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PROFILE OF THE INFORMATION SOCIETY IN THE REPUBLIC OF YEMEN

2003

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INTRODUCTION

All countries in the world agree on the importance and role of the increasing telecommunication and information technology as a means of their movement towards economic and social development. Therefore, the United Nations started to concentrate on looking for different means that tend to decrease the informational hiatus that separates the developed countries from the advanced ones, and to look for different mechanisms that enable them to find what is called “Information society” or “Knowledgeable Society” for their countries.

In order for the Arab countries to be able to face their economic and social problems, they must formulate some serious national policies and strategies under the global economy frame based on knowledge, and its connection with adopting new techniques and entering the technical elements of novelty to their societies. Undoubtedly, to carry out this work, there must be a big deal of effort collaborations represented by the government interference, formulation of new mechanisms to allow the institutions of the private sector to carry on their hopeful role, and produce firm regional and international cooperative channels. This, naturally, will not be fulfilled without having modern informational networks and channels, and an infrastructure that allows employing economic resources, and adopting new institutional types based on transferring and exchanging knowledge.

The Republic of Yemen is one of the countries that are being developed. It seeks maintaining all telecommunication and information technology as a new and quick implementation to solve its social and economic problems, and to raise the standard of Yemeni citizens’ welfare. The democratic performance has formed a complete perception and stable persuasion of knowledge and its importance and started practical steps towards the information society. This concern is because the knowledge Gap is the main indicator of the developed countries. It is not the Income Gap, which the United Nations has endeavored to discriminate between the rich and poor countries. The mental capital became mainly more important than material capital and knowledge has become a power and wealth that adds some value to the work. Thus, some developed countries such as India which has an enormous number of people began to export new wealth which is informational thought beginning with programming, then designs and studies through its knowledgeable citizens. Other countries such as Phillipine, Iran, and Egypt have been doing the same.

Here, lies the importance of this paper as an endeavor to show the importance of creating the information society, and to clarify the current reality of information in Yemen through recognizing the infrastructure of the telecommunication and information technology, the current strategies, future planning, difficulties that retard its executing steps. Baring in mind the fact that the main and first step is to work towards the information society or the society whose developing policies are based on knowledge. We cannot imagine having development without obtaining knowledge. Thus, the information society that Yemen opts for is one, which is distinguished by having a big storage of knowledge and information that can be exchanged among the citizens in their ordinary life, and between the local institutions and organizations. It is also distinguished by the capacity that its individuals have in using the techniques of telecommunication and information in various fields. The information society is also distinguished by its ability to send, receive, and exchange the digital data in a short time with other people regardless of the distance between each other.

I. POLICIES AND STRATEGIES

A. POLICIES OF CONSTRUCTING THE INFORMATION TECHNOLOGY SECTOR

To face the above-mentioned challenges, the Yemen Government had to formulate national strategies and policies tend to create and develop the information society in Yemen seeking to transfer it from the traditional to the information society. Clear and limited policies for the information society have not yet emerged. However, the National Center of Information and the Ministry of Communications were relied on to prepare and formulate specific programs and work on executing them. They are as follows:

1. *The National Center for Information*

The National Center for Information is considered the first step that the Yemen Government has carried out towards establishing an informational basis. The center was founded in the middle of 1990s. It follows the Republic Presidential Office and aims at establishing the informational infrastructure and

producing a complete information technology sector on the national level. The need to set national informational strategies has emerged to respond to the requirements of the general development and accompany the current universal developments in the field of information and its techniques.

It can be said that the Informational Center is one of the important government centers which tend to shelter bases for data in all fields; political, economic, industrial, agricultural and other topics that are concerned with law legislation, the history of Yemen, daily news ...etc. The center has become a very important source of information that fulfils the needs of researchers, students, investors, and others through the center web site www.nic.gov.ye.

The current informational survey is considered one of the important strategies that the center has carried out, in spite of the delay of its execution until 2001. It is the right step, which aims at evaluating the informational reality scientifically, then to move to constructing national and detailed policies towards establishing the information society. The survey has focused on recognizing the following sides:

- (a) Institutional systems and organized structures of the specialized informational units by the informational activity administration in the institutions and bodies on the national level;
- (b) The infrastructure of the information technology and telecommunications;
- (c) The information activity management;
- (d) The used information organization and technology in treating, saving, recovering, exchanging and publishing information, and the extent of its confirmation and comprising to the needs and requirements of the informational work;
- (e) The standard of the informational reliability and make it under the service of decision-makers;
- (f) The reality of entering reliance of informational systems and technology in the educational process and outputs of specialization connected with the information technology fields and general education as a whole;
- (g) The quantity of investments in the field of information and technology;
- (h) The reality of labor cadre in the information technology field;
- (i) Informational sources, the extent of their fulfillment to the beneficiaries' needs, the coordination between them and their completeness;
- (j) The reality of the private sector activities in the field of information systems and information technology on the national level;
- (k) The reality of the information systems and technology marketing in Yemen;
- (l) The reality of personal usage of computers and Internet.

2. The National Program of the Information Technology

It is the program adopted by the Ministry, and most of it forms the infrastructure of telecommunication and material structure. It responds to the country's needs of programs and policies in the information technology fields. The program aims at providing several services seeking to execute the governmental works and procedures in using information technology and telecommunication to amalgamate information and complete it. It endeavors to increase the competence of the governmental procedures and the bureaucratic work. It can also open communication channels between the local level on one side and the world on the other side. It aims at providing economic and social benefits, mostly to increase the standard of education and training at a distance, providing new job opportunities in the information technology sector and improving the government abilities in planning strategies based on information. Moreover, it aims at simplifying the government jobs, increasing labors' productivity, improving the inner structure of the investment to attract local and foreign investment, using the human resources ideally to increase the added value and fulfilling the returns from the governmental performance¹.

¹ *The Informational and telecommunication City*, Informational and Telecommunication Forum. Issue #11, May 2002. P.32 and up.

With this in mind, the Ministry has set specific strategies executed in the meantime and that enabled it to reach its goals through the city of information and telecommunication technology that was opened in the middle of 2002 www.yemen.net.ye. It seeks to reach the following goals²:

- (a) Introducing the importance of information technology in the people's lives and to affect their development;
- (b) Showing the importance and role of harnessing the information technology in reinforcing the development efforts in different fields;
- (c) Promoting the competence of the governmental bodies, improving their dealing with the citizens and companies and decreasing the cost of the administrative operations and procedures;
- (d) Opening the channels of telecommunication and contacts between the national level on one side, and the outer world on the other side to keep up with the hasty development in this field and reach the digital society;
- (e) Creating the necessary infrastructure to encourage work sectors in investment. It encourages the individuals, governmental institutions, and work sectors to use the information technology and benefit from its privileges;
- (f) Employing the information technology in evaluating the governmental institutions' performance, projects, programs, economical and social development plans;
- (g) Providing the sufficient transparency of the results of the economic, social, cultural, environmental technical programs, and policies;
- (h) Investing the information technology in activating the role of confirming and developing its activities in recording, collecting, treating, saving and publishing all documents and information, and making it available to researchers and decision makers.

B. SECTOR PLANS AND PRIORITIES

There are many challenges that the Republic of Yemen is facing especially those of globalization since the beginning of the 21 century. Globalization had led to great changes in the international economic balances, the concepts, systems, and administrative methods. It also made noticeable changes in the economic, technical, and information technology fields. The age of isolation and trade protection has passed away.

These changes had lead and would still lead to changes in the economic relations between countries in the near future and will enforce a group of challenges and changes. The most important are: universalizing the products in terms of form and specifications, specifying and dividing an international and accurate work to one product, adopting a unique international market where the same clients and suppliers are dealing, universalizing prices for the products, adopting one informational and technical village, and the independence of price value currency exchange from the economic indicators that are related to production and trade, and other changes.

These changes require quick, scientific, and non-traditional solutions. There is an urgent need to adopt information technologies as an important means to face the current challenges in job organizations, which are as follows:³

- (a) The ineligibility of the administrative body and job organizations to be able to deal with the international system;

² Al Jabri, Camal, Plans of developing the Informational and Telecommunication Plans, the information, strategy sight for the telecommunication Sector in Yemen Republic. Paper presented in the West Asia Conference for the International Summit in Preparing the Information society, ESCWA, Beirut, February 4-6,2003. P.16.

³ For extra details about the challenges that Yemen Republic is facing, see: Ashamii, Ahmad Mohammad, *Globalization and its effects on the work organizations*, researches of the Fifth Scientific Conference, Faculty of Commerce and Trade, issue #17, September, 2001.

- (b) The weakness of competence in the industrial organizations and the incompetence of knowledge management in its contemporary conception due to the weakness of the possibilities provided to it;
- (c) The unconcern about administrative human sources, investing their mental energy and creativity, training them, improving them, involving them in the administrative process, in addition to the continuation of the traditional and classical way that is concerned with routine issues;
- (d) The weakness of the educational outputs and the unconcern of the scientific research; In addition to the weakness of the coordination between the social and economic development and the educational institutions outputs;
- (e) The deterioration of quality and productivity, the absence of total quality management and its implications, the unconcern of specifications, standardization, and mediocre control. These issues are posed in the local markets to face the strong competition under the free international trade contracts.

In short, there are local, regional and international changes and challenges. Modern knowledge management is the main tool to face all these challenges. Today, the successful knowledge management uses information and communication technology as a main root in its various processes. It is true that management is a science and an art. However, successful management needs the management as a science, and efficient skills. Finally, it needs information and communication technologies. It is a combination of science, art, and information.

