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INTERNET INFRASTRUCTURE IN ISRAEL: A PROPOSAL FOR REFORM

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Introduction

In the past, during the Industrial Age, the countries which were most advanced economically were those which knew how to exploit their natural resources, and which industrialized their economies. Today, now that we have entered the Information Age, the countries whose economies will be most advanced are those which will develop their human capital and create the conditions necessary for this Age; in other words, for the transfer of information by means of technology, especially the Internet. Israel, a country lacking natural resources but with a wealth of human capital, now has an opportunity to take a central place in the world economy and attain high growth and economic independence.

Against this background, the fact that regulatory limitations and a structurally non-competitive marketplace have retarded the development of the Internet infrastructure in Israel is shocking. As a result, Israeli Internet users pay a high price for Internet service and receive in return a slow and "crowded" infrastructure. The reality of Israel's high-tech infrastructure stands in stark contrast to Israel's image as a high-tech superpower.

Both the users and the public at large suffer. In 1998, the damage resulting from slow Internet access and high prices is estimated at \$61 million, which found partial expression in inflated telephone and Internet bills. Also, some 2.1 million work hours and 5 million leisure hours were wasted; their value is estimated at almost \$40 million.

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But the greatest damage resulting from the government regulation in Israel and its monopolistic market is Israel's failure to exploit the full potential of a web-based, Internet economy. As new information-related technology does not enter the economy, and the Internet industry does not produce at its optimum, the economy as a whole suffers. Similarly, economic distortions affecting the scope of Internet use and slower industrial development also cause economic damage. Lost growth and the potential loss from missed opportunities for economic expansion probably total in the hundreds of millions of dollars each year. Israeli firms may be left behind, or perhaps driven to the U.S. or other locations, in order to exploit available technologies.

This *Policy Studies* surveys the current Internet structure in Israel, state interference in the sector, and the effect these conditions have on Internet users. In addition, it examines developments in the Western world, notably the U.S. and Europe, both of which lean toward less government involvement. And, finally, this study recommends policy reforms to improve the infrastructure, the quality-of-life of the users, and the national product.

Internet Development

The Internet is a technological infrastructure which allows information to be transferred between distant computers. Such information can be a photograph, a video film, a telephone conversation, a newspaper, or any piece of data suitable for encoding as electronic signals which can be read by a computer. In principle, any kind of data can be transferred by Internet, and thus a trend is developing to use the system for combinations of telephones, business, payments, radio and television.

The average Internet user sits by his computer at home or at work, and is potentially in touch with 40 million "host" computers around the world, each containing a wide variety of data (for instance, governmental, university and corporate entities), or with the $100^1 - 150^2$ million people who were connected to the Internet as of 1998.

Larry Ellison, president of Oracle, the second largest software company in the world, says of the Internet: "Everything that happens on earth, this planet, the universe, will depend on the Internet. It will be the center and heart of all industry. It will change human culture."³

To understand the history of the Internet one really should begin with the invention of the telegraph in 1836, or perhaps with the laying of the first trans-Atlantic cable in 1858-1866. These were the first examples of data-transmitting networks. The groundwork for the Internet itself was laid in 1958, when the U.S. Department of Defense established the Advanced Research Projects Agency (ARPA). This agency was formed in the midst of the Cold War between the U.S. and USSR, after the Russians had launched a satellite into space and U.S. government officials were worried about their technology lagging behind the Soviet's. The purpose of ARPA was to promote military research and projects.

The Internet was officially born in 1969;⁴ that year, computers in four universities were connected to the data transmission network of ARPA, known as ARPANET. The network soon

shed its military purpose and became a tool for academic research, providing an efficient means of communication between institutions. The first international connections on the network were made in 1973, to England and Norway. The next year, a network, Telnet, was created for civilian and business use.⁵

The trend toward this type of use continued during the eighties and nineties, and the number of users grew accordingly. At the same time, other networks were created which could tap into ARPANET. BITNET, for example, was established in 1981.

ARPANET ceased functioning in 1991, when a “provider” provided the first telephone dial-up access. This essentially completed the transformation of the Internet from a military-oriented, then to an academic, and finally to a business-oriented network.

In 1991, the U.S. government removed restrictions on Internet trade, thereby establishing that year as a watershed for the civilian and business uses of the Internet. Later that year, the World Wide Web was created. The web is today the most widely used form of the Internet.⁶

By 1992, the number of host computers had passed one million. That same year, audio and video messages were transmitted over the Internet, and the term “surfing” was coined to describe a sometimes haphazard search of the information available on the web. There were 50 sites on the web then; by 1996, there were more than 300,000.

Last year, 1998, saw the growth of electronic commerce (E-commerce) over the Internet; it was estimated at \$20⁷-37⁸ billion. It should be noted that estimates about the Internet by different research organizations vary by great amounts; this is because Internet operations are generally unsupervised and unrecorded, and because the different organizations interpret the available information by different means.

At the end of 1998, the amount of material transmitted on the Internet was estimated to be doubling every 100 days.⁹ The worldwide web had over 50 million users within four years of its creation; by comparison, 74 years were needed before the telephone had that many users.¹⁰

By the beginning of 1999 over a hundred million people were surfing on the Internet by means of thousands of local networks in 217 countries (at the beginning of the decade, only 22 countries were connected).¹¹ Calculating the exact number of users is difficult. Therefore, the growth of the Internet is more often measured by the number of host computers hooked up or the number of websites. Table 1 shows the speed of Internet growth.

Table 1
Indicators of Internet Growth

Date	Number of Countries Connected^a	Number of Websites^b	Number of Hosts^b
December 1969	1		4
December 1979			188
October 1989			159,000
July 1992	48	50	992,000
July 1993	60	150	1,776,000
July 1994	83	3,000	3,212,000
July 1995	129	25,000	6,642,000
July 1996	174	299,000	12,881,000
July 1997	192	1,203,000	19,540,000
July 1998	217	2,594,000	36,739,000
January 1999		3,689,000 ^c	43,230,000

Sources: a. International Telecommunication Union, *Challenges to the Network, Internet for Development* (Geneva: ITU, 1999), p. 23.

b. ISOC Internet site: <http://info.isoc.org>; <http://nw.com/zone/WWW/report.html>; Gregory R. Gromov, "The Roads and Crossroads of Internet History," at www.internetvally.com.

c. Note: As of December 1998.

Despite the impressive numbers, we appear to be only at the threshold of the so-called Information Age. Any look at the current operations, programs and plans for the Internet will make clear that the Internet stands before great changes regarding the amount, speed and quality of material transmitted. Indeed, the U.S. government has already initiated the establishment of the Internet 2 network in 1996, and it is now in the advanced stages of preparation. Internet 2 and other technological innovations are likely to significantly increase the scope of worldwide data transmission.¹²

Development of the Internet in Israel

Israel has been part of the worldwide development of the Internet since the mid-1980s. As in other parts of the world, it was the academia in Israel that spurred the first Internet growth here. From the inception of the Internet in Israel, the Israeli government has supervised and regulated the industry.

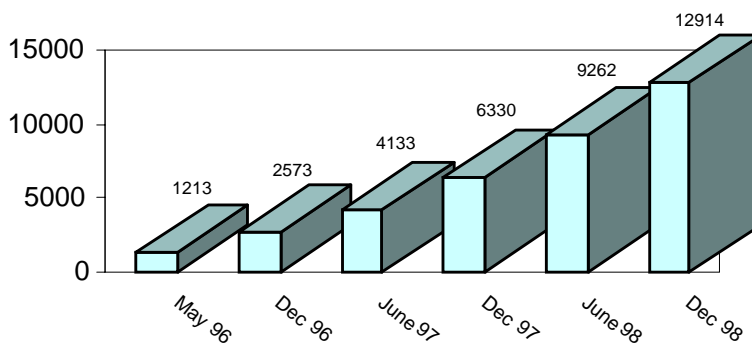
IBM supplied several Israeli universities access to the BITNET network in 1984. This access was paid for mostly by IBM, though the Israeli Ministry of Science contributed \$50,000. At the time, the access served mostly to enable electronic mail.¹³ After several years of experience, in November 1988 the Israeli Academic Network (ILAN) was formed. ILAN is owned by Israel's seven universities, through an organization known as the Inter-university Computing Center (the Center). The Center manages the network and maintains the connections of local universities to the Internet, through hook-ups to the U.S. and Europe.¹⁴

The Israeli government decided in 1993 to try to establish a national network for research and development, education and culture. The government therefore allowed the Center to connect non-university organizations involved in R&D, including corporations, to ILAN. As part of this experiment, the government paid approximately \$150,000 to connect 604 entities to ILAN from the beginning of 1993 to the end of 1994.¹⁵ At that point, the Ministry of Communications decided to allow Internet “providers” to provide the public with access to the Internet, provided they obtain a state-issued license to do so (a requirement typical of centralized economies). This requirement is one of the examples of tight state control of this market, which will be discussed below. The Communications Ministry also ordered the Center to cease providing access to business entities.

In Israel as elsewhere, the Internet grew rapidly. By the end of 1998, the number of Internet connections was estimated at 360,000; of those, about 100,000 were non-subscribing occasional surfers, schools and universities.¹⁶ The number of actual users is much higher, since one connection can serve several members of one family or several employees of a business. The Communications Ministry estimated the number of users – not including the occasional surfers – at 600,000, or about one-tenth of the population, at the end of 1998.¹⁷ A research group, TGI, estimated the number at 800,000, or 13 percent of the population.¹⁸ For purposes of comparison, about 30 percent of the U.S. population used the Internet at the time.¹⁹ The pace of Internet expansion in Israel, based on the number of domain names, is displayed in Figure 1.

Figure 1

Increase in Number of Domains in Israel



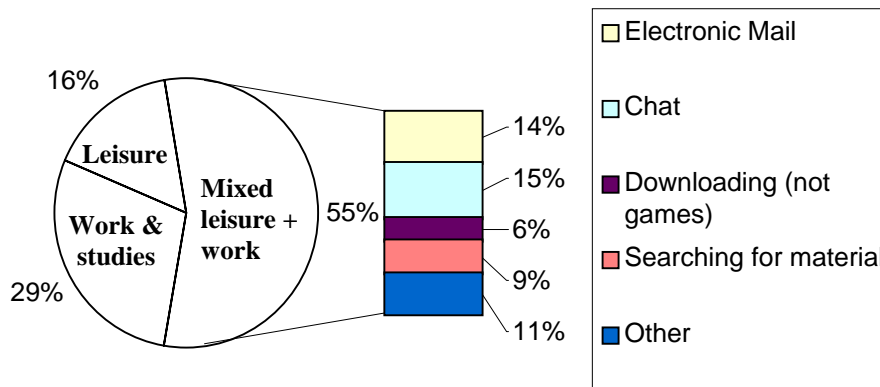
Source: www.iguide.co.il/stats.htm.

