INFORMATION TECHNOLOGY HUMAN RESOURCE IN PALESTINE

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FOREWORD

The conversion of the Palestinian Territories into a modern competitive country requires a strategy that expands and deepens the Palestinian economy into the information age. Developing a competitive information-based economy will also require policies and regulations, institutions, infrastructure, and people that meet international standards. There is no greater challenge or imperative in this equation than educating people, often referred to as human resources, to participate in and contribute to the emerging information economy.

Critical indicators of global economic competitiveness today are natural resources and people that attract scarce global capital. The Palestinian Territories offers few natural resources outside of limestone to attract foreign investment. The single most important factor for attracting foreign investment today into the booming information technology (IT) markets is skilled people. Global capital is moving to places where educated people are concentrated. Equally important, countries and companies are able to compete in distant markets if their people can operate within a leading-edge information and communications technology environment through the Internet.

The need for educated people is the fundamental pre-requisite in IT and related industries. Investing in people through high-quality education, particularly in core areas such as engineering, computer science, and mathematics, is the most important investment today for long-term economic growth. A framework for IT human resources development is fundamental to guide public and private investment in education. This framework, which is elegantly developed within this study, should be based upon a consensus among educators, university administrators, economic policy makers, and industry and business leaders about the overarching strategic objectives for economic and social development of the emerging state.

This report outlines the economic growth imperative that will drive the vision and consensus among key interest groups for the development framework for human resources to support the information economy. The report identifies an important comparative advantage as the cultural legacy of education of the Palestinian people, who traditionally place a high value on their children becoming engineers, doctors, lawyers, computer scientists, educators, and professionals. It is the higher value-added contributions through an educated Palestinian people that will contribute to an economy grounded on quality and competitiveness. In turn, this will contribute to higher incomes, profitability, and economic growth.

Although it is uncertain whether a new “silicon valley” will emerge in the Palestinian Territories, it is clear that its economy must enter into the information age. The future

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economy will likely be based on IT applications in sectors with comparative advantages such as tourism and other services, as well as in some traditional industries that can be converted to higher competitiveness. This higher value-added performance will have to be driven by workers educated by a network of educational institutions supported by both the public and the private sectors.

This report rightly targets access and usage of the Internet as the critical tool for economic performance in the information age. This requires an educated population as well as IT-educated professionals. Improved Internet performance will require a cadre of IT-educated professionals in education and business, as well as in non-governmental organizations, who develop the policies and regulations, institutions, and services of an information economy. Today, an estimated 12,000 people use the Internet in the Palestinian Territories, representing less than 1 percent of the population. This fact is recognized by all parties—including the local Internet community, the Palestine Telecommunications Company (PALTEL), the Ministries, and representatives of universities and business communities—and is considered unacceptable to improve economic growth and business performance. A critical mass of households—perhaps a minimum of 10 percent or 300,000—should have access to and use the Internet within the next few years to achieve business-to-business and e-commerce benefits, as well as educational opportunities and global access, for the Palestinian economy.

The Palestinian Territories lags behind most Arab countries, which range from 1 to 3 percent of households having access to the Internet. Jordan and Egypt are making great strides to improve their IT capabilities, with King Abdullah and President Mubarak providing the leadership for this top priority to modernize their economies. Neighboring countries are already setting a new standard for the information economy in the regional market.

This report was encouraged and supported by the Market Access Program (MAP), financed by USAID, because it provides both the rationale and specific policy guidelines that will support the investment and development of the Palestinian people as participants in the new information economy. The report is not just another consulting study that might be confined to the dusty bookshelves of concerned analysts and academics. In contrast, this report represents a milestone in an ongoing process for building consensus among public and private sector stakeholders to forge a new framework of education for the information age. The challenge of this report is to turn this milestone into a cornerstone for future investment in education that is rich in information and communications technology.

Once there is agreement about the economic and social imperatives presented in this report, several steps are required to implement a framework for developing IT human resources. First, leadership is required to establish the consensus of a common vision for the information economy and the people who will both contribute to it and benefit from it. Leaders of universities, government, business, and civil society should provide the broad strategic vision for guiding action and investment. Second, a clear policy is required for investing in education, with a specific focus on areas related to information and communications technology. This report provides the rationale and outlines of a policy for education and training in information and communications technology.

Third, public-private partnerships should be formed in existing and new institutions to develop the education and employment opportunities for IT-trained people. Policies without implementing mechanisms will not bring results. This report provides recommendations for institutions in education, government, and the private sector that should contribute to the overall objective of IT-trained people. One example is an IT in Education Coordinating Body to coordinate various Ministries that share an interest in IT and education, as well as in economic development. It is important to build the concepts in this report into new initiatives, such as the establishment of the Naming Authority and Registry as a non-governmental body to develop the top-level domain at the country level (.ps TLD) under the regulatory guidelines issued by the Internet Corporation for Assigned Names and Numbers (ICANN). Every initiative should reinforce the vision and framework for developing IT-trained people for an information economy.

Finally, this Palestinian framework for developing IT-trained people should be extended to international organizations that support economic and social development to ensure their programs reinforce the same objectives at every investment opportunity. A focused effort is required by all investors in the Palestinian economy to achieve higher performance driven by an educated Palestinian people.

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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

Figure

Table

INTRODUCTION

Changes in technology and the development of new forms of economic organization are transforming global development. The "New Economy," based primarily on telecommunications networks, the Internet, and high-speed exchange of information, is growing at an exponential rate around the world. The challenges these changes present for an economy such as Palestine's are immense—Palestine could have a special advantage in this process because it is located strategically close to the markets of the Middle East, Israel, and Europe and has human and financial resources throughout the world.

Management Consulting Services (MCS) was commissioned by Development Alternatives, Inc. (DAI) in July 2000 to develop a framework for information technology (IT) human resources development.

MCS convened a team comprising the following consultants:[1]

- Sam Bahour, Applied Information Management;
- Marwan Tarazi, Birzeit University;
- Khalil Mahshi, Ministry of Education;
- Hisham Kuhail, Ministry of Higher Education;
- Mazen Hashweh, Expert Team on Vocational Training–Ministry of Labor;
- Adam Hanieh, TOKTEN consultant to UNDP; and
- Qais Saleh, MCS.

From the outset, this study was approached as complementary to existing strategies and related reports. It should be noted that Marwan Tarazi and Hisham Kuhail are members of the steering committee for the development of a national IT strategy, funded by the World Bank.

Initially, the scope of work of the consultant team was to study two distinct parts of the human resources equation as it relates to IT—the supply side: educational and training institutions producing skilled labor for the market; and the demand side: absorbing the skilled IT staff and defining the needs of the market. The team initially adopted a survey-based, statistical approach aimed at collecting and qualitatively interpreting data on the existing situation within IT while trying to ground the findings within an international baseline.

Following discussions with experts within the IT private sector and an examination of the experience of other countries, however, the team determined that this approach was inadequate for the current stage of development of the industry in Palestine. It became clear that the marketplace lacks a critical mass of any single IT profession.

[1] Apart from Qais Saleh, organizations are listed for identification purposes only. Biographies of the consultant team are provided in Appendix II.

Also, definitions of existing professional positions are unclear, partly because of the underdeveloped IT market in Palestine and partly as a result of the rapidly changing IT marketplace and job definitions. The team felt it was not beneficial to the emerging IT sector in Palestine to count the handful of professionals currently working in IT for use in a baseline methodology.

Additionally, a great number of the IT professionals are Diaspora educated. Attempting to measure their skills is a complex matter and, more important, ignores the fact that the local educational environment is unable to produce the needed IT skills.

Instead of focusing efforts on quantitatively measuring a small number of undefined IT professionals, the team determined that the study would be more beneficial in making recommendations about a policy framework for IT human resources development. This framework would define where the human resources efforts in Palestine need to be concentrated for a critical mass of IT-literate graduates to be created. Instead of measuring the throughput, there is a need first to define the channel that creates this throughput.

This study begins by presenting background information on the Palestinian economy and IT in Palestine.

Section One presents an overview of the Palestinian IT sector and analyzes the potential competitive advantages that Palestine has within this sector on a global level.

Section Two presents a detailed look at the methodology adopted by the consultant team. Beginning with an overview of existing strategies and other literature, this section explains the process carried out by the team and the justification for the specific objectives and goals adopted in this study. One important stage in the development of this study was the identification of the place of IT within the various Palestinian national development plans. This section summarizes how these plans relate to the IT sector and details the economic and political assumptions inherent in them.

Section Three discusses the findings of the consultant team with regard to the education sector, which is identified as the main site for any strategic intervention in future human resources development.
Through an examination of the basic reality at all levels of the education sector, the study identifies the major impediments blocking a viable IT human resources development environment within the Palestinian educational system. These impediments are grouped within three key elements: curriculum and methodology, physical and human resources, and legal and administrative issues. These elements are then analyzed from the perspective of internationally recognized standards necessary to compete in the 21st century global economy. Section Three also provides recommendations and describes projects necessary to move from the current reality to the standards identified. Each recommendation is designed to address particular impediments that characterize the Palestinian educational system.

Section Four turns to an examination of the private sector within Palestine and, following an overview of the current reality, offers recommendations designed to foster the involvement of this sector in strengthening the human resources potential within IT. This process is repeated in Sections Five and Six, for the role of the government and public awareness of IT, respectively.

It is important to point out that this report is not intended to provide an implementation strategy or a blueprint for Ministries. Rather, this study provides a framework for the elaboration of future strategies to create a critical mass of IT-literate professionals and an increase in IT literacy within the Palestinian community. It is also hoped that this study will assist in identifying specific projects for further investigation and support.

Acknowledgement is extended to Dr. Jamil Hilal, Professor Khalil Hindi, Dr. Anton Zahlan, and Dr. Philip Drake for the valuable comments and advice they provided during the drafting of this report.

SECTION ONE
THE PALESTINIAN ECONOMY AND INFORMATION TECHNOLOGY

PALESTINIAN ECONOMY—BASIC FACTS AND FIGURES

The Palestinian economy is of relatively small size, with real gross domestic product and gross national product in 1999 reaching US$4.7 and US$5.7 billion, respectively, and a total population of 3 million at the beginning of 2000.[2] Real per capita GDP and GNP, respectively, hover around US$1,550 and US$1,890. The participation in the labor market is low, with less than 50 percent of the working age population in the labor market and less than 40 percent in Gaza. Indeed, in 1998 more than one-third of the population in Gaza and nearly 15 percent of the population in the West Bank lived in poverty—defined as US$2 per day per person. The Palestinian National Authority controls only a fragmented and limited portion of the Palestinian land and water resources, limiting internal and external trade, access to services, and rational and comprehensive development of infrastructure. On the positive side, the average illiteracy rate is just 15 percent—low by regional standards—and there are no differences in literacy between young men and young women. The Palestinian people are healthier than most in the region, with a higher life expectancy and lower infant mortality than in most countries in the region.

Palestine entered the realm of telecommunications and IT where much of the world left off. The unique advantage of being able to leapfrog into the rapidly moving world of high-tech information-based economies presents Palestine with significant potential to benefit from decades of knowledge gained worldwide.

Palestine is strategically located at the crossroads of Europe, Asia, and Africa and has preferential access to U.S. and E.U. markets. In addition, the close proximity to the Middle East market (estimated at 300 million people) and the E.U. market (380 million people) makes Palestine a potentially attractive investment opportunity.