Thus, the importance of entering structural and institutional reforms has increased in all sectors (educational, professional, governmental, banking etc) as well as employing scientific and technological advances to accelerate development and to promoting university, specialized and higher education; in addition to expanding the scientific research activities, adopting the information technology methods and data bases in studying the problems, setting policies, taking decisions, and setting plans and programs.

Moreover, the movement to the democratic work and the increasing awareness in the Yemeni society of the citizens' democratic rights tended to form a new understanding of the importance of data and information that support practices of liberty, criticism, research, study and evaluation of several phenomena and variables. Therefore, the individuals' rights to gain information, facts, studying, circulating, and to benefit from it has been a complete part of those democratic rights.

II. LEGAL AND REGULATORY FRAMEWORKS

It was normal that the absence of national policies related to the information and communication technology is accompanied by the absence in the legal and legislative frames, which organizes the national information and communication sectors. These frames are considered necessary in organizing the information trade, protecting it, limiting monopoly and the violation of intellectual property rights; in addition to treating it with the necessary schemes on the national and informational level. This cannot be fulfilled without setting international contracts and legislation, revising laws and contracts related to telecommunication, publishing rights, invention innocence, relying on criteria that are controlled by the legislator, and caring for individual's interest on the national level and the interest of all countries on the international level.

If there are countries that began to modify the main rules or form new rules to telecommunication as a goal to liberate the telecommunication sector, this subject has not gain enough attention in Yemen. The Yemen Government turned first to hold the challenges and economic crisis that were enforced in the last decade of the past century through adopting economic reform programs. Then, it worked on the right evaluation of the results of these programs, their paths, fulfillment, future challenges, and ensuring the country's capability in its progress towards opening markets; in addition to liberating foreign trade, joining the world trade organization, and adopting policies that can respond to the local inputs and accompany the international economy that is strongly changing.

However, it can be said that the information and communication sector in Yemen has been subjugated since the 1990s to some reforms that were enforced by international changes, the turning towards privatization, the liberalization of the telecommunication and information, and the efforts towards finding new formation of the country's role in the economic life to organize this sector. We list most of these efforts in the following:

- (a) In 1991 a Republic resolution #39 on the main constitution of the wired and wireless telecommunication allowing the Ministry of Telecommunication to insure communicative services, which include building wireless stations, importing and exporting communication equipment, manufacturing them, and selling them, in addition to limiting the telecom tariffs, their wages and duties and organizing the ideal usage of its vibration. The constitution also included conferring licenses to any normal person or implied to establish a network for telecom or use it inside Yemen Republic lands and the license to use the frequencies specified to the Republic and monitoring and administrating this usage;⁴
- (b) In 1995, a Republic resolution #155 was issued to construct a national center for information to set the main basis of the informational work mechanism in Yemen. It was in charge of the work of information collection, saving, analyzing, organizing its exchange, and putting it in the hands of policy and decision-makers; in addition to providing it to researchers, students, investors, and the interested people in general;
- (c) The cabinet agreed in August 1998 on the project of establishing a center for media documentary to produce media materials, collecting and providing necessary information for national media and the various governmental bodies, students and the concerned people of media affairs;
- (d) A cabinet resolution #8 for 1997 was issued on reorganizing Sheba News Agency, to help it do several activities, mostly to send publications that include local, Arabic and international news from which audible, visible and readable mass-media can benefit. In addition, to publish political, news and specialized publications in Arabic and English languages;⁵
- (e) Yemen Government issued a republic resolution, constitution #19 for 1994 related to the intellectual property rights aiming at protecting the right of writers, inventors, explorers to guarantee creativity freedom, develop and protect the society's interests to benefit from the art products and scientific contrivance. The constitution included protection of all different mental creativity like the invention contrives proposition, writer's rights, industrial and trademarks, and industrial samples and duties;
- (f) In the middle of 1990, the Ministry of Transportation formulated bylaws specifying private sector's duties, its bonds in presenting telecommunication services with its various types to the public. That is through constructing telecom centers in all the country. It specified the nature of the necessary information to be used, the means of its presentation to the public, and to stick to specific tariff put under monitoring. In fact, this idea is considered the first-fruit of the Ministry policies towards liberating the telecommunication market in Yemen;
- (g) A Republic resolution #105 for the year 2003 was issued to form a new Yemeni Government. The main characteristic of this formulation is to change the name of the Ministry of Transportation into Ministry of Telecommunication and Information technology. This name suits the contemporary reality, which witnessed quick development in the telecommunication sector and information technology. It is considered a good step on the political level towards giving this sector its share of policies and strategies. It also forms a great challenge to this Ministry in its hopeful role in the side of telecommunication and information technology and what it includes in formulating policies and strategies that enable the information sector to fulfill its targets towards raising the citizens' social and economic standards.

⁴ For extra details, see Republic of Yemen, Ministry of Law Affairs, Official Journal, issue #7, Part 6,15/4/1991, Sana'a, 1991.

⁵ For extra details, see Republic of Yemen, Ministry of Law Affairs, Official Journal, issue #20, Part 3,31/10/1994, PP. 15-54, Sana'a, 1991.

Concerning the services given through the information and telecommunication technology such as e-government and e-trade, they require great coordination between the ministries and the governmental bodies, producing a qualified push to unify the criteria, work process and procedures. The current reality in these institutions is characterized by the complete independence of the bodies in maintaining their private strategy related to its special informational rules and systems. Thus, the absence of the general systematic frame which permits the closure of these activities towards one goal makes the repetition of projects a way of spending more money and efforts and demoting the expected information benefit.

It can be said that the telecommunication sector in Yemen is still subjugated to a complete monitoring of the government represented by the Ministry of Telecommunication and Information technology, Ministry of Transportation previously. It applies fixed policies to develop and disseminate telecommunication services of all kinds and fulfils the demand of the beneficiaries in all parts of the country. This includes urban, rural and distant regions. However, a group of legal frames, which control the discussions, the electronic documentary, and their laws, i.e., electronic signature have not emerged. In addition to modernizing the telecommunication laws that were issued in 1991, this includes the execution of the electronic implications that are currently being done.

Related to the mobile telephony, the Ministry offers a license to the private sector to provide the public with this service too. This license is only confined in a privilege way to Sabafon and Spacetel. It is predictable that this privilege will be expired in the middle of 2004. There are no clear plans or policies whether there are any inclinations towards liberating the telecommunications sector, allowing other companies to enter the telecommunications market, or whether any intent is aimed at permitting the Ministry of Telecommunications to enter the telecommunication market. There is no sufficient information about allocating the telecommunications sector. It seems that the government will keep it, since it represents dominant revenue that covers its investing expenditures.

It can be deduced from the above that the legal and systematic frames of the information and telecommunications sector in Yemen Republic is in an urgent need to reconsider its content and articles. The first thing is the necessity to find a clear plan of the information and telecommunications sector so that the various governmental bodies can deeply use the information and communication technology and accompany its international development. Similarly, the telecommunication articles need to be reconsidered, particularly those related to liberating the telecommunications sector, transparency in its different fields, the methods of encouraging investment in this sector, and the way that enables the Ministry of Telecommunications to accomplish its task in terms of monitoring and supervision of its sector; in addition to working as an operator to the fixed network and including it in a competition with the private sector in producing some of the telecommunication services, and the continuation of the government and financial laws which dominated through the past year without any changes.

Finally, there must be bylaws and legal framework, basis for electronic treatments, and other rules that allow using electronic media in a way that guarantees the rights of all the dealing parties. Because using the various applications of the information and communication technology may accompany emerging new behavioral types i.e., the emergence of new technology in committing traditional crimes or a group of novel crimes like seizing money at a distance or penetrating information networks and others. The Yemeni legislator has not invented new laws in facing such crimes. Besides traditional law enforcement on these crimes raises several problems, most of them are the problems of proof. This requires the legislating bodies to start searching for other means, which complete the criminal punishments to protect information, the individuals' rights and possessions regardless of their types. It is the permanent responsibility of the judicial institution to augment training and qualifying programs in the information technology field and its application, especially the prosecutors and court judges.

III. ICT INFRASTRUCTURE

The infrastructure of the information and communication technology sector is considered the main basis in constructing and developing the information and communication sector. The dimensions of this infrastructure are bounded through creating and developing a large information network. The presence of a society divided into two categories, a small one that can deal with the information technology, and another that cannot. This causes a big danger for the country in employing its resources in building the information society. Therefore, the process of limiting the nature and quality of the infrastructure and the different

segments of the individuals in the society should be taken into consideration. Studying the applications of this technology must be suitable, and respond to the needs of the majority of the population.

Accordingly, insuring Yemen needs of information depends on the ability of the Yemen society. This requires the cooperation of a compound of productive elements. In other words, to provide information and communication technology infrastructure. If this infrastructure varies in its nature and capacity with the circumstances of every country and its directions, then the most important component of the infrastructure of the Yemeni information society can be limited by the following elements:

A. FINANCIAL COMPONENTS

These are the machines necessary to receive data, save it, deal with it and display it by different popular means. They are either elementary i.e., computers, or complementary and auxiliary, or independent and consolidated. They also include information exchange means represented by the telecommunication technology and network requirements, and the completing and auxiliary machines.

