ECONOMIC AND SOCIAL COMMISSION FOR WESTERN ASIA

PROFILE OF THE INFORMATION SOCIETY
IN PALESTINE

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INTRODUCTION

The aim of this study is to examine the status of Information and Communication Technology (ICT) in Palestine. Given the current political conflict and the lack of security, it is not that easy to give an accurate account of the activities in any sector, let alone the ICT sector.

The importance and relevance of information technology is a fact that the Palestinian people cannot afford to ignore. Information technology presupposes the existence of a professionally trained manpower despite the current impediments and military closures. In fact Internet services have increased by 100%. This includes the increase in the number of clients using leased lines and other internet- related services. The Palestinian people have continuously been denied the opportunity to advance or catch up with the technological changes in various spheres, beginning with agriculture. Here Israel's usurpation of the fertile lands had resulted in a Palestinian exodus.

Secondly, industrial development never picked up in a land that new no *industrial revolution*. Indeed the native inhabitants were as a matter of course denied the right to develop industrially, and so became mere consumers of the products of their neighbors. Thirdly, in the sphere of education, the Israeli occupation turned schools and universities into prisons, and students into building or agricultural laborers. The current revolution in communications and information technology provides an opportunity for the Palestinians to lay the foundations of a knowledge-based economy, and to develop the necessary skills for this undertaking. This " revolution" can in part be implemented at a modest cost. It essentially boils down to employing scientific expertise along with the necessary infrastructure.

The economic tendencies at present are not clear-cut. Plans adopter by the Palestinian National Authority (PNA) do not specify the role of ICT in Palestinian society. The relative importance of this sector can't but lead the Authority to adopt the necessary the strategies to prepare Palestinian society and stimulate its awareness of information and communication technology. This entails introducing IT into school curricula and providing the necessary training at all stages of learning, in addition to promoting it in the private and public sectors.

Admittedly, the Palestinian Authority has from the outset tried to promote the growth of an ICT industry. By way of example, the authority set up governmental bodies, and promulgated several laws to encourage investment in IT. It started off by improving the infrastructure and put in place a programme for the structuring and development of Palestinian industry, in cooperation with the UN Organization for Industrial Development. It also promoted the founding of the Palestinian Information Technology Association (PITA). Further more, it established many agencies and departments to assist and serve the industrial sector; such as the Industrial Cities Commission, Standards and Specifications department, Investment Promotion Commission, to name a few. These efforts, however, didn't go far enough in developing an IT industry, basically because of the absence of a national strategy for the promotion of ICT. Consequently the role of the government has been largely ineffective. Add to this, the government's powerlessness to carry out many of its tasks in the prevailing political climate.

I. POLICIES AND STRATEGIES

All Palestinian sectors, in particular the economic, are operating under too many constraints, due to both external and internal factors. The external factors are directly attributable to Israeli policies and military closures, and the restrictions placed on the freedom of movement of people and goods, across Palestinian territories. Add to this Israel's total control of air, sea and land routes, water resources, electric power and a significant number of other basic services. As for the internal factors, these are reflected in the scarcity of natural resources, in particular land and water and the limited size of the local market, coupled with a high birth rate, large redundant labour force, weak performance of already inadequate public institutions, inadequate legislation designed to encourage investment, and finally the absence of a clear political vision of the future of Palestinian economy. All this has led to a conspicuous weakness in planning and implementing economic policies. The consequences of all these impediments and structural defects have been the weakening of Palestinian economic performance over the years.

The Information and Communications Technology (ICT) sector has not received the attention it deserves from the Palestinian Authority, inasmuch as there has been no clear plan or strategy related to this sector. An attempt, financed by the World Bank, to implement a plan based on, (1) introducing IT into education, and (2) creating a software industry together with the necessary institutional framework and supporting infrastructure. The project however, failed to achieve its objectives. This matter is sufficiently important to warrant adding it to its list of priorities but not without coordinating with the private sector.

II. LEGAL AND REGULATORY FRAMEWORK

The Palestinian territories lack laws and regulations governing the protection of intellectual property rights, despite the fact that there is plenty of legislation in this sphere in such countries as Jordan, Egypt, Britain and finally Israel.

The Legislative Council is, or will be, debating passing a law for regulating computer software property rights. The Ministry of Trade and Economy has taken a fist step in this direction, and is planning to setup a special department to implement resolutions in this area. Regulating the telecommunications sector, which is also on the council's agenda. Currently, telecommunication services are handled by Paltel Ltd., which enjoys a licensed monopoly under the supervision of the Ministry of Communications it would seem. The licensing agreement, however, has not been made public. The government appears to be heading towards setting up an independent body with a view to ending the monopoly agreement.

The 1998 law for the promotion of investments provides for financial and tax incentives to a variety of manufactures including software manufactures. These incentives are, on the whole, very generous extending in some cases to tax exemptions

or reductions over a period of 20 years. The law also exempts importers of machinery and spare parts from custom duties, and grants foreign investors unrestricted freedom o transfer profits. The law, however, does not offer any incentives in the area of research and development (R&D). Moreover maximum payable income tax has been reduced to 20%. In fact the tax incentives are quite competitive compared to similar incentives in some neighboring countries. Unfortunately these incentives remain ineffectual because of the general insecurity in the work environment brought about by Israeli incursions and military closures. These facts have had a negative impact on the size of the local market, consumer mobility, and the accessibility of goods and services.

Moreover, Palestine stands in need of regulatory laws in such areas as Internet-related services and Electronic Commerce (E-commerce). The government has approached the World Trade Organization, and is setting up a national commission to study what needs to be done.

III. ICT INFRASTRUCTURE

The territories under the jurisdiction of the PNA are both disjointed and limited in area, which curtails internal and external business and trade activities, access to services, and limits the power of the government to carry out a comprehensive development of the infrastructure. In this difficult environment Communications Technology becomes on essential tool for linking together Palestinian territories quickly and efficiently, which in some cases is the only means for producers and consumers to exchange information and products. Indeed, the existence of a cost-effective communications network is a basic requirement of all modern economies that have evolved out of the information revolution.

When, in 1994, the PNA took over " power" in the West bank and Gaza strip, there were severe deficiencies in wireless and cable communications. Surveys have reported 5.5 telephone sets per 100 inhabitants, which was at the time considerably smaller than corresponding figures in neighboring states. There is no doubt that Palestine has, following other countries, entered the world of Communications and Information technology. A courageous decision was taken to setup a privately managed Communication sector. In 1996, local and expatriate investors, planned to invest USD 65 million towards establishing what became later known as Paltel or the Palestinian Telecommunication Company, which eventually constructed an advanced digital communication network in the west bank and Gaza. This achievement marked a qualitative (and quantitative) leap, which brought in its wake the Internet and put Palestine on the road to modernization. The company's telecommunication services cover most of the Palestinian territories.

There was a marked increase in the number of telephone sets, following granting Paltel monopoly rights in Jan.1997. The number of telephones (fixed and mobile) rose from 83621 units in 1997 to 272212 units in 2000, i.e. an increase of 225%.

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The highest rate of increase occurred in the year 2000, reaching 63%. Between 1997 and 2000, the number of "fixed" telephones in the West bank and the Gaza strip amounted to 10 sets per 100 inhabitants i.e. an increase of about 170% [1997=100]. According to Paltel's figure, the company supplies cable telephone services to over 96% of Palestinian residents. At the same time, the number of mobile telephones rose from 25000 in 1996 to 285.000 in 2000, which is equivalent to 9 "mobiles " per 100 inhabitants. Altogether, the average number of telephones (mobile and cable) is about 9 per one 100 inhabitants. Nonetheless the service cost to the consumer remains rather high in comparison with that in neighboring countries.