Immediately following the creation of the Palestinian National Authority, a swift decision was made to enable Palestine to fully privatize its telecommunications sector. In 1996, local and Diaspora Palestinian investors pulled together US$65 million to create the Palestine Telecommunications Company (PALTEL).[3] This fully private monopoly operator, which is traded on the Palestine Stock Exchange,[4] has embarked on an investment plan of US$400 million to establish a modern communications infrastructure in the West Bank and Gaza. PALTEL can already claim a 100-percent-digital network and, after only three years of operation, introduced JAWWAL, the first national Palestinian GSM cellular network that was built in association with the Swedish cellular giant Ericsson. The first three full years of

[2] Statistical information in this section is taken from *Pathway Toward a Palestinian Vision for 2005 and Beyond: A Progress Report on the Palestinian Strategic Development Plan*, which can be found at http://www.pna.net/events/pathway_lisbon.htm

[3] http://www.paltel.net

[4] http://www.p-s-e.com

operation for PALTEL have been profitable to the tune of more than US$8 million each year. PALTEL has since increased its capital to US$95.7 million and is moving into new modern network services.

The retail world has long known that location is the key to success. International IT suppliers are boldly aware that creating a virtual world will require well-positioned global professionals who know the local culture and speak the local language. With the Arab world opening its telecommunications and IT markets and steadily permitting greater access to the Internet by the public at large, the potential growth in the sector is immense.

Palestine, already on-line, has made great strides and is keenly aware of the strategic role these markets will play in building its own IT sector.

The core of any IT industry is its people. Historically, Palestinians have had the highest level of education in the Arab world. Furthermore, the Palestinian experience has brought together IT professionals from various corners of the globe. The United States, Germany, and United Kingdom and the Persian Gulf, Far East, and South America all have graduated and employed Palestinian students. They are now either in Palestine or on the verge of returning, capable of bridging the critical gap between business strategies and real products and services. Significant effort in training and a plan to upgrade the educational curriculum are being implemented to adjust for the 21st century. Strategic partnerships that incorporate a training component are equations for success and are viewed as an ideal entry point for multinational firms wanting to do business in Palestine.

The official unemployment rate declined to 10 percent in the West Bank and Gaza in the fourth quarter of 1999 (7.5 percent in the West Bank and 15.5 percent in Gaza).[5] Most of these jobs are found within the service sector—for example, trade, transport and hotels - and the public sector.

The Palestinian legal system has been receiving special attention by the Palestinian National Authority. A strategy of providing for a comfortable legal apparatus to facilitate direct foreign investment has been a high priority in the ongoing revamping of the legal framework. In this respect, one of the first laws passed was the Law on the Encouragement of Investment. This law prohibits expropriation of private investments and prohibits any investor to be discriminated against on the basis of nationality. Furthermore, the law provides full income tax exceptions for the first 5 years, with investments exceeding US$5 million eligible to be granted an additional 20-year period at the rate of 10 percent. Special exemptions are granted to enterprises engaged in export. Additionally, the law offers unlimited transfers of foreign currency and freedom for repatriation of income generated from investment in Palestine.

Palestine, today, exisits within a window of opportunity economically as well as politically. For IT, this has meant that a wealth of projects have entered the market and are well funded by donor nation-states, the World Bank, European Union, and others. The majority of these

[5] "West Bank and Gaza Update," April 2000, World Bank Group, pg. 9.

projects have a significant IT component and are creating the first stepping stone for multinational IT firms to market their wares in Palestine.

From selling products and services to the local market, Palestinian IT firms are gradually building relationships and partnerships that result in value-added services to offer in the regional and global IT markets. An example of this strategic direction is the creation of industrial parks. Local Palestinian firms have already begun to relocate into these well-equipped parks and are beginning to market their services to the export market. By designating certain areas as free-trade zones, the Palestinian National Authority is faciliting the emergence of Palestine as a regional and international trading and service center.

There are strong indications that Palestine will successfully position itself in the global IT market by optimizing its competitive advantages and leveraging its emerging knowledge-based economy into niche markets that will benefit from the added value created by these firms. The relatively small size of Palestine allows for dedicated attention to the export market, and the area is ripe for software development joint ventures and partnerships and for arrangements to establish Arabic/English call centers.

INFORMATION TECHNOLOGY AND PALESTINIAN NATIONAL DEVELOPMENT PLANS

The development of any human resources strategy must be situated within a particular economic and political environment governed by national development plans. In the case of Palestine, several important documents chart the future development environment and Palestine's potential position within the global economy. It is important to identify the characteristics of this environment and the political and economic assumptions on which it is based because any variation in these assumptions can affect the feasibility of future human resources development strategies.

The economic direction adopted by the Palestinian National Authority will determine the place of IT within Palestinian society and the marketplace. The relative importance ascribed to this sector will affect the willingness of the government to adopt the strategies necessary for strengthening the human resources capabilities of the IT sector (that is, government policies toward education, training, and the private and public sectors). The importance attached to IT by the private sector—a critical factor in determining human resources development—will largely be dependent on the economic attractiveness of IT. The strength of the Palestinian economy will determine the level of resources invested in the IT sector which, in turn, will influence future development of this sector.

However, government policy as it relates to the public sector is not the key determinant of the demand for human resources. Rather, it is a liberal economic policy that will create jobs and promote growth, and thus determine the characteristics of future human resources needs.

Although government policy with regard to the education and training sectors will determine the supply side of human resources, the health and vigor of the economy will determine the demand for human resources and create jobs. An open-market policy with clear safeguards

(that is, investment laws and a clear regulatory framework) will facilitate foreign direct investment into Palestine and thus significantly affect employment demand.

Many documents from local and international bodies aid in understanding the economic trends and framework for the future Palestinian state. The most important are the *Palestine Development Plan: 1999-2003, Pathway Toward a Palestinian Vision for 2005 and Beyond, Palestinian Economic Policy Framework*, and the reports of the Ad-Hoc Liaison Committee (AHLC).[6] All of these contain assumptions about the current political and economic situation and its development. These assumptions are identified below because changes in them will affect future strategy.

Political Assumptions

The following political assumptions were identified in the *Pathway Toward a Palestinian Vision for 2005 and Beyond: A Progress Report on the Palestinian Strategic Development Plan:*[7]

- That a comprehensive, just, and lasting peace agreement will be reached between the PLO and Israel and that an independent Palestinian state is created to replace the Palestinian National Authority;

- That such a peace agreement will parallel other peace agreements ending the Arab-Israeli conflict and creating a region of stability and cooperation;

- That the Palestinian state will have sovereign control over its land and natural resources and will enjoy a free and unfettered access to the outside world; and

- That the international community in its quest for lasting peace and stability will continue to play a major role in providing the financial resources and technical assistance needed to finance and implement the development needs as defined by the strategic plan.

The fulfillment of these political assumptions are critical for the future of the IT sector and the development of human resources in Palestine. There is a clear direction within Palestinian national development plans toward embracing the opportunities presented by the global technological revolution. As *Pathway Toward a Palestinian Vision* states, one key component for the medium-term strategic vision is:

> reintegrating Palestine in the regional and world economy, and the design and implementation of economic policies and economic management that will lead to this goal. The intention here is to build competitive advantage of the

[6] These documents can be found at http://www.pna.net.
[7] See http://www.pna.net/events/pathway_lisbon.htm:

> Palestinian economy so as to benefit from the immense opportunities created by the twenty-first century revolution in communications and technology.

However, without the presence of a secure and stable political environment, it will be extremely difficult to mobilize the resources necessary to facilitate free access to the regional and world economies.

Economic Assumptions

Based on a thorough reading and discussion of the critical documents and interviews with key experts, the consultant team has identified the following assumptions regarding the Palestinian economy:

- The Palestinian state will adopt a free-market approach to economic development.
- There will be a large number of returnees to this state.
- The Palestinian National Authority is moving toward financial accountability and transparency.
- Agreements will be established with countries on a favorable trading partners basis. These countries will include the United States and Europe.
- The private sector will lead economic development.
- There will be free movement between the West Bank and Gaza.
- Industrial zones will be established in partnership with Israeli and other foreign companies.
- Policies will be put in place to better regulate development.
- An emphasis will be placed on institution building.
- A free-trade arrangement will be established with Israel that allows flexibility and freedom for the Palestinian state to set relations with other countries.

The emphasis placed upon institution building and on regulated and planned development with a lead role for the private sector is vital in creating the necessary environment for a flourishing IT sector. The *Pathway Toward a Palestinian Vision* puts it succinctly:

> Scientific research, technology and innovation will be a critical basis for sustainable economic and social development for Palestinian society. Palestinians have long been cognizant of the critical nature of this fact, as is evident in the number of universities, research centers, and percentage of

> science and technology graduates, the extent of technological innovation with limited resources, including in the areas of manufacturing computer software and IT in general. What is lacking is an agreed upon strategy to harness and build on these achievements.

There is also a strong emphasis on improving management practices and decision-making processes and on implementing administrative reform:

> Management strengthening is key in the areas of policy planning, phasing-in decentralized decision making as appropriate, program and project evaluation, and rationalizing administrative and budgeting regulations and processes. An important tool for all of these will be data and information systems that are compatible within and across the public sector.

The following assumptions can thus be made about the Palestinian economy:

- A major aim of Palestinian economic policy is to attract foreign direct investment.
- Economic development will focus on quality rather than low-wage employment, utilizing Palestinian entrepreneurial experience and the strong tradition of family business within Palestinian society.
- The Palestinian economy will focus on export-oriented growth in overseas markets.
- Trade, tourism, construction, physical infrastructure, and agriculture are considered important.
- Palestine has potential competitive advantages in several fields, including IT.
- Much development will take place within industrial zones.

Thus, the Palestinian National Authority has prioritized policies aimed at attracting foreign and local investment within a regulated and liberal market economy. In addition, the Palestinian National Authority has a clear understanding of the importance of IT in the future economy. However, these policies are dependent upon political developments and on an economic framework that has not yet been fully realized.

SECTION TWO
APPROACHING IT HUMAN RESOURCES DEVELOPMENT

METHODOLOGY

This section presents the methodological approach of the consultant team and provides a justification for its goals and objectives. The development of this study passed through seven interrelated stages:

First Stage: The team conducted a thorough literature review of relevant documents and previous strategies. The review included the following:

- The Ministry of Education Five Year Plan;
- The Ministry of Higher Education Rationalization Plan, 1997;
- "Education and Training in Palestine" presented to the International Conference on Employment in Palestine held under the auspices of the Palestinian Ministry of Labor in May 1998. This report was developed by the Expert Team on Vocational Training;
- The National IT Strategy (excerpts of draft);
- The Workshop on Information Technology Curriculum Development, held 13 March 2000 under the auspices of American Near East Refugee Aid (ANERA) and the Palestinian National Authority (PNA);
- The Center for Private Enterprise Development (CPED) study entitled, "Palestine Information Technology Business Planning and Diagnostics" (1998);
- The Khadoury Technology Development Center Feasibility Study, carried out in May 1999 by The Services Group, Inc (TSG); and
- The Technical and vocational education and Training Strategy in Palestine (1999), Implementation Plan, produced by the Ministry of Education, Ministry of Labor, and Ministry of Higher Education of the Palestinian National Authority.

The aim of this literature review was to determine the extent to which current and projected national strategies considered human resources development within the IT sector and to utilize these findings in the development of this report. It should be noted that this report should be considered as complementary to the documents outlined above. Indeed, several members of the consultant team were involved in developing the aforementioned reports.

In addition to these documents, the team conducted a comparative review of IT and human resources strategies of other countries.
The aim was to identify international best practices with regard to IT human resources planning. A complete list of these resources can be found in Appendix I.

Based on these findings, the objective and goals of the study were identified. A conscious decision was taken to focus on the education sector. In addition, the public and private sectors and the general public awareness of IT were identified as critical to the development of a human resources strategy. Each of these four areas was examined with a view to

identifying the barriers to the development of a vibrant human resources environment. It was decided to avoid quantitative speculation regarding the nature of the future Palestinian workforce because of the lack of reliable data in this regard.

