectivity while the figure is still well below 90%. Thus, the absorption level in the academic sector is rated moderate.

Commercial sector.

In 1997, Jordan has a total of 8,564 economic enterprises of all types, of which 428 had 100 or more employees.[27] We were unable to find data on the number of such firms which have web sites; however, we have deduced this number indirectly as follows:

1. A list of all 430 .com domain names registered with NIC were accessed at http://amon.nic.gov.jo/dns/owa/jo_domains.
2. A sample of 49 sites was accessed in order to determine whether they represent firms of more or less than 100 employees. Only in a very few cases is the number of employees stated at the site; the determination of number of employees was based on the nature of the business and other information available at the site. This very intuitive categorization obviously leaves considerable room for error. It is hoped that the errors in both directions more or less compensate for each other. Of the 49 sites sampled, 28 were evaluated as less than 100 employees and 21 as more than 100 employees.
3. Some interesting phenomena were observed in the course of accessing sites noted above. In particular, many addresses listed in the NIC domain name register were not accessible. In fact, we accessed 142 sites all told in order to obtain the sample of 49. It is not clear whether sites were inaccessible because of transient network problems or because they are not, in fact, providing service. In a number of cases, multiple attempts to access were made with consistent lack of success. Of the sites accessed successfully, there is a relatively large number

[27] Department of Statistics: http://www.dos.gov.jo:8000/owa-user/owa/em_show_t1 (1998)

of sites under construction or linked to a default server – usually an ISP. A breakdown of all sites accessed, together with an extrapolation to the entire .com.jo domain is as in Table 6:

Table 6: .com.jo sites by size

Access data	Number of accesses	extrapolation
<100 employees (est.)	28	85
>100 employees (est)	21	64
default server	4	12
not accessible	78	236
under construction	11	33
all accessed	142	
all .com.jo sites		430

4. Assuming the sample distribution to apply to the entire .com domain, there are at least 64 hosts of firms with more than 100 employees.
5. Given the 64 large firms with web sites and the 428 firms with one hundred employees or more, this puts the ratio of large firms with web sites at about 15%. This is a very conservative estimate, for a number of reasons:

    1. There are probably firms with 100 or more employees that maintain web sites only outside the .jo domain.
    2. In many cases, sites that could not be accessed may actually provide service, but could not be accessed for temporary technical reasons.

    In any case, since the calculated percentage lies comfortably within the 10%-90% criterion for moderate penetration, we can safely assume that level of absorption in the Jordanian commercial sector.

HEALTH SECTOR

According to the listing of the National Information System (NIS) there are 67 hospitals in Jordan.[28] A search of the NIC domain name registry yielded not a single hospital or clinic; we can only conclude that no organization of this type has its own server in the .jo domain. A search for hospitals in all ISP sites yielded only seven (see Table 7); interestingly, five of them are in the .com domain rather than .com.jo. Four of these five have their own DNS.

Of the seven sites found, only two are in the NIS list of medical facilities. This implies that the number of such institutions is in fact considerably larger than the 67 hospitals listed. Thus, the level of absorption by the health sector is still very low, and , in any case, well below 10%; this implies that penetration of the Jordan health sector should be rated rare.

[28] http://amon.nic.gov.jo/infres/owa/get_org?info_code=12 (no update date; accessed Sept. 15, 1999)

Table 7. Medical facilities for which an Internet site was found.

Institution	URL	In NIS list?
Amman Gamma Knife Center	www.access2arabia.com/gammaknife	no
Arab Center for Heart & Special Surgery	//www.achss.com/	yes
Gardens Dental Implant Center (Dr. Mazen Tamimi Polyclinics)	www.drtamimi.com/	no
Hijazi Medical Laboratories	www.geocities.com/~hijazi-labs/	no
Islamic Hospital	www.islamic-hospital.com	yes
Sharif Eye Clinic	www.sharifclinic.index.com.jo	no
Shmaisani Hospital	www.cns.com.jo/shmaisani	no

GOVERNMENT AND PUBLIC SECTOR

The NIC domain name register contains 54 ministries and government agencies. Twenty-three of these are ministries, including the Royal Court and the Prime Ministry; at least 16 of these have web pages. In addition, there are 59 public departments such as the Customs and – 11 with web sites. The NIC site contains pointers to city pages; these consist, however, of a single information page for each city, with no further links. We were unable to find sites maintained by the cities themselves. It appears therefore that well over 10% but less than 90% of government agencies have their own Internet servers. This implies a moderate sectoral absorption level.

A summary of the scores for the four sectors indicates that, overall, there is a moderate level of sectoral absorption of the Internet in Jordan.

Sector	absorption level	score
Academic-primary and secondary schools, universities	moderate	2
Commercial-businesses with more than 100 employees	moderate	2
Health-hospitals and clinics	rare	1
Public-top and second tier government entities	moderate	2

Connectivity Infrastructure

In terms of Connectivity infrastructure, Jordan spans levels 0 and 1.There is no domestic backbone; all connections are currently through JTC, although this will probably change with the impending introduction of competition to JTC. This is a Level 0 attribute

There are international links of the order of 6-7Mbps (see Figure 4). This is between Levels 0 and 1.