Users in Israel as elsewhere are divided into two main groups – private and business. Business subscribers use the Internet more than private. Businesses may use hundreds or thousands of hours a month, especially since some businesses maintain a permanent hook-up which may serve dozens of different computers in one firm. Private subscribers are more restrained in their use by high costs and poor quality.

Figure 2 shows that one-third of Internet use in Israel is either at the workplace or at home, for business purposes.

Figure 2

Internet Use in Israel



Source: Mark Gazit, associate director of Netvision, letter to the author, March 1, 1999. [Hebrew]

The Structure of the Industry

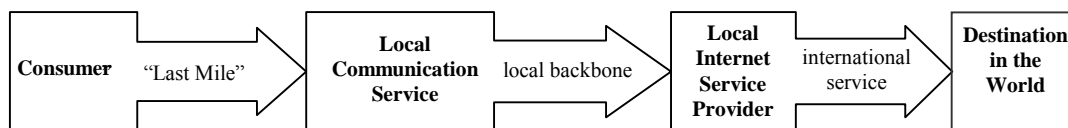
To understand the development of the Internet industry in Israel, it is necessary to examine its structure, rather than the character of its subscribers.

Bezek, the state telephone monopoly, is the one company that has an overwhelming influence on all aspects of the Internet infrastructure in Israel. Unfortunately, as is the case with so many state-granted monopolies, it is a deleterious influence.

In 1982, two years before Bezek began operations, the Knesset passed the Bezek Law. Paragraph 50 of this law states that licenses for communications operations or service will be issued only to Bezek.²⁰ This paragraph was cancelled by the Knesset in early 1999, effective June 1, 1999,²¹ but the state protection continues, as the Communications Ministry has not yet allowed any competitors in the field of domestic telephone communications. As of February 1999, 54 percent of Bezek's shares were held by the state.²²

To understand how pervasive and influential Bezek is on the Israeli Internet structure, a brief overview is in order. Figure 3 displays the different stages of Internet access, each of which will be discussed in detail below.

Figure 3



1. The Last Mile, or the Local Loop – this is the access network, usually telephone lines, that connect the consumer to the local communications system, near his home or place of work. As noted, the only company in Israel allowed by the Israeli government to provide infrastructure for the Last Mile is Bezek. While the infrastructure of existing cellular phone systems in Israel could provide competition for the Last Mile, the cost and quality of such service limit its relevance to owners of portable computers who wish to connect themselves to the Internet in a location not served by Bezek.²³

2. The local communication system – whose role is to pass the transmission from the Last Mile to its destination, in this case, the local Internet provider. Since the entire local stage (i.e., the stages described in nos. 1 & 3) in Israel is in the hands of Bezek, the local system is merely a technical tool for connecting different stages controlled by Bezek.

3. The local transmission backbone – which is the main pipeline passing information within a country. In the past, this backbone was based on copper wires, but today it includes the far more effective fiber optics. This backbone is also owned solely by Bezek.

4. The local Internet service provider – unlike most countries, where no special license is required to provide Internet service (though in some countries, providers are required to notify a regulatory body that they are operating),²⁴ the Israeli Ministry of Communications requires such licensing. At the close of 1998, over 30 providers held licenses, 20 of which were active. The main market-wide providers are Netvision and Internet Zahav, while Barak ITC and Bezek Benleumi (a subsidiary completely owned by Bezek) provide substantial business service. An international research company, IDC, determined that annual income from Internet service in Israel is \$115 million, with an expected annual growth rate of 45 percent.²⁵

5. The international infrastructure – this is the final stage of transmitting data between Israel and the world. The three companies allowed by the Communications Ministry to provide such service with a physical infrastructure are Bezek Benleumi, Barak ITC and Kavei Zahav. They use fiber optics in an underwater cable. Three other companies are allowed to provide satellite hook-ups: Darcom, Israest and EDC. While much of the Internet communications with Israel is accomplished via satellite, such infrastructure has inherent deficiencies which make it less efficient (regarding live videoconferencing, for example).²⁶

The physical connection is itself divided into stages. The first is a cable connecting Israel and Europe. Until this year only two cables were laid from Israel, one to Cyprus (CIOS) and one to Sicily (AMOS). In April of this year, a third cable was inaugurated with a much larger bandwidth, also connected to Sicily (MED-1).²⁷ This last line is jointly owned by the Italian Telcom, the Clal investment group and Aurec. Bezek had been a partner, but was forced by Israeli anti-trust authorities to sell its share at the beginning of the year.²⁸

The trend in 1999 is towards merging the providers of infrastructure and service. The few key players in the market, led by Discount Investments, Aurec, the Dankner group and Bezek, are working towards vertical integration of service and infrastructure. Simultaneously, these same groups are working towards horizontal integration and control by merging the currently competing companies with cellular or cable infrastructure.

The description provided of the Internet industry in Israel leads inexorably to two conclusions:

1. There is no competition for domestic communications service – Bezek maintains almost total control over the Last Mile and the local backbone. Most consumers have no choice but to use Bezek's telephone lines to reach the Internet. Even those consumers with special Frame Relay lines for data transmission, must use Bezek. In other words, all Internet communication in Israel must pass through Bezek's infrastructure.
2. There is a low level of competition for international communications – As noted above, this stage is characterized by little competition. While some competition recently has been introduced into this sector, all for good result, the competition remains limited in scope and in quality by government regulation, and the dearth of international communications providers remains as a serious barrier to the competitive development of the Israeli Internet sector. (See, for example, the discussion below beginning on p. 10.)

State Involvement in the Internet

As regulator, the state has essentially shaped the face of the Israeli Internet industry. Regulation affects prices and service both for telephone and Internet users. The Communications Ministry is involved in both infrastructure and service (see Appendix). In effect, there is almost no one involved in communications who is not regulated in one way or another by the Ministry, and almost no decision affecting the industry can be made without the Ministry's approval.

Infrastructure (see the Appendix for a diagram of the different levels of service and infrastructure) is ordered by the government. It usually involves digging under roads or erecting poles in the streets. It is often argued that the use of radio waves, which are in limited supply, and other limited factors do require some amount of regulation. This reasoning, however, has become the excuse in Israel for almost total ministerial and state control over the communications and Internet infrastructures.

This control gave the Ministry much power and influence. Before Bezek was created in 1984, the Ministry provided telephone service in Israel. Since then it has focused on supervision. In October 1985, the government decided to make the Ministry responsible for computer communication in Israel as well.²⁹

Two additional government ministries affecting the Internet are the Ministry of Science, which is responsible for promoting Internet 2, in accordance with a government decision of June 1998,³⁰ and the anti-trust authorities at the Ministry of Industry Trade. Due to government law and regulations, communications in Israel are not very competitive, and this interestingly enough has increased the involvement of the anti-trust authorities.

Regulation is the Cause of Distortions

The infrastructure servicing the Internet is on the whole the same as that servicing vocal communications. As infrastructures are merged and as one type of line is used to provide more than one type of service, the difference between Internet and other communications infrastructure becomes less distinct. Since as late as 1998 the Internet made up only 2 percent of the communications market, it barely, if at all, affected regulatory decisions.³¹

This *Policy Studies* focuses on distortions involving Internet infrastructure, and thus will not address the communications sector as a whole. Nonetheless, some of the difficulties listed below stem from the wider regulation of the sector.³² It is inescapable that over-regulation, resulting in a lack of competition, has deleteriously shaped and affected the overall telecommunications sector in Israel.

The Ministry of Communications affects the market, the players and the technology used in the following ways:

The “Fix-a-Problem-By-Introducing-Another-Problem” Method of Regulation: During the eighties and early nineties the government did not allow anyone other than Bezek to operate. The policy changed in the mid-nineties and several other companies were allowed to enter the communications field. The most important development affecting the Internet came in 1996, when the Ministry issued licenses for three companies to provide international telephone service: Barak ITC and Kavei Zahav, which began operations in 1997 and are in competition with Bezek; and Bezek Benleumi, which subsequently became a subsidiary of Bezek. As a result of the competition, the price of international calls dropped 70 percent almost immediately.³³

Bezek employees expressed their displeasure with this new potential competition by striking in 1995. They ignored back-to-work court orders,³⁴ even when the High Court ruled their strike was politically motivated.³⁵ They ignored even the request of Amir Peretz, who then headed the Professional Unions Department of the Histadrut, to return to work. But Peretz also announced that “if the workers do not get clear and acceptable answers about their fate, the magnitude of the protest will increase.”³⁶ The main point of the protests was that competition would eliminate the distortionary system by which international calls subsidize local calls, and that Bezek itself would be endangered, along with its employees’ futures.

The strike succeeded. The government, seeking to end the strike and win employee approval for partial competition, agreed to a series of compensations supposedly meant to ensure Bezek's financial well-being (thus the name of the agreement: "The Financial Well-Being Paper").³⁷ The value of the benefits awarded Bezek by the state is estimated at \$1 billion, even though there were those who estimated the potential damage to Bezek at a mere \$30 million.³⁸

The most serious benefit awarded, in terms of its implications for Internet service, was the obligation imposed upon the new international telephone companies to pay a special fee, a sort of tax, to Bezek, beyond the payments to be made for use of Bezek's infrastructure. This tax, called an access fee, is to be gradually reduced until the year 2001, going from 80 percent of the sums paid by the international companies to Bezek, to 40 percent.³⁹ In 1998, the tax totaled more than \$75 million.⁴⁰ In addition, until 1999, the price the international companies had to pay Bezek for the actual use of its infrastructure was higher than the cost, in order to compensate Bezek for the competition.

The cost of international calls was made more expensive by these access fees, as well as by a requirement that the companies pay 5 percent of their income as royalties to the Ministry of Communications.⁴¹ And so, to compensate these companies for these added costs and the distortions they cause, and to win their "agreement" to enter the market, the government promised them protection from competition until the beginning of the year 2002. This promise has had perverse implications for Internet prices and for the quality of the infrastructure available for Internet use.

Regulation as a Form of Keeping Away Potential Competitors: Several entities are active in various aspects of Israeli infrastructure but are unable to enter the telephone and Internet markets because of legal or regulatory barriers.

The most important such example is the cable television industry. Cable television companies reach approximately 70 percent of Israeli homes.⁴² In various countries, most notably in the U.S., cable companies have begun supplying Internet and telephone service to their subscribers; the cable infrastructure is capable of carrying a larger quantity than copper wires.⁴³ Some of the Israeli companies would need to upgrade their infrastructure before being able to offer Internet service, but the only real barrier preventing their entering this market is the Ministry of Communications.