Second Stage: Following the identification of the objectives and goals of the study, three internal workshops of the team were devoted to investigating the key assumptions of the economic and political environment in which human resources development in Palestine would take place. This was done by reviewing the key economic and policy development plans of the Palestinian National Authority and related international bodies such as the World Bank and the Ad Hoc Liaison Committee. The findings were then verified in a meeting with the Palestinian Minister of Economy and Trade, Maher Al-Masri. These findings—important because they form the building blocks on which a human resources development strategy must be based—are presented below.

Third Stage: A further series of four workshops were held to investigate the current reality at each level of the education sector. These meetings heard detailed reports from members of the steering committee who occupy senior leadership positions within the relevant Palestinian education ministries. Considerable attention was focused on discussing current strategies and other documents concerning human resources in the IT sector. Following the discussion of the current reality within the sector, participants discussed the findings and drafted outlines of strategies within each level.

Fourth Stage: Two internal workshops were devoted to discussing the role of governmental policy, the private sector, and public awareness of IT. These discussions were led by team members active within the IT sector in public and private sectors capacities. Following the model adopted in stage three, the aim of these discussions was to identify the current reality and analyze impediments blocking the adoption of international best practices.

Fifth Stage: A closed e-mail discussion list was established for the consultant team that was used for discussion throughout the process and to disseminate relevant reading materials and online resources. These are listed in Appendix I.

Sixth Stage: The findings were discussed within the committee, and feedback was sought from other relevant experts. Dr. Jamil Hilal, Professor Khalil Al-Hindi, Dr. Anton Zahlan, and Dr. Philip Drake provided valuable comments that have been incorporated into this report and were critical in the verification of many of the findings below.

Seventh Stage: The final stage involved the wider circulation of the draft report and its findings among industry experts and DAI. A public meeting will be held to disseminate the findings on a broader level.

GOALS AND OBJECTIVES

The framework for a strategy for human resources development in IT for Palestine is a blueprint for improving the utilization of human resources in IT to meet the challenges of the 21st century.

IT is defined as the use of technology for data acquisition, communication, coordination, analysis, and decision support. IT is pervasive in all organizational functions and is used within accounting, finance, marketing, and production. It encompasses both hardware and software aspects of technological developments.

This study is governed by the following goal:

To develop the framework of a strategy that will:

- Create a critical mass of IT professionals; and
- Ensure a general level of IT literacy within the Palestinian workforce.

Technological literacy builds on a base of general education by mastering, as an integral core component, a set of technological skills that focus on interacting with technology.

Consistent with this goal, four objectives have been identified as fundamental to its achievement. These are discussed below.

Developing the Educational System

The underlying assumption of the study is that any improvement in the utilization of human resources depends on the education sector. This assumption is based on the following facts:

- Palestinian society is a young society with 47 percent of the population below the age of 15, and 20 percent below the age of 5. Thus, almost 30 percent of the population at any one time (and the future labor force) attends school.

- The labor force, estimated at 680,000 persons at the end of 1999, faces a potential demographic annual growth of 4 percent in the number of working-age persons. The vast majority enter the labor force directly from the educational system.

- Participation in the education sector is very high (from grades 1 to 10 inclusive, there is 97 percent attendance and for grades 11 and 12, 57 percent); thus, a successful, concerted strategy aimed at the educational system should have a significant impact on the make up of the human resources pool in Palestine.

Thus, any strategy concerned with improving the utilization of human resources within IT needs to focus on the education sector. Education is the most important factor in improving general IT literacy, producing a critical mass of IT-literate persons, and promoting

competencies that are necessary for future IT-based societies. For this reason, the bulk of this report examines the Palestinian educational system and provides recommendations for future strategies in this sector.

Improving Government Practice

IT is a critical component for a successful future Palestinian economy, and the Palestinian government will take steps to improve the environment for the development of human resources within this sector. For this reason, the framework examines government practice as it relates to human resources in IT—particularly policy, strategies, planning, finances, and administrative and legal/regulatory issues.

Fostering the Participation of and Linkages within the Private Sector

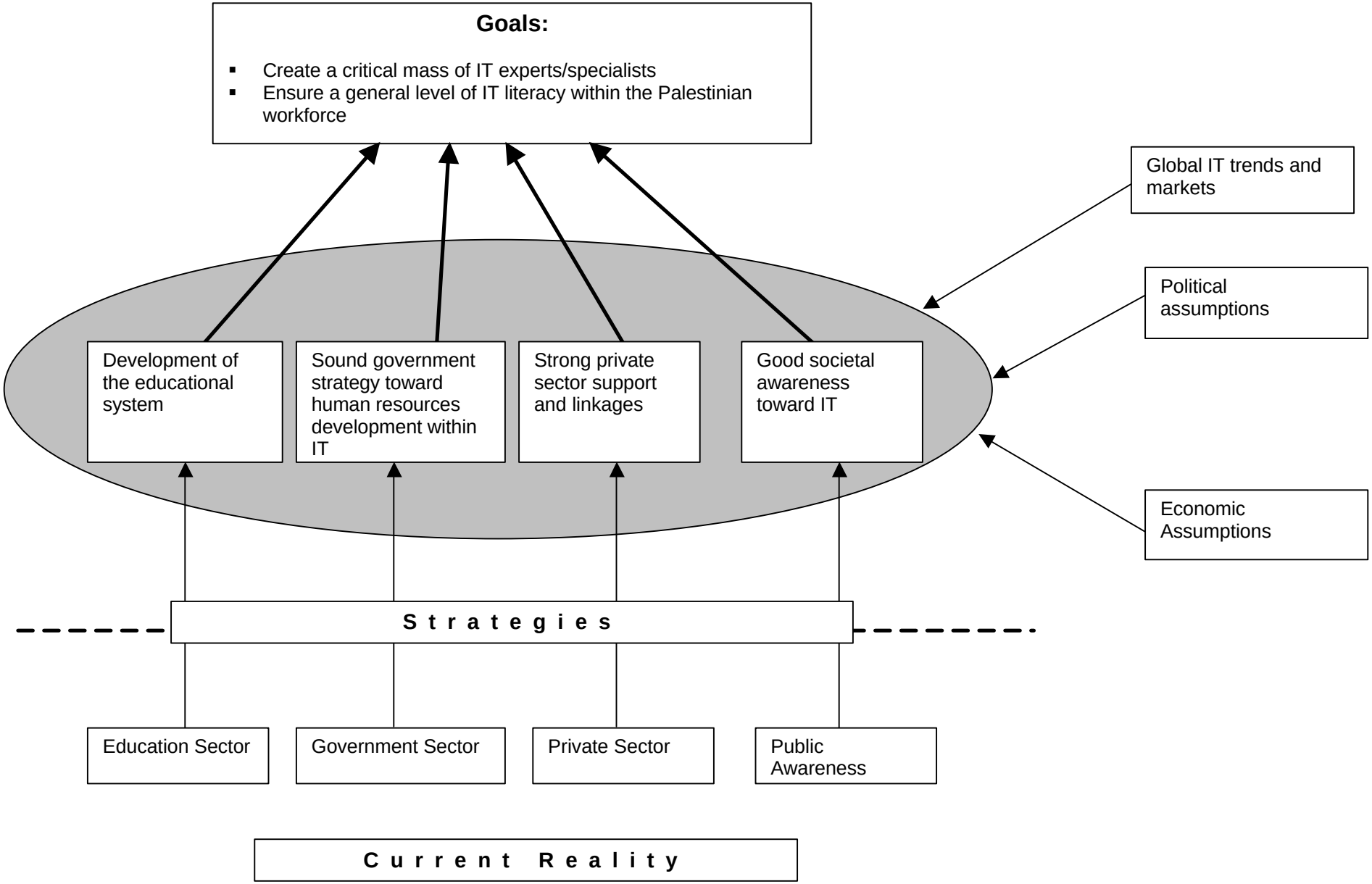
The private sector is the driving force behind IT development, and a nascent Palestinian IT industry already exists with an established—although fluid—human resources potential. Any strategy must include the private sector in shaping the future human resources needs within IT. This requires a dynamic and innovative private sector with strong internal links and working in close partnership with other sectors.

Creating Public Awareness of Information Technology

The general enabling environment of Palestinian society will strongly affect the direction in which future human resources are employed. People make choices about their future, based on an awareness of different options. It is thus important to examine and promote strategies that ensure a general public awareness of IT and the potential rewards of work in this area.

The relationship between the goals, objective, and strategies of this study is summarized in the following diagram.

Figure 1: Framework for a Human Resources Development Strategy for Information Technology



SECTION THREE

EDUCATION SECTOR

At all levels, the education and training sectors will be determining features of the future economy and of IT in particular. Any human resources development strategy has to begin with an examination of the current reality of these sectors. This will help identify the factors that block the realization of the goals outlined in Section One. It will then be possible to delineate strategies to develop Palestinian human resources and overcome or mitigate the barriers identified.

BASIC FACTS ABOUT THE EDUCATIONAL SYSTEM

General Academic Education

According to the Palestinian vision, education is based on two aims:

- To create good citizens; and
- To serve the economic needs of the country.

Palestinian general academic education encompasses the first 12 years of general education (1-12). Responsibility for this system lies with three authorities: public (Ministry of Education), UNRWA (for registered Palestinian refugees), and private and nongovernmental organizations. The breakdown is as follows:

Figure 2: Responsibility for General Academic Education

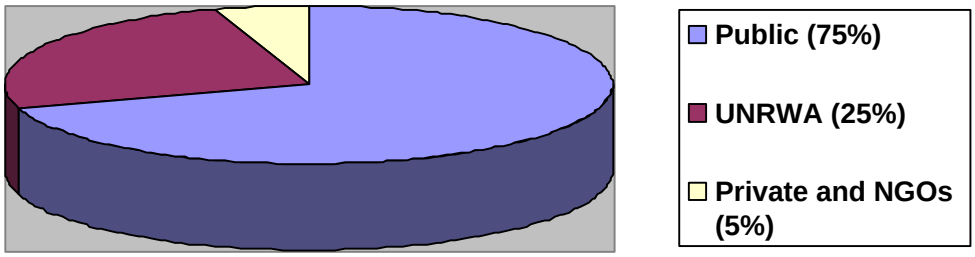


Table 1: Distribution of Students and Classes, by Educational Level and Supervising Authority, 1999/2000[8]

Authority	Basic		Secondary	
	Student	Classes	Student	Classes
Government	518,483	14,387	68,294	2,154
UNRWA	223,085	4,782	0	0
Private	51,422	1,974	4,256	241
Total	792,900	21,143	72,550	2,395

Table 2: Number of Schools, Students, Teachers, and Classes in Government Schools, 1994-2000

Year	Schools	Students	Teachers	Classes
1995/1994	1,084	418,807	14,938	11,817
1996/1995	1,070	447,822	16,810	12,524
1997/1996	1,113	481,678	18,858	13,623
1998/1997	1,175	516,160	21,186	14,729
1999/1998	1,230	549,404	22,695	15,633
2000/1999	1,289	586,777	24,318	16,541

The Palestinian Ministry of Education, set up in 1994, is responsible for the administration and financing of the public, pre-university education sector. Prior to the establishment of the Palestinian National Authority, the Ministry of Education and the Ministry of Higher Education were combined. At the beginning of the secondary cycle, pupils are classified into three streams: scientific, literary, and vocational. At the end of this cycle, students sit for a national exam called the *tawjihi*. Those who pass the *tawjihi* are eligible to enroll in academic institutions of higher education; the actual score required to enter various fields of study is determined by the institution.