The licensed monopoly granted to Paltel Ltd. is expected to last for several years to come. No competing companies are allowed to operate in the communications-related services sector. Such services are not easy to pinpoint at present. Thus, the company enjoys total control over the Communications and IT sector in general, while the Ministry of Communications adopts a passive attitude with respect to the private sector at large. Paltel currently offers Internet services to local firms as well as to public and private establishments; it also plans to extend it's Internet service to subscribers via direct dial up connection, which is bound to adversely affect potential ISP's (Internet Service Providers) who will be in no position to compete. In addition the company has setup a mobile telephone communication system (AL-JAWAL). A recent positive development has been the agreement concluded between Paltel and PITA (Palestine Information Technology Association), which stipulates providing Internet service exclusively through an ISP.

Palestine can communicate with the rest of the world, but only by courtesy of the Israeli occupiers who control Palestinian land and airspace. Palestinians do not have a single direct communication channel of their own, whether via Egypt, Jordan or through satellite. To stay in contact with the rest of world, it is imperative that the Palestinians take a serious strategic look at the role of the Communications sector in building an ICT- oriented, knowledge-based economy.

Palestinian telecommunication services have helped to spread the use of the Internet. The overall average transmission rate is about 60MB per second, 40 of which are via Israeli companies and the remaining 20 via Paltel. Internet services are available in all cities and a large proportion of villages. Internet users in Palestine number about 300 thousand, which is close to 10% of the total population.

Service cost, through dial-up connections varies from 10 and 20 USD. The service is available to all people through Internet clubs. The quality of the service is rated "good", and most statistical surveys estimate that 1.5% of the population own computers which is equivalent to 20 computers per hundred inhabitants.

IV. ICT CAPACITY-BUILDING

A. PUBLIC EDUCATION

Formal education is normally 12 years long. The first 9 years are at the elementary and intermediate level and the last 3 at the secondary level. There are 3 categories of schools: governmental, private and these run by UNRWA (UN Relief and works Agency).

Table 1 shows the distribution of students according to school category and educational level/grade, while table 2 gives the number of schools students, and class sections over the years 1994–2002.

TABLE 1. BREAKDOWN OF STUDENTS AND CLASSES ACCORDING TO EDUCATIONAL LEVEL

Category	Elementary and Intermediate		Secondary	
	Students	Class/section	Students	Class/section
Governmental	572054	1575	81596	2522
UNRWA	244711	5300	0.	0.
Private	51366	2077	3755	204
Total	868131	23134	85351	2726

Source: Ministry of education

TABLE 2. NUMBER OF SCHOOLS, TEACHING STAFF, AND CLASSES, 1994-2002

Year	No. of schools	No. of students	No. of teachers	No. of sections
94/95	1084	41807	14938	11817
95/96	1070	444822	16810	12524
96/97	1113	481678	18858	13623
97/98	1175	516160	21186	14729
98/99	1230	549404	22695	15633
99/2000	1289	586777	24318	16541
2000/2001	1343	621285	26173	17338
2001/2002	1406	653650	28015	18279

Source: Ministry of Education, 1994-2002

Data published by the ministry of education suggest that a high proportion of Palestinian youth go to school, which is a very encouraging sign. Almost all children attend the first grade. The corresponding figures for students attending grades 1 to 9 and grades to 10 to 12 are 97 % and 57% respectively. The 5-year plan drawn up by the Ministry of Education aims at raising this last figure to 68%, while developing education and technical training in terms of quality and content.

The new Palestinian curriculum contains a technological component, namely "Computer Studies" which are being introduced gradually at all educational stages. Thanks to government efforts, all secondary schools and some elementary schools too are now equipped with a computer laboratory. In 2002, there were some 400 computers laboratories. Such facilities, no doubt, contribute to spreading computer literacy. On the other hand it is quite likely that all private schools have computer facilities. In fact the new generation of university students are finding computer science programmes well below their expectations.

B. VOCATIONAL EDUCATION

There are at present hundreds of vocational schools that provide long and short-term training programmes. Along side these vocational and technical training centers, private cultural centers and institutes supported by benevolent societies, there are technical colleges that offer various educational programmes to intermediate school leavers. Surveys have indicated that, with the exception of some training centers, vocational programmes offered in schools do not incorporate IT-related courses. Some technical colleges, however, do offer such courses, matter that we will discuss in the sequel.

One problem facing vocational education is society's tendency, to look down upon vocational training as unbecoming pursuit, suitable only for the needy or academically disadvantaged social groups.

Further more, the higher education system does not automatically allow those who have completed their vocational/technical training to enroll in university courses to develop their skills if they choose to. Tables 3 and 4 show a breakdown of vocational schools in the West bank and Gaza, by region, type and number of students.

TABLE 3. NUMBER OF PALESTINIAN VOCATIONAL TRAINING SCHOOLS,Y2001/2002

Controlling body	Type of school					Total
	Industrial	Agricultural	Commercial	Religious	Hotel man.	
Government	6	2	39	4	0	51
Private	2	0	1	2	2	7
Total	8	2	40	6	2	58

Source: Ministry of education, 2002.

TABLE 4. NUMBER OF STUDENTS PER DIVISION, Y2001/2002

Division	Number of students
Agriculture	331
Commerce	655
Industrial	1634
IT related field	Nil

Source: Ministry of education, 2002

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C. HIGHER EDUCATION

There are at present 11 Palestinian universities, all of which grant Bachelor and Master degrees. In addition, there are 4 colleges that grant degrees in education, and 16 technical and community colleges, all of which grant diplomas in technical, business, and some academic fields, Two of these colleges are affiliated to the Islamic University, and AL-Azhar University in Gaza. Universities, generally offer programs in traditional disciplines such as Science, Engineering, Literature, Business Administration, Education, Pharmacy, Medicine and Hygiene. Unfortunately, higher education still lacks modern programs of study that meet the needs of the market and society at large. The available programmes are limited in scope and applicability, which explains the very few contracts signed between universities and the private business community.

It is now recognized that IT is a vital component of higher education and should have high priority in any development plans.

Unfortunately, however, there is to this day no concrete working plan to implement the necessary measures. The Ministry of Education, however did sponsor many IT conferences in collaboration with universities, and came forward with various recommendations to promote the utilization of IT. It has also invested a great deal of effort in setting up a communications network to facilitate information exchange and promote joint scientific research conducted by Palestinian universities. These plans, however, never materialized due to lack of funding and inadequate coordination between the universities concerned, and in some cases improper exploitation of the available resources.

We will examine in the following sections the numbers and distribution of students in the various technical colleges and universities with special emphasis on those specializing in IT related fields. We have conveniently divided IT- related programmes into two classes. The first class comprises programmes offered by Science and Business Administration departments and includes Computer Science programs and Information Systems. The second class comprises programs taught in Engineering departments, namely: Computer Engineering, Electrical and Electronics Engineering and Information Systems Engineering. It is significant that many engineering graduates have shown a tendency to go into Computer programming and Networking.

D. TECHNICAL AND COMMUNITY COLLEGES

These colleges offer part secondary technical, and part vocational training, which emphasizes the new technologies –more specifically IT. Aware of the importance of having technically skilled manpower, the Ministry of Education together with the Ministry of Labor, has worked out a national strategy to achieve this objective.

The strategy envisages the implementation of a flexible curriculum consisting of course modules designed to teach elementary and more advanced skills tailored to meet market needs. Educational programs can be completed by students in one year and may extend up to 4 years of study, leading to a BSc degree in technology, after which the student may choose to continue his or her studies at the graduate level. Once again the objective is (1) to supply the market with individual skills consistent with market demand and (2), to offer the student a variety of options.