Undoubtedly, the number of the used computers is considered one of the indicators that clarify the existing condition for the information and communication technology of any country. The import of computers is increasing, whereas the idea of constructing collective industry of the computer's content is still in its fetus stage. Attention is directed towards satiating local needs through collection, which can be the first step. However, the industrial subsistence of the components of these computers or their helping machines is not available in Yemen.

Therefore, Yemen has persisted in importing different types of computers and of different manufacturers. There are three types of computers: those, which are in concordance with IBM and form the majority, they are about 93%, such as Compaq and Dell. The second type is the collective machine, which is imported from East-West Asia, but is not in concordance, and forms about 3%, such as Mackintosh. The third type is the laptop, whose volume forms about 4%⁶. However, the total number of the actually used personal computers is about 1400. The average is about 7,18 to every 1000 people. This average is so feeble and cannot be elevated to be an indicator of the information society in Yemen, particularly if we know that the percentage of the people who are capable of using the computer do not exceed a percentage of 1.6% of the population.⁷

B. TELEPHONE LINES

The General Telecom Cooperation that is related to the Ministry of Transportation produces the following services:

- (a) The fixed telephone lines, which reach about 600,000;
- (b) Transferring data communication services through DSL technology with a speed of 2 Megabytes;
- (c) The complete digital service ISDN with a speed of 64 kilobytes/128 kilobytes;
- (d) The institution shares with the Cabled and Wireless Company in producing the international telephony communication with a percentage of 49%;
- (e) The Paging services;
- (f) Audio-text services

However, the cellular telephony services are provided by private sector companies such as:

- (a) TeleYemen Company, which solely offered the service in 1995 with the Analogue Systems;
- (b) Sabafon Company;
- (c) Spacetel Company.

⁶ Same resource, P.42

⁷ The National Center for Information, summary display of the most important findings of the current informational reality survey in Yemen Republic, Sana'a, September, 2002, P. 20.

There has been a contract between the last two companies to enter the digital mobile system services GSM in 2001. The telecommunication market in Yemen has witnessed good work and prices less than the prices in the past because of the competition between these companies, and the increasing number of the working lines, which reached 200,000 lines by the end of 2002.

The Partnership Limited Company produced space telephony services, and there are no ratings about the working lines in Yemen, although it is known for its weakness as a result of its high cost which may reach \$1400 for every subscriber.

Additionally, the Yemen Company for General Telephones (Alo) provides telephone services for the citizens in all the country by using the card system.

It is worth mentioning that the provinces of YR have the telephone telecom centers and Internet services, which are administered by the private sectors. There are about 5000 centers, and every center includes eight telephone cabins. They offer local and international telephone services to the public, fax services, selling prepaid telephone cards, and introducing Internet service. The idea of decentralization helped in marketing telecom services in the distant regions and villages, employing a great number of people, and providing continuous income for many individuals and families. This experience is considered from the researcher's point of view as one of the most important national policies that contributed to reducing poverty and absorbing the unemployment problem in the work market.

The current strategy of Yemen government aims at distributing telecommunication services in all the country with suitable prices. Despite the continuous expansion in providing fixed telephone lines, the fixed telephone density is still between 2-3 for every 100 individual in 2002.⁸

In fact, the telecommunication sector has witnessed in the last two years great concern from the Yemen Government. There was an expansion of the fixed telephone services to include urban and rural areas as an implementation of the new 500-telephone line project and the 70,000-telecom lines to spread and expand telephone services. The offered service is facing increasing demand, effective marketing policies such as, reducing the telephone tariff during the holidays and weekends down to 50% in the rural area, and the fees of telephone services installations from 22,000 YR per minute to 17,000YR. It equals 30 cents per hour. This tariff is considered low if compared to other countries, where it could reach 80 cents per hour. It includes all telephone types: rural, fixed wireless system to encourage communication between rural and urbane areas.

In addition to the above, the fixed monthly subscription for rural communication decreased from 1300 YR to 800 YR. That is a percentage of 40%⁹. These policies are totally considered a practical and serious step towards enabling the citizens to seek telephone services with consideration to their income. It is also considered a big step towards a strong basis for the information society.

C. INTERNET SERVICES

The only provider (TeleYemen) inaugurated Internet service in Yemen in the middle of 1990s. There were about 50 Internet cafes in 2000. There are 30 Internet hosts and around 7000 subscribers.¹⁰This number is so small to what is currently happening in other countries of ESCWA. Therefore, the Ministry of General Telecom is another provider for Internet service besides the Company of Tele Yemen. A cabinet resolution #16 for the year 2000 agreed to bestow license to Internet service providers in order to contribute to spreading this service to all Yemen. Definitely, the Yemen Internet Gateway was provided through which Internet service providers can be connected with the international Backbone. Equipment was installed in five main cities: Sana'a, Eden, Taiz, Hudeidah and Mokala'a. It includes about 12 points of presence in which it works to provide primary capacity that serves about 30,000 users. It also produces the service either through

⁸ YR, Ministry of Transportation, Informational and telecommunication Forum. Issue#8. February 2002, P. 34.

⁹ Information technology Forum, previous resource. Issue#12, June 2002, p. 46.

¹⁰ YR, Ministry of Planning and Development. A Summary of the second five plane2001-2005. ALWai Al Zareebi publishing, Sana'a, p.42.

the Dial Up method of through leased lines, with different speeds ranging from 64KB to 2MB/s. We can sum up the advantages of Yemeni Internet Gateway in the following points¹¹:

- (a) Access to the Internet Backbone through two different means: satellites and fiber optic cables;
- (b) Providing capacity to 30,000 users able to be expanded to 80,000 users;
- (c) Providing the possibility of connection with high flexibility to more than 16 service providers spread in most Yemen regions;
- (d) Reaching the Internet service providers through Data Network;
- (e) Providing the possibility of connection with high flexibility to more than 16 service providers distributed in most Yemen regions;
- (f) Providing complete protection of the network from penetrating through special equipment installation;
- (g) Making a filter and preventing access to prohibited points of presence.

Studies indicate that the average of using the Internet in Yemen is about 8.9 for every 10,000 people. The limitation of this service becomes obvious when comparing it to what existed in some Arab countries in 2000. Regarding the service providers, their number Egypt may reach 34 companies, 25 companies in Saudi Arabia, 16 in Lebanon and 6 in Jordan. However, the average internet usage reached 93 in Egypt, about 412 in Jordan, 858 in Lebanon, about 181 in Palestine, and about 17 in Sudan. Thus, Yemen is considered the least country that have used the Internet ever. The persistence of this pattern in the average usage predicts a dangerous situation in the future, Yemen's inability to communicate with the outside world, not to mention the impossibility of the existence of the information society in Yemen.¹²

Consequently, the Yemen Government, represented by Public Telecommunication Corporation, issued in April, 2002 the Internet service (Yemen Net) as a contribution to overcome the already mentioned obstacles, to fulfill the society's needs in elevating the service standard, and to guarantee reaching most citizens in many provinces of YR; in addition to the subscription in the Internet service with fixed monthly costs regardless of the daily usage period, baring in mind that the subscriber still pays the bill of the local telephone service which is connected to the Internet network, whereas, the subscriber is offered this service free, as it is the case in Egypt. In addition to the services produced by the Telecommunication Corporation, it is concerned with organizing workshops and training courses such as Internet web sites, discussing the practical implements and methods of the way to collect data and information.

IV. ICT CAPACITY-BUILDING

Although the Yemen Government lately sought developing the information and communication technology infrastructure, these efforts alone are not sufficient to establish and improve capacities in this sector. It requires a compound of efforts not only from the government side, but also in the form of contributions from the private sector, the civilian society, the non-governmental organizations, and others. Thus, capacity building in information and communication technology requires separated and independent initiatives and programs, ungoverned by any specific policy or strategy. These are as follows:

A. GENERAL TELECOMMUNICATION CORPORATION

It is concerned with developing the infrastructure in the telecommunication field, expanding the Internet boundary and its implications, distributing awareness, activating and guiding the usage of information technology in ministries, corporations and individuals.

¹¹ Information technology Forum, Yemen Internet Gateway. Issue #6, December 2001.P.14.

¹² Sharafuddin, Hassan Ahmad, *Informational and Telecommunication Technology and its Role in Employing and Reducing Poverty*, Yemen Republic condition, Sh'uun Al Asar Forum. Issue #9.

B. THE NATIONAL CENTER FOR INFORMATION

It currently works on establishing a database and seeks a complete information sector on the national level. It also works on evaluating information technology reality from the scientific side to move towards establishing national policies and formulating detailed strategies in the information technology field.

C. THE INTERNET CLUB

It provides halls equipped with computers and overhead projectors. It tends to provide Internet service at low prices for university students, schools, public sector employees, scholars, and interested people. This can be done through spreading information technology awareness.

D. THE GENERAL INSTITUTE OF TELECOMMUNICATIONS

It is responsible for training and qualifying skilled cadre in different information and communication technologies. Well-experienced people in the training field perform the teaching. The institute has a bilateral relationship with many foreign institutes and specialized companies, where lectures are given, symposiums and meetings are held between the government employees on one side, and specialized public and private sectors on the other. It can be said that this institute has formed a small society. Its consumers look forward to repeating the experience, everyone in his profession and work environment, for the purpose of building the information society.

E. THE CREATORS' DEVELOPMENT CENTER

It works on crystallizing creative ideas and turning them into actual projects of digital technology. It also works on supporting creators and encourages self-employment through improving their talents and developing their creativity and interest for their inventions in the field of telecommunication and programming technology.