Access to basic and secondary education is very good, and the recent Ministry of Education *Five Year Plan* aims to retain this level of access. There is close to 100 percent attendance of students in 1st grade. Between grades 1 and 10, there is 97 percent attendance. From grades 10 through 12, there is 57 percent attendance—the aim is to increase this number to 68 percent within the *Five Year Plan.*[9] The *Five Year Plan* also focuses on quality, training and vocational education, capacity building, and non-formal education.

US$250 million is needed for construction of new schools and classrooms each year (there is an intake of 65,000 new students each year—that is, a 6.2 percent increase). Most of this money must come from donors. Another US$645 million is needed for development costs, which is an unrealistic amount given the current budget of the Palestinian National Authority. Currently, 18.3 percent of the national budget goes toward the education sector. The aim is to increase this to 19.5 percent within the *Five Year Plan*. In addition, US$35 million comes

[8] Taken from *Statistics about Palestinian General Education*, General Directorate of Educational, Planning and Development, 1999/2000.

[9] See *Five Year Plan*, Ministry of Education, Palestinian National Authority, 1998.

from donors (this is 25-30 percent of the total amount pledged). The community also provides US$11 million. Thus, the goal is to raise US$240 million for development costs. The Ministry of Education is putting considerable effort into management and administrative capacity building.

Technical and Vocational Education and Training

In the West Bank and Gaza, hundreds of training institutions provide short- and long-term training programs. These institutions consist of vocational secondary schools, vocational training schools, vocational training centers, private cultural centers, charitable associations, and development institutions. There are also 23 community colleges offering different educational programs for *tawjihi* graduates.

Vocational education and training are generally regarded by Palestinian society in a negative manner, mainly because they are considered to be at the lowest level of the educational system and the last option for students who are unable to continue in the academic stream. Historically, vocational education and training was linked structurally to Israel as a means of producing low-skilled workers for the Israeli economy.

The students at vocational secondary schools have successfully completed the basic educational cycle of 10 years. Currently, 3 percent of grade 10 graduates move into this sector, which is projected within national plans to increase to 7 percent There is no enrollment prerequisite for admission, and a graduate of a vocational program receives a vocational *tawjihi* (matriculation) certificate, in contrast with regular *tawjihi* certificate for a graduate of general secondary school. This certificate qualifies a student to enroll in a community college or university. The duration of study for these programs is two years, in which students spend the first year studying general subjects and the second year studying theoretical subjects and in practical training related to the relevant occupation. Only between 3.5 and 4 percent of students enrolled in post-10th grade schooling attend these schools. This number is very low compared with students in other countries (for example, 47 percent in all Israeli schools and 30 percent in Arab schools in Israel).[10]

Vocational secondary education is provided by 20 secondary schools. Three streams are available: industrial (10 schools), agricultural (2 schools), and commercial (8 schools). During 1997/1998, the number of students enrolled in vocational secondary schools reached 2,220 of which only 513 were female.[11] The breakdown of students is as follows:

[10] *Palestinian Vocational Education and Training,* Mazen Hashweh, Palestinian Ministry of Labor, 1997.
[11] *Technical and vocational education and Training Strategy in Palestine, Implementation Plan,* Ministries of Education, Labor, and Higher Education, Palestine, 1999.

Table 3: Number of Students in Vocational Secondary Education, 1997/1998

Training Stream	Number of Students
Agricultural Stream	231
Commercial Stream	555
Industrial Stream	1,434

A second level of technical and vocational education and training is the community college level, which prepares the mid-level labor force that forms the link between specialized and skilled workers. Students entering community colleges must have passed the *tawjihi* exam with an average greater than 60 percent. Following the two-year study period, students sit for a comprehensive exam and are able to enroll at university based on special regulations. Community colleges can be divided into three types; technical community colleges, academic community colleges, and community colleges covering both vocational and academic specializations. The colleges offer 44 specializations within 10 major areas (academic, educational, engineering, medical assistants, administration and finance, computing, arts, social work, hotel management, and vocational). The Ministry of Higher Education supervises the education in these colleges. In 1999 and 2000, there was a large increase in the number of new commercial sections opened in academic schools: 13 new sections were opened, and the number of students studying commercial specializations increased to 1,200.

The third level of training is the non-formal sector. This is divided among UNRWA and other charitable association training centers, Ministry of Labor vocational training centers, and private and public cultural centers. These centers provide practical, semi-skilled training in courses varying from five months to two years.

Several problems have been identified by the relevant ministries involved in the technical and vocational education and training sector. They can be summarized as follows:

- The system is fragmented, and there is an absence of coordination between its components and the local community.

- There is a wide array of bodies responsible for supervising the different training institutions, vocational secondary schools, and community colleges.

- There are limited resources available, and modern equipment and machinery are lacking.

- There is a weak relation between the technical and vocational education and training path and the academic stream, leading to a decline in the training quality.

Given these characteristics, a national strategy for technical and vocational education and training was developed three years ago with participation from all relevant sectors. The plans are as follows.

The system is to become demand driven. Three ministries—Ministry of Education, Ministry of Higher Education, and Ministry of Labor—are giving high priority to technical and vocational education and training. The President of the Palestinian National Authority and the Cabinet have formally adopted technical and vocational education and training implementation plans, and various social partners are heavily involved in this implementation. The government acknowledges the role of the private sector in the design and delivery of training and in earmarking funds to priority sectors.

The system itself is to become demand driven and responsive and aims at producing skilled workers and technicians for the labor market. The system will provide basic training but also retraining opportunities.

The curriculum is to become flexible, modular, and competency based. The process aims to produce creative and well-rounded people who can think analytically and solve problems.

Table 4: Distribution of Schools that Teach Vocational Education, by Region, Supervising Authority, and Stream, 1999/2000[12]

Region	Authority	Industrial	Agricultural	Commercial	Religious	Hotel	Total
West Bank	Government	5	1	22	0	0	28
	Private	3	0	1	1	1	6
	Total	8	1	23	1	1	34
Gaza	Government	0	1	1	0	0	2
	Private	0	0	0	2	0	2
	Total	0	0	0	2	0	2
West Bank and Gaza	Government	5	2	23	0	0	30
	Private	3	0	1	1	1	8
	Total	8	2	24	3	1	38

University Education

The higher education sector comprises 9 universities and a polytechnic school (which grant Bachelor's degrees and higher) and 16 community colleges (which offer 2-year diplomas, generally in technical and commercial fields). The universities are composed of the following faculties: arts, sciences, commerce and economics, engineering, agriculture, law, pharmacy, medical professions, nursing, education, and hotel management.[13]

The universities are distributed geographically as follows: two in Gaza (AL-Azhar and Islamic), two in the North (An-Najah and Arab American), Birzeit University (in the center), two south of Jerusalem (Bethlehem and Hebron), 1 in Jerusalem (AL-Quds), and 1 open university (Al-Quds Open)

[12] Taken from *Statistics about Palestinian General Education*, General Directorate of Educational, Planning & Development, 1999/2000.

[13] See Ministry of Higher Education, *Five Year Plan*, 1998.

The universities were established during the 1970s. Student enrollment for 1998/99 was 63,000, practically all undergraduates. Enrollment in graduate programs totals 650 students.

From 1978 to 1994, the sector was managed by the Council of Higher Education. However, with the establishment of the Ministry of Education and Higher Education in 1994, the management responsibility for community colleges was transferred to its Directorate of Technical Education and Community Colleges. In mid-1996, with the establishment of the Ministry of Higher Education, the entire sector of post-secondary education came under its responsibility. As nongovernmental organizations, individual universities are generally administered by a board of trustees (as the main policy-making body) and by a President (as the main executive responsible for day-to-day management).

Existing policy seeks to make higher education available for all qualified graduates of the secondary cycle *tawjihi*, mainly academic *tawjihi*. However, only those students with 65 percent or above in *tawjihi* score are eligible to enter universities.

The number of students admitted is limited further by available facilities at the universities. The Ministry of Higher Education sets guidelines based on international standards for maintaining high-quality education and on improving the quality in areas and universities where such standards are lacking. Emphasis is placed on student-to-faculty ratio, which was set at 25:1 in the social sciences; 20:1 in the physical sciences; and 15:1 in engineering, pharmacy, and nursing.

Institutions of higher learning are classified under three categories:

1. **Government Institutions**: these generally come under governmental supervision both administratively and financially. The Minister nominates candidates for the head of the institution and advisory board to be appointed by the Palestinian National Authority President. Included in this category are five community colleges, four are referred to as Palestine technical colleges; Gaza College of Education in Gaza City; and the College of Science and Technology in Khan Yunis. Al Quds Open University, which was created by the Palestinian Liberation Organization, fits within this category.

2. **Public Institutions** (private, non-profit): these have a self-perpetuating board of trustees that carries partial financial responsibility and legislative authority for the institution. The board appoints the President of the institution and the senior administrative officers. Included under this category are UNRWA vocational colleges and the teachers' colleges, as well as seven universities and some *shari'a* colleges that belong to the Waqf. With the exception of UNRWA, all of these institutions are partially subsidized by the government, directly or indirectly as a share of the contributions made by donor countries, according to agreed-upon formulas.

3. **Private Institutions Owned by a Person or a Group of Persons**: the Arab-American University and some community colleges fit within this category.

The government has no financial or administrative responsibility for this category, but does have an overall supervision and accreditation responsibility.

Financing of the universities has depended on three main sources: external contributions, tuition fees, and other miscellaneous sources. Most universities rely on the government, and most face a severe fiscal crisis (the debt of these institutions exceeds US$25 million).

The Ministry of Higher Education has highlighted IT within its official policy and considers IT as a high priority in its development plan. However, there is currently no action plan to implement this vision. There is a lack of synergy among institutions of higher learning, the Ministry of Higher Education, and other government agencies on the national development plan, IT national strategies, and fundraising.

Enrollment figures are shown in the table below:[14]

Table 5: Number of Students Enrolled in Palestinian Universities, 1999

Faculty	Male	Female	Total
All Courses	31,192	24,421	55,613
Science	4,516	3,621	8,137
Engineering	2,546	1,007	3,553

INFORMATION TECHNOLOGY IN THE EDUCATION SECTOR

Programs

There is currently no integrated plan for the implementation of IT within high schools. Although several individuals are encouraging IT within the Ministry, there is no official program of implementation.

Recently, a new technology subject (to be taught by scientists and engineers) was introduced to secondary schools. There is also a focus on English, which will now be taught from first grade (although the number of hours of instruction will remain the same).
A series of books are being produced, titled *English for Palestine*, in conjunction with Macmillan Publishing Company.

There are individual initiatives to promote IT within education based upon the Irish experience. It can be summarized briefly as follows:

[14] Statistics taken from a workshop on "Information Technology Curriculum Development," March 13, 2000, under the auspices of the Palestinian National Authority and ANERA.

- In every school, there must be at least one computer;
- All teachers should be IT literate;
- Computer “driving license” indicating competency in basic computer skills; and
- The business sector partners with the government.

The Irish government has expressed its willingness to provide training materials such as software for schools, to assist in the translation of all materials, and to provide training. The Irish government, however, is unable to provide equipment.

Case Study
Computer Training for 6,000 Second-level Teachers

Taken from the *Irish Times*, 3 October 2000, http://www.irishtimes.com
By Emmet Oliver, Education Correspondent

Intel, one of the biggest employers in the State, is to train up to 6,000 second-level teachers in how to use information technology in their classrooms.

The Leixlip-based microchip producer will spend £750,000 over the next three years training the teachers. It is part of a world-wide training programme involving 400,000 teachers in 20 states.
The training in the Republic will be provided free in local education centres and is open to all teachers, regardless of their subject.