Table 5 shows the distribution of students by gender and field of studies (Science or Engineering). Table 6 indicates the number and distribution of students in IT- related disciplines .The data shows that the number of students enrolled in Engineering programmes amounts to about 6% of the total. A second observation is that all Engineering technicians irrespective of specialty are enrolled in IT- related programmes. The same applies to all those enrolled in Science programmes. Furthermore, only 14% of all students attending Technical and Community colleges are enrolled in Science programmes.

The data cited is significant in some respects. The first observation is the small number of students attending Technical colleges. The number officially quoted is 6264 distributed over 17 colleges, compared to 83667 university students which explains the relatively small number of trainees in the Engineering and IT areas, notwithstanding that many IT service training programmes requires no more than two years of study. This, in most cases, is due to society's attitude, which holds vocational training in low esteem. In fact it is quite rare for a talented student to go to a Technical training college. One other factor is the law academic standards in these colleges, due to poor equipment and inadequate staff. On the bright side, the data indicates that all college students enrolled in Science or Engineering -related trades are opting for programmes with IT content, which reflects a healthy tendency. Tables 5 and 6 indicate the number and distribution of students attending Palestinian Technical and community colleges and, enrolled in programmes with IT content -2001/2002.

TABLE 5. DISTRIBUTION OF STUDENTS BY GENDER AND FIELD OF STUDY

Field of Studies	Male	Female	Total
Computer studies	475	412	887
Engineering	308	50	358
Other	1977	3042	5019
Total	2760	3504	6264

Source: Ministry of Education (unpublished data), 2002.

TABLE 6. NO. OF STUDENTS ENROLLED IN COLLEGE PROGRAMMES WITH IT CONTENT, 2001/2002

Field of Studies	No. of students
Programming/Data processing	887
Computer and electronics Eng.	358
Other	5019
Total	6264

Source: Ministry of Education (unpublished data), 2002.

E. PALESTINIAN UNIVERSITIES

Universities are currently in the process of redesigning their academic programmes so as to include Computer Science courses. Most universities now require all students to be computer-literate, and have introduced elective courses connected with computer applications. Students in the faculties of Science, Engineering and Business Administration are free to take minor courses in Computer Science in order to give Engineering students some programming experience before graduation. In spite of their limited resources, universities remain the leading centers for promoting the diffusion of ICT services to benefit the wider Palestinian community. In fact every university is equipped with networking facilities open to all students and staff.

In the following sections, we look at the various features that characterize Higher Education in Palestine.

1. *The structure of IT*

The above-mentioned developments have contributed to raising the standard of performance of staff and students. Various departments are now equipped with computer laboratories. Universities, by and large, recognize that they have a leading role to play in social and market development. University curricula have been so designed as to provide students with a reasonable measure of computer skills. Indeed, universities are making it mandatory for all students to take certain courses in computer science.

However, the ratio of the number of computers to the number of students remains low one computer per 25 students at best. On the other hand this ratio is almost 1:1 in the case of lectures in the Science and Engineering Departments, and 1:5 in Departments of Humanities. Similar figures apply to Internet users in the Departments of Science and Humanities. All students and staff in Science Departments use the Internet, whereas no more than 50% of staff and 80% of students in the Departments of Humanities use the Internet.

The quality and quantity of equipment found in Institutes of Higher Education vary from place to place. Science Departments are normally quipped with several laboratories, while most Departments Humanities are equipped with a single laboratory. Most universities however, are unable to provide the necessary technical and financial support necessary for maintenance and system upgrading. The low ratio (1:25) of students to computers has meant, in practice that each student has access to a computer for at least one hour a week, on the assumption that a computer is available 5 hours a day, 5 days in the week. But as computer laboratories stay open for 8 hours a day, 5 days a week it follows that the available computer facilities are not sufficiently exploited. Incidentally universities close down at 4 p.m. daily. Most Internet users use the system for E-correspondence, chatting or simply as an information resource.

2. *Academic Programmes*

There are 9 universities that grant bachelor degrees in Computer Science and Information Systems. Four of these universities grant degrees in Electrical Engineering, four in Information Systems Engineering, and one in Electronics Engineering. The Al-Quds University has recently introduced its first degree programme in IT, a year after the Polytechnic University of Palestine. Three Computer Engineering programmes had been introduced two years earlier in other universities. The Arab-American University has for the past 3 years been offering courses in ICT and Multi-Media, followed by AL-Najah National University which created an IT Department and added to its list of programmes a programme covering Information Systems .A similar department was set up in AL Azhar University, there was an attempt to set up an IT dept. in Birzeit University, but the Ministry of Education has not endorsed the idea.

Most of these IT Departments offer programmes that are, in terms of structure and content, Computer Science or Computer Engineering programmes. The upshot has been the introduction of "traditional" Engineering programmes under the guise of Information Technology programmes. This clearly will not of itself produce trained IT professionals in the proper sense of the word.

The initial zeal shown in creating these IT programmes has not led to any changes in terms of quality or number of qualified teaching staff. A notable exception in this case is the Arab-American University.

Most academic programmes adhere to ACM international standards, but the fact remains that almost all universities seem to offer identical courses under different titles.

In most cases the number of IT- related courses is relatively small, and only a limited number of students attend such courses. These courses are fundamentally replicas of traditional Computer science or Computer Engineering courses.

At the same time, the available resources do not to be fully exploited. By way of example, Computer labs close at 3 p.m., while Internet services are not generally accessible to staff and students working at home. Academic IT programmes, in general, are not market-oriented and therefore, do not satisfy market needs.

It is noteworthy that universities often compete to obtain permission to start up 'traditional' programmes, while only a few endeavors to set up IT-related programmes.

3. *University curricula*

Although many university courses are of high quality, there is urgent need for modernization, notwithstanding the administrative difficulties that this entails. This

situation is commonly found at all levels in the Educational System. Teaching methods tend to stress passive rather than proactive learning that encourages independent research. Add to this the low level of proficiency in the English language. Academic programmes that are not directly related to Information Technology do not generally contain courses with any IT content to speak of. Furthermore, courses emphasizing applied Computer skills are not properly integrated into the respective programmes.

4. *Academic Staff*

Universities and colleges are currently suffering from a severe shortage of specialists (of Ph.D. or M.S caliber) in Computer Science and Computer Engineering. In fact the student/ lecturer (Ph.D) ratio is at least 50:1 and 30:1 in the case of lecturers holding MS or MA. The average number of students specializing in a given discipline is about 40. Although there are plenty of accessible teaching aids, no more than 5% of lecturers appear to use them. The teaching staff, notwithstanding its high academic potential, have not had the opportunity to upgrade their knowledge which is a vital factor in developing University Education. Most lecturers lack advanced training in IT, and only very few academics are involved in scientific research work.

Herebelow is a summary of the main problems facing universities:

(a) Scarcity of specialists in the upper academic echelons (Ph.D's). Too few students/graduates are able to get sponsorships to study abroad;

(b) Lack of consistent support for the IT industry;

(c) Severe shortage of funds to develop teachers' potential and know-how;

(d) Training in Applied Science is not geared to meet the practical needs of the community and the private sector;

(e) Inflexible academic regulations that tend to be more concerned with procedural or financial matters, than with incentives to encourage creativity and innovation.

State funding is generally inadequate, and some universities are not receiving the necessary financial support. Moreover universities have failed to invest in commercial enterprises to cut down their endemic deficits. What is needed is a practical policy to develop the more traditional sources of income by e.g. collaborating with the private business community.