Shmuel Dankner, chairman of the board of a cable television company, Matav, stated that his company is already capable of offering consumers Internet service that would be one hundred times quicker than Bezek's. Dankner claims the single reason he does not do so is the ministerial prohibition.⁴⁴ Yossi Doar, director of the cable television company Tevel, estimates that the entry of cable television companies into the Internet market will reduce current Internet prices by 50 percent.⁴⁵

The cellular phone companies in Israel are also waiting for the Ministry's go-ahead. These companies already have over two million customers in Israel, with antennas standing the length and breadth of the country for broadcasting and receiving. Some of the companies have already begun laying advanced infrastructures which are able to handle Internet service.⁴⁶

Similarly, the company with the tender to provide digital broadcasting service (DBS) for television via satellite (this sector, too, is under the state's watchful eye and one needs to win a tender to do business), will be able to offer Internet service, though its main purpose is to compete with the existing cable television. Prosper Abitbol, one of the main investors in Unicorp, which is vying for DBS rights, says his company will offer its subscribers service that will include television, telephone and Internet, for a base cost of eight dollars a month per family.⁴⁷

Others, utilities such as the Israel Electric Corporation and the Israel Railways, for instance, have received permission from the Communications Ministry to lay infrastructure for internal company communications. Such infrastructure could easily be used as an alternative to Bezek's, especially for the domestic backbone, if the Ministry would permit it.

A Low Level of Freedom in Internet Services: The field of Internet service providers is also regulated by the Communications Ministry. As noted, most countries simply require a notice of operations.⁴⁸ Yet the Israeli ministry requires presentation of a detailed five-year business plan, and a list of assets capable of convincing the Ministry that the would-be provider has the financial ability to offer the service.⁴⁹

Other regulatory burdens include a prohibition against small providers uniting to purchase large bandwidths for communication, which would lower costs. In addition, the over-regulation reduces the number of potential applicants, and thus the number of applications rejected by the Ministry is low.

Regulation as a Means of Preventing the Introduction of New Technology: The license issued for Internet service allows only value adding activities based on the current infrastructure. This means that the licensee is allowed to operate only by using the infrastructure of someone who has a license for general communications activity (in other words, Bezek, at the local level). The provider is forbidden to use advanced technologies to transmit commercial Internet communications within Israel (e.g., cellular phones and satellites), unless Bezek provides them the technology. Use of such technology as an alternative to Bezek would naturally lower costs and whittle away at Bezek's profits. It therefore seems unlikely that as long as Bezek enjoys monopoly status, Israeli consumers will ever be able to benefit from new technology. Even Bezek's move to new technologies, which could improve its own infrastructure (with digital subscriber lines, or DSL, for instance), is slow and will probably not be implemented until Bezek faces competition.⁵⁰

Despite the prohibitions and regulatory limits, several attempts to introduce new technology for the Internet have taken place. These attempts have seemingly been illegal and have been stopped by the Communications Ministry.

Gilat Communications Services, for instance, offered satellite hook-ups between consumers and Internet providers. In July 1996, the company announced it would provide the service at a price lower than Bezek's provision of similar-quality service.⁵¹ Gilat submitted its license request to the Communications Ministry in March 1997. The Ministry turned down the request and ordered Gilat to disconnect its customers, since its activity was unapproved. No explanation for the complete prohibition of such technology was issued.⁵²

Current legislation and its enforcement by the ministry has effectively eliminated this technology, which could lower prices and allow people, who today cannot afford Internet service, to hook up. Three years after Gilat's application, the prohibition is still in force. Dr. Gilad Amichai, director of Gilat, says: "As far as I can see, there is no reason for limiting use of this technology, and market forces should determine whether the technology is used and to what extent."⁵³

An attempt by a company called Activinet to hook up customers by means of microwave communications is another example of foiled technological innovation. The Activinet system is known as a Wireless Local Loop (WLL).⁵⁴ Yossi Meiber, director of Activinet, says his system allows speedier and less expensive hook-ups over the Last Mile than Bezek provides.⁵⁵ The Communications Ministry informed Activinet that its operations were illegal and must cease. The company soon found itself with financial debts to its suppliers and customers and a prohibition against offering any service. The company collapsed and WLL technology has still not entered the Israeli market.⁵⁶

According to Israel Drori, associate director of marketing at Breezecom, which sold Activinet its wireless equipment, use of the product would lower the cost of telephone calls and the transmission of data. "Our equipment," says Drori, "is an alternative to Bezek's infrastructure. Our company sells such equipment in many countries, but while around the world use of the wireless Internet is encouraged,⁵⁷ in Israel, introduction of such technology is prevented."⁵⁸

Shmuel Kat, Internet service director at Israserv, says if he were allowed to offer WLL, he could offer his customers unlimited Internet access for \$25 per month, with no additional costs. The connections and transmission of information, he says, would also be significantly quicker than his customers enjoy today.⁵⁹

Kat adds that if all regulations were removed, excepting those against extreme anti-competitive activities, then he would be able to re-sell chunks of communication lines and time he has already purchased for his own use. He would be able to set up an independent Internet facility and offer direct access to the main Internet backbone in the U.S. This would, in turn, significantly reduce the final price to the consumer for unlimited Internet access. Kat says:

The situation today is absurd. Existing prohibitions are not based on technological problems or considerations, but on business considerations and attempts to protect interested parties from competition. For instance, I am allowed to download from a satellite a much larger bandwidth than my company needs (which reduces the per-unit cost), but I am forbidden to sell some of the extra time to other providers. Business activity I engage in without difficulty in other countries, is forbidden to me in Israel.⁶⁰

A senior official of an Israeli company, which develops products based on WLL, says he thinks the reasons for the Ministry's prohibitions is the desire to protect Bezek. He says WLL could be used for all of Tel Aviv's local telephone calls for Internet connections, for which the city residents could pay a set fee to the Internet provider. Of course, this would have an extremely adverse effect on Bezek's income, as they currently charge for calls on a metered basis.⁶¹

Government Decisions Not Implemented

Many government decisions and committee recommendations issued over the past few years concerning communications could have improved Internet and over-all communications service in Israel had they been implemented. The implementation of these decisions has not been enforced, and no one has been held responsible for such inaction. Some examples of these decisions follow.

A government decision of August 1993 established a committee to examine licensing and regulatory practices in the communications industry.⁶² The committee was headed by David Boaz, the Finance Ministry's budget director. The committee concluded that:

A government ministry is not the proper organizational framework for dealing with the challenges the communications industry will face in the coming years...Because of these great changes, appreciable damage will be done to the Israeli economy if communications reform is not enacted....The regulatory burden borne by the Ministry [of Communications] is unnecessarily large, and the current control over communications in many cases prevents technological innovation.⁶³

The committee's main recommendation was to "establish a statutory authority for licensing, supervision and enforcement in the communications industry...[to create] a barrier between the political sector and the professional functions of licensing, supervision and enforcement in communications." The committee recommended that such an authority begin operations no later than the beginning of 1997.⁶⁴

In August 1995, as a result of the committee's recommendations, the government asked the ministers of finance and communications to submit by April 1996 detailed plans for establishment of a communications authority, as per the recommendations.⁶⁵ In September 1997, Minister of Communications Limor Livnat announced that the authority would be established in two years, as she needed that much time to close her ministry.⁶⁶ Two and a half years after the

authority should have been established according to the Boaz Committee recommendations there is still no operative plan to do so.

Another important and still-to-be-implemented decision reached by the government in January 1997 was to open the domestic communications market to competition no later than January 1999.⁶⁷ The decision was made on the recommendation of a ministerial directors-general committee, headed by the directors-general of the Ministries of Finance and Communications and the Prime Minister's Office (the committee report is known as the Wax-Leon-Brodet report, after these directors-general).⁶⁸

Having arrived at the January 1999 deadline, the Ministry of Communications decided to postpone competition until June 1, 1999. This deadline, too, has passed and two and a half years after the government decided to allow competition, it is unclear when such competition will begin.

The recommendations issued by a committee appointed by Minister Livnat to promote the Internet have also not been fully implemented — this, despite Livnat's announcement in October 1998 that she would do so.⁶⁹ Among the recommendations not implemented are one that declares that “the Ministry of Communications will seek to end the [right of] exclusivity given the international telephone operators, and will allow additional licenses to be issued as soon as possible.” Another recommendation, also not implemented, is to allow the establishment of Israeli Internet “exchanges” connecting the various local providers, who could then hook up directly to the worldwide Internet system.⁷⁰ Although it is permissible to establish such an exchange, it is forbidden for Internet providers to do so, and as of today, no one else has expressed any interest in doing so.

Cost of Internet Use

Tight state control has affected both telephone and Internet rates. The price of Internet use in Israel is among the highest in the Western world (see the international comparisons, below). These high prices are a result of the problems described above, especially the monopolistic structure of the industry and the prohibition against new technology.

One example of artificially inflated costs is the international hook-up stage of Internet use.⁷¹ Internet providers forced to pay high prices pass these costs on to Israeli consumers. Thus, the low level of competition for international telecommunications raises the price of Internet service for Israelis.

Also, Israeli Internet companies often cram a large number of users into a small communications carrier, thus slowing the transmission of data. This slowdown in turn increases the size of the telephone and Internet bills paid by the consumers, as they need to use more time. Doron Shikmoni, a member of the board of the Internet Society of Israel, explained to the Knesset in January 1999 why a slide meant to describe local Internet use actually displayed a picture of a cup of coffee: “...many people think this business takes too much time, so that

sometimes between each press [of a computer keyboard to download data] one can go make himself a cup of coffee.”⁷²

Table 2 shows the various costs of dial-up Internet access. The payment to Bezek for metered phone access depends on the time of day, the day of the week and the geographical location. Also, not everyone pays all costs, and the actual prices vary from customer to customer. So, too, does the payment to the Internet provider vary depending on the type of subscription. The most popular packages are ten or twenty hours per month, with each additional hour costing \$1.75 (VAT included), or unlimited access. The estimates in the table are conservative as they do not take into consideration costs which are applicable only to some customers, as, for instance, the monthly payment to Bezek for a phone line or payments for Bezeknet service.

Table 2

**Average Cost for an Hour's Surfing on the Internet in Israel,
For the First Quarter of 1999 (\$, VAT included)**

Type of payment	Average hourly cost
To Bezek, by meter	0.44 ^a
To Internet provider	1.75-1
Total for Internet hour	2.19-1.44

Source: Mark Gazit, associate director of Netvision, letter to the author, March 1, 1999. [Hebrew]. The data have been updated based on rate changes since then.

a. In April 1999, the cost fell by 20 percent and is now 0.35 cents an hour.

Table 3 offers two examples of the cost of Internet use to Israeli consumers, assuming that 100 hours per month are used. With a regular phone line, when the time of use affects the price, it is assumed that half the use is at night or on weekends. Also provided is the price for a frame relay connection, when the time is not important.