F. TELECOMMUNICATION FORUM

It is a specialized monthly forum that is issued since July 2001. It is concerned with the information and communication issues, spreads cultural and knowledgeable awareness among interested people, scholars, students, and citizens. It defines the information and communication technology, stays up to date with the changes and development in the world of information technology, publishes and encourages scientific studies and provides them with a suitable price that equals about 60 cents. This makes it handy to everyone, especially when it is compared to other forum prices that are published in some of the Arab countries.

G. THE ELECTRONIC LIBRARY

It endeavors to respond to the demand of researchers of knowledge, information, its classification in a way that provides simplicity in use, browsing, and a variety and speed in finding the required information.

H. THE ELECTRONIC RIAL

It aims at establishing an electronic information system as a medium between citizens and trade and service institutions, and that would allow the citizen to gain a proposed currency named the electronic Rial, which are cards that are paid in advance. The post office is responsible for printing and selling them. They have secret numbers, the citizen could pay bills and dues to the righteous institutions, which are directly connected to the network. This service was established in August 2002 as an electronic way of payment through the Internet e-rial. It is easily used and very secure. It enables the users to pay telephone, electricity, and water bills, and the possibility of financial transference and buying stamps that are issued by the post office. Moreover, there is the electronic rial web site: www.post.ye where it enables the subscribers to activate their subscription, give feedback or repay some of the bills of the mentioned services.

I. DEVELOPING LABOR FORCES

The data survey about the information technology's current status in Yemen indicates that the group of labor cadre in the information technology field of the places covered by the survey is about 4000 workers. About 68% of them work as computer operators and data loaders, about 8% as programmers, about 6% in the field of network installation, and the rest which is about 18% are distributed in different percentages in systematic analytical jobs (3%), maintenance (5%), data analysis (4%), and libraries (5%).¹³

This data explains the difference in the size and quality of workers in the information technology field in addition to the deterioration of this number compared to the number of the total labor forces, which reaches nearly 900,000 workers¹⁴. Not to mention that about 21% of the places that were included in the survey do not have an information technology department. It can be noted that there are many sectors that have not acquired enough concern in information technology and require setting enhanced policies in the field of training and qualified human sources.

J. SCHOOLS

According to a survey of the public and private schools in their different stages (Elementary, Secondary), data indicate that about 44% of the surveyed schools have computers. About 26% of public schools have computers, and this percentage is so small, whereas, about 92% of private schools have computers¹⁵. Since most students in Yemen study in public schools, the current condition of information technology usage in public schools predicts the dangerous situation in the future. It does not form a reliable basis for future capacity building in the information technology sector.

K. EDUCATIONAL QUALIFICATION

The number of qualified people in the field of the information technology was estimated as follows: 1981 specialists, most of them are BA holders, Intermediate Diploma (1594 specialists), MA (69), Ph.D. (11), and the rest are Higher Diploma holders and below. This proves that the process of skills and experience acquisition in the field of information technology is still in its onset, and indicates the urgent need to provide an information technology framework, which can be involved in playing a major role in dealing with information science. This constitutes a big challenge to the concerned parties that are capable of disseminating science, knowledge, qualifying, and training to establish the information society¹⁶.

If the number of Ph.D. specialists is rare, then teachers' rehabilitation, the scarcity of dispatched students to achieve higher and specialized certificates, the lack of continuous information technology support to the teaching staff were not naturally viewed by the government as a factor in constructing institutional abilities of the information and communication technology. The current trend towards the reduction of government investment spending on university education, and the absence of a plan to protect the university cadre from immigration and working abroad for a better living had increased the deterioration of capacity building in information technology.

L. HIGHER EDUCATION

There are 15 universities in YR: 7 are public, and the rest are private. In spite of this number of universities, only a few have the information and communication technology specialization. It may form a noticeable care for its officials in cooperating with the labor market needs. It is sufficient to know that until 2001 the two faculties of Engineering and Science at Sana'a University, the deep-rooted university in

¹³ Yemen Republic, Republic Presidential, the National Center for Information, the National Strategy for Information, the first part of evaluating the current informational reality, Sana'a, September 2001, P.15.

¹⁴ Yemen Republic, Ministry of Planning and Development, the Central System for Statistics, Annual Statistic Book, Sana'a, 2001. P. 225

¹⁵ The National Center for Information, previous resource, P.98, and up.

¹⁶ The National Center for Information, previous resource, P78, and up.

Yemen, were unable to support the labor market with the specialized graduates of information and communication technology¹⁷.

It can be said that the status of information and communication technology in Yemen universities, especially public universities, is so deteriorated. This is due to the absence of administrative and computerized financial systems, the absence of experienced staff in information technology, and the lack of encouragement of these teachers by putting their curricula on the Internet web sites. Besides, the libraries of these universities neither witnessed the great benefit that the information technology contributed in preparing and developing studies and researches, nor in facilitating the library work for the employees. The political leadership has supported the teaching staff at Sana'a University with 1,00 computer sets, however, this project is still under preparation and execution. This will cause the teaching staff members a leap in the academic work methods.

M. CURRICULA

The curricula in university education are suffering from much negligence. The most important negligence is that they do not match with the students skilful needs that are set by the nature of the contemporary development and the paucity of the practical application of information technology due to the absence of equipment; in addition to the paucity of university teachers income which reflected negatively on their productivity, and their qualifications and educational status¹⁸. These factors, together, form negative mechanisms, which limit, undoubtedly, the ability of constructing the information and communication technology sector.

N. PRIVATE INSTITUTES

It can be said that the private institutes, which are ruled by individuals and some of the informational technical companies, contribute efficiently in supporting labor market with its need of the different specialization in the information and communication technology. It can be noted from appendix #2 that many of the private companies are responsible of training and qualifying Yemeni young men in the programming field, maintenance nets and others. It is predictable that the domestic sector will contribute in developing the vocational training and the human resources.

It is worth mentioning that the Yemeni Government tried to admit the technical and vocational learning. This kind of learning is cared a lot by the political leadership. However, in the past years, the technical learning has not achieved its right of care and these universities were the only choice to most high schools graduates. Moreover, the share of information and telecommunications has not gained its position in the technical and vocational learning policy.

O. SOCIAL EDUCATION

Yemen Government sought many efforts since the nineties to admit a sample of social colleges to higher education in Yemen. That is to serve the local societies through providing complete and various programs for specialized qualifications that are directed to practicing professions and skills, demanded by the local market or the preparation to continue university education. Therefore, the two Faculties of Society were established in Sana'a and Eden in 1998.

Among the main targets to establish the Faculty of Society is the weakness of connecting universities' outputs on one side and labor market and developing requirements on the other side; in addition to the low percentage of technical and educational qualification in universities where more than 90% of university graduates has graduated from Human Studies College.¹⁹

¹⁷ Yemen Republic, Sana'a University, the Annual Statistics 2000/2001. PP. 80-81

¹⁸ Yemen Republic, the Yemeni Strategic Report 2001, the Yemeni Center for Strategic Studies, Sana'a, 2002. P2001.

¹⁹ Yemen Republic, the Ministry of Higher Education and Research, the Supreme Council of Society Colleges, Yemeni Social Colleges System. Sana'a, March 2002. p.12 and up.

Due to the novelty of applying this kind of education in Yemen, it is predictable to witness graduates from the colleges of society in the information and communication technology in the coming years. However, there are evidences that the outputs of this kind of education will not have special characteristics, which make them different from the outputs of other domestic universities and private institutes.

Besides, the number of dispatched students from the College of Society to the United States to be qualified in the field of technical training, which is about 30, has decided not to return home because of the low predicted income they may receive there²⁰. In addition to their preference to stay in the USA.

In addition to the mentioned above, the Internet clubs play a big a role in distributing the Internet culture and its usage. The assessments indicate that there are tens of these clubs that are primarily centering the capitals of the provinces. They play a big role as an information resource because of the individuals' difficulty to access the information technology. The cost of the Internet usage is assessed nearly as one dollar/an hour. This tariff is somewhat expensive in Yemen, where the average of the individuals share of income is 360 dollar a month, particularly when we know that most of the comers to these clubs are university students.

P. STUDIES AND RESEARCHES

Studies and researches are considered an important means for building the information and communication technology sector. It is also the ideal way of inventions in this field, endeavoring to achieve knowledge and apply it to activate the demand of the commodities and services in the market. However, the studies and researches in the information technology field have not obtained their deserved concern, and their preparation is rare except for those research projects, which are given to university students, as it is the case with Science and Engineering Colleges.