5. *The Student Body*

There are 83668 undergraduate students, of whom 29845 students are attending the Al-Quds Open University. There are no post-graduate programs that are IT-related, except for a Computer Science programme recently introduced by the Al-

Quds Open University and one other program (Scientific Computing) in Birzeit University.

One notable Palestinian university is the Open University (N.B. Programs are not based on distant learning). Over 30% of all university students attend this university, which pioneered offering an assortment of programs to High School graduates and many working and non-working individuals who were unable to pursue higher education for practical reasons. Note that table 7 refers distinctly Al-Quds Open University while grouping together the remaining universities; whereas in Table 8, and charts (1) and (2) make no reference to the Open University. This is because the academic programs offered by the Open University are tailored differently than those offered by traditional universities and cannot be incorporated, properly speaking in future IT Planning.

Moreover the inclusion of the Open University in our charts is bound to inflate the actual number of students enrolled in Computer Science and Engineering programs, thus giving a deceptive picture of the true state of affairs of IT in Palestine.

Table 7 shows the student distribution by gender and field of study (mainly Science and Engineering). Table 8 shows the distribution of students in IT- related programs. Chart 1 indicates the following: (a) 10% of all students are enrolled in Engineering programs, (b) 29.8% of all students enrolled in Engineering programs are enrolled in IT – related programs, while 3.1% of all university students are enrolled in IT – related programs. Chart (2) indicates that: 11% of all students are enrolled in science programs, and 25.3% of all students enrolled in science programs are enrolled in IT- related programmes, while 2.8% of all university students are enrolled in IT – related programs.

The available data indicates generally that 21% of all university students (excluding AL-Quds Open University) are following Science and Engineering programs, of which 28% are in IT- related fields, that is to say 5.9 % of all university students are enrolled in IT-related programs i.e. 3176 students. About 10%, however, dropout and in effect only 575 IT students manage to graduate (Incidentally, only 350 students graduated in 2000/2001). Only a small proportion of graduates can be relied upon to develop their skills to meet international competitiveness. Be that as it may, the number of IT graduates is expected to double in view of the new programs that were introduced in the past 2 years. Various studies have shown that laying the groundwork for an IT industry in Palestine requires an annual influx of one thousand, new graduates. Many initiatives have been taken to assist graduates in finding suitable employment but this is a matter that we need not go into.

TABLE 7. NUMBER OF STUDENTS ENROLLED IN PALESTINIAN UNIVERSITIES

Department	AL-Quds Open University		Department of Education		Other universities		Total
	Male	Female	Male	Female	Male	Female	
Science							8217
Engineering							5552
Computer/ Technology							2260
Other							67639
Total							83668

Source: Ministry of Education (unpublished data)-2002

TABLE 8. NUMBER AND DISTRIBUTION OF STUDENTS IN PALESTINIAN UNIVERSITIES, IN IT- RELATED FIELDS

Field of Studies	No. of students
Information *	1508
Engineering**	1657
Total	3165

* Comprises Computer science & IT and Information Systems.

** Comprises Computer Eng., Elect. and Electronic Eng. and Information Systems Eng.

Figure 1. Distribution of students in IT-related Engineering fields

Universitites:
Engineering Related to IT

40%
20% 29.8%
0% 10% 3.1%
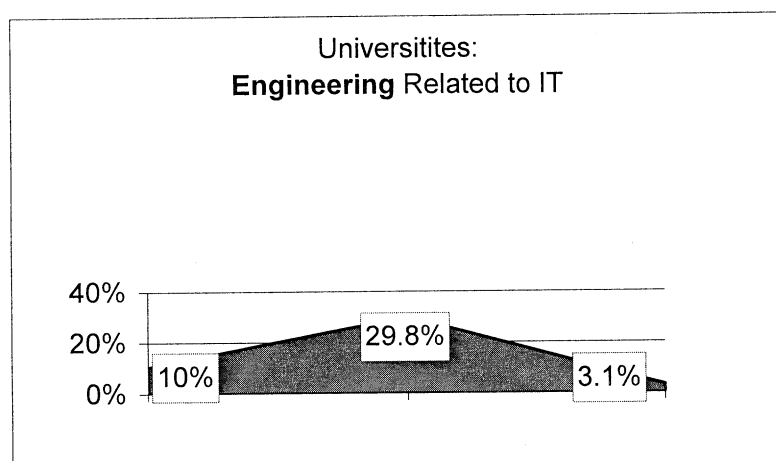
Figure 2. Distribution of students in IT- related scientific disciplines

Universities:
Science Related to IT

50%

11% 25.3% 2.8%

0%

F. CONTINUING EDUCATION
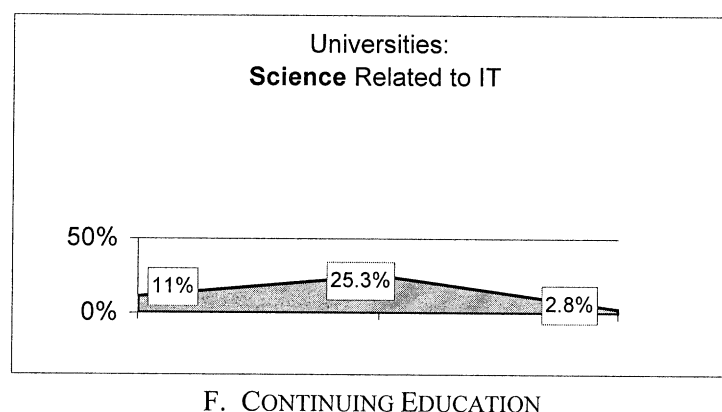
The objective of Community Education is to spread educational and technological awareness amongst the public. Many local and international agencies are attempting to provide community services to a variety of age groups, ranging from 6-years old children to housewives. These services include Computer training services and occasionally, Internet applications. One such example is the so-called *futurekids* project which offers modular programs for all ages. It also provides schools with complete technology curricula. Computer Clubs and Internet Cafes play a considerable role in spreading computer literacy. Although these facilities are concentrated in major cities, mainly in Ramallah, Nablus, Jerusalem and Bethlehem, they are likely to spread to other less fortunate areas. According to current estimates, there are tens of Internet Cafes in Ramallah and Nablus, and to a lesser extent in Gaza, Bethlehem and Hebron. We might add that free access to the Internet costs about one US dollar per hour, which Palestinians cannot afford.

The fundamental problems and impediments facing IT and Public Education in general can be summarized as follows:

(a) The School System lacks adequate technical aids. Teachers are ill-prepared in the field of IT and its applications;

(b) Poor showing of students in terms of Problem Solving and /or finding innovative solutions;

(c) Absence of a pedagogical philosophy at the Elementary and Intermediate level of Education;

(d) Preference of Academic Education to Vocational Training;

(e) The weak links between universities and private business community;

(f) Inadequate laboratory equipment over-dependence on donations;

(g) Lack of funding for R& D (Research & Development);

(h) Lack of proper coordination between Educational Institutions;

(i) Market needs are not, often enough, taken into account in development plans.

In spite the above shortcomings, the following positive signs should be noted:

(a) Decision makers are becoming aware of the above shortcomings, and are attempting to remedy the situation;

(b) Increasing interest in modernizing the Educational System;

(c) Increasing student interest in IT and IT-related fields of study. More and more students are opting for IT or IT –related specialization;

(d) Great concern is being shown for improving the quality of teaching and drawing on international experience in this sphere;

(e) There are signs that graduates are beginning to acquire a more innovative spirit;

(f) Increasing recognition of the importance of linking technical training to the job market.