The course takes 40 hours to complete and consists of 10 modules. Microsoft will provide participants with free software and a small discount off a Dell computer.

An Intel spokeswoman said that after the 6,000 teachers were trained the company might extend the programme for another few years, although no decision had been made.

The Minister for Education, Dr Woods, said the programme was a very important development in teacher training and he thanked Intel for the scale of its commitment.

Intel said the aim of the programme was to help teachers to "effectively integrate the use of computers into their existing curriculum so that students will increase their learning and performance".

The general manager of Intel Ireland, Mr John McGowan, said: "Intel is not getting involved in this for commercial or profit-making reasons." He said that without trained teachers schools could not make effective use of technology.

The training will concentrate on ways information technology and computers can be used as additional tools in the classroom. Dr Woods said he did not see PCs replacing textbooks; they should be "complementary".

The Intel course—known as "Intel Teach to the Future"—has been recognised by the National Centre for Technology in Education (NCTE) in Dublin, which was set up by the Department of Education.

Teachers wishing to take the course have first to complete basic training in information technology at the NCTE or an equivalent institution. They then contact the information and communication technology adviser at their local education centre and enrol for the Intel course. Much of the material involved in the course will be available at the NCTE's website, www.scoilnet.ie

At the launch of the programme, Dr Woods said he could envisage computer studies being incorporated into the Leaving Certificate. He said computer skills would become like numeracy and literacy.

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There is a problem in the relationship between technical and vocational education and training and the academic stream. The system provides basic training but with almost no opportunities for further training or re-training and is thus close ended. The changes to technical and vocational education and training propose streamlining this system to allow students either to move into the labor market or to pursue further study.

There is almost no IT component in general offerings within the vocational training and vocational secondary levels, although a better situation exists in community colleges. There are very limited offerings in IT-related programs within long-term programs.

The low-level of participation within the technical and vocational education and training system is a serious concern, especially compared with other countries such as Germany, where 60 percent of students are to be found within this sector.

Regarding IT-related programs within the non-formal technical and vocational education and training sector, there is a large number of short-term programs in Microsoft Office applications offered in private, charitable, and nongovernmental organization sectors. However, there is no national standard or mechanism to measure the success of these programs and their graduates. In general, there are no national occupational standards and linkages are poor with the labor market throughout the system.

Only 8.13 percent of courses in higher education institutions are related to IT. There are a limited number of students, and the programs offered are confined to the traditional areas of computer science and engineering. This partly stems from the limited capacity of institutions (that is, facilities, funds, and teachers), but there also is an under-utilization of facilities (for example, computer labs are generally not open after 3 p.m. and most staff are not offered e-mail/Internet access from home). Another factor related to the small number of programs is the weak signaling system with regard to the labor market, results in university departments that are unresponsive to the changing demands of the marketplace.

Consequently, few universities apply to the Ministry of Higher Education to conduct IT-related programs whereas they continue to apply for other programs.

Universities and other higher education institutions generally offer community outreach that is limited in scope and with little business mindset. There are no incubators or industrial parks in Palestine, although there are plans to establish a high-tech park near Tulkarem. Although training offered to the community is of good quality, the public sector lacks a strategy to utilize dormant resources.

Curriculum and Methodology

The Ministry of Education is made up of 15 departments, one of which is the Curriculum Development Department. This department formed teams of subject specialists, a methodology specialist working on values, and a specialist on gender.

These specialists were brought in to develop a curriculum framework and were drawn from educational practitioners from schools, universities, and other specialists.

For the first time, a Palestinian curriculum is being developed. There are three important components of this curriculum. There is a technology and computer component, English will be taught from 1st grade, and there is a focus on computer-assisted learning in all subject areas. Following the design of the curriculum framework, 1,000 authors were selected to write textbooks. These textbooks then will be approved by the Ministry.

Up to 2004, curriculum and textbooks will be produced for years 1 to 12. The first batch for years 1 to 6 was ready in August 2000 and replaced the previous Jordanian and Egyptian curriculum.

Teaching methodology in schools is very traditional, focusing on rote learning rather than encouraging skills such as problem solving, creative thinking, analytical skills, and team-work. Testing methods reinforce this focus by examining how well students can remember rather than what they understand or how they think.

As with the general academic secondary stream, technical and vocational education and training does not promote the necessary thinking skills required of the 21st century, relying instead upon traditional teaching methods. In addition, the curriculum is often too broad to produce skilled workers. However, the proposed changes to the technical and vocational education and training system include changing the curriculum and teaching methodology to encourage problem solving and analytical skills. The new competency-based curriculum model focuses on a hybrid behavioral-constructivist approach. Through the use of projects, concept maps, and other tools, this approach will ultimately produce graduates who not only follow instructions and master skills, but who also work systematically and can troubleshoot. Standards are being developed. Qualification profiles for seven occupations have been developed in conjunction with business and industry.

Although some of the curriculum is of good quality, there is a slow administrative process in terms of modernizing programs. As with all levels of the educational system, methodology tends to focus on rote learning rather than independent learning, and levels of English competency are low.

Trainers/Faculty

Teaching quality is a major focus of the Ministry of Education *Five Year Plan*. Generally, teaching staff are undertrained and IT knowledge is particularly weak. The teachers face a difficult economic situation; many work second jobs to support themselves and their families. This means there is little incentive for teachers to improve their skills. Currently, 15,000 teachers (out of 34,000) are being trained in the new curriculum and to improve their content knowledge. On the positive side, the teaching force is very willing to extend its skills, given the right conditions and environment. A good example can be found in the excellent work of the educational resources centers established in the West Bank and Gaza.

The implementation plan for the national strategy for technical and vocational education and training projects the provision of pedagogical training for all trainers and specific technical training in certain areas. In addition, directors and management staff are to be trained in administration and planning.

There are 900 trainers, headmasters, and other academic staff working in the technical and vocational education and training system. Only 30 percent of the trainers have pedagogical qualifications, and about 75 percent have the required technical and academic qualifications. The training-of-trainers institute established one year ago is working on institutionalizing human resources development for the technical and vocational education and training system. This includes the identification of standards, design and delivery of pre-and in-service training programs, formation of a network of training institutions, and development of the legislative framework necessary for the process.

The non-IT-related streams in higher education generally have a low level of IT literacy and do not integrate IT into course material. There are no minimum IT requirements for graduates within these courses. Reinforcing this characteristic is the low level of IT literacy among faculty and the lack of facilities and infrastructure in higher education institutions.

Trainers and faculty at higher education institutions are unable to use modern IT tools and methodology in courses and lack knowledge in computer-related instruction. The reasons for this are as follows:

- Lack of accessibility and support for IT tools;
- Lack of staff development funds;
- Lack of real-world experience;
- Lack of business incentives and ties with the private sector;
- A rigid academic system that focuses on academic titles and salary scales instead of offering incentives for innovation; and
- Lack of general funds.

Physical Resources

The Ministry of Education inherited an approach of placing computers (13 or so) within individual high schools to teach computer programming (the same concept as 20 years ago). This was the approach of donors such as the Welfare Association, to teach students programming such as BASIC.

Out of 1,200 schools, 350 have computers, from 486 to Pentium II.

The physical resources within the technical and vocational education and training sector are inadequate. There is a severe lack of modern equipment and training facilities. The proposed changes within the technical and vocational education and training sector call for the following:

> Developing the existing colleges, schools and centers in the following areas: condition of the building, designated areas, electrical and sanitary installations, provision of health and safety necessities, as well as provision of facilities for dealing with disabled in addition to other facilities such as cafeterias, playgrounds and libraries.[15]

The quantity and quality of physical resources within higher education institutions vary, but generally there are few computer labs and few computers available for use. Most universities lack operating revenues and a budget for maintaining and upgrading resources. There are limited support personnel and an under-utilization of facilities and resources after hours.

[15] Strategy in Palestine, *Technical and vocational education and Training Implementation Plan*, page 10, Ministries of Education, Labor, and Higher Education, Palestine, 1999.

A HUMAN RESOURCES IT STRATEGY FOR THE EDUCATION SECTOR

The previous section examined the reality of the education sector in general and the place of IT in particular. The key dimensions affecting the realization of the necessary human resources development for IT are summarized below. Table 6 lists the characteristics of IT within each educational level and categorizes these into three elements:

- Curriculum and methodology;
- Physical and human resources; and
- Legal and administrative issues.

These key elements form the basis of a framework for the development of a human resources strategy for IT. Below is an examination of each of these dimensions from the perspective of international standards—that is, what are the requirements for the education sector to fulfill the human resources needs in IT for the 21st century. Recommendations will then be provided on what must be done to overcome the barriers preventing the realization of a strong future in human resources in Palestinian IT.

Curriculum and Methodology

"The objective of education is no longer simply to convey a body of knowledge, but to teach how to learn, problem-solve, and synthesize the old with the new."[16]

Although the current Palestinian curriculum and methodology are too narrow and based on a rigid system of rote learning of facts, some positive developments are evident. To prepare for a future in which information will be accessible and the renewal of knowledge in many fields increasingly rapid, the school curriculum will have to evolve a better balance between the learning of factual knowledge and the mastering of concepts and processes. The following general competency vectors are necessary:

… better balance between the learning of factual knowledge and the mastering of concepts and processes.

- Teamwork and interpersonal/collaborative skills such as negotiation, organizational effectiveness, leadership, and social skills;

- Professional attitudes and constructive work values and habits, self-esteem, goal setting, motivation, personal and career developments, and a desire for quality;

- Technological capability;

[16] Technology for Basic Education: A Luxury or a Necessity?, Wadi D. Haddad, *TechKnowLogia*, May/June, 2000. www.TechKnowLogia.org.

Table 6: Impediments to a Positive Human Resources Environment within the Education Sector

Impediments	Key Elements		
	Curriculum and Methodology	Physical and Human Resources	Legal and Administrative Issues
General			
No national qualification standards for TVET[17] graduates			*
No integrated plan for IT implementation			*
Poor legal/institutional infrastructure			*
No opportunities for retraining TVET graduates			*
TVET system is close ended			*
No research-and-development culture in institutes of higher education		*	*
Weak labor market signaling system			*
Lack of links with external institutions	*		*
Limited community outreach	*		*
Programs			
Limited number of IT programs		*	*
IT-related programs in TVET are too broad	*		
Limited IT content for non-IT programs	*		
Slow administrative process to modernize programs			*
Limited admission capacity for IT programs in higher education institutions		*	
No minimum IT requirements in educational system	*		*
Curriculum			
Curriculum focus on rote-learning	*		
Curriculum lacks emphasis on critical thinking and analytical skills	*		
Absence of extra-curricula activities (necessary for developing teamwork)	*		
Methodology			
Lack of incentives to use modern IT tools/methodology	*		*
Lack of technical support for the use of IT tools in education	*		
Poor linkages with industry	*		*
Limited business mindset	*		
Trainers/Faculty			
Overemphasis on academic qualifications of teachers in higher education institutions			*
Low IT literacy among staff and faculty	*	*	
Teaching staff under-trained in IT		*	
No allocation of staff development funds			*
Physical Resources			
Poor physical infrastructure		*	
No use of facilities after hours		*	*
Limited support personnel to support physical infrastructure		*	
Lack of operating revenues			*
Lack of strategy in non-educational public sector to utilize dormant resources			*

[17] Technical and vocational education and training.

- Basic functional skills: reading, writing, mathematics, communication (listening and oral), presentation skills;
- English language fluency;
- Thinking and decision-making skills, creative thinking, and information processing capacity;
- Ability to learn/adaptability, learning to learn, memory training, creativity, flexibility, and autonomy; and
- Environmental and social responsibility.