Table 3
Monthly Cost of 100 Internet Hours in Israel in 1999
(\$)

Type of Service	Permanent frame relay connection (not affected by duration or time of day)	Telephone line (50 hours day rate, 50 hours night rate)
Metered payment to Bezek		43
Payment to Bezek for Internet line	130	12
Monthly payment to Internet provider	280	37
Total	410	92

Sources: Mark Gazit, associate director of Netvision, letter to the author, March 1, 1999. [Hebrew] The data have been updated based on rate changes since then; Eddie Cohen, Netvision, letter to the author, March 31, 1999. [Hebrew]

MK Michael Eitan commented on the cost of Internet service in Israel when, as a deputy minister in the Prime Minister's Office, he headed the Unit for the Preparation of Israel for the Information Age:

The rates for Internet use in Israel are high, even scandalous, and more than anything, do damage to the future of Israel. The Ministry of Communications talks a lot about a free economy and deregulation, but its intervention and its policies regarding data-transmission, merely prevent Israel from being an advanced, modern information-based society.⁷³

In sum, we have seen that though the Internet sector holds enormous potential for Israel, the net result of government interference, the exclusivity awarded Bezek, the prohibition against innovation in the field of Internet infrastructure, and the distorted structure of the industry, result in both slowing the speed of Internet use in Israel and in the artificial inflation of the costs of such use. The negative effects on the transmission of information over the Israeli Internet system stand in stark and ominous contrast to the very purpose and advantage of the Internet-based Information Age: immediate access to an inexpensive source of information.

Analysis

The history of Internet development recounted above, and the story of state interference in the industry in Israel, have adverse effects on Israeli consumers and the Israeli economy. The analysis that follows will describe the economic distortions which have ensued and quantify the damage to the economy.

Losses to Israeli Internet Users

The slow speed of the Internet in Israel and its high price cost Internet users \$61 million in 1998, mostly in bloated telephone and Internet bills. Some 2.1 million work hours were lost and 5 million leisure hours wasted; the value of these hours is estimated at \$37.9 million.

Thus, the damage done in 1998 amounts to approximately \$100 million. This analysis is based on the economic value of speed and costs, with other factors remaining fixed. It stands to reason, though, that in a competitive environment, the speed of data transmission, costs, number of hours used, and number of subscribers would all change accordingly. Thus, for example, when the international telephone market was opened to limited competition, the amount of calls rose by 70 percent in less than one year.⁷⁴ Were one to assume similar potential growth in the Internet industry, the estimates of the damage being done would have to be increased substantially.⁷⁵

Bezek is the main beneficiary of this waste of Internet user's money, as its income is based on metered telephone calls and the use of its infrastructure. The Committee for the Determination of Bezek Rates (the Grunau Committee), appointed by the Communications Ministry, published a report at the end of 1998 which sheds light on Bezek's income.⁷⁶ The picture painted is a sad one, which shows the effects of Bezek's monopolistic status and pinpoints where the lost money of Israeli Internet users has gone. The Committee concluded that Bezek's unduly high rates had allowed the company to rake in profits of \$450 million more than the Ministry had planned during the four years preceding the report's publication. In essence, Bezek essentially doubled its profits at the expense of the consumer.⁷⁷ These profits cannot be explained by increased efficiency, insofar as the Committee noted "a relaxation of efforts to become more efficient over the second half of the period." (Reference is to the period following the agreement on Bezek's "Financial Well-Being," which gave the company a windfall without any effort on its part.) The "relaxation of efforts" led to an unnecessary \$90 million being spent beyond planned budgeted expenses.⁷⁸

In order to measure the damage done to the economy, the following will be taken into account:

1. The speed and price of Internet service: This model will assume the speed of surfing today is 50 percent what it would be in a competitive environment, and the price of use is twice what a market price would be. Netvision's associate director Mark Gazit says:

Assuming a solution offering an alternative to Bezek's infrastructure, and the possibility of purchasing less expensive hook-ups to the U.S. network, the relative price [for similar Internet services] would drop by about 50 percent....In my opinion it will be possible to enlarge the width of the frame for users [i.e., the speed to consumers] by 100 percent at no additional cost.⁷⁹

In the opinion of Shmuel Kat, cited above, under market conditions prices would drop and speeds increase more than 100 percent. A comparison with prices in the U.S. (see below) shows Israeli consumers pay four to twenty times what U.S. consumers pay, relative to average

wages. Thus it would appear that Gazit's estimates, which will be the basis for this analysis, are conservative.

2. The number of subscribers in Israel: This analysis assumes 260,000 full subscribers and 100,000 occasional users, which were the figures for the middle of 1998.⁸⁰ According to the Communications Ministry's Rahav Committee, at the end of 1998 there were 600,000 regular users and another 100,000 occasional users.⁸¹ Thus again, the estimates used herein will be conservative.

3. The average number of monthly hours spent on the Internet: Determining the time spent on the Internet by Israelis is made difficult by the differences in types of connections (permanent or dial-up) and the types of users (business or private). A survey by the Israeli electric-commerce company Modus shows the average business use in Israel is over 40 hours a month.⁸² Bezek estimates that in the first quarter of 1999, 800 million minutes were spent on dial-up access, which usually means private consumers.⁸³ If one divides this number by the number of subscribers, approximately 250,000 in mid-1999,⁸⁴ one arrives at an average use by subscribers of 17.8 hours a month. When all figures are taken into account, for purposes of this analysis one would be assuming an average monthly use of 24.7 hours.⁸⁵

4. Download time: Research by the American company Relevant Knowledge shows that 25 percent of time on the Internet is spent waiting for data to be downloaded to the user's computer.⁸⁶ No similar research exists for Israel; Netvision estimates that 10 percent of "surfing" time is spent downloading.⁸⁷ Differences between countries can be expected; in English-speaking countries, for example, reading English-language material takes less time and thus more time is spent, relatively, on downloading. Within Israel, too, differences can be expected between different providers.

For this analysis, the mean time based on the above research will be used, thus leading to the estimate that 17.5 percent of surfing time is spent downloading material. This does not include the time necessary to make the connection to the provider, though this might very well amount to a significant number of hours for dial-up subscribers.

Table 4 shows how the cost of slow Internet service can be estimated, both for users and for the economy. First, one must determine the number of people who subscribe to the Internet in Israel. Then it is necessary to determine how much time these subscribers spend on the Internet, and how much time is spent on the Internet by non-subscribers. Then one must determine what percentage of that time is spent downloading information into Internet users' computers. Having determined how many hours are spent on the Internet and what percentage is spent waiting for material to be downloaded, and assuming that half that time would be saved if information traveled twice as fast, one can then calculate how much time is wasted. The amount of wasted time should then be multiplied by the cost of Internet use in Israel in order to determine how much money is spent unnecessarily.

The table below thus shows the estimated number of hours spent downloading material, and that half of these hours could have been spared. Finally, a value is assigned to these lost hours (assuming the price of use is a constant). The result is that the slow speed of Israel's Internet service caused a loss of \$11 million to Israeli users in 1998; these millions were charged in telephone and Internet bills.

Table 4
Economic Loss to Subscribers Resulting From Slow Speed
(static model)

Number of Subscribers ^a	260,000	A
Average number of monthly hours for an Israeli ^b	24.7	B
Total non-subscription hours per month ^c	416,667	BZ
Percentage of time spent downloading ^d	17.5%	C
Hours spent on Internet per year	82,064,000	$T=(A \times B)+(BZ \times 12)$
Time spent downloading each year	14,361,200	$D=T \times C$
Damage each year (hours) (assuming speed is half that of market speed)	7,180,600	$E=D \times 50\%$
Average cost of Internet hour in Israel (meter + provider) ^e	\$1.5	F
Annual economic damage from lost hours	\$10,770,900	$N=D \times F$

Sources: a. See assumption no. 2, above on p. 17.

b. Based on various findings of this *Policy Studies*.

c. *Yediot Aharonot*, September 1, 1998.

d. See assumption 4, above.

e. Based on the conclusion presented in Table 2, above.

As noted in Table 4, 7.2 million hours were wasted downloading material because of slow data transmission speeds. Time spent waiting for material came at the expense of both work and leisure. These factors have an economic value. Of the lost hours, 30 percent are lost work hours and 70 percent lost leisure hours. One would therefore multiply the number of lost work hours by their economic value, and the number of lost leisure hours by theirs, and add these two numbers together in order to determine the total lost value to the economy.

Table 5 shows the economic damage done to the economy by slow Internet speeds. The value assigned work and leisure hours is based on the estimates of the Finance Ministry's Budget Department.

Table 5
**The Economic Damage to the Economy Resulting From
Lost Work and Leisure Hours (Annually)**

Lost hours (see Table 4)	7,180,600	E
Lost work hours ^a	2,154,180	$F = E \times 30\%$
Lost leisure hours ^a	5,026,420	$G = E \times 70\%$
Value of work hour ^b	\$14.335	H
Value of leisure hour ^b	\$1.393	I
Value of lost work hours	\$30,880,170	$J = F \times H$
Value of lost leisure hours	\$7,001,803	$K = G \times I$
Total annual damage	\$37,881,973	$N = J + K$

Sources: a. See Figure 2, above. Thirty percent of Internet use is at or for work.

b. Finance Ministry Budget Department, *Instructions for Investigating the Economic Feasibility of Land Transportation Projects 2* (Jerusalem: Ministry of Finance, September 1996), p. 2. [Hebrew]

Cost of Service

The above estimates tell the story of what effect a lack of competition has had on the quality of infrastructure and service. Unfortunately, the infrastructure is not only slow, it is also overpriced. Minimally, this cost Israeli consumers an additional and unnecessary \$61.5 million in 1998.

Table 6 shows the cost to Israeli Internet users of high prices (assuming that the speed remains constant). This analysis will base the cost on the conservative estimate offered by Netvision's associate director, that prices would be 50 percent lower if competition and new technologies were allowed. Thus, the following table notes the number of hours used, then calculates their cost, and finally records that half of that cost could be saved, but instead is wasted.

Table 6
Economic Damage Resulting from High Internet Prices
(static model, as of end of 1998)

Annual Internet hours	82,064,000	T
Average cost of Internet hour in Israel (Bezek + provider)	\$1.5	F
Total annual Internet expenses	\$123,096,000	$T \times F$
Estimated cost in competitive market (50% of current cost)	\$61,548,000	$B = F \times T \times 0.5$
Damage from high Internet costs	\$61,548,000	$C = A - B$

Lost Economic Potential

The monopolistic structure of the industry, the government regulation, and the prohibition against new technology all combine to cause yet additional damage to the economy, in terms of lost economic potential. Precious resources are being lost as technological innovations are delayed, and growth is slowed as new companies producing or using such technologies never come into existence.

The slow infrastructure and high prices hurt the productive ability of Internet-based companies, make them less competitive against foreign companies, and reduce the incentive to produce for the domestic market. This study has already identified two examples of such damage: the collapse of Activinet and the prohibition of wireless technology use by Breezecom.

Israeli citizens are also suffering as economic potential is lost. Many Internet applications, such as long-distance learning, work and medical assistance are not available to Israelis because of slow and expensive infrastructure.

Since the Internet industry and related technologies are growing exponentially not linearly, Israel's failure to fully exploit the Internet (as a result of state regulation and Bezek's monopoly) results in much more damage and potential loss than the totals listed in the tables above.