The data cited so far, suggests that the manpower engaged in the IT and Software industry sector is bound to increase considerably, albeit without planning. Hence, we can expect the emergence of another challenge viz. creating employment opportunities together with the sort of environment that attracts investors. This question will be addressed in section V.

V. STRUCTURE OF THE ICT SECTOR

To begin with, the ICT sector offers services such as Consultancy and Training on the use and maintenance of Equipment, System Implementation, Networking, and Software utilities. More specialized services such as Integrated Systems design, writing custom software, Data Processing services, Data Conversion, including remote processing. The latter application is growing via the available communication channels, and most of the Internet.

The importance of IT-services is apparent in various walks of life, especially in the cultural and scientific spheres. The importance of IT in the Palestinian context and for the region in general stems from its potential for promoting development. For this to take place it is essential to set up the necessary infrastructure and the right environment, which entails attending to such matters as human resources, intellectual property rights, and legislation designed to encourage investment. Software industry and Software-related services are the cornerstone of IT industry which must be supported and developed. We would do well to remember that the assets of a certain international company in terms of hardware & software products equal in value the gross national income of the entire Arab world including the income from oil! In light

of this revelation it is all the more urgent to begin planning for an IT-driven economy, otherwise the Arab Economy as a whole will simply drop out of the global economic scene. One hopes it is not too late.

The region is showing a pronounced tendency to use IT products and services in response to the dictates of the global culture, as indicated by the growth of satellite channels. ATM's, Control Systems and finally E-commerce. A measure of the expected growth in IT- applications worldwide is that in 1998 the total value of electronic transactions (conducted via the Internet) was about 43 billion dollars in the USA alone. This figure is expected to rise to 1.3 trillion dollars, by the year 2003, while the number of Internet accounts is supposed to reach 545 million. Surely this figure should entice people to invest in developing software to handle E-commerce and related Internet services.

The Private Sector which is beginning to show special interest in IT, stands to play a decisive role in developing IT, creating investment opportunities coupled with the appropriate legislation, all of which depend on adopting an open market policy supported by laws to protect and attract foreign investors. Such a policy is bound to have a positive influence on Software Industry and create job opportunities.

Some firms in the West bank and Gaza have already started offering IT-related services. In the early nineties of the last decade, some retail came into being in response to the demand for computers and other electronic gear. Consequently, there was a marked increase in IT activities and services to meet the needs of the private sector, universities and municipalities. Most companies until that time had been retail outlets for Israeli companies. On the other hand there were few software companies that started out marketing software packages for accounting purposes. Up until the signing of the Oslo Accords, the Israeli occupation had controlled the Palestinian communications sector, and as a result the Palestinian public was denied access to leased lines, fax and telephone services, use of satellite communication facilities, and other such services. IT services were not begun properly speaking until after Oslo.

E-mail service was introduced into Palestine in the mid- nineties, through the collaboration of Palestinian academics from within Palestinian, and American universities. The first commercial Internet Service Provider (Planet Ltd.) was created in 1995.Palnet provides wireless to the Internet, the first of its kind in the Middle East. One other important development has been the creation of the Palestinian Academic Network (PLANET). PLANET links universities, colleges as well as schools with the Web. It also links most of the Palestinian ministries, and offers connectivity between cities and within cities.

After 1995 the IT sector began to take shape following the establishment of PNA institutions, non -governmental organizations, banks, and newly formed companies. By the end of the year 2000 the number of companies had grown to over 60 companies, each employing 13 workers on average; with a similar number of small shops (2 workers per shop on average). During the past 3 years the number of

companies increased by about 30% with a total estimated income of 120 million dollar in 1999/2000, 30% of which was in software products. Present projections predict that this constant growth rate is likely to continue. Since 1995 the number of firms delivering Internet services has increased by at least 50%.

Computer and IT companies are concentrated in places where there is high demand for services, namely, Jerusalem and Nablus, and to a larger extent in Ramallah (see Table 9). Services and activities include selling computer hardware (ready made or assembled), software development, consultancy, Internet services, Office automation and training. Many international firms have opened offices in Palestine, including such companies as, Timex, IDS, HP, Microsoft and Seimens, in addition to Oracle, Sun Microsystems, IBM, ACER who have agents or representatives in the Palestinian territories.

TABLE 9. DISTRIBUTION OF COMPANIES ACCORDING TO FIELD OF WORK

Field of work	No. of companies
Communications	2 (Paltel + Jawwal)
Software	60
Training	67
Networking (sale and maintenance)	37
Programming/Training	17
Training	7
Consultancy services	18

Source: PITA.

All hardware is either directly imported or imported via Israeli intermediaries. After PNA took over, Palestinian companies attempted to deal directly with suppliers, as sales representatives rather than distributors or retailers as is currently the case of many companies. Some software companies have succeeded in signing contracts to develop software for regional and international companies. Indeed some firms have setup business to develop software for international clients. In the present circumstances, software companies are concentrating on the export of software while continuing to work for private foreign companies. To this end, many companies are turning to organizing trade shows and other marketing activities.

There are at present, over 20 companies offering Internet services dispersed over all Palestinian districts, with 80% of them situated in the Ramallah and Jerusalem areas. Companies employ leased lines provided by Paltel, covering the West bank and Gaza. These companies serve as many as 25 thousand registered subscribers. This number does not, however, reflect the actual number of users, because many individuals share the same account by arrangement with the service provider, or otherwise. The total number of Internet users spread over governmental and non-governmental bodies, schools, and Internet cafes, is close to 200 thousand-i.e.7.5% of Palestinian society. Data released by major ISP's, shows that both the numbers of

subscribers and leased lines have risen by 50% during the first few months of 2001 and by 100% by the end of 2002.

The IT private sector is represented by PITA [4]. Founded in 1994 as a non-profit organization, it has grown rapidly to represent most ICT hardware, software and service firms in the West bank and Gaza. The 73 member companies that make up PITA represent 20 to 80 percent of the private sector, which includes Paltel and Jawal. As part of its consistent effort to serve its members, PITA has embarked on a plan to help member companies market their products regionally and internationally. Moreover, the association seeks to further its members' interests by involving the government in the IT sector. One consequence of this has been the formation of several national and ministerial committees to set down guidelines for the development of the IT sector. The Association strives to cooperate with the government in the promulgation and implementation of laws to regulate activities in the IT sector. The private sector, and universities consider that they must have a large role to play in the formulation of an IT policy, while the government contends that it should have control over the direction of IT policy of the private sector, a view vehemently opposed by Palestinian academics and the IT sector.

To qualify for PITA membership, a company must be in the Computer business, which includes trading in hardware and/or software, peripheral equipment, Computer System development, Computer Networks, services related to Information System operation and maintenance, Consultancy services, Audio-visual aids, and multimedia products.

The Palestinian National Authority's policy is to encourage IT firms to benefit as far as possible from government tenders in this sphere. Palestinian businessmen are encouraged to participate in tenders even when their bids are higher than those of foreign firms. In fact local bids are reduced (purely formally) by about 10-20%, to enable Palestinian businesses to compete effectively provided Tender conditions and specifications are adhered too. On the other hand, the financial ability of local business to participate in sizable tenders remains a real problem, except when 2 or more companies submit a joint offer. For example, a project is underway to computerize the Authority's financial operations in the West bank and Gaza; but no local contractor was willing to make an offer in spite of efforts to find local firms capable of doing the job. The PNA, however, did manage to computerize the government payroll relying on local contractors. A similar project to computerize the Treasury department was carried out by local firms. As far as the project to computerize the tax system is concerned, the considerable degree of technical expertise required might not be available locally, and recourse to Israel remains the current option for practical reasons.