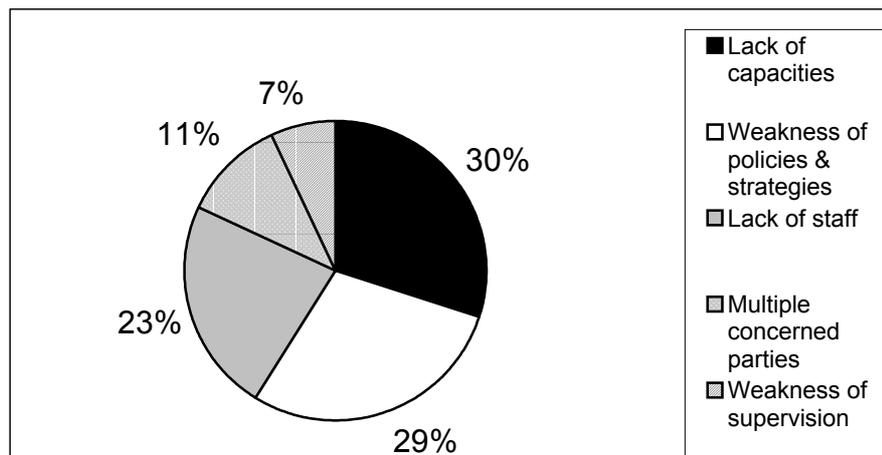
The government is considered the main source that is supposed to conduct research, but the currently common direction is towards reducing the government expense phases in general. The educational institution cannot solely fund the expense of research away from the government supervision. The government routine and administrative bureaucracy is still common in the administrative work. Therefore, the current condition of the studies and research does not form a basis to build abilities in the information technology sector.

It is worth mentioning that the Ministry of Telecommunication and Information technology is the locality to which the construction of the information and communication technology sector was assigned; it has no research activity or marketing and production studies preparation. However, the economic studies are completely absent and there is scarcity in researchers and specialists in Economics.

It can be noted from the above that there is a group of hindrances that oppose the movement of the educational, researching and qualifying process and other factors that are supposed to contribute to capacity building in the information and communication technology sector. It can be said that the educational institutions in Yemen contribute to the type and nature of hindrances that face the educational process in the information and communication technology field. The result that the survey of the information technology status in 2002 reached is shown in Figure 1.

²⁰ Dr. Harold Matison, *Evaluating the Project of Yemeni Social Colleges System*. A paper presented to the evaluating Symposium of the final of project period. Sana'a, March 6-9. 2003. p.5.

Figure 1. Information Technology Survey Results (2002)



It is clear from the form above that the facilities shortage comes in the beginning of these hindrances of about 30%, then comes the weakness of the plans and the followed policies in the information technology field of about 29%. After that the cadre paucity, then the supervised localities. Therefore, the continuation of these circumstances as they are in the coming years keeps the construction of the information and communication technology sector far away from reality.

V. BUILDING THE ICT SECTOR

The task of constructing the information and communication technology sector in Yemen is considered one of the urgent topics that support Yemen Republic economies. The importance of developing this sector and its abilities emerges from the fact that the cost of knowledge has increased in addition to the decrease in the price of basic goods. The relative importance of knowledge increased and so its role in creating the value. Consequently, international software development companies are roaming to hunt the enlightened and thoughtful brains, which are not invested in their country to benefit from their wealthy production and produce information and knowledge.

The Republic of Yemen is suffering, like all Arab countries, from the lack of not only in knowledge production but also in its achieving course. This is because the characteristics of the Yemeni economic condition are controlled by the oil sector, which is capable of depleting and vacillating in the price and to maintain great importance in the resultant content of the total local production. It is also characterized with decreasing the productive abilities and corroding the relative advantages of employment, in addition to the presence of the unstable resources such as tourism and employing exportation. It complains about inflation and the structural defect in the exports and imports, production, consumption and the shortage of commercial balance, which makes Yemen seek a constructive information technology sector as a developing means and as an element of productive contribution in raising the society's production. It also provides organic adhesion among productive positions and scientific research institutions. It contributes in creating a new income source and that is information and communication technology sector, which is mainly based on the electronic, and programming industries.

A. PROGRAMMING INDUSTRY

The most important aspect of the information and communication technology sector is the local programming industry, because the Yemeni local market requires programs in Arabic language and it depends on special documentary session that differs from the available programs. However, this industry is distinguished by its tiny size, its disability to compete with the available applications, especially if we know that most of the governmental and non-governmental institutions use a special pattern of applications, which serve different stages of limited nature, the most of them are:

- (a) Payroll System;
- (b) Accounting Applications;
- (c) Inventory Control Applications;

- (d) Protection & Security;
- (e) Graphics;
- (f) Statistical Packages;
- (g) Publishing;
- (h) GIS.

In spite of this variety, most of these applications are imported from abroad, because the locally developed applications could not achieve the confidence of the dealers. This is due to its disability to support the targeted administration with statistics, up to fate data, and its complete way in dealing with the rest of applied programs, in addition to the disability of labors to understand it fully and the lack of dealing with it for one reason or another.

It can be said that the demand for programming in the Yemen market surpasses a big deal the size of demands on the available programming. Yemen market waits for a qualitative shifting in providing special programming, for instance, Arabic learning systems, and the mechanic translation from and to Arabic, mechanic speech, speech recognition, its mechanic construction, optical character recognition for changing traditional libraries into electronic ones and publish them on the Internet.

B. ELECTRONICS INDUSTRY

The second aspect of establishing the information and communication technology sector is to encourage and develop electronics industry for its importance to produce new revenue sources, create new job opportunities, the foundation that many countries base their direction towards the knowledgeable society. It also tends to produce exchange relationships with the other economic sector. The Republic of Yemen is considered a big consumer of the electronic industrial products. There is a continuous demand for those products and are requested by telecommunications and consumer's equipment, measuring machines and information technology equipment, office equipment, school, and university needs and others. Those products are totally imported from abroad because they are not manufactured locally. Their imports cause big pressures on the country's revenues of hard currency and reduce the chances of employing these resources to the developed and economic projects.

C. GOVERNMENT EASINESS

If the chance of elevating the local programming industry is characterized by having a small market and the strong competition and the difficulty of paying the costs of improvement and marketing, then the chance of nationalizing the local electronic industry may contribute efficiently in establishing the information and communication technology sector. That is if the factors of productive and serving elements were provided, the government should contribute in producing and preparing them. However, this matter has not achieved a clear plan in the current and developing five-year plan. There has not been limited policy in this field based on technical studies and marketing and economic researches bearing in mind the extent of its contribution in priming the pump and ensuring a series of the added value to this important and lively sector.

The absence of such policies, the continuity of tax-collection by the government of electronics, the absence of the government easiness during importing the contents of the computer techniques, the carelessness of the informational telecommunication technology sector in the investing law as other productive sectors because of its connection to the excellent contract, all these factors neither contributed in encouraging the investors in the electronics industry nor they continued in seeing the information and communication technology sector as a consuming sector or as a productive one.

In accordance with the mentioning above, the role of the government in constructing the information and communication sector is forced by reality. It is predicted that the government will contribute in producing the informational environment in helping the society reach the information society and work on limiting some behavioral manners in administration, dealing with the individuals and get red of the routine and the bureaucracy in the administrative work. The continuation of such phenomena does not form a basis that can be relied on in constructing the informational and technical sector and developing its applications such as the government and trade electronics.

D. THE WORKING COMPANIES IN TELECOMMUNICATION AND INFORMATION TECHNOLOGY

The last limitation that contributes, as we have seen, in constructing the information and communication technology sector is the current condition in the working companies in this sector. If most of the mentioned companies in Appendix2 is responsible with importing, selling, constructing and maintaining the information and communication technology equipment, then the specialized companies in the programming industry in Yemen are described as limited (two or three). Some of these companies are satisfied with importing the available programming from abroad and marketing them to the clients because of their disability to pay the cost of developing these programming.

In this regard, the Ministry started to produce a project to find programming solutions for the various systems. Besides, producing improved programming can be applied in the administrative, technical and trade fields and contributing in establishing the informational networks. Moreover, improving the programs related to the Ministry works and the constitutions connected to it. That can be done through establishing a center for manufacturing and developing programming. However, the results of this idea have not been shown because the Ministry has developed solutions for the informational systems and programs without cooperating with the private sector in this movement. It did not work on supporting, nor encouraging it, or offering marketing easiness, or helping it in exportation and merchandize its products.

The most important difficulties and obstacles that the working and local companies of information and communication technology suffer from are many. Most of them are as follows²¹:

- (a) The absence of sufficient awareness of the wide sector among the various categories of the society about the discipline of the information technology;
- (b) The limitation of the role of the national companies in the investing field of the private equipment field for information technology, the inadequacy of these companies in importing this technology and selling it to the public without developing this activity to be industrial;
- (c) The absence of clear rules to protect the thought possession, which are connected with the programming;
- (d) The increase of the information technology cost possessions and its necessities because of the high custom-duties and taxation imposed by the government for these commodities.

VI. APPLICATIONS IN GOVERNMENT ESTABLISHMENTS

The information technology data survey indicates a big distinction in the size of the computer application users, as shown in the following table:

Text Treating Programs	42.47%
Calculation Timetable Programs	24.46%
Informational Protection & Safety Programs	15.99%
Fee Programs	7.08%
Statistic Programs	6.55%
Journal Publishing Programs	1.51%
Reality Designing	1.37%
Specialized Scientific Programs	0.34%
Map Designing Programs	0.12%
Multiple Media Programs	0.06%
Database Application Programs	0.03%
Archive & Index Programs	0.01%

It is clear from the table above that text treatment programs come first in use, this is a result of computer replacement for the typewriters in textual works in many places. The information technology survey data did not show the extent of governmental institutional use for the stored programs, product costs,

²¹ The Industrial and Trade Chamber, Sana'a, Informational and Telecommunication Technology and its role in the development. A paper of the private Sector presented the first Symposium. January, 29-30, 2003.

the extent of its completion in the network environment with the calculation programs. This indicates that most of these applications are based on definite data rules, which do not serve the high leadership of the institution by supporting it with the necessary statistical reports to make decisions and to do instant control.