Summary

This *Policy Studies* has described and quantified the damage to the Israeli economy resulting from the lack of competition and the low degree of freedom in the telecommunications sector, and specifically the Internet industry, in Israel. Table 7 attempts to show the total damage done to Israeli Internet users and the economy as a whole. In order to determine this total, the following analysis adds the sums spent by users because of inflated prices, determined in Table 4, to the sums spent because of hours wasted due to slow data transmission speed, determined in Table 6. To these sums one must add the damage to the economy as determined in Table 5.

Table 7

Total Damage to Internet Users and Economy (\$, dynamic model)

Annual loss to users because of wasted hours (assuming price was competitive, or 50% of current price). ⁸⁸	5,385,450	A
Annual loss to users because of high prices (assuming speed was competitive, or twice current speed). ⁸⁹	56,162,550	B
Annual loss to users in Israel	61,548,000	N1=A+B
Annual loss to economy	37,881,973	C
Annual loss to users and economy	99,429,973	TN=N1+C

The annual loss to Israeli Internet users and to the economy as a whole due to the statist controls currently in place is approximately \$100 million. This estimate is conservative and does not take into consideration an expected rise in the number of Internet users and surfing time, as one would expect to occur should conditions improve. Nor does it give expression to lost economic potential based on a wide dissemination of information technology within the economy, nor to the harm done to the Internet industry itself. These numbers might easily reach into the hundreds of millions of dollars annually.

International Comparisons

Many countries in the West are undergoing a process of structural changes in their communications sectors. These processes are driven by the fast-paced changes in recent years, including the development of cellular phones and computer networks, notably and especially the Internet. The processes are advancing at unprecedented speeds and require an ability to respond quickly and a market structure that encourages technological advances.

In the past, many Western countries accepted the type of communications market that Israel still has today: A state-owned or at least state-backed monopoly. Today, more competitive models are being adopted. Many countries have concluded that heavy-handed government bureaucracies are not able to meet the demands for quick response and change imposed by technological advances. Markets that are not competitive prevent new technology development and negatively impact the economy.

The structural changes taking place include a transfer of communications infrastructure to the private sector, the entry of domestic and international competitors to previously monopolized fields, a reduction in government involvement in the market and a refocusing of regulatory bodies towards preventing the development of anti-competitive institutions. This new openness has been accompanied by the application of new technologies, lowered prices and a wide variety of services. In many instances, the monopoly which had previously controlled the market has not been hurt by the competition⁹⁰ — for with the competition, comes increased market activity.⁹¹

A comparison of Internet costs in various countries is shown in Table 8. The comparison is based on research by the International Telecommunication Union. The study compares by country the cost of Internet access as a function of either (1) a payment to the Internet provider and to the telephone company when such service includes the cost of a telephone line; or (2) when the service does not include the cost of a telephone line. In both categories, 20 hours of use per month is assumed. In either case, Israel does not do well: Israel is ranked 36 and 33 out of 45 countries, respectively.

Differences in pricing in different countries make finding common ground for a comparison difficult. For instance, in many Western countries, weekend rates are in force one day longer than in Israel. Also, in many Western countries, there is an increasing reliance on new technologies which lower costs for many consumers.

Table 8
Comparison of Monthly Internet Cost in Various Countries
(20 hours/month, off peak, \$, Nov. 1998 prices)

Country	Payment to Provider and Telephone Co. (excluding tel. line)	Rating	Payment to Provider and Tel. Co. (including tel. line)	Rating
Malaysia	8.42 ^{a,b}	1	13.68	1
Canada	12.27 ^{b,c}	2	26.51	7
India	12.77 ^c	3	17.25	3
Indonesia	14.38	4	16.57	2
New Zealand	18.67 ^{b,c}	5	37.70	15
USA	19.95 ^c	6	37.95	16
Russia	20.00 ^c	7	23.42	4
Singapore	20.50	8	25.73	6
Taiwan	22.15	9	23.54	5
Hong Kong	22.94 ^{a,b}	10	31.84	9
South Africa	25.58 ^a	11	35.35	10
Korea	26.38 ^b	12	28.38	8
Finland	27.06 ^{a,b}	13	44.77	21
Mexico	27.18 ^a	14	40.06	17
Greece	28.66 ^a	15	36.32	12
Australia	28.89	16	36.37	13
Portugal	28.91	17	42.39	19
Philippines	30.54 ^c	18	41.21	18
Switzerland	32.09 ^b	19	49.92	25
Turkey	33.87	20	35.92	11
Poland	33.99 ^{a,b}	21	37.07	14
Norway	34.70 ^a	22	46.50	22
Ireland	35.27 ^{a,b}	23	52.96	29
Brazil	36.24 ^b	24	50.26	27
Italy	36.89	25	48.42	23
Spain	38.44	26	50.01	26
Sweden	38.61	27	56.50	34
Chile	38.83 ^a	28	52.68	28

Czech Republic	39.75 ^a	29	42.70	20
Argentina	41.32 ^b	30	54.27	30
Holland	41.71	31	9.77	36
France	42.41 ^a	32	54.34	31
Belgium	42.73 ^{a,b}	33	61.34	38
Hungary	44.25	34	49.24	24
England	48.57 ^a	35	59.70	35
Israel	49.83	36	56.27	33
Denmark	50.11 ^a	37	62.54	39
Iceland	50.18	38	56.26	32
Germany	51.18 ^a	39	65.38	40
Austria	52.03 ^a	40	64.42	41
Japan	55.58 ^b	41	70.07	42
Thailand	58.16 ^b	42	60.93	37
China	65.36	43	N/A	
Venezuela	66.88	44	73.61	43
Luxembourg	78.27	45	93.70	44
Average cost in 45 surveyed countries	36.28		46.02	

Source: ITU, *Challenges to the Network, Internet for Development* (Geneva: ITU, 1999), p. A-29.

Note: The cost includes payments to the Internet provider and telephone company for 20 hours of off-peak use, and value-added tax. Not included is the installation fee for Internet service, in the event there is such a fee.

- a) The price includes unlimited access.
- b) The price includes installation.
- c) The price includes unlimited telephone service.

Thus, the table shows that Internet prices in Israel are high even compared to those countries in Western Europe that have not yet opened their markets to competition. The high prices in Israel are even more striking when Israel's relatively low per capita GDP (compared to other developed countries) is taken into account. Thus, while Japan and Luxembourg were ranked last with the highest prices, their per capita GDP was more than twice Israel's in 1996.⁹² Were Internet costs to be measured in relation to per capita GDP, Israel would be last among developed countries, with the highest costs. Ironically, Israel's image as a high-tech driven economy contrasts with the reality that Israel is last in cost-effective Internet use.

In order to understand the relative competitiveness of the Israeli Internet structure juxtaposed against that which exists worldwide, this study will examine structural changes and communications and Internet developments in the United States and European Community. The focus of this comparison will be on the U.S., where the market is more competitive and open to

technological innovation. Europe, while far from the American level of competition and prices, has recognized the dangers and problems of a communications sector without competition and is moving purposefully to rectify the situation. The EC's activity in this regard highlights all the more Israel's lackadaisical approach. The gap between Israel and Europe is largely potential at this stage, but Europe is preparing for change while Israel lags behind. The gap may soon become real.

United States

The U.S. is the birthplace of the Internet and is without a doubt, the Internet-center of the world today. Internet statistics for the U.S. are impressive, if not overwhelming:

1. Over 90 percent of data transmitted on the Internet is produced, sent to or passed through the U.S.
2. Ninety-four of the one hundred most popular websites are located in the U.S.⁹³
3. As of March 1999, there were 83 million surfers in the U.S.,⁹⁴ or 52 percent of the users in the world.⁹⁵ The surfers are served by 6,400 Internet providers within the U.S.⁹⁶
4. English-language material comprised 81 percent of all information on the Internet, at the end of 1997.⁹⁷ This fact implies a strong advantage for English-speaking populations, which are, in fact, characterized by more use of the Internet than others.

The communications sector in the U.S. has been undergoing a process of liberalization for the past two decades.⁹⁸ The central development came in 1984 when the AT&T communications giant was divided into seven "Bell" companies. This followed a 1982 court ruling that found AT&T in violation of the Sherman Antitrust Act.⁹⁹ The communications law enacted in 1996 allowed unrestricted competition in all aspects of telecommunications.¹⁰⁰ While the local telephone market is still dominated by the Bell companies, their competitors are steadily gaining larger market shares. These competitors doubled their revenue in 1997. They held a 3 percent share of the market; the market's turnover in 1998 was \$97 billion.¹⁰¹

Internet service by means of cable television is not yet a model market. The service is dominated by two companies. Still, either the increasing competition or the threat of such competition has brought prices down and encouraged technological improvements. Competition in the U.S. is characterized, among other things, by a "bundling" of services. Customers are offered a choice of choosing two or more of the following services as a package deal: Internet, cable television, and domestic and international telephone service.¹⁰²

Most Internet users in the U.S. are still connected to the Internet by means of their regular telephone wires, but alternative service providers, especially cable television, continue to enlarge their share of the market.¹⁰³ Telephone connections are paid for by a monthly fee which averaged \$23 in early 1998.¹⁰⁴ This fee allows customers an unlimited number of local calls (in New York and other regions, millions of people are included in such "local" areas).¹⁰⁵ Unlimited Internet access was available for an additional average monthly fee of \$18.50.¹⁰⁶

Thus, a U.S. consumer who wanted unlimited Internet access in mid-1998 had to pay a total of \$41.50 per month. (Other and later estimates for 1998, apparently based on slightly different data, show a total average monthly fee of \$34.50.¹⁰⁷) For someone who does not use the Internet enough so that he requires a second telephone line, and who would in any case be paying for one line, the total additional cost for unlimited Internet service is \$18.50 per month; this user will not be charged for a hook-up on a metered basis. Where bandwidth access by means of television cables is available, the price for unlimited access in June 1998 was \$40 a month.¹⁰⁸ As of January 1999, 600,000 homes were connected to the Internet in this manner, about 90 percent of them through two cable companies, Roadrunner and @Home.¹⁰⁹

Table 9 compares the cost of Internet use in the U.S. and Israel. U.S. consumers fare much better than Israelis.

Table 9
Costs of U.S. and Israel Internet Use

Type of Connection	Monthly Cost in Israel, \$	Monthly Cost in US, \$	US Cost, \$, Relative to Average Monthly Wage	How Many Times More Expensive is Israel?
100 hours on special phone line used only for Internet	102 (half at night, half during day)	34 – 41.5 (unlimited service); \$40 for higher quality cable connection	20.4 – 24.9 (unlimited service); 24 for higher quality cable connection	4 - 5
100 hours on existing regular line	91 (half/night, half/day)	18.5 (unlimited service)	11.1 (unlimited service)	8
Unlimited	410 (Frame Relay) ¹¹⁰	34 – 41.5, or 40 for higher quality cable connection	20.4 – 24.9 (unlimited service); 24 for higher quality cable connection	16 - 20

Note: The average national wage in the U.S. is approximately \$2,500; in Israel it is approximately \$1,500.