In respect of the factors impeding growth of ICT, all studies point to the difficulties and challenges that are threatening the viability of the IT industry which stands to play a pivotal role in the development of the Palestinian economy. Some of these challenges are not specific to IT. They are symptomatic of more general

conditions facing all firms operating in the Palestinian territories. In the following we take a brief look at these conditions.

A. GENERAL POLICY OF THE PALESTINE NATIONAL AUTHORITY

The lack of a serious government strategy to develop ICT and, more generally Science and Technology has deprived the IT sector of the financial resources available during the years prior to the "Intifada". The Palestinian Authority's attempts have failed to assist in building up the private sector during the ten years prior to the Intifada, and its insistence on controlling initiatives, private or otherwise, has hindered development.

B. LEGISLATION

An important issue in IT is the protection of intellectual property rights, and the extent to which proprietary laws are enforced in practice. The ease with which copying or modifying software can be done is a well-known fact. As is commonly the case in many parts of the world, the Palestinian software industry suffers from inadequate legislation to combat software piracy, let alone enforcing the current software proprietary laws.

C. SKILLED MANPOWER AND THE JOB MARKET

As was pointed out earlier, a major issue is the inadequate coordination between the educational institutions and local business, especially since software industry is a fast developing industry, which necessitates continuous coordination with educational institutions on which they must depend to supply the necessary skills. Such skills normally include, English language proficiency, operation and maintenance of equipment, quality control, system analysis, documentation, and finally programming and software design. The problems posed by shortages in such skills are common to many countries and in particular developing countries. The importance of English as the medium of communication (and documentation) between local and international companies is all too obvious. International companies find it easier to dealing with countries and firms with whom they can communicate in English, consequently the absence of English language skills in a given company is likely to lessen its chances of signing contracts with international companies.

D. THE INFRASTRUCTURE

The absence of competition has impeded service development and had a negative effect on the quality and cost of services notwithstanding the changes that have taken place in the Palestinian telecommunications sector.

E. PRODUCTION LEVEL AND QUALITY

Negligence or ignorance of International Standards governing software quality has led PITA to organize workshops to educate participants in the value of Quality Control and adherence to regulations. On the other hand there are financial and technical reasons that make it difficult to comply with these regulations, as this would entail making changes in the production routine. As it is, some companies are having

difficulties in coping with quality control, risk management, errors in program design, and some times misjudging the volume of work necessitated by contract specifications. PITA is currently assisting companies in preparing for ISO 9000, ISO 9001 and CMM certification, which is a necessary step towards entering the global market.

F. MARKET POTENTIAL

It is now clear that the major problem in this area is the lack of software marketing expertise. The problem has become more acute in the export and sales sector, which requires efficient distribution channels coupled with good advertising practices which emphasize after-sale technical and maintenance support. To this end, some local firms have resorted to Arab distributors for their products along with the promise of technical and maintenance support.

One other problem is the limited size of the local market, which has raised the tempo of competition amongst software companies thus forcing them to seek export outlets for their products; but even here, competition is just as strong. The modest size and means of local firms, have on the one hand, prevented them from taking the sort of risks that characterize software industry, and on the other, impeded their development and ability to collaborate with international firms or to compete in public tenders. In fact local companies have on many occasions of their being ill equipped to deal with international firms. The situation is made worse by the fact that these companies have not kept pace with market trends regionally or globally.

To improve their chances of finding markets, some companies (about 30% of the total) have resorted to participating in trade shows locally and internationally, and indeed some software firms have succeeded in wining contracts to develop software for some Arab and foreign clients.

All indications suggest that the size of the Palestinian market is extremely small by any standard. Geographically, the total area of the territories classified as A, B and C, is no more than 5647 Km^2. A fundamental impediment to progress is the disjoined state of the road system connecting the West bank with the Gaza strip, has inevitably led to the disruption of internal commerce. Moreover, the low per capita income diminishes demand for software products. The view of the private business community is that the current intensive competition is impeding the growth of the software industry. In addition there are no endowments or investments funds to promote and support small enterprises, although there is significant banking sector comprising 23 banks, of which 9 are locally owned, 11 Arab owned, and 3 foreign owned. There are altogether 115 bank branches, 41.7% of which are local, 54.8% Arab and 3.5% foreign.

Bank accounts are predominantly Current Accounts, constituting 57% of total bank credit, whereas the Palestinian economy stands in need of medium and long - term bank credits.

G. The Israeli Dimension

Like other industries, IT is suffering the ill effects of Israeli practices, the hitherto undecided future of the region, political and economic instability –all natural consequences of Israel's siege policy which has introduced an element of risk not conducive to the development of a software industry, nor to any fruitful collaboration with international companies in terms of investments or marketing.

The possibility of ICT growth in the short term is contingent upon satisfying the following pre-conditions:

(a) Establishment of an institutional framework for sustained development. Any executable plans or proposals should be subject to accountability;

(b) Ensuring that the ICT sector follows international business practices, so that it can compete at the regional and global level;

(c) Attracting foreign investments, while striving to penetrate overseas markets should be the focus of Palestinian economic policy;

(d) Encouraging carefully planned applications of technology in business, tourism, construction, and agriculture;

(e) Exploiting the local market where Palestinians have the greatest comparative advantage;

(f) Investing in the promotion and development of Industrial Zones;

(g) Establishment of proper environment conducive to developing software industry for the export market. This entails having people with the right skills in software design and upgrading of products.

The overall policy objectives of the Palestinian Authority, as was pointed out earlier, should be the encouragement of local and foreign investments in a regulated free market environment.

IV. ICT APPLICATIONS

A. Education

The Ministry of Education has taken an active interest in the Computer Studies curriculum. The curriculum stresses the teaching of the basic skills that a computer user requires. The Ministry is currently involved in training teachers in the use of computer technology as an educational aide. All private schools and few governmental schools use data management software. At the university level, courses and educational material are commonly displayed on the university's Website for the benefit of students unable to attend the university in person because of the on-going siege and constant closures.

B. BUSINESS AND COMMERCE

A promising feature in this domain is Electronic commerce (E-commerce). Although it is still in its infancy, there is considerable official interest in taking legislative measures designed to encourage the spread of E-commerce. At present on-line banking services are limited in scope, and only few banks, notably the Arab bank, seem to offer them. Legislation in the following spheres is currently under consideration:

(a) Telecommunications;

(b) Intellectual property rights;

(c) Electronic signatures;

(d) E-commerce, however can not be expected to flourish before some degree of political stability is established.

C. HEALTH CARE

Databases for the documentation of medical records of patients are under preparation. Universities and civic organizations are carrying out this task on their own initiative.

D. ONLINE LINKS

Most or all establishments maintain Web pages for advertising and marketing their products. This applies to many public, private, civic or educational institutions. Arabic Web pages, however, are only a small fraction of the total, but there is an appreciable increase in their number. No statistics, official or otherwise, are available in this respect. Remote access technology in the area of health care is non-existent at present.

VII. CONCLUSION AND RECOMMENDATIONS

The recommendations we propose are intended to briefly address, organizational, political, and administrative and economic issues:

A. THE ORGANIZATIONAL ISSUE

We suggest the following guidelines for the safeguarding and better management IT sector:

(a) Establishment of an autonomous and competent Authority to organize telecommunications along lines that bring optimum benefits to the economy and the consumer;

(b) Establishment of an independent body to handle questions such as getting Palestine registered as an Internet domain i.e. with a country-code;

(c) Re-activating the defunct IT Commission with the participation of all business and civic society stakeholders, and in particular, the commercial and educational sectors;

(d) Formation of a special department for integrating IT into the private and public school system in coordination with the Ministry of Education, Ministry of Labour, and the private sectors; and ensuring that resolutions are fully implemented;

(e) Appointment of a working panel composed of representatives from the Ministry of Trade & Economy, Dept. of Communications and Posts, IT Dept. and PITA. The objective of the panel or working committee should be to define terms of reference guiding the work of the Commissions as outlined in (a), (b), (c), and (d) above. International experts should also be consulted when necessary.