There is no Internet Exchange, although this function is partly filled by Hashem 1; this is Level 0.

Access is by modem – a Level 1 characteristic.

In view of the above, and of expected near-term developments, we can classify Jordan as Level 1 in terms of its Connectivity Infrastructure.

Organizational Infrastructure

In terms of its organizational infrastructure, Jordan clearly falls into Level 2 – Controlled. There are only a few ISPs, not so much because of formal restrictions to entry, although licensing is required. The main barriers to entry are the small size of the market and high connectivity costs paid by ISPs; these will be discussed in the section on dimension determinants.(see the ISP statement.)

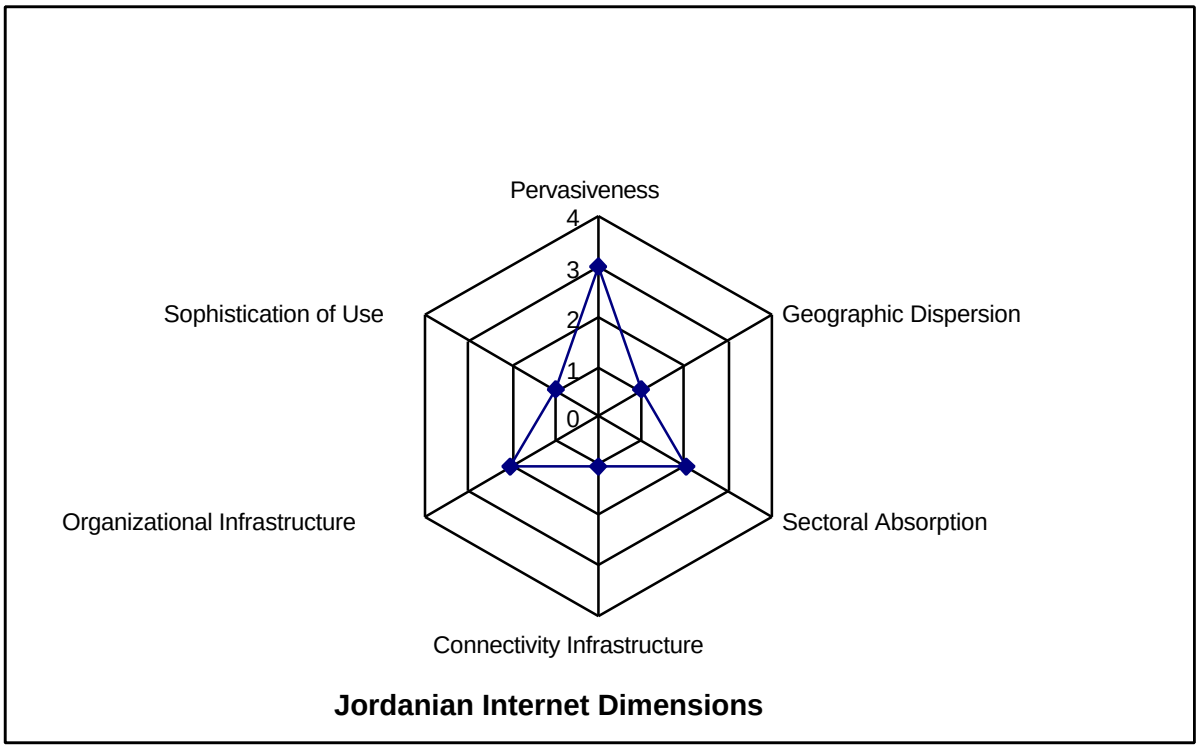
All ISPs connect to the international Internet through a monopoly telecommunications service provider, JTC. The provision of domestic infrastructure is also currently monopolized by JTC, but is about to change with the decision to open the local telecommunications market to competition.

Sophistication of use

The Internet is used in Jordan by public and private organizations almost exclusively to announce presence and to provide information on the history and nature of the organization. The sites themselves are nearly all structured along conventional lines offering virtually a identical set of pages. After visiting literally hundreds of web sites we found not a single case in which transactions could be executed via a web based application. Furthermore, a not insignificant number of sites have a single "under construction" page. This includes, for example, the Jordan Telecommunications Company.

The nature of use by private users is reported to be mainly for chat, i.e. establishing and maintaining social relationships. Although all virtually all web sites that we visited provide an e-mail address, the level of e-mail use is quite low, as evaluated by a number of knowledgeable people interviewed.

In view of the above, we characterize the level of sophistication of use as minimal; only the most basic conventional services are provided with no evidence of processes being changed as a result. This is not surprising given the small user base and the consequent impossibility of basing operations on Internet infrastructure.



Jordanian Internet Dimensions

Jordan Glossary

HCST	Higher Council of Science and Technology
JD	Jordanian Dinar. JD1 = ±US$1.40.
JTC	Jordan Telecommunications Company
NIC	National Information Centre. The NIC was founded in 1993 and charged with development and management of a national information system. It subsequently initiated use of the Internet in Jordan.
NIS	National Information System
RIPE	The RIPE Network Coordination Centre provides services to the European Internet service providers. It supports all those RIPE activities that cannot be effectively performed by volunteers
TRC	Telecommunications Regulatory Commission