Regarding data security and protection programs, it forms a low percentage. This indicates that it is not efficiently used because of the connection between these programs and the computers themselves. These data indicate that insuring information is only confined to the programs. While in the information insurance process, it should include the computer location, organize the work circle, protect the used media and reserve it, set controls for operating process, resist computer viruses, distribute and specialize duties. In addition, there are other information insured methods like machine privacy and insurance, insuring the final party processes which are connected with central telecommunication.

It is worth mentioning that the computer applications should be developed locally in accordance with the common documentary circle in the governmental bodies. It should also be harmonious with the systemized rules and laws of the administrative work, not to enforce these units to fit work with the available applications, whose developing source comes from the developed societies. Yemen shares applications with other developed countries in executing them such as textual treatment programs. However, for the financial and accounting applications, the local experience varies a big deal from what is happening in the developed countries.

It is worth mentioning that the applications that are locally developed are based on various types of administrative database systems. For instance, the tourism sector uses database based on Sybase, whereas the economic sector uses Informix, fishing uses Oracle etc. This tends to create many difficulties in collecting data due to the absence of consistency.²²

A. FUTURE PLANS FOR ELECTRONIC GOVERNMENT

The absence of expansion in using information technology in Yemen is due, basically, to the absence of national policies in the information technology field, and the obvious delay in adopting strategies aiming at organizing data, drawing future plans in such a way to benefit from these sectors and solve developing problems. Indications prove that nearly 25% of the public and private and governmental institutions have not intended to adopt information technology in their daily activities. The traditional work is still the most common in practicing its activities. However, the places that hastened to adopt these techniques and their inclinations are unclear and are not based on feasibility studies. Their structural division is still pyramidal, not cross-functional. Information technology work specifics are not taken into consideration, nor are its practical or professional classifications.

From here, most public sector institutions have sought the formulation of information technology policies in an independent way. It seems that this stage is necessary to begin establishing what is called the electronic government then generalizing it as an effort to build the information society. In this case, we can mention the most important basic and supplementary plans that aim at prodding and developing the applications of the electronic government as follows:

1. *Ministry of Finance*

The project of developing the financial and accounting information system which aims at suppurating the institutional construction in the field of financial administration and the ministries connected to the budget units, provinces and directories, was carried out. This system tends to present more transparency by publishing the budget, the reliance, which were approved, the pamphlets and the periodical financial reports on the web site of the Ministry of Finance Internet. The Ministry of Finance aims at expanding its information system network to include other ministries, i.e., Ministry of Health and Population, Ministry of Education, Ministry of Construction, and Housing, and the Urbane Planning. The plan also includes

²² The National Center for Information, previous resource, P52.

processing a network connection with every central bank and the customs service, which applies the ASUCIDA system and the system of administrative loans and taxes GST²³.

In addition to mentioning the above, the priority given in the electronic governmental applications is found in the Ministry of Finance plan towards unifying the statistical data for the government and unifying the actual database in the ministries and institutions in order to be merged and to facilitate the process of its comparison with the actual reports that resulted from executing the government budget, to provide information of the fixed and planned invested projects as a device for businessmen and disseminate it on the World Wide Web; in addition to provide detailed information about the dating of projects' execution and the timetable of refunding and transfer them mechanically to their private accounts electronically.

2. Ministry of Higher Education

The Ministry of Higher Education and Scientific Research aims at executing projects of infrastructure for the information and communication technology through the two network-connected projects between the Yemeni Universities and developing the Higher Studies. These two projects aim at developing the infrastructure of the main telecommunication in every university, where the teaching staff and the administrative cadre contact each other and the World Wide Web; in addition to developing the program of training teaching staff, employees, administrators, and students and to make them acquire basic skills in information technology and improve their research and work abilities.²⁴

In order for the Ministry of Higher Studies and Research to fulfil the ambitions mentioned above, it is expected to adopt certain strategies to execute its aims, for instance, constructing a complete computer network (Internet) on the level of Yemeni universities and on the level of a single university; in addition to connecting the network of the Higher Studies with that of the World Wide Web, and qualifying the national cadre of the universities and support it with the technical experience in constructing, operating and maintaining the networks.

3. The Ministry of Civil Services and Insurance

The Ministry of Civil Services and Insurance is aware that there are big challenges facing information technology usage and the transference towards the electronic government. They are social, cultural, scientific and economic challenges. All of them are strongly related to the administrative challenges, which Yemen particularly suffers from. This is negatively reflected to the performance of the governmental bodies. An example of these challenges is the existence of change resistance, seeking towards disseminating culture awareness of information technology under the spread of illiteracy, poverty, and unemployment. In addition to the high costs that is necessary to transfer information technology and the lack of human and financial abilities and the disability of the technical and infrastructure abilities.

In spite of above mentioned challenges, the Ministry of Civil Services and Insurance aims at completing modernizing information systematically and administratively and supporting it with modern machines and equipment. The Ministry also turns to connecting database to the administrative and service stocks. It endeavors to execute the employed national numerical project by using the biological finger print and picture to complete the civil service information system which is targeted to control the government expenditure and limit job inflation and prevent job twofold.

²³ Ministry of Finance, the Project of Accounting, Financial and Informational Improvement System. A paper presented to the Symposium held entitled Telecommunication and Information technology and its role in Development. Ministry of Communications. June 29-30, 2003, Sana'a.

²⁴ Dr. Yehya Mohammad Arraywi, Reality and Horizons of Informational Development in Higher Education in the Republic of Yemen. A paper presented to the first Symposium about the Informational and Telecommunication Technology. Ministry of Communications. June, 29-30, 2003, Sana'a.

VII. APPLICATIONS IN EDUCATION

The electronic school projects are a big challenge for the officials of elementary, secondary, technical and Higher Education in Yemen. Consequently, ministries concerned with education currently endeavor in equipping the educational institutions with information technology, preparing a complete conception of entering the information technology and computer curriculum that accompanies the development of science and mathematics curricula in elementary and secondary education. Therefore, it can be said that the application of electronic education in Yemen is still in its fetus stage and needs care and improvement.

Education officials have some hope to begin teaching the computer subject in some public schools by 2003/2004 as an experiment. After that, studying this experiment's results and working on changing it, then generalizing it in all public schools should be done. Regarding equipping these schools with information technology, it is still limited and under research and studies²⁵.

However, it can be said that the schools whose possession is related to the private sector, surpasses its counterparts in the government sector in the availability of information technology. The results of evaluating information technology status have indicated that around 92% of private schools have computer sets. While this percentage is decreasing in public schools. It forms 26%²⁶. This decrease may be due to the financial difficulties that public schools face in possessing information technology.

Regarding distance university learning (e-learning), presidential precepts were ordered in the beginning of the current year to originate the virtual university. The work is being done in coordination with the Ministry of Higher Education and Scientific Research, with the belief that education at a distance will work in solving the educational problems that the Yemeni students face in the immigration place. It is expected that these applications will contribute to providing educational service in its different stages to distant and rural regions of the Republic of Yemen.

VIII. APPLICATIONS IN COMMERCE AND BUSINESS

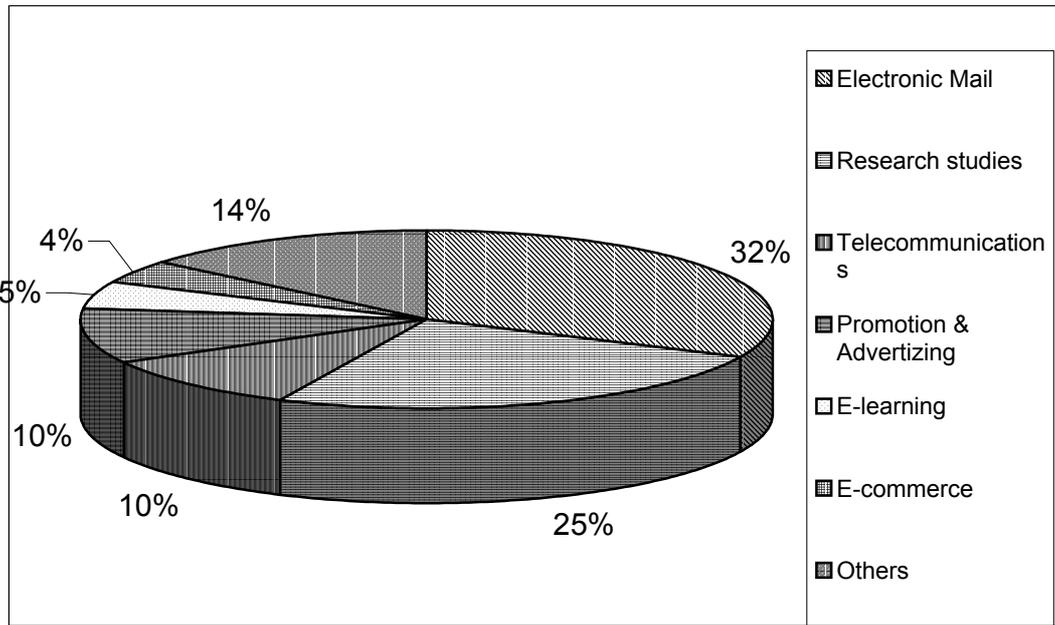
E-commerce applications in Yemen are very limited. This is due to the absence of laws that organize such activities despite the availability of the telecommunication infrastructure. In spite of the annual increase in the number of the Internet subscribers, only the electronic main service, studies, and researches benefited from this technology, then the telecommunication sector, followed by advertising and circulation. The electronic trade comes at the end of the list as its benefit from the Internet network and capacity is only 45% from the total services, as shown in the Figure 2.