Finally, it is important that the said Commissions be empowered to carry out their task with a minimum of bureaucratic interference. Naturally, the necessary budgets will have to be allocated for this purpose.

At the same time, measures should be taken to surmount the obstacles that hinder the growth of IT industry. Such measures include:

(a) Concentrating on the development of an IT infrastructure through building technology incubators;

(b) Disallowing the Government sector from entering into direct competition with the Private sector;

(c) Removing as early as possible all restrictions on free market competition in the telecommunication industry;

(d) Taking immediate action to modernize the educational system which is the mainspring of skilled manpower. Supporting university education and research centers should be directed at developing human resources and encouraging academic initiatives towards   supplying   the   market   with   a   sufficient   number   of professionally trained individuals;

(e) Striving to attract international investors, and more particularly Palestinian expatriates;

(f) Promoting partnership between private businesses and the public sector;

(g) Developing policies and organizational structures geared to encouraging investment, which entails regulating the IT industry and ensuring that intellectual property rights are respected;

(h) Developing the IT industry, so that it can compete effectively in both, the local and world markets;

(i) Government must show total commitment in terms of funding, promoting, and supporting ICT services in a creative way.

B. THE POLITICAL ISSUES

Any Palestinian development plans rest on the tacit assumption that a peace treaty will eventually be signed, ending all strife in the region and leading to the emergence of a sovereign Palestinian state. It is further assumed that the international community will continue its financial and technical support during the interim period.

The validity of this assumption is absolutely critical for the prospects of a viable Palestinian ICT industry.

An important strategic objective for the foreseeable future is the integration of Palestinian economy into the regional and global economy. Achieving this objective will call for the implementation of economic policies, and measures the challenges ahead. This will be an extremely difficult task, given the current climate of insecurity and political instability.

C. ADMINISTRATIVE AND ECONOMIC ISSUES

It is important that concerted action be taken to improve administrative and economic performance through:

(a) Concentrating more on building a strong institutional structure, more transparency and financial accountability on the part of the Palestinian Authority, paving the way for the private sector to take the initiative in developing the economy. The importance of institutional reform and the leading role of the private sector in planning economic development can not be over-emphasized, if IT is to grow and flourish;

(b) Adoption of free market principles in economic development, entering into flexible free trade agreements with neighboring countries, seeking to conclude trade agreements with countries that give preferential consideration to Palestinian goods (USA and Europe amongst others), and encouraging the establishment of industrial zones in participation with neighboring countries and foreign companies;

(c) Research in science and technology coupled with an innovative spirit is a fundamental requirement of socio-economic development. For many years Palestinians have been known to be creative and innovative people, a fact attested to by the number of universities, research centers, the high proportion of Science and Engineering graduates; all this despite limited resources, and deficiencies in IT services. What is needed now is a strategy that takes into account what has been achieved so far and builds upon these achievements.

Finally, the immediate task facing Palestinians is setting up a competent and transparent administration, capable of planning for the short and longer term, and at the same time steering away from centralism in decision making, exercising budgetary control, and proper allocation of administrative tasks and responsibilities.

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[10]   Welfare Association, Information Technology Projects

[11]   Palestine Gateway.

INFORMATION SOCIETY INDICATORS FOR PALESTINE

Indicator	Y2000	Y2001	Y2002
1. Basic Background Indicators			
1.1 Population	3,000,000		
1.2 Area	Unknown !		
1.3 Density	NA	NA	NA
1.4 Urban Population	NA	NA	
1.5 Adult literacy	85%		
1.6 Poverty	70%	NA	NA
1.7 GNI per capita	NA	NA	NA
1.8 GDP Growth			
2. Telecom Infrastructure			
2.1 Fixed lines (total)	NA	NA	
2.2 Domestic (lines per household)	NA	NA	
2.3 Urban(%)	NA	NA	NA
2.4 Waiting list (total number)			
2.5 Waiting time (average)			
2.6 Revenue per line($)	NA	NA	NA
2.7 Cost of local call ($ per 3 minutes)			
2.8 Cost of call within region ($ per 3 minutes)	NA	NA	
2.9 Cost of call to US ($ per 3 minutes)	NA	NA	
2.10 Number of fixed lines operators			
2.11 ISDN lines	NA	NA	NA
2.11.1 Initial cost ($)	NA	NA	NA
2.11.2 Monthly charge ($)	NA	NA	NA
2.12 DSL lines	NA	NA	NA
2.12.1 Initial cost ($)	NA	NA	NA
2.12.2 Monthly charge ($)	NA	NA	NA
2.13 Leased lines	NA	NA	NA
2.13.1 Initial cost ($)	NA	NA	

Indicator		Y2000	Y2001	Y2002
2.13.2	Monthly charge ($)	NA	NA	
2.14	Cable	NA	NA	NA
2.14.1	Initial cost ($)	NA	NA	NA
2.14.2	Monthly charge ($)	NA	NA	NA
2.15	Outgoing traffic (minutes per subscriber)	NA	NA	NA
2.16	Incoming traffic (minutes per subscriber)	NA	NA	NA
2.17	Mobile lines	NA	NA	NA
2.18	Number of mobile operators			
3. Media Infrastructure				
3.1	Radios			
3.2	Television		.	
3.3	Satellites	NA	NA	NA
3.4	Daily Newspapers	4		
4. Computers and Internet				
4.1	Personal computers		40,000	
4.2	Personal computers in education		20,000	
4.3	Percentage of computers that are networked		70%	
4.4	Internet subscribers		100,000	
4.5	Internet users			300,000
4.6	Internet hosts			
4.7	SP's			20
4.8	ISP monthly charges ($)			10-20
4.9	Telephone usage charges ($)			$25/month
4.10	Available national bandwidth	NA	NA	60 Mb/s
4.11	Hosting availability			Available
4.12	Secure servers			
5. ICT expenditure				
5.1	Telecom expenditure (million$)	NA	NA	NA
5.2	IT expenditure (million $)	NA	NA	NA

Indicator	Y2000	Y2001	Y2002
5.3 Percentage of GDP(%)	NA	NA	NA
5.4 ICT per capita($)	NA	NA	NA
6. Capacity building			
6.1 Scientists and engineers in R&D			Unknown
6.2 R&D expenditure (% of GNI)			Unknown
6.3 ICT related university graduate per year			400
7. ICT government and business environment			
7.1 e-readiness index	NA	NA	NA
7.2 e-government index	NA	NA	NA
7.3 IPR enforcement			Negative
7.4 Compliance with WTO			Underway
7.5 Basic telecom agreement			
7.6 Reference paper	NA	NA	NA
8. Laws and regulations			
8.1 Patent law			Y
8.2 Trademark law			Y
8.3 Copyright law			Y
8.4 IT agreement	NA	NA	NA
8.5 e-commerce law	NA	NA	Being drafted
8.6 e-signature law	NA	NA	Being drafted
8.7 Piracy law	NA	NA	
9. ICT policy			
9.1 ICT strategy			None
9.2 ICT plan of action	NA	NA	
9.3 National initiatives	NA	NA	

*Mid of the year

**Labor force survey

NA=Not Available

THE AGENCIES INVOLVED IN THE DEVELOPMENT
OF THE ICT SECTOR

In the absence of a national strategic policy for the development of the IT sector, it is fitting to cite the many initiatives undertaken by the business community, civic society stakeholders, and donor countries. We describe in what follows some of these initiatives, which are intended to promote IT development. But it must be said that these initiatives lack the necessary coordination.