The European Market¹¹¹

The European market was in the past characterized by a monopolistic structure, similar to the American market of old and today’s Israeli market. Though most European countries opened their markets to competition early in 1998, the structure is still far from competitive.¹¹²

The market was opened in stages. First, in 1984, the ground was laid for a common European communications policy. The second stage, characterized by a debate over communications regulation, began with the publication of a Green Paper on the subject in

1987,¹¹³ and entailed European Council decisions.¹¹⁴ The approach adopted was to allow markets to operate freely, except for certain sectors, such as cellular phone service and other similar services, in which resources were limited (i.e., the amount of airwaves). In these instances, the number of operators were limited by regulation.¹¹⁵

The third stage was the publication of a two-part European Commission policy paper at the end of 1994¹¹⁶ and beginning of 1995.¹¹⁷ Following its publication, the European Council¹¹⁸ and the European Parliament decided to open the communications sector to free competition as of January 1998.¹¹⁹ Monopolistic rights over infrastructure were ended on November 15, 1996. The communications market was opened to all in January 1998.

In 1994, the EC also issued the Bangemann Group Report on the global information network and its impact on Europe. The report urged that in order to be ready for the information age, monopolistic practices should be abandoned in favor of liberal market policies and competition.¹²⁰

In general, those aspects of the European telecommunications market that relate to the Internet do reflect competition between providers, and as a result prices are dropping. Other communications prices are also falling. Mary O'Rourke, the Irish minister for public enterprise, estimates, for instance, the competition introduced at the end of 1998 will lower consumers' telephone bills by 20 percent in one year and another 5-10 percent the next year.¹²¹

The fact that domestic phone service in Europe is still not totally competitive has aroused the ire of local consumers. Consumer protests have been expressed in demonstrations, consumer strikes and the establishment of protest organizations, the most well known of which is called the Campaign for Unmetered Telecommunications, or CUT.¹²²

Internet users in seven European countries joined forces early in 1999 to protest high local telephone prices which, in turn, raise the cost of using the Internet.¹²³ Most of the protesters were eyeing the U.S. model, by which a fixed monthly fee purchases Internet service regardless of the amount of use.

Protests have occurred elsewhere as well. The methods of pricing local telephone calls for Internet service were changed in both Pakistan and the Philippines, after similar consumer protests.¹²⁴

Summary

This study has examined several examples of countries adapting to changes in communications as a result of the dawn of the information revolution. It would be difficult to point to one model as the ideal. Different countries have different models based on their own demographics, topography and culture. Yet the common thread that runs through all the Western countries trying to win a place in the Information Age is quite simply: A process of opening the market to competition, and reducing government interference to a minimum.¹²⁵

Competition and a free market are the factors that will decide how the market will be shaped in any given country. In this respect, Israel is hardly advanced, despite the presence of advanced technology and an educated work force. Internet prices in Israel are among the world's highest, and as a result, Information Age technology is introduced more slowly if at all: A 1998 study by the International Telecommunication Union rated Israel nineteenth out of 30 countries examined, in terms of the number of host computers for every 1,000 people.¹²⁶

Recommendations

State interference in the communications sector and Internet industry have created an anti-competitive, technologically underdeveloped market in Israel. The market is characterized and hobbled by what can only be described as a slow, inefficient infrastructure and high costs. Several policy reforms, however, would improve the industry and Israel's chances for economic growth and advancement.

1. **Regulatory Reform:** State regulation needs to undergo significant reform. The Boaz Committee's admonitions that the Communications Ministry's regulatory burdens were too great to bear and were preventing new technology development, holds true for data-based technology as well. The Committee's recommendations should be implemented: to replace the Ministry with a statutory licensing, regulatory and enforcement authority, resembling in structure the U.S. Federal Communications Commission.¹²⁷

The authority should be a statutory entity whose director and members would be appointed by the government for five-year terms, based on professional credentials; they would not be dismissed unless convicted of serious crimes (unlike today's Ministry, a political entity, whose director can be fired whenever the minister wishes). The authority and its activities would be subject to review by the state comptroller, and would be required to submit an annual report to the government. The government would set the authority's policy goals and approve its budget. Such an authority would be more professionally motivated than a politically motivated Ministry. For comparative purposes, one might note that the Bank of Israel, whose governor is appointed by the government, operates on a relatively professional basis, exercising its authority while remaining aloof from political considerations (certainly more aloof than government ministries).

The 1991 Boaz Committee Report best described the role of the government: "In areas where a competitive market functions, market forces should be the incentive for quality service, and therefore there is no need for state regulation beyond determining whether licensing qualifications and standards' requirements have been met. These standards should be designed to guarantee proper use of the network, to avoid mutual disturbances on the spectrum and the public system."¹²⁸ This recommendation should be implemented in full when it comes to Internet service.

2. Competition at the Level of Local Infrastructure: The main problem facing the Internet industry in Israel, and the cause of its high prices, is the low level of freedom within the domestic infrastructure. Several reforms would introduce freedom and competition and lower prices:

- (a) Eliminate all restrictions and limitations on competing infrastructure providers. The fact that Bezek provides the only infrastructure for Internet use at the domestic level is a regulatory act, not a divine one. Other communications companies already offer cable television and cellular phone service. These infrastructures can serve as alternatives to Bezek's. These and other companies should be allowed to provide these alternatives. The abrogation of Paragraph 50 in the Bezek Law already allows the Ministry to issue licenses for such activity, and no further legislation is necessary.
- (b) Eliminate all restrictions and limitations placed on entities having their own communications infrastructure. Even companies not involved in communications, but which possess an internal communications infrastructure, should be allowed to enter the market. The Israel Electric Corporation has such infrastructure and has expressed an interest in competing with Bezek. Most such entities in Israel are state monopolies enjoying state protection from competition in their own fields. Their entry to new fields should be accomplished along with their privatization; yet even when owned by the government, they should be allowed to compete. This is provided that they are prevented from using cross-subsidization to artificially lower Internet service. This can be accomplished by requiring that any such company wishing to engage in communications establish a subsidiary to do so. Legislation could be enacted making such cross-subsidization illegal. Subsidiaries would be required to keep their own books, separate from their parent companies, and would be watched by local antitrust authorities.
- (c) Allow the use of new technologies. Today, Internet providers are forced to use specific technology supplied by Bezek, even though Israel is a world-class producer of wireless and satellite technology for all stages of data transmission. These and other technologies such as DSL should be allowed to compete on the domestic stage, in order to facilitate new and efficient means of transmitting data.
- (d) Infrastructure belonging to state-sanctioned monopolies should be available to all. Monopolies which sprung from legislation (e.g., the cable television companies, Bezek, the Israel Electric Corporation) and which wish to operate Internet service should be obligated to allow other providers equal access to such infrastructure.
- (e) Eliminate the prohibitions against mergers. The Rahav Committee, which studied Internet services in Israel and presented its recommendations in October 1998, suggested "limiting the ability of one entity to simultaneously own, control or direct the operations of several Internet-related companies."¹²⁹ This is poor advice and inappropriate for the following reasons.

A monopolistic communications market is detrimental to consumers. The monopolies in the Israeli communications market are state corporations or entities which have enjoyed state protection. But with increasing privatization and a more competitive market, there would seem to be no reason for state interference in the structure of companies, beyond the already existing regulation by the state antitrust authorities in the Ministry of Industry and Trade. Currently, the authorities must approve mergers and takeovers when the companies concerned have large enough market shares theoretically to endanger competition. The proviso must be added to this recommendation, that mergers or takeovers among companies owned by the state should be allowed only after their privatization.

Adopting the policy recommendations listed in this *Policy Studies* would create a competitive market and reduce the likelihood of limited competition.

3. Competition at the Level of the International Infrastructure: In order to improve the relative position of consumers vis-a-vis the international communications infrastructure, the following should be accomplished:

- (a) End the access fee paid to Bezek. One of the more substantial expenses incurred by companies which have won tenders to provide international telephone communications is the access fee paid to Bezek, which is a cost beyond the cost of renting Bezek's infrastructure. The obligation to pay this fee, meant to subsidize Bezek's domestic service, must end immediately.
- (b) End concessionaires' royalty payments to the government. The obligation imposed upon concessionaires to pay 5 percent of their earnings to the government must end. These payments are a tax by any other name, and serve to make international communications, including data communications, more expensive.
- (c) Open the international communications market to full competition. The Ministry of Communications should open the field of data communications to full competition even before the exclusive concession awarded the current concessionaires expires. The fact that the three companies operating today, Bezek Benleumi, Barak and Kavei Zahav, will no longer have to pay the extra access fee and royalties, should be considered compensation or partial compensation for early end to their exclusivity.

4. Give More Freedom to Internet Providers: The level of freedom enjoyed by Internet providers is higher than that enjoyed by infrastructure providers. Yet the situation is far from optimal and too many business limitations are imposed on the Internet providers. Especially harmful is a prohibition against cooperating even when there are advantages of size. The following should be done to rectify the situation:

- (a) Issue providers' licenses. There is no reason a potential provider should have to undergo the tiresome process required for licensing today. As noted, most Western countries do not require such licensing.¹³⁰ Internet providers should be allowed to operate freely, assuming they abide by general guidelines issued by a Communications Authority. The Authority should be responsible for ensuring that its guidelines are enforced, rather than issuing licenses in advance. Guidelines, which should be given the force of law, are necessary in order to prevent the infringement by one provider on the rights of other providers or of the public. Violators, as any violator of the law, are subject to prosecution. The number of providers should be determined by consumers and market forces. This same logic applies to infrastructure providers.
- (b) Establishment of local Internet exchanges. Any entity, Internet providers included, should be allowed to establish an exchange to transmit Internet communications between the providers, and others if they wish, in Israel. No special license or government permission should be required. These exchanges should be allowed to connect directly to the world Internet backbone. These steps should increase the efficiency of service and decrease the price to consumers.
- (c) Internet providers should be allowed to coordinate purchase of bandwidths. This would increase their purchasing power and reduce their costs. Allowing smaller providers to cooperate in this manner will level the playing field and put them on a more competitive footing in a market still dominated by monopolies and cartels.

This *Policy Studies* has surveyed the recent development of the Internet around the world and in Israel. In terms of price and quality, Israel's Internet infrastructure is in bad shape. As a result, the economy is suffering minimally over \$100 million worth of damage a year, mostly in unrealized potential. A more realistic estimate of the damage would reach hundreds of millions of dollars. This situation is the direct result of a private sector that lacks freedom and a state that intervenes in all aspects of the industry. The state's intervention has created an industry dominated by a monopoly, and has prevented new technologies from being introduced. Instead, inefficiency has been encouraged.

The Internet, or any other future computer networks that will come into being, is one of the main arteries of communication for any society in the twenty-first century. Israel has great human capital; there is no reason the state should be debilitating and preventing economic growth. Implementation of the recommendations of this *Policy Studies* will end the chains binding this industry and preventing its natural development. Israel will benefit from growth and prosperity and Israelis will assume a leading role in the global village now being formed.