This learning should shift from information receiving toward finding relevant information, learning to apply information to solve problems, and communicating ideas effectively. This approach would help bring about the necessary change, from the current view that learning is something you do at school to an appreciation of learning as a life-long process.

> Learning is a life-long process.
>
> In an ideal world, educational purists envision a lifetime of learning that begins at birth and never ends—a worldwide culture of learning that nourishes innate human curiosity, feeds imagination, and fuels communication. The school, structured as it was to resemble the factory during the early days of the Industrial Revolution, has been the repository of learning. But in the post-industrial society, the school has been slow to adapt to the rapid changes that are transforming the world around all of us. Instead, the leaders of the Information Economy, the Microsofts, Oracles and Java's, have all developed their own asynchronous systems for learning that require no classrooms and no admissions tests. The credentials they offer are available to all regardless of back-ground or place of origin, and the mastery of the necessary skills requires little more than imagination, motivation, aptitude and opportunity. The institution of the school is increasingly unnecessary for learning the new skills of the computer age. Without change, the school may become like the monastery at the dawn of the industrial revolution.[18]

IT will be a pivotal tool in effecting this change. The use of IT will strengthen the teacher's skills and open up a much wider array of learning resources for pupils to access. It will allow for a greater degree of independent learning, encouraging more-able pupils to expand their horizons beyond the standard curriculum. The rich, interactive capability of IT-based learning resources can also motivate and engage weaker students, and allow them to learn at an appropriate pace.

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[18] "The Watering Hole: Creating Learning Communities with Computers," by Mary Fontaine with Richard Fuchs, The LearnLink Project, Academy for Educational Development (AED *TechKnowLogia*, May/June, 2000).

Students take an active approach to learning.

The task of basic education is to give every girl and boy the basic skills and competencies required to find and manage information and to communicate. These are basic requirements in the information society and are essential for further education. All levels of the educational system should support the continuous updating of these skills. The proper usage of IT in the classroom will enable students to take an active approach to learning and will encourage the development of independent learning skills.

Resource-based learning approaches are a pre-requisite to a strategy for IT in the classroom. One significant aspect of IT is its use to acquire, analyze, and communicate information.

Expand the number and quality of IT-related programs at all levels of the educational system.

The number and quality of IT-related programs should be expanded at all levels of the educational system. It is also critical that IT is integrated into all courses to encourage the use of basic technology for research and presentation, and thereby increase general IT literacy.

Pupils should be expected to acquire specific IT skills from primary school upward. By the time they leave secondary school, they should have acquired minimum competencies in desk-top publishing, spreadsheet and database construction, and drawing information from CD-ROMs and on-line resources

Modern concepts of learning emphasize the responsibility of students for their own learning and their active role in seeking and using information. The role of the teacher changes from a distributor of book learning to a tutor guiding students. The school environment becomes a center for learning and activity. In libraries and information services, telecommunication and digital information products are increasingly found alongside traditional services as information sources of equal value.

The role of the teacher changes from a distributor of book learning to a tutor guiding students.

There is a pressing need to increase the number of students within the vocational education sector and to tailor these programs to include competency in the skills necessary for the information society. It is encouraging to see the Palestinian National Authority projecting an increase of students and upgrading of this area in vocational education. However, the skills and competencies needed for the information society should be taught to take account of the requirements of a working life that changes continuously and is becoming increasingly international and network based.

Physical and Human Resources in the Education Sector

> The Masterplan adopts a strategy of developing a set of Demonstration schools so as to enable experimentation at the frontiers of IT-based learning. The 22 Demo schools, comprising 10 primary and 10 secondary schools and 2 JCs, will provide the rest of the school system with concrete, local models of innovation in teaching and learning strategies and in school administration.[19]

All teachers need new knowledge, skills, and competencies to be able to use IT as a tool in their teaching. Teachers must also become familiar with applications in their respective fields. Teachers of all subjects need to know how to utilize IT and take account of the requirements of the information society in their work.

Teachers need to know how to utilize IT and take account of the requirements of the information society in their work.

The conditions and content of both the initial and the continuing education of teachers must be developed to correspond to the demands of the information society. Teachers need to be trained to use the equipment required for open and flexible learning, to be able to tailor teaching material to suit their purposes, and to be able to develop their own material. Teachers must be able to manage the information relating to their own field as well as being able to handle the media used for communicating that information.

There is a pressing need to upgrade the physical infrastructure at all levels of the educational system because it is not possible to guarantee a general IT literacy without sufficient access to these resources. All students should have access to computers, software, and the Internet. These should not be considered as luxury items.

The IT industry is changing rapidly. Coupled with the nature of this change, which does not necessarily require societies to proceed through earlier stages of technological development, decision makers are urged to take into account the opportunity to enter the globalized world at the point of current technological development.

Computer technology needs to become a natural component of school resources, for both students and teachers alike.

Computer technology needs to become a natural part of school resources, for both students and teachers alike. The *Master Plan for IT Education in Singapore* puts it in this way,

[19] *Master Plan for IT Education in Singapore*, 1999, Demonstration Schools.

> The computer will be an essential work tool of the teacher. Teachers must have ready and frequent access to computers both during and after curriculum hours, so as to access information and learning resources; prepare lesson plans; deliver their lessons; assign work and respond to their pupils' scripts and projects; communicate with their peers and supervisors; and perform administrative tasks.

There is an under-utilization of IT resources in some educational institutions. Universities in particular need to become more flexible in allowing after-hours access to information tools and providing staff and students access to networks.

A vital need is the connectivity of schools and universities to foster professional collaboration among educators and the sharing of limited resources. With the help of information networks, it is possible to transmit different types of service to different audiences via a single channel. This also makes possible the improved provision of education and other services to small target groups and special audiences. Through increased cooperation and by exploiting the potential of technology, regional equality can be enhanced and the opportunities for individuals to acquire information can be improved. More effective use of resources will be possible.

A vital need is the connectivity of schools and universities to foster professional collaboration among educators and the sharing of limited resources.

Legal and Administrative Issues

Many legislative and other special prerequisites must be taken into account to improve the utilization of human resources. These include questions concerning copyright, standardization, and privacy protection as well as issues of openness, data security, and the price that is charged for information.

In the information systems of education and research, the goals are openness and flexibility while making sure personal integrity is respected in data processing. Openness and transparency are the aims of public authorities for providing information that affects the lives of citizens.

Openness and transparency are the aims of public authorities for providing information that affects the lives of citizens.

Senior Palestinian policy makers are seriously addressing the issues of financial accountability and transparency. The issues of copyright and intellectual ownership also are being given a high priority.

In making this change, much will depend on the leadership of the school principals and the management systems introduced into the schools. At present, the necessary skills and systems are at a very early stage of development in Palestine. Adequate training for

leadership positions in schools should be provided in order to undertake successfully the complex and demanding roles required.

A barrier to the realization of the goals outlined above is the minimal dispersal of funds earmarked for the educational system. Despite a high percentage of the Palestinian budget devoted to education (18.3 percent), this amount is currently not dispersed to schools and universities. It will be extremely difficult to implement many of the changes identified in this report and adopt realistic plans for the future without the regular dispersal of these funds.

University administrations also need to adopt more flexible academic regulations. In particular, the process for the registration and approval of new courses and curriculum needs to be streamlined. Without this change, it becomes difficult for universities to offer courses that retain relevance in the rapid changing world of the information society.

The rigid academic salary scales and necessary qualifications required by many universities are also barriers to a flexible and responsive academic system. It is vital that universities recognize professional experience as a genuine indicator of skill level. This is all the more important within the field of IT, where academic qualifications are often a poor indicator of knowledge and skill.

The rigid academic salary scale and necessary qualifications required by many universities are barriers to a flexible and responsive academic system.

RECOMMENDATIONS WITHIN THE EDUCATION SECTOR

Recommendations

The following recommendations concern the education sector:

- Develop IT within the Palestinian educational curriculum with a particular focus on technological skills and on creative thinking, independent learning, and improved pedagogical methodology.
- Identify and propose particular projects that would improve the technical resources within the education sector with a focus on access to physical networks and improved accessibility.
- Develop and implement a training program to upgrade the IT-related skills of all educators.
- Promote IT within the education ministries and the Palestinian government in general.
- Streamline the transition among the different educational levels as it relates to IT.

- Develop an IT policy and implementation plan within the education sector.
- Identify and adopt policies that will make the educational system more responsive to the needs of the private sector and marketplace.
- Identify and adopt policies that will enable post-secondary institutions to become more flexible with regard to hiring and compensation of academic staff.

IT in Education Coordinating Body

To facilitate the implementation of these recommendations, an **IT in Education Coordinating Body** should be formed by representatives of relevant ministries. This body would strengthen the level of formal collaboration among ministries and can draw upon other experts during the course of its work. It should meet regularly and be empowered to make decisions quickly and efficiently. This body should also have strong input from the private sector and IT industry.

The terms of reference for this body should include a detailed examination of the above recommendations, including a financial appraisal of the costs required for implementation. The IT in Education Coordinating Body should be charged at the highest level of the Palestinian government with ensuring that the recommendations are realized while considering the level of development of the future Palestinian state.

PROJECTS WITHIN THE EDUCATION SECTOR

Program of IT Innovation in Basic Education

The consultant team recommends a phased expansion to increase the number of teachers trained in the use of IT within general curricula and to increase the number of IT educators within schools.

A number of models are available to implement such a program. Although a detailed proposal is beyond the scope of this study, one possible model is a tiered, “fan system.” In this model, a limited number of teachers are trained intensively in the use of IT and in collaboration with universities and the private sectors. These IT-trained staff would then offer training to staff at other schools, with a commensurate reduction in teaching load. These schools would then train another layer of schools. This fan approach has the advantage of generating a multiplier effect and increasing the culture of collaboration between schools.

This program could also involve committed IT professionals from the private sector and higher education institutions by offering their services as advisors and consultants to schools.

Concurrently with this approach, the team recommends reforms to the system of education training within universities that would see IT as a required component of all education courses. This approach would ensure a minimum level of IT literacy for new teachers entering the system.

Development of a School-Net Program

The phased establishment of an intra-school network would see all schools equipped with a networked computer laboratory connected with one another on an open, broadband network. Such a project, the **School-Net Program**, would require in-depth investigation of funding and infrastructure constraints, but several models are possible, including the use of mobile computer laboratories. It is expected that foreign donors would be interested in such a project if presented in a technically and financially competent manner. It is also possible that schools could generate income for themselves through offering use of these labs to the broader community after-hours. International companies such as Cisco, Microsoft, and IBM could be approached for corporate sponsorship.

Networking should allow for the sharing of teaching resources and digitized media resources between schools and staff. Future access to the Internet could be provided through connection to the Internet infrastructure. All teachers and students from Grade 5 on should be provided with free e-mail accounts. Future building specifications for schools should take into account the necessary requirements for an IT-enriched school.

Internet-supported collaborative projects with other educational systems interested in sharing experiences with Palestinian colleagues should be encouraged.