The electronic rial project is considered one of the projects that the Ministry has fulfilled in the electronic trade applicable field, in which the citizens are able to pay service bills (i.e., telephone, electricity, mobile telephony, Internet subscriptions, sending mail, money-order, etc) to the deserved institutions. Electronic rial experience is considered the first fruit of working in developing the rest of electronic trade applications. However, the seriousness of its use, its development and spread depends on providing the regulations and overcoming the behavioral types which are still commonly used in the routine and bureaucratic work in many private and public premises.

²⁵ An Interview with Mr. Sami Ali Shamsaan, the General Manager of Curricula in the Ministry of Education. Sana'a. See Informational and Telecommunication Technology Forum. Issue#22, April, 2003. PP. 34-35.

²⁶ The Notional Center for Information, previous resource, p.98.

Figure 2. Internet Services Distribution



IX. APPLICATIONS IN HEALTHCARE

Similarly, regarding e-health, some government localities obtain general information about health condition in Yemen. However, some of the developed countries still have not adopted e-health in its current meaning due to the paucity of information from one side and its slow electronic execution from the other side, as explained below:

A. PAUCITY OF HEALTH INFORMATION

There are various statistics on health condition in Yemen, but these statistics are not placed in the database from which scholars and students can benefit especially those who are living abroad. Statistics that are published in annual statistical books, are still currently ruling, until the emergence of training and qualification that the governmental bodies seek in order to improve the level of work performance for its employees and information technology role in the social and economic life.

B. ELECTRONIC APPLICATIONS

There are no real Yemeni web sites on the World Wide Web that work on supporting health care system, and providing Tele-medicine service, except the case of the General Revolutionary Hospital. Such projects are still under research. The causes behind delaying its applications are due to social causes such as illiteracy, health awareness, technical problems in the infrastructure and slow information browsing and data transfer. It is thought that the main cause in the delay of its dissemination may be the high cost that the citizen pays to obtain such service compared to his low income.

X. DIGITAL ARABIC CONTENT

No doubt, that the content, which is found on the World Wide Web and stored on CD-ROM media has great importance and a big role in providing the individuals with knowledge of all sides. The importance of the content is based on the fact that the individuals' instrument in searching knowledge or information has been concentrated around these media. The libraries and the traditional shelves have not been the remedy so far in getting information or knowledge either in the form of news, articles, or studies.

Therefore, these media have become the individuals' daily means in his communication with the society's individuals locally and internationally or through chatting clubs to express their points of view or

voting or commenting or exchanging letters electronically. It is an elevated way of introducing an individual or an establishment. Some of these resources are of one direction. In other words, they do not require interaction between the sender and receiver. Others have two directions as in learning at a distance or shopping.

If we tackle the available Arabic content on the Internet, we find that Arabic speaking Internet users, whose population is about 300 million do not exceed 0.8%. This explains the weakness of Arabic content in terms of number of web sites, which is basically due to the fact that Arabic contributions and resources on the Internet are characterized by high paucity in spite of the great Arabic cultural heritage in the written texts and databases. There is still a big effort waiting for the scholars in providing the Internet with fertile Arabic information.

Yemen Republic is considered one of the most important Arab countries rich in cultural and historic storage. However, this storage is not destined to be highly available on the World Wide Web. This reflects the low information technology cultural level and the extent of the awareness of the importance of the Internet as a source to acquire knowledge, and as a basis for constructing and developing electronic applications, i.e., e- government and e-commerce, e-learning and others. One of the Yemen's scholars found out that the number of Yemeni web sites is about 216 until February 2002, distributed as follows²⁷:

- 18 Governmental web sites
- 15 News Web Sites
- 24 Organizations and Embassies
- 91 Private Companies
- 31 Tourism and Traveling
- 4 Internet Clubs
- 4 Service Web Sites
- 6 Banks and Insurance Companies
- 23 Educational Web Sites

Regarding Internet usage on the level of public government, private and mixed sectors, a data survey has shown that the average of subscription density in the total surveyed units is about 1.7 (it means that there are 387 subscriptions for about 232 localities²⁸. In fact, this indication is so weak as for Internet usage especially if we know that the surveyed specimen is one of the important social and economic units in Yemen.

In spite of the low density of the government, public and private sectors subscriptions and presence on the Internet, it does not prevent the presence of Yemeni web sites characterized with important databases, beauty in the design and good production such as:

- (a) Yemen Gate Net www.yemennetwork.com/arabic.shtml;
- (b) Hadhramout Province Meeting for Arabic Debate www.hdrmut.com;
- (c) Yemen Web www.yemenweb.com;
- (d) The National Center for Information www.nic.gov.ye;
- (e) Hajareen Page www.hajreen.com;
- (f) Yemen Daily www.yemendaily.com;
- (g) Yemen Web site www.al-yemen.com;
- (h) Yemen 2B www.yemenb2b.com;
- (i) Yemen Gate Way www.al-bab.com/yemen/default.htm;
- (j) Yemen News Agency (Sheba) www.sabanews.gov.ye;
- (k) Yemen Tourism www.yementourism.com;
- (l) Free Zone- Eden www.aden-freezone.com;
- (m) General Organization for Investment www.giay.gov.ye;
- (n) Hadhramout University for Science and Technology www.hust.edu.ye;
- (o) The Supreme Committee for Elections and Referendum www.scer.org.ye

²⁷ Adhahbaani, Khaled, Yemen on the Spider International Network. Telecommunication and Information technology Forum. Previous resource. Issue#8, February, 2002. P31.

²⁸ The National Center for Information. Previous resource. P63.

It must be pointed out that the causes of the weakness of Yemeni content on the Internet add up to those that lead to the low Internet usage, which can be mentioned below:

- a) The absence of a clear information technology policy: most government efforts have been concentrated on constructing and developing the information network in its technical side without assigning the same effort to the content which will benefit the citizen in particular in the educational and cultural sides. Information issues are cared for by more than one place and the absence of coordination between each other forms a big difficulty to promote this technology and benefit from it;
- b) Some people see the Internet web sites as an entertainment and an unnecessary phenomenon. Therefore, the cost of obtaining information technology and navigating the Internet is not justified by the low individuals' income. It was expected to increase media campaign awareness for scholars and businessmen of the financial and economic returns that these web sites contribute to their owners;
- c) The increase of service cost compared to other countries made this service confined to the high-income class and those who are capable of paying its high fee; in addition to the high telephone charge when using the Internet service, represented by the variable cost in using the local telephone lines;
- d) The status of the telephone network infrastructure, where many problems appeared in the main lines, in some dividers, fuzzy sounds and interference are happening; Speed is considered one of the main problems that users face. The speed decreases as soon as the number of users reaches twenty in the same time. It usually decreases to reach 200 Bytes/second, which causes line disconnection;
- e) The non-availability of sufficient funds for the Ministry and the institutions in the public sectors to acquire information technologies and software, to construct and develop its web sites, in addition to the difficulty in obtaining funds for their hosting, their management, maintenance, and modernization, where it enables the citizen to be in touch with these web sites all the time;
- f) The absence of clear criteria adopted to distinguish between the good and bad web sites, ascertaining the validity of the available information on them in such a way that it would provide the individual with confidence and reliability in dealing with it. It is not the number of Yemeni web sites that is the major concern but the quality of the information and to what extent it is useful;

In fact, the topic of the Arabic content has not obtained its full care. The evidence is the absence of researches and studies, which tackle this topic. However, limited trials can contribute indirectly to elevate the Arabic content and enforce it in the Internet network. That is through adopting some programs, which are still under research and study, and it is predictable to be executed soon, for instance:

- (i) A project on providing computer sets at suitable prices paid by installments every month and that would suit the individuals' incomes, considering that this work will sustain the abilities of using information and telecommunication technology and allow every one to make use of it;
- (ii) Exempt Internet subscribers from paying the subscription fee starting year 2003. This will increase the number of Internet users and encourage scholars to accelerate the Yemeni web sites on the Internet and their Arabic content;
- (iii) The Ministry seeks to provide services of the web sites with symbolic prices for certain professions, i.e., journalists and producing necessary training courses, assisting their preparation and development, baring in mind that this will contribute in increasing the Yemeni content on the internet and the percentage of local users; in addition to fulfilling the financial returns through using the local telephone lines for the Internet service.