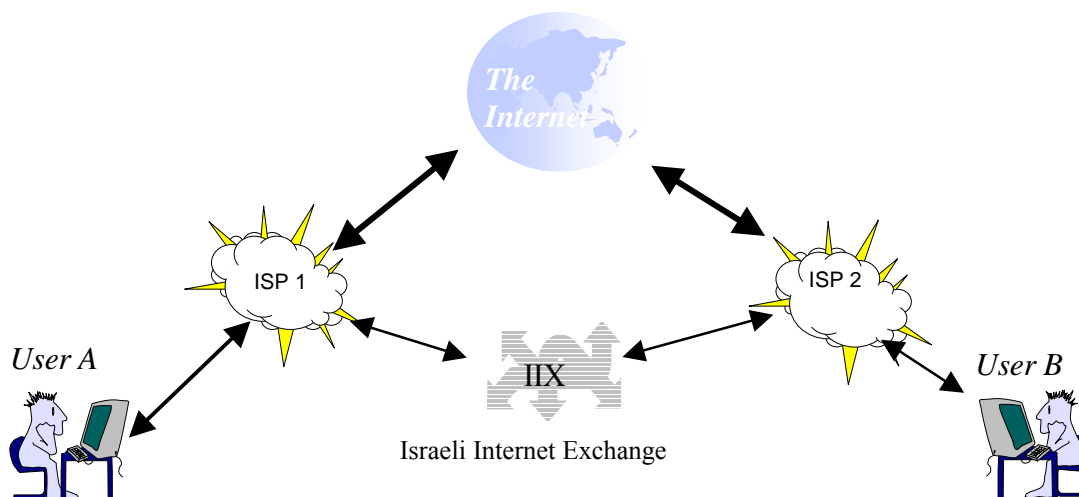
Appendix

How does the Internet work?

Insofar as this *Policy Studies* focuses on policy and economic aspects of the communications sector as they relate to the Internet, it avoids the technical or technological aspects of the industry. For readers unfamiliar with the Internet, an easy-to-understand description of the technical aspects of the Internet follows.

Figure 4

Schematic Diagram of Internet Use



Source: The diagram is based on a presentation by Doron Shikmoni, a member of the Israel Internet Union, to members of the 14th Knesset's Special Committee on Scientific and Technological Research and Development, January 12, 1999.

Figure 4 shows the most common form of Internet use. The user, Customer 1, sits opposite a computer connected to an Internet service provider (ISP). An order is sent from the computer to the provider, telling the provider that Customer 1 wishes to contact Customer 2, or a specific data bank. This order includes the name or address the first customer seeks. The provider connects its customer to the address he wants. If this address belongs to a person or data bank which are also customers of the same provider, then the connection is simple and remains within the provider's own network. If the address is somewhere else around the world, then the provider must connect to the network where it can be found. This is done by entering the communications infrastructure known as the worldwide Internet backbone. Most providers are hooked up to this backbone. The main backbone is located in the U.S.; another important one is in Europe.

If Customer 2 has an address at a different Israeli provider, then the first provider has two options. It can hook up to the second provider via the worldwide backbone, or it can initiate a direct and quicker local contact. At least it could, if Israel were a normal market. But at this point

Israeli providers have a problem. The Ministry of Communications forbids them to make direct contact. In May 1996, the Ministry allowed the Israeli Internet Union to establish an exchange, called the Israel Internet Exchange (IIE).¹³¹ Most Israeli providers are connected to IIE, and it allows them to exchange data between themselves, via the exchange, without leaving Israel. Still, direct contact between providers is forbidden.

Data is transmitted between computers on a communications infrastructure. The provider uses this infrastructure to enable it to provide its service. Such a division between infrastructure and service exists in most of the communications sector. The infrastructure is actually used for a wide variety of services (telephone, television, etc.). The Internet itself is metamorphosing from a service into an infrastructure as it becomes the technological means of transmitting other services (again: telephone, television, etc.).¹³² This encourages convergence between services supplied on the same infrastructure.¹³³ For example, cable television companies in the U.S. are now bundling, or planning on bundling, a package of services including telephone and Internet, which can be transmitted on their infrastructure.¹³⁴

Figure 5 shows the divisions within the communications sector. The lower level is the infrastructure, where data is transmitted. The middle level is the technology using the infrastructure, which transforms it into a technological network able to connect different customers whenever a request to do so is made. The upper level includes the various services provided by means of the infrastructure.

Figure 5

Schematic Diagram of the Communications Sector

Control	Telephony services (voice mail, etc.)	Nonsubscriber Internet		Internet (ISP)	Other	<i>Service</i>
	Telephone			Data		<i>Switching</i>
	Copper wires	Fiber optics	Radio and satellite	Cable	Other	<i>Transmission</i>

Source: Eli Dekel, Isranet Division director at TNN, interview with the author, December 17, 1998. A more detailed description with a seven-tiered model can be found at: <http://www.busn.ucok.edu>.

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NOTES

¹ Gregory R. Gromov, "History of the Internet and WWW," at www.internet.valleycom/intval.html.

² For a wider survey on worldwide users, see www.nua.ie/surveys/how_many_online.

³ *Maariv Asakim*, January 22, 1999.

⁴ See www.isoc.org/internet/history and Gromov, "History."

⁵ The name "Internet" derives from the development of a multi-network communications architecture, called Internetworking Architecture.

⁶ International Telecommunication Union, *Challenges to the Network, Internet for Development* (Geneva: International Telecommunication Union, 1999), p. 19.

⁷ *HI-TECH* 49 (1998), p. 34. [Hebrew]

⁸ *San Francisco Chronicle*, November 25, 1998.

⁹ Nua Internet Surveys, "Bandwidth a Key Issue in 1999," December 7, 1998, at www.nua.ie.

¹⁰ ITU, *Challenges*, p. 2.

¹¹ ITU, *Challenges*, p. 23.

¹² More details about Internet 2 and projects such as NGI can be found at www.Internet2.edu/html/faqs.html.

¹³ Dr. Gideon Arieli, director of computer science and advanced technologies, Ministry of Science, telephone conversation with the author, December 28, 1999.

¹⁴ Israel Academic Network (ILAN), FAQ at www.tau.ac.il.

¹⁵ The Committee for the Promotion of Internet Service in Israel, *Report* (Tel Aviv: Ministry of Communications, October 1998), pp. 17-18. [Hebrew]. The exchange rate used is from the end of 1993, NIS3 = \$1.

¹⁶ *Tele.com* 1 (Tel Aviv), November 9, 1998, p. 6. [Hebrew]

¹⁷ Committee for Promotion, *Report*, pp. 17-18.

¹⁸ *Haaretz*, December 14, 1998.

¹⁹ See www.nua.ie/surveys/how_many_online.

²⁰ *Bezek Law* (5742 – 1982), p. 218. [Hebrew]

²¹ *Arrangements Law proposal, Reshumot* 2753 (October 26, 1998). [Hebrew]

²² Daniel Rosen, "Competition in Israeli Communications, Updates and Looking to the Future," at www.moc.gov.il/new/hebrew/index.html. [Hebrew]

- ²³ The Committee for Setting Bezek's Rates, *Report* (Jerusalem: Ministry of Communications, September 1998) ch. 1, p. 6. [Hebrew] Of all local calls, only 5 percent do not go through Bezek lines. These are calls made from one cellular phone to another.
- ²⁴ ITU, *Challenges*, p. 109.
- ²⁵ *Haaretz*, October 4, 1998.
- ²⁶ For comparisons between satellite and optic infrastructures, see www.iguide.co.il/isp-sum.htm. [Hebrew]
- ²⁷ See <http://www.med-1.com>.
- ²⁸ *Yediot Aharonot*, June 23, 1999.
- ²⁹ Government Decision 7 (MT/7), October 23, 1985. [Hebrew]: "The Ministry of Communications is responsible for implementing a national infrastructure for computers (just like oral communications) and it is the authority that will set technical standards and implement communications regimes." This decision followed a recommendation by the Subcommittee on Government Computerization, that "the subcommittee sees as imperative that a clear ministerial authority be established for government computerization. The subcommittee recommends that the Ministry of Communications be this authority." See Subcommittee on Government Computerization, *Concluding Report* (Jerusalem: National Council for Research and Development, May 1985), p. 5. [Hebrew]
- ³⁰ Government Decision 3942 (MT/14), June 25, 1998. [Hebrew]
- ³¹ Daniel Rosen, director general of the Ministry of Communications, interview with the author, June 29, 1999.
- ³² The source of most of the distortions can be found in the principle of universal access, which obligates Bezek to provide telephone service to the entire population at the same price. This principle, which is in effect in many countries, is meant to prevent peripheral settlements from being charged more than centrally located areas. In Israel, Bezek is required to provide universal access, in return for which Bezek receives protection from competition. Competitors and new technology, in the event they provide telephone access as well, may affect the cross subsidization currently existing.
- ³³ See, for example, Bezek Rates Committee, *Report*, p. 16.
- ³⁴ *Yediot Aharonot*, March 10, 1995.
- ³⁵ *Haaretz*, April 30, 1995.
- ³⁶ *Davar*, March 12, 1995.
- ³⁷ Bezek Rates Committee, *Report*, p. 18.
- ³⁸ *Globes*, June 7, 1995.
- ³⁹ State of Israel, *Prospectus to Sell and Issue Stock* (February 27, 1998), pp.139-141, 331-332. [Hebrew]
- ⁴⁰ Bezek Rates Committee, *Report*, p. 44. Prices are for December 1997.
- ⁴¹ Ministry of Communications, General License for Kavei Zahav International, Ltd., to Provide International Bezek Service (Jerusalem: Ministry of Communications, February 4, 1997), p. 68. [Hebrew]
- ⁴² *Anashim Umachshavim* 824 (January 18, 1998), p. 54. [Hebrew]
- ⁴³ For more information about the new strategies of cable companies in the U.S., see Christopher Mines and Emily Nagle Green, *Will Open Access Trip Up Broadband? The Forrester Brief: People and Technology Strategies*, vol. 5, no. 22 (Cambridge: Forrester Research, February 1999), at www.forrester.com.
- ⁴⁴ Shmuel Dankner, chairman of the board of Matav, lecture at a conference on The War for Communications Competition Has Begun, Tel Aviv, February 23, 1999.
- ⁴⁵ *Yediot Aharonot*, July 1, 1999.
- ⁴⁶ Zvika Shchori and Dan Shaklarski of Celcom Communications, interview with the author, January 14, 1999. Celcom is currently laying SDH infrastructure across the country.
- ⁴⁷ *Anashim Umechashvim* 821 (December 28, 1998), p. 20.

⁴⁸ ITU, *Challenges*, p. 109.

⁴⁹ *Bezek Regulations (License Request)* – 1982, at www.moc.gov.il. [Hebrew]

⁵⁰ The trend can be seen in the remarks of Bezek Director Ami Arel, in response to this question from reporter Eliav Alaluf: “By the very fact that you offer less expensive ADSL service, you hurt Bezek’s data transmission and ISDN service.” Arel replied: “Yes, but what is my alternative? If I don’t offer ADSL, the consumers will go to the cable companies for this service.” Of course, Arel was referring to the time when the cable companies would be allowed to offer such service. *Globes*, July 6, 1999.