Formation of Centers of IT Excellence within the Higher Education Sector

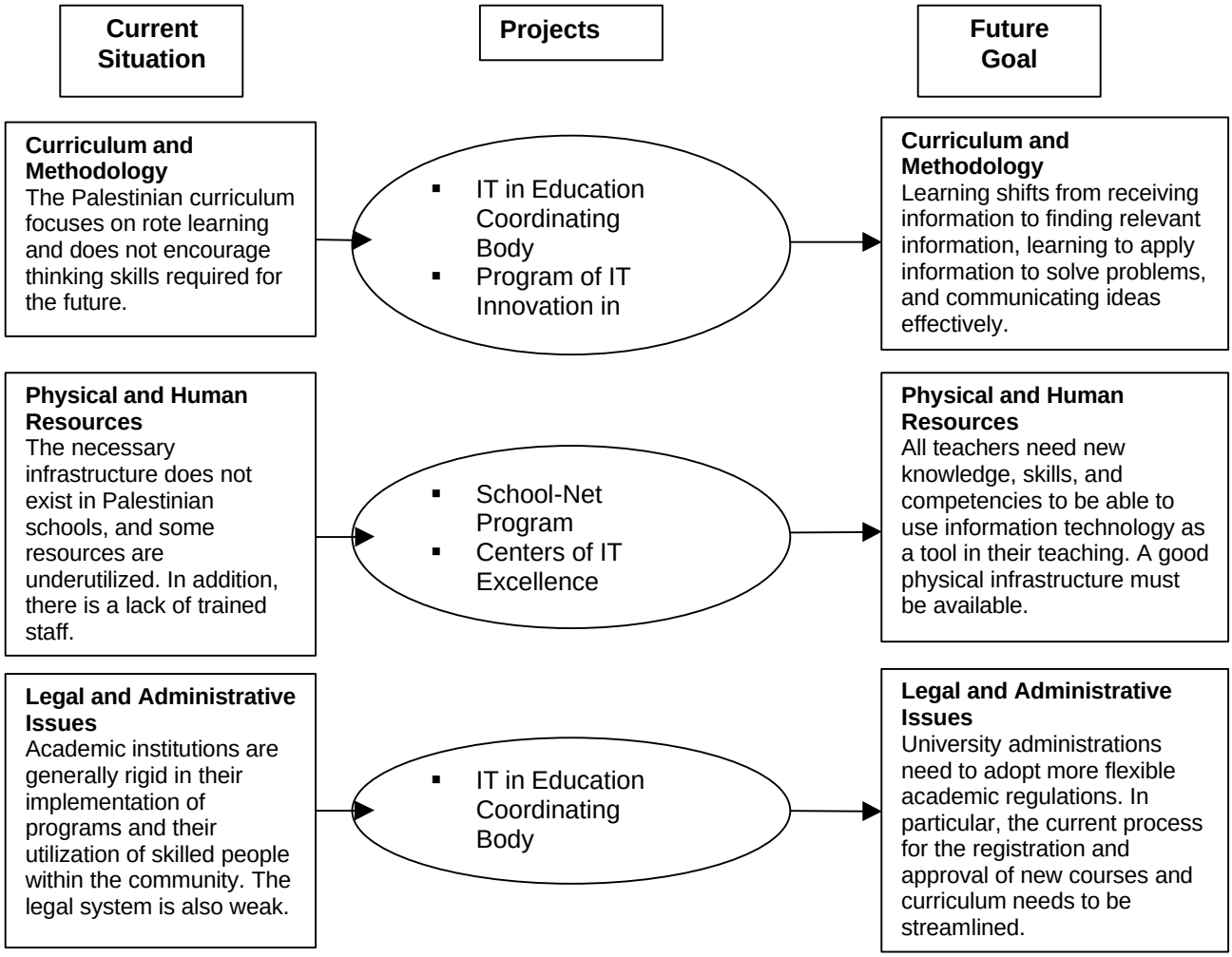
Financial constraints make it impossible to immediately upgrade all Palestinian universities and colleges. However, a phased approach is recommended in which a small number of universities are selected to become **Centers of IT Excellence**.

These universities would offer high-quality programs in IT and would be equipped with state-of-the-art technology. This could be done in collaboration with major international IT firms such as Microsoft, Cisco, and IBM. These universities would be connected to one another on an academic network similar in concept to the model described above for schools. All staff and students would have e-mail and Internet access, including access after-hours.

All courses would have stringent IT requirements, and the private sector would play a strong role within specific programs. This private sector linkage could be encouraged with a reduction in the percent of payroll tax for staff if such programs are implemented.

These centers would become a pilot project for further expansion to all universities and colleges. It is suggested that the selected centers be linked with institutions of higher learning in other countries. This would enable the development of multi-faceted programs and foster institutional capacity building.

Figure 3: Integrating IT into the Educational System



SECTION FOUR
THE PRIVATE SECTOR

BASIC FACTS

The IT private sector is in an embryonic stage of development in the West Bank and Gaza. The market is not well structured, and the human resources employed are not able to specialize, given the size and stage of the sector. The sector comprises IT distributors, resellers, and sales organizations, on the one hand, and service-oriented firms offering software development, training, and some minor solution providers, on the other. These firms are concentrated in the West Bank because the demand for services outside of the government sector are concentrated there. Special note should be made of the 10 Internet service providers that provide all Internet users in Palestine with service.

Palestine has been appointed the .ps top-level domain and is setting up a naming authority that will include all stakeholders, including universities.

The private sector recently has organized itself into a professional membership-based association called Palestine Information Technology Association (PITA). The association represents 40 IT-firm corporate memberships, which represents approximately half of the firms working in IT in Palestine. Most firms are small, ranging from 3 to 20 employees.

The sector participates in a national mailing list called ITsig, which has been a focal point for IT-related discussion for over four years. This discussion forum has played a significant role in disseminating information and stimulating policy debates. Many policy makers regularly monitor the list and act upon the discussions that take place.

It is critical that IT staff and user communities also organize themselves, parallel to the necessary government structures providing sector-development assistance where they can.[20]

Approximately 3,000-5,000 persons are employed in IT-related fields. It should be noted that PALTEL, which employs over 2,000 individuals, is part of this figure.

From a broader prospective, Palestine has started to attract multinational IT firms, such as Hewlett Packard, Timex, SIEMENS, Oracle, and 3COM. Also, several firms are seriously considering setting up shop in a new high-tech industrial park being developed by the Palestinian National Authority in Tulkarem. This facility will increase the attractiveness of the Palestinian market. Similarly, many efforts, this report being a leading one, are being focused on the educational system, in order to upgrade the IT literacy of the entire workforce while increasing the throughput from the educational system with IT graduates.

[20] Sam Bahour, "Companies and Information Technology in Palestine: Does Your Company View the IT Function Strategically?," 1997, http://www.alquds.net/sbahour.

STATUS OF THE PRIVATE SECTOR REGARDING HUMAN RESOURCES DEVELOPMENT

The current links between the private sector and educational institutions are extremely weak. This situation contributes to the rigid nature of many universities, their outdated curricula, and a weak signaling system between the labor market and the education sector.

Educators need to develop partnerships with industry in order to introduce on-the-job training as a component in some curricula. Educational institutions need to realize that students' total education can be achieved through a variety of means, provided by a range of institutions, and delivered by a number of mechanisms. Public sector providers should make greater use of private sector providers and employers.

Increased collaboration between these two sectors will encourage the introduction of more-relevant curricula and could potentially provide an important alternative source of income for cash-strapped educational institutions. There is considerable scope for the private sector to work with higher education institutions in training students, sponsoring programs, and providing scholarships.

The interface between industry and educational institutions could also be improved through the introduction of a career and counseling system at all levels. This is a serious gap in the Palestinian educational system.

The private sector also devotes few resources to in-house training of staff, with a noticeable lack of incentive packages for staff who upgrade their qualifications. Most private sector companies do not include a line item for training costs within their annual budgets.

Palestinian business managers mistakenly believe that all necessary skills are encompassed in a single management information systems specialist. IT and management information systems are broad and encompassing fields, and it is important to understand that several disciplines are involved in producing and maintaining management information systems.[21]

RECOMMENDATIONS FOR THE PRIVATE SECTOR

Involve the Private Sector in the Design of National Education Policy, particularly at the Higher and Vocational Levels

Several mechanisms exist for increasing the input of the private sector to educational curriculum and program design. It would be possible, for example, to employ consultants from the IT industry during the design stage of new curricula.

[21] Sam Bahour, "Companies and Information Technology in Palestine: Does Your Company View the IT Function Strategically?," 1997, pg. 5.

Alternatively, through such structures as the IT in Education Coordinating Body suggested in Section One, the private sector could participate in the design of education policy in a more-structured manner.

Provide Direction to IT Human Resources Demand via Strategic Planning and Information Dissemination

One positive development within the private sector is the formation of PITA. PITA provides a possible framework for the IT industry to engage in strategic planning on a formalized level. This is particularly important in determining the needs of the industry with regard to human resources as well as the current status of the industry. Such planning could take place in conjunction with government bodies such as the Ministry of Labor. PITA, or similar bodies, could enable the industry to present a unified voice and common approach to potential investors as well as act as a lobbying body toward the government.

Cluster the Private Sector to Link to Centers of IT Excellence

In conjunction with the suggestion outlined in the Section Three, the Centers of IT Excellence provide an opportunity for the private sector to collaborate more closely with academic institutions. Possible foci of such collaboration include:

- Tap students to work as interns.
- Leverage academic institutions' resources to support private sector needs.
- Align private sector suppliers (that is, multinationals) to support needs of academic institution (for example, labs, books, equipment, and lectures).
- Provide real-world lecturers to academic institutions.
- Coordinate private sector donations (cash and in-kind) to Center of IT Excellence and surrounding institutions.
- Coordinate career days at Center of IT Excellence to expose students to tracks of expertise and possible opportunities.
- Participate in Advisory Council to IT Board within Center of IT Excellence.

Develop a High-Technology Park/IT Incubator

As an adjunct to the program of industrial zones that forms such a central feature of the economic direction of the Palestinian National Authority, the consultant team recommends the adoption of an IT Incubator Project in collaboration between one Palestinian university, the Ministry of Labor, and the private sector.

Such a project would see the development of a high-technology park, located close to one of the free-trade zones. This park would offer advanced research capabilities for local and international businesses in software development and would include the participation of academic staff and talented IT graduates. The park would offer significant tax reductions for companies willing to invest, in addition to an advanced technological infrastructure.

Lower-level vocational technical training would also be available at the park through collaboration with the Ministry of Labor. This would enable foreign companies to become directly involved in training Palestinian workers with a view toward employment within the Palestinian free-trade zones.

SECTION FIVE
THE GOVERNMENT SECTOR

BASIC FACTS

The Palestinian National Authority was established in Palestine on the basis of the Oslo Agreement signed between the Palestinian Liberation Organization and the Israeli government.

The land under the control of the Palestinian National Authority is divided into the West Bank and Gaza districts. These districts are further divided into municipal and village councils, which follow the Ministry of Local Government in their administrative affairs. The government is directly responsible before the President and the Palestinian Legislative Council, whose members are directly elected by the people.

During the last quarter of 1999, the number of employees of the Palestinian National Authority was more than 100,000, according to both the Ministry of Finance and the International Monetary Fund. This figure has been rising steadily from a share of 15 percent of public employment since 1995 to 20 percent in 1999.

STATUS OF THE GOVERNMENT SECTOR AND HUMAN RESOURCES DEVELOPMENT

There are no government documents outlining a strategy for IT within the West Bank and Gaza. However, several projects and initiatives are underway that demonstrate government interest in this area:

- **National IT Strategy**

The development of a national IT strategy began in January 1999 as an initiative of the Ministry of Planning and International Cooperation, funded by the World Bank, and was

expected to be completed by September 1999. The latest draft was produced in June 2000, and the current status is unclear.

- **IT Industrial Zones**

The Palestinian National Authority has placed the construction of free-trade zones centrally in its economic policy. Under the auspices of the Palestinian Industrial Estates and Free Zones Authority (PIEFZA), this program has produced tangible results in the form of the Gaza Industrial Estate, which is currently leasing first-phase industrial property.

There is a clear commitment in place regarding an IT component within industrial estates. This is evident in the selection of Khadoury College, near Tulkarem, as the site for a technology-oriented industrial estate. There is, however, a need for IT-specific laws within the PIEFZA framework. There is also no policy toward value-added services—that is, whether this policy will focus on low- or high-end manufacturing.