The Ministry of Higher education

Aware of the role of universities in national development plans, the Ministry of Education has participated in preparing studies related to manpower development, development and upgrading of academic and vocational programs, and supporting research activities. Moreover, the Ministry organizes an annual IT conference in collaboration with universities and other interested parties. The conference this year will be held on the premises of the Arab-American university in Jenin. The topics scheduled for discussion will be: the quality of IT teaching, scientific research, and Global trends in the applications of IT in Education.

The conference will also discuss Technology Transfer as a means of safeguarding the continuity of higher education in the face of current difficulties [6]. Less recent conferences had addressed the following points:

(a) The importance of getting the universities involved in the development process;

(b) Promoting the creation of communication channels aimed at furthering cooperation between Palestinian universities and universities abroad in the area of IT, organizing training sessions in ICT for the benefit of university teachers, and spreading IT awareness amongst officials and decision makers;

(c) Setting up the proper infrastructure that can support investment in this promising sector, within the framework of a truly national policy;

(d) Setting up effective system aimed at coordinating the efforts of the Ministries concerned, in creating educational and IT curricula designed to produce a generation capable of adapting to the global changes that Information Technology is undergoing. In the same context, Palestinian universities were called upon to coordinate their efforts to meet the constantly evolving needs of the local and global market;

(e) Taking appropriate legislative measures that safeguard the interests of all parties working in this field.

The Ministry is also planning to computerize libraries in addition to setting up Wide Area Networks (WAN) to interconnect Palestinian universities. The plan in question was drawn up in 1995 but its execution was interrupted because of the high cost involved.

(a)   The Government Computing Center (GCC)

The main objective of the GCC is to lay down the foundation of Electronic Government (E-Government), provide government personnel with ICT training [8], and to take the lead in the planning and implementation of a proper strategy to develop the IT sector. GCC was set up by the Ministry of Planning and International Cooperation, to promote and diffuse IT culture, in association with the private and public sectors. Unfortunately, however, these ambitious plans remain no more than paper projects.

Nonetheless, the Center continues to provide IT services (including training) to various organs of the Palestinian Authority, including assistance in the management and operation of the Palestinian Authority's Web site, in addition to fostering relations with countries and regional and international organization working in this field.

(b)   The National Information Technology Institute

The national IT institute was established in Y2001 by the Palestinian Council for Development and Reconstruction (PACDAR), with a view to providing training programmes to various categories of Palestinian youth, ranging from school dropouts to university graduates. The overall objective of the institute is to transform the ICT sector from a Service sector to an Industrial sector, able to take the lead in the socio-economic development process. Amongst the objectives of the IT Institute are the following:

(i)   Keeping pace with the global market trends in the IT sector, and ensuing that IT training programmes are in line with these trends;

(ii)   Implementation of ICT industry standards that conform to international specifications. The institute offers two types of training programs:

1.   Programmes directed at school, college and university graduates in such areas as Software Engineering, development of integrated solutions, E-commerce, systems engineering, networking and database management;

2.   Market–oriented training programmes, i.e. programmes designed to meet market needs. Such programmes target employees in the private and public sectors alike.

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In carrying out its task, the institute has had to face many problems arising from: political instability in the region, shortage of professionally trained manpower and the reluctance of IT service firms to invest money in training programs for their employees. A number of projects, some of which we have alluded to, are currently on the Institutes' agenda, viz.:

(i) Establishment of Technology Incubators;

(ii) Certification to ICT international industry standards;

(iii) Providing support and vocational training for victims second Palestinian Intifada. The Islamic Development Bank is financing this undertaking.

(c)   The Ministry of Industry and IT Government Committees

Various national (but largely ineffective) Committees have been formed to organize, develop, and streamline the activities of Palestinian ICT industry, all under the auspices of the Ministry of Industry in association with of the Ministries of Planning, Finance, Higher Education, Communications, and civic society stakeholders. Various subcommittees were subsequently formed to look into areas where IT can be gainfully applied. Sadly, the work of these committees and sub-committees never goes beyond writing impressive reports or submitting ambitious proposals intended to build a Palestinian IT industry from the ground upwards.

The committees in question normally submit their projects to the Palestinian president for endorsement. Thereafter committee members meet to decide matters of procedure and the tasks ahead, which often entail organizing visits to neighboring countries, and signing cooperation agreements. Scarcity of financial resources and Israeli practices, however, remain fundamental obstacles to any possible progress.

(d)   ANERA

ANERA (American Near East Refugee Aid) has recently initiated an Information Technology project in the West bank and Gaza. The project is intended to establish and foster the growth of an IT industry and create over time thousands of high quality jobs. The project will train Palestinian university graduates in IT. The ANERA initiative consists of four components: (1) establishing training centers, (2) a revolving loan fund that will help students to finance their training courses; (3) a job placement center that will help IT professionals find jobs and (4) the setting up of technology incubators. To this end, centers of excellence for training IT professionals have been set up in four Palestinian universities, with access to certification from such international companies as: Microsoft, Oracle, Cisco and Sun Microsystems. Indeed some 200 instructors, students, and technicians have already received IT training at various levels. Two more Centers in Al–Quds University and the Polytechnic University of Palestine, are being built and equipped thanks to donations from wealthy Palestinians. The total cost per Center is estimated at one million dollar.

There are also official (i.e. government supported) and non-official Centers that offer various IT training services. Some of these Centers are university affiliated while others are privately run.

We have no reliable data on the number or quality of these centers. All that can be said is that these centers were not conceived as part of a clear and well-coordinated national plan. In fact to this day, no ICT industry standards have been implemented, especially in the area of software writing.

(e)   The Welfare Association

The Welfare Association was one of the earliest organizations to work in the field of Information Technology in occupied Palestine. Thanks to its efforts, which has included financing, a number of projects were undertaken to introduce IT into school curricula, implementation of the so-called *futurekids* project which targets school children, introduction of Cisco-certified training courses into a number of Palestinian academies and universities, namely, AL-Najah National University, AL-Quds University, Hebron Polytechnic, Gaza Islamic University and the College of Science and Technology in Khan Younis. In 1999, the *Across borders* project was initiated in order to bring Internet technology into Palestinian refugee camps across the Middle East. Other projects, underway are: the College of Technology/AL-Najah university, upgrading the AL-Quds university Computer Center, setting up two computer training centers in Jafa and Acre, computerization of the Gaza AL-Azhar university in Gaza, and upgrading the Khan Younis college of Science & Technology Computer Center.

In addition, the Welfare Association has built and equipped over 15 schools with a computer laboratory (260 computers were purchased for this purpose); and ICT curriculum subject teachers were trained in how to use the various utilities. Elsewhere, a council was set up to study the service needs of the districts of Nablus and Jenin, and Council members were trained in ways to develop the available human resources.

Finally the Welfare Association has on its agenda a number of plans intended to support IT firms and simultaneously assist in the social and economic development of Palestinian society.

Among other things, these plans envisage (a) the introduction of Local Area Networks (LAN) into hospitals, and (b) expanding the "Technology for Youth" program to encompass the Gaza strip, and Palestinian refugee camps Lebanon.

(f)   Market Access Programme

This is a multi-facet business support programme financed by USAID and managed by Development Alternatives Inc. (DAI) that began operations in 1999. This programme has played and continues to play a definite role in the diffusion of ICT services.