⁵¹ *Globes*, July 26, 1996.

⁵² Source within the telecommunications network, interview with the author, name and date withheld upon request.

⁵³ Dr. Gilad Amichai, director of Gilat Communications, telephone conversation with the author, May 4, 1999.

⁵⁴ In this case, a wireless connection is made between a central building in the neighborhood and the rest of the neighborhood buildings, while the central building is connected via Bezek to the Internet provider and the world.

⁵⁵ The range is approx. 2.4 ggh, which is permitted in Israel and around the world.

⁵⁶ Yossi Meibar, director of Acitivnet, interview with the author, January 27, 1999.

⁵⁷ The U.S. government has recognized the importance of the Internet and is moving to allot the range of 5.3 ggh for the free Internet use of academic institutions.

⁵⁸ Israel Drori, Breezecom sales associate director, interview with author, January 21, 1999.

⁵⁹ Shmuel Kat, Israserv director, telephone conversation with the author, June 23, 1999.

⁶⁰ Ibid.

⁶¹ Employee at wireless communications company, interview with the author, January 1999, name withheld upon request.

⁶² Government Decision 1819, August 31, 1993. [Hebrew]

⁶³ Public Committee to Examine Licensing and Regulations in Communications, *Final Report* (February 1996), pp. 13-14. [Hebrew]

⁶⁴ Ibid.

⁶⁵ Government Decision 6074, August 27, 1995. [Hebrew]

⁶⁶ *Globes*, September 23, 1997.

⁶⁷ Government Decision 1177, January 3, 1997. [Hebrew]

⁶⁸ Inter-ministerial Team to Examine Communications Policy and Competition, *Report* (Jerusalem: State of Israel, December 1996). [Hebrew]

⁶⁹ *Anashim Umechashvim* 812, p. 28.

⁷⁰ Ibid., pp. 6-7.

⁷¹ Most of the profits of Kavei Zahav, Bezek Benlueumi and Barak stem from international calls and not Internet, so these companies offer Internet providers a relatively expensive international telephone infrastructure for Internet use.

⁷² *Protocol* 60, 14th Knesset, Special Committee for Scientific and Technological R&D, p. 6. [Hebrew]

⁷³ *Haaretz*, August 11, 1998.

⁷⁴ Ibid.

⁷⁵ The model is static in that it allows only the speed and price to change. The number of subscribers and hours of use remain set. In actuality, changes in speed and price will affect the number of users and the amount of use. If these factors were taken into account, the damage would be greater than that set by this *Policy Studies*.

⁷⁶ Bezek Rates Committee, *Report*, pp. 19-35.

⁷⁷ Ibid., pp. 8-17 (Introduction), 29.

⁷⁸ Ibid., p. 27. The reference is to the expenses planned by a previous committee that set Bezek rates for the years 1994-1998.

⁷⁹ Mark Gazit, Netvision associate director, letter to the author, March 1, 1999. [Hebrew]

⁸⁰ *Tele.com* 1, p. 6.

⁸¹ Committee for Promotion, *Report*, pp. 17-18.

⁸² See www.internetnews.com/intl-news/article/0,1087,archive_6_71991,00.html.

⁸³ *Haaretz*, June 20, 1999.

⁸⁴ Rosen, interview.

⁸⁵ The number is based on the assumption that the approx. 100,000 people who are connected through the more than 2,000 permanent hook-ups, including universities, government offices and large corporations, are using the Internet at the same rate as the rest of the population (18 hours per month). The calculation of this number along with the 250,000 dial up access subscribers is as follows: $(250+100) \times 17.8 / (250+2) = 24.7$.

⁸⁶ See <http://www.nua.ie/surveys>.

⁸⁷ Gazit, letter.

⁸⁸ Since it is now assumed that the hourly cost drops by 50 percent, it is necessary to replace F+\$1.5 with F=\$0.75 from Table 4.

⁸⁹ According to the analysis in Table 4, assuming that the speed is twice what is necessary today, 50 percent of the time spent downloading could be saved. As downloading time is about 17.5 percent of use, then if the speed were twice as fast, 8.75 percent of use time would be saved. The market's activity would drop 8.75 percent, and the numbers in Table 6 can be multiplied by the remaining 91.25 percent to show damage of \$56,162,550 to the economy in 1998.

⁹⁰ Inter-ministerial Team, *Report*, p. 13.

⁹¹ For more details, see Amir Etzioni, "Strategic Behavior Under Network Externalities" (Ph.D. diss. proposal, Bar Ilan University, 1999) [Hebrew]; Nicholas Economides, "Network Externalities, Complementarities, and Invitation to Enter," *European Journal of Political Economy* 12, no. 2 (September 1996), pp. 211-233.

⁹² ITU, *Challenges*, p. A-7.

⁹³ Ibid., pp. 16-17.

⁹⁴ See www.intelliquest.com/press/release78.asp.

⁹⁵ See www.nua.ie/surveys/how_many_online/index.html.

⁹⁶ See thelist.internet.com.

⁹⁷ ITU, *Challenges*, p. 38.

⁹⁸ For more information on US communications development, see Michel Carpentier, Sylviane Farnoux-Toporkoff and C. Garric, *Telecommunications in Transition* (England: Commission of the European Communities, 1992).

⁹⁹ Public Committee, *Final Report*, pp. 84-85.

¹⁰⁰ *Telecommunications Act of 1996*, 104th Cong., 2d sess.

¹⁰¹ Jeanne M. Schaaf and David Goodtree, *Local Competition: Working Up a Head of Steam*, The Forrester Report: Telecom Strategies, vol. 3, no. 9 (Cambridge: Forrester Research, January 1999), p. 2, at www.forrester.com.

¹⁰² Bruce Kasrel, Christopher Mines and Shar VanBoskirk, *Making Consumer Bundles Work*, The Forrester Report: People & Technology Strategies, vol. 5, no. 6 (Cambridge: Forrester Research, August 1998), p. 4.

¹⁰³ Christopher Mines and Kate Delhagen, *Cable Modems Speed to Market*, The Forrester Report: People & Technology Strategies, vol. 5, no. 2 (Cambridge: Forrester Research, June 1998), p. 2.

¹⁰⁴ Kasrel, Mines and VanBoskirk, *Making Consumer Bundles Work*, p. 5.

¹⁰⁵ See www.unmetered.org.uk.

- ¹⁰⁶ Ibid.; see also, The Strategies Group, at www.strategiesgroup.com.
- ¹⁰⁷ Christopher Mines, Mary Modahl and Shar VanBoskrik, *Broadband Hits Home*, The Forrester Report: People and Technology Strategies vol. 5, no. 4 (Cambridge: Forrester Research, August 1998).
- ¹⁰⁸ Tom Rhinelander and Christopher Mines, *Saving Cable Competition*, The Forrester Brief: People & Technology Strategies vol. 5, no. 3 (Cambridge: Forrester Research, June 1998), p. 2.
- ¹⁰⁹ Mines and Green, *Will Open Access Trip Up Broadband?*, p. 2.
- ¹¹⁰ Eddie Cohen of Netvision, letter to the author, May 31, 1999.
- ¹¹¹ For more information about communications and data companies in Europe, see Information Society Project Office, at www.ispo.cec.be.
- ¹¹² European Commission, Directorate General XIII, *Status Report on European Union Telecommunications Policy* (Brussels: European Commission, October 1998), p. 5.
- ¹¹³ European Commission, *Green Paper on the Development of the Common Market for Telecommunications Services and Equipment* (Brussels: European Commission, June 1987).
- ¹¹⁴ The Council of the European Communities, *Council Resolution of 30 June 1988 on the Development of the Common Market for Telecommunications Services and Equipment up to 1992* (Brussels: The Council of the European Communities, June 30, 1988).
- ¹¹⁵ Inter-ministerial Team, *Report*, p. 15.
- ¹¹⁶ European Commission, *Green Paper on the Liberalization of Telecommunications Infrastructure and Cable TV Networks, part 1: Principle and Timetable* (Brussels: European Commission, October 25, 1994).
- ¹¹⁷ European Commission, *Green Paper on the Liberalization of Telecommunications Infrastructure and Cable TV Networks, part II: A Common Approach to the Provision of Infrastructure in the European Union* (Brussels: European Commission, January 25, 1995).
- ¹¹⁸ The Council of the European Communities, *Council Resolution Of 22 December 1994 on the Principle and Timetable for the Liberalization of Telecommunications Infrastructure* (Brussels: European Council, December 22, 1994).
- ¹¹⁹ The European Parliament, *European Parliament Resolution of 7 April 1995 on the Green Paper on the Liberalization of Telecommunications Infrastructure and Cable TV Networks, part 1: Principle and Timetable* (Luxembourg: The European Parliament, April 7, 1995); The European Parliament, *European Parliament Resolution of 19 May 1995 on the Green Paper on the Liberalization of Telecommunications Infrastructure and Cable Networks, part II: A Common Approach to the Provision of Infrastructure in the European Union* (Luxembourg: The European Parliament, May 19, 1995).
- ¹²⁰ The Council of the European Communities, High-Level Group on the Information Society, *The Europe and the Global Information Society – Recommendation to the European Council* (Brussels: European Council, May 26, 1994).
- ¹²¹ Information Society Commission, *Information Society Commission Update*, no.17 (Ireland: Information Society Commission, December 17, 1998), at www.infocomm.ie.
- ¹²² See www.unmetered.org.uk.
- ¹²³ See www.unmetered.org.uk/news/news050299.htm.
- ¹²⁴ See www.unmetered.org.uk.
- ¹²⁵ For more information about the trend towards competition in communications around the world, see OECD, Committee on Competition Law and Policy, *Competition in Telecommunications*, Roundtables on Competition Policy 6, (Paris: OECD, 1996).
- ¹²⁶ ITU, *Challenges*, p. 40.
- ¹²⁷ Public Committee, *Final Report*, p. 13.
- ¹²⁸ Committee for Examining and Changing The Communications Industry Structure, *Report* (Jerusalem, Ministry of Finance, April 21, 1991), p. 5. [Hebrew]
- ¹²⁹ Committee for the Promotion of Internet Services in Israel, *Report*, p. 7.

¹³⁰ ITU, *Challenges*, p. 109.

¹³¹ The Israel Internet Society is a voluntary non-governmental organization, responsible for assigning domain names to Israelis. See, <http://www.isoc.org.il>

¹³² The reference is to types of protocols that can transmit data on the current or future Internet, and which can replace most current means of transmitting telephone, television and similar services.

¹³³ For more information about this trend, see Kasrel, Mines and VanBoskrik, *Making Consumer Bundles Work*.

¹³⁴ Leading companies in this area are @Home, a partnership of cable companies providing Internet service, and Roadrunner.

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