- **Government Computer Center**

The creation of the Government Computer Center indicates a recognition of the need for such a body by the Palestinian government. The Government Computer Center was intended to establish a government network and coordinate training efforts. An achievement of this body was to secure the top-level .ps domain for Palestine. Unfortunately, the Government Computer Center has poor linkages with the IT community in general. This lack of coordination has led to possible duplication of efforts and resources within the sector.

- **Other Government Initiatives**

The Palestinian National Authority, through the Ministry of Post and Telecommunications, has promised to provide free Internet access through PALTEL. This would certainly be important in encouraging general Internet literacy within the community. There is some concern, however, that in the absence of a national strategy this plan could threaten the viability of private sector Internet service providers.

The government has introduced several laws that could potentially benefit the IT sector, including a new tax law that allows deduction of training fees from income tax. This law needs to be publicized within the community because most organizations are unaware of the change in policy. The Palestinian National Authority has also emphasized attracting foreign investment and promoting Palestine on an international level. There is, however, no specific IT focus to this effort at the current time.

Providing a legal apparatus that facilitates direct foreign investment has been a high priority in the revamping of the legal framework. In this respect, one of the first laws that were passed is the Law on the Encouragement of Investment. This law prohibits expropriation of private investments and prohibits discrimination against any investor on the basis of nationality. Furthermore, the law provides full income tax exceptions for the first 5 years, with investments exceeding US$5 million eligible to be granted an additional 20 years at the

rate of 10 percent. Special exemptions are granted to enterprises engaged in export. Additionally, the law offers unlimited transfers of foreign currency and freedom for repatriation of income generated from investment in Palestine.

RECOMMENDATIONS FOR THE GOVERNMENT SECTOR

Establish a National IT Commission to Coordinate Efforts and Ensure Implementation

Several noteworthy initiatives have been undertaken by the Palestinian National Authority within the field of IT.
Unfortunately, many of these initiatives are characterized by a slowness in implementation and/or an unclear status. There is a pressing need for a national body, such as a National IT Commission, that could coordinate efforts among different sectors, minimize chances of duplication of resources, and ensure implementation. This is particularly true in the case of the national IT strategy which urgently needs to be completed with an implementation plan.

Implement Favorable Government Policy toward IT

Despite a relatively high commitment within the budget to education, there is a severe problem with lack of disbursement. It is critical that funds allocated are dispersed and that additional funds are clearly earmarked for IT training and education.

Despite commitments from government ministers toward a legal framework that would ensure intellectual property rights and other necessary laws to provide a safe investment environment, there has been no official step toward drafting and implementing such laws. This is an urgent necessity, if Palestinian IT is to become an attractive prospect for foreign investors.

IT should be incorporated within government policy as a sector for favorable investment promotion.

Involve Education and Private Sectors

A holistic approach should be taken toward the establishment of free-trade zones with a conscious attempt to involve the education and private sectors in all phases of planning and development. Possible mechanisms include formalizing a relationship between the proposed National IT Commission, the IT in Education Coordinating Body, and a body such as PITA representing the private sector.

SECTION SIX

PUBLIC AWARENESS OF IT

BASIC FACTS

A recently published survey by the Palestine Central Bureau of Statistics (available at http://www.pcbs.org/english/com_use.htm) provides useful information on some aspects of IT in Palestine. The survey reveals that 3.9 percent of households in the West Bank and Gaza have a computer. The total number of computers is 33,867, most of which are concentrated in the West Bank (29,038 in the West Bank as opposed to 4,829 in Gaza). Of the total number, 24,723 are located in urban areas, with refugee camps having the lowest percentage number at 2,554.

Costs for Internet access through an Internet service provider range from US$10 to US$25 per month for dial-up access and US$200-400 for a lease-line connection at 32 K. It should be remembered that the average Palestinian wage is just over US$300 a month.

Within the major Palestinian population centers, there is good coverage from 10 Internet service providers, in Jerusalem, Ramallah, Bethlehem, Hebron, Tulkarem, Qalqilya, Jenin, Nablus, and Gaza.[22]

There is no direct Palestinian connection to the Internet infrastructure so all Internet service providers must go through an Israeli service provider. Internet bandwidth ranges from 128K to 768K. There are 8,000 clients for these Internet service providers. These figures represent the number of individual, institutional, and corporate customers for Internet service providers. The real number of Palestinians who use the Internet is much higher. All universities have Internet access as do several high schools.

One indication of a growing interest in IT is the proliferation of Internet cafes within major Palestinian cities. This number has expanded rapidly over the last two years with over 10 such cafes in the Ramallah area (compared with 1 in 1997).

In the community as a whole, there is little public awareness of IT, particularly as it relates to job opportunities and career choices. This is a relatively cost-efficient area in which the government and the private sector can intervene to improve the situation.

[22] See “Palestine's Websites in 1999,” Adam Hanieh, http://www.birzeit.edu/web/99internet.html

RECOMMENDATIONS TO INCREASE PUBLIC AWARENESS OF IT

Establish Career Guidance and Counseling Services

Most universities and high schools lack adequate career guidance and counseling services for students. One reason for the relatively low rate of enrollment in IT courses is the lack of public awareness regarding IT opportunities. Career guidance and counseling services would need to work in cooperation with the private and government sectors where there is an urgent need to conduct tracer studies and labor market monitoring of the IT sector.

Conduct a National Media IT Campaign

The experience of other countries indicates that steps toward a general improvement in IT literacy can be easily achieved through a well-conducted media campaign. This provides another opportunity for government and the private sector to collaborate in producing targeted materials aimed at improving IT awareness in the community. A weekly television program, for example, could introduce viewers to the Internet. Currently, no such programs exist despite the proliferation of private and public broadcasters who are open to suggestions and easy to approach.

Develop a Catalyst Program

There is a critical need for a well-established IT reward and incentive system in the public and private sectors. As with many countries at a similar level of development, Palestine faces a potential brain-drain, despite the high level of commitment many citizens hold toward the country. It is necessary to develop and put in place a system that would attract talented people to the industry and remain with it.

SECTION SEVEN
CONCLUSIONS

The education sector is the critical juncture in increasing the number and quality of IT professionals in Palestine and in raising the general IT literacy of the Palestinian workforce.

This sector is weak in curriculum and methodology, physical and human resources, and legal and administrative practices. It is necessary to thoroughly review each of these areas and adopt policies that will create and foster graduates with the necessary skills to compete in the marketplace.

In addition to the education sector, policy must be developed within the government sector to ensure the necessary support for the IT industry and to guarantee that the reforms identified in this framework can be implemented. Most important, there is an urgent need for a comprehensive IT policy that takes into account the financial and administrative requirements of educational institutions. This policy must be backed with an implementation plan.

The IT private sector needs to increase its involvement in producing qualified graduates through collaboration with academic institutions and formalized involvement in the development of government policy. This will necessitate stronger links within the sector and a consensus on the direction of the industry.

A rise in general public awareness is important to foster interest in IT as critical factor in the future economy at both local and international levels. This public awareness could be easily achieved through a concerted effort by the relevant sectors.

To achieve this, the suppliers of IT human resources (training and education providers) and those requiring IT human resources (employers) must work closely with the government in ensuring the right environment for success.

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APPENDIX II
CONSULTANT TEAM

Sam Bahour, General Manager of the Arab Palestinian Shopping Centers, P.L.C. and Managing Director of Applied Information Management (AIM), holds a Bachelor of Science in Applied Science degree in Computer Technology from Youngstown State University in the United States and an M.B.A. degree from a joint international program between Northwestern University in Chicago and Tel Aviv University. He is currently pursuing a Doctorate degree through the University of Amsterdam in the Netherlands, focusing on the development of telecommunications in the Arab world using Palestine as a case study. He was heavily involved in the first privatization effort in Palestine with the establishment of the operations of the Palestine Telecommunications Company (PALTEL) and later served as its Director of Information Systems.

Marwan Tarazi is the head of Birzeit University Information Technology Unit (BIT), which he established as a spin-off program from the Computer Center at the university in 1998. Since its establishment, BIT has become a leading IT professional training provider in Palestine. Currently, Mr. Tarazi is involved in establishing Centers of IT Excellence, an IT park, and university-industry partnerships for Birzeit University. Prior to this, Mr. Tarazi directed the Birzeit University Computer Center, one of the largest and most diverse Palestinian information centers. Since the early 1990s, he has played a key role in the development of the Palestinian IT sector. He played a leading role in the introduction of the Internet to Palestine and in establishing ITsig, the Palestinian IT sector's electronic forum. He was also involved in developing the terms of references and steering the IT Strategy Project, and participated in some of the major IT studies related to the sector. He is a board member or on the steering committee of the Palestinian Development Gateway, the IT Sector Growth Committee, the National Information and Communications Technology Board, and the Palestinian Academic Network. Mr. Tarazi has also served as a member of the Euro-Mediterranean Information Society Group, the Palestinian Scientist and Technologists Abroad, the Committee for the Advancement of Sciences in Palestine, and the Palestinian NGO Electronic Network.

Mazen Hashweh is head of Expert Team on Vocational Training. He studied in the United States, Germany, and England, obtaining a B.E. degree in Mechanical Engineering, a Higher Diploma in Educational Planning and Economics of Education, a Higher Diploma in Educational Administration and Pedagogy, and a Master's degree in Management and Business Administration.

Mr. Hashweh has extensive local and international experience in human resources development, technical and vocational education and training, strategic planning, and project design and management. He worked as expert with the Swiss government, UNDP, ILO, Austrian government, DIFID-British Council, and other international organizations. He has published four books and dozens of articles and studies.

Khalil Mahshi is Director General of International and Public Relations at the Palestinian Ministry of Education. He was the Director of the Ramallah Friends Schools in Palestine before he joined the team that established the Ministry of Education in 1994. Previously, he was active in establishing the Education and Psychology Department, the Research Center, and the Literacy and Adult Education Division at Birzeit University. He has steadfastly worked for the past 25 years toward making school education in Palestine relevant to the needs and aspirations of students and society. In this context, Mr. Mahshi is presently the Coordinator of the working groups at the Ministry of Education in charge of producing the first five-year education development plan and member of the Ministry's task group to formulate IT policies for schools.

Hisham Kuhail was appointed Deputy Minister of Higher Education in June 1996. He holds a M.Phil in Architecture degree from University of Newcastle. Mr. Kuhail has been involved in education for 22 years. He has held several important positions, as Director General for Technical Education at the Ministry of Education and Dean of Palestine Polytechnic at Hebron. Mr. Kuhail has been very active in designing the national strategy for technical and vocational education training, and is a member of several national and international committees and organizations.

Adam Hanieh has conducted research, training, and website design for several non-governmental organizations in Palestine including Birzeit University, where he coordinated the WWW Project for two years. He holds B.Sc. and Grad Dip. Ed degrees from the University of Adelaide, Australia, and is currently completing a Master’s degree in Regional Studies at Al Quds University. He works as an IT consultant to the UNDP in the Palestinian Ministry of NGOs.

Qais Saleh, full-time Consultant at Management Consulting Services (MCS), holds an M.A. degree in Development Studies from the International University of Japan and a B.A. degree in Economics and Business Administration from Yarmouk University in Jordan. His work at MCS includes investment monitoring and evaluation, working on the IT component of projects, telecommunication studies, technology and Internet consulting projects, equities research, and world markets analysis and reporting. Mr. Saleh’s career history includes investment banking, Internet start-ups, and media sectors. His contribution to the team comes from his familiarity with the IT world, fascinated by computer technology since he first learned BASIC at age 10. Being a certifiable Internet evangelist since 1994 has helped infuse a distinctly disruptive input into this project.