A. DIFFICULTIES FACING THE ESTABLISHMENT OF THE INFORMATION SOCIETY

It is obvious from the above that the information society in Yemen is still in its beginning stage where efforts are concentrated on preparing the infrastructure, setting policies and strategies to establish this society. In spite of all those efforts, there are still a number of difficulties and obstacles that tend to entangle creating this society and setting it up. It is required from the government to solve these problems seriously. The most important of these difficulties are:

- (a) The absence of a national strategy for information technology that would enable organizing the information technology work and drawing clear national policies of the goals and landmarks, which can warrant the ideal benefit of the information technology outputs. Additionally, it shows the phases of coordination between information centers in the administrative units and making suitable decisions for not repeating producing the same statistic information. Not to mention the absence of planning on the public level to realize the concepts of the information technology age and coordinating ambitious and national training plans;
- (b) Language Barriers: where information on the Internet network web sites is mostly edited in English and the limitation of knowledge for Internet users on the way of searching, browsing and finding the required information. It is worth noting that learning English is not to get a list of verbs and memorize them but this language should be comprehended in its expressions and thoughts. This requires condensing training language competence programs, which is considered one of the infrastructure's elements for the information society;
- (c) Purchasing Power Barrier: where the citizen does not have the necessary purchasing power to possess a computer and its requirements and media. Yemen is one of the poor countries in which the percentage of families in high poverty is about 35%. This is a high percentage compared to other under-developed countries (10%). Because of the continuation of this phenomenon in Yemen, knowledge poverty adds to food poverty. This requires government officials to provide the government employees and the public sector with information technology at symbolic prices of monthly installments and exert efforts with the organizations and the granted agencies in offering endowments and aids in this field;
- (d) Work Bureaucracy and the procedure multiplicity in the process of making decisions that are distant from their goal. It is difficult to think of the mechanism of e-government before getting rid of the routine procedures in the traditional government work and reformulating the documentary cycles according to the concepts and requirements of the information technology;
- (e) The educational institutions face a number of difficulties in introducing educational curricula related to e-learning or teaching and rehabilitating their students in the information technology field. All of them seem to share facing these difficulties, which are: lack of ability, weakness of policies and plans of learning in the information technology field, scarcity of specialized cadre, multiplicity of supervising institutions and weakness of their standard;
- (f) The private sector faces a group of hindrances, which detain the marketing activity of its pecuniary and non-pecuniary products in the information technology field, and limits its expansion and growth. The most important difficulties are the lack of encouragement that the official institutions assign to the working companies in this field. This is because the investing law exempts the productive sectors from paying the taxes of trade and industrial profits for many years except those companies that are working in the information technology sector. Besides, the continuing increase of customs tax on imports has contributed to the increasing the cost of possessing information technology on one side and the emergence of smuggling in the markets where information technology is sold at competitive prices to the working companies in this field on the other side;
- (g) There is a regulatory weakness in constructing the information technology units and vagueness of the picture on the limitations and authority of its work. There is no sufficient authority given to the information technology units that would enable them to fulfill their duties without any hindrances, nor the necessary money to complete their construction, and the interference in their

job by unspecialized managers. Concentration is only given to computer sets, not to programming, productive systems, work environment, training and qualification, or maintaining work and others;

- (h) The weakness of the information technology awareness in the Yemeni society whether at the leadership level or the administrative one in the country: Naturally, this weakness covers education plans and policies in the information technology field. It can be said that the continuation of the illiteracy phenomenon in the information technology field at the level of leaders in the government units neither will offer the investment in the infrastructure of any industrial or civilian dimensions nor will contribute in creating the information society that we long for;
- (i) Because of the novelty of information technology and its big role in the successful management, the managers' inexperience in information technology has created a psychological barrier from using it. In addition to the continuing inclination towards the paper and printed material, and the weak investment in the information technology and its applications;
- (j) A great shortage in the number of Yemeni cadre in charge of teaching in the information technology field in the Yemeni universities and a clear inadequacy in keeping up with the successive changes and developments in information technology. The low percentage of information technology qualified people is due to the absence of Yemeni policies and plans based on periodical studies about the needs of the labor market in the information technology field.

B. RECOMMENDATIONS

The study has included an analysis of the information technology reality in Yemen. The society is still in its fetus stage and there are still many steps that need to be followed and urgent efforts to be executed in order to enable Yemen to transfer its society into the information and knowledge society. These efforts can be summarized in the following recommendations:

- (a) Establishing an official institution to be concerned with the information technology sector. Sufficient money must be assigned to it for preparing studies, specifying goals, formulating policies, drawing strategies that guarantee the information and communication technology sector and carrying out cooperative programs between the various sectors in the country in its movement towards the information society;
- (b) Producing committees or workgroups on analyzing the current reality of the information technology sector, specifying its problems, proposing necessary applications for the importance of information, involving academic people, businessmen and specialized government institutions for these purposes;
- (c) Paying good attention to the human element in exerting the training and qualifying programs, and relating promotions, bonuses, and financial preferences to the individuals' achievements in information and communication technology; in addition to the concentration on research related to electronic government, and on learning at a distance and treating at a distance;
- (d) Developing the basic structure of the information network and connecting it with the Ministry of Higher Education and Scientific Research, and providing teaching staff in universities and primary educational workers with information and communication technologies at low prices and in installments;
- (e) Developing governmental management, elevating the workers' competence, limiting the bureaucratic routine that contributes to hindering performance. Imposing the use of information and telecommunication applications in the government work regardless of its type and considering using these technologies as a challenge that must be faced not only advertised for;

- (f) Beginning to activate the electronic industry and the country's needs for computer sets with their requirements and equipment, and cooperating with the private sector in carrying out their alliance and partnerships with international companies. Shifting the society from the complete importing activity of information and communication technologies to manufacturing and creating job opportunities;
- (g) Issuing organized rules and laws for the information and communication sector, reconsidering intellectual property and telecommunication laws. Taking a clear step in liberating the telecommunication market, intensifying training and qualifying programs for the judges in the field of information and communication technologies and what may result as conflicts between the individuals, formulating rules and the necessary bylaws.

Annex 1

INFORMATION SOCIETY INDICATORS

Indicator	Y2000	Y2001	Y2002
1. Basic Background Indicators			
1.1 Population	18,145,873	18,862,999	19,193,102
1.2 Area	460,000	460,000	460,000
1.3 Density (per sq.km)	41.00	41.00	42.00
1.4 Urban population	4,808,656	4,998,695	5,086,172
1.5 Adult literacy	52.7	52.7	N.A.
1.6 Poverty	42.5	42.5	N.A.
1.7 GNI per capita	384.00	403.00	N.A.
1.8 GDP growth	4.5	N.A.	N.A.
2. Telecom Infrastructure			
2.1 Fixed lines (total)	459,434	540,434	626,832
2.2 Domestic (lines per household)	1.90	1.90	1.90
2.3 Urban (%)	97.8	95.9	N.A.
2.4 Waiting list (total number)	159,490	621,602	680,500
2.5 Waiting time (average)	60		95
2.6 Revenue per line (\$)	95	95	95
2.7 Cost of local call (\$ per 3 minutes)	0.02	0.02	0.02
2.8 Cost of call within region (\$ per 3 minutes)	0.08	0.08	0.08
2.9 Cost of call to US (\$ per three minutes)	4.00	4.00	4.00
2.10 Number of fixed line operators	346,709	422,228	469,807
2.11 ISDN lines			
2.11.1 Initial cost (\$)	625	588	555
2.11.2 Monthly charge (\$)	28	26	25
2.12 DSL lines	N.A.	N.A.	N.A.
2.13 Leased lines			32
2.13.1 Initial cost (\$)			500
2.13.2 Monthly charge (\$)			100
2.14 Cable	N.A.	N.A.	N.A.
2.15 Outgoing traffic (minutes per subscriber)	105	102	N.A.
2.16 Incoming traffic (minutes per subscriber)	30	36	N.A.
2.17 Mobile lines	00	147837	243264
2.18 Number of mobile operators	00	147837	243264
3. Media Infrastructure			
3.1 Radios	N.A.	N.A.	N.A.
3.2 Television	N.A.	N.A.	N.A.
3.3 Satellites	N.A.	N.A.	N.A.
3.4 Daily newspapers	4	4	4
4. Computers and the Internet			
4.1 Personal computers	N.A.	N.A.	140,000
4.2 Personal computers in education	N.A.	N.A.	N.A.
4.3 Percentage of computers that are networked	N.A.	N.A.	N.A.
4.4 Internet subscribers	6377	7034	9026
4.5 Internet users	N.A.	N.A.	59520
4.6 Internet hosts	N.A.	0.02	N.A.
4.7 ISPs (main)	1	1	2
4.8 ISP monthly charges (\$)	N.A.	N.A.	18.00
4.9 Telephone usage charges (\$)	0.05	0.05	0.01
4.10 Available national bandwidth			24

Annex I (continued)

Indicator	Y2000	Y2001	Y2002
4.11 Hosting availability	N.A.		Yes
4.12 Secure servers			Yes
5. ICT expenditure			
5.1 Telecom expenditure (million \$)	N.A.	N.A.	63
5.2 IT expenditure (million \$)	N.A.	N.A.	0.74
5.3 Percentage of GDP (%)	N.A.	N.A.	3.3
5.4 ICT per capita (\$)			
6. Capacity building			
6.1 Scientists and engineers in R&D	N.A.	N.A.	116
6.2 R&D expenditure (% of GNI)	N.A.	N.A.	N.A.
6.3 ICT related graduates per year	N.A.	N.A.	N.A.
7. ICT government and business environment			
7.1 e-readiness index	N.A.		
7.2 e-government index		N.A.	
7.3 IPR enforcement	N.A.		
7.4 Compliance with WTO	N.A.		
7.5 Basic telecom agreement	N.A.		
7.6 Reference paper	N.A.		
8. Laws and regulations			
8.1 Patent law	Yes		
8.2 Trademark law	Yes		
8.3 Copyright law	Yes		
8.4 IT Agreement	No		
8.5 e-Commerce law	No		
8.6 e-Signature law	No		
8.7 Piracy Rate	N.A.		
9. ICT policy			
9.1 ICT strategy		No	
9.2 ICT Plan of action	Yes		
9.3 National Initiatives	Yes		