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## **PROFILE OF THE INFORMATION SOCIETY IN THE KINGDOM OF SAUDI ARABIA**

**2003**

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Note: This document has been prepared by Mr. Mohamed Mahmoud Mandoura, Mandoura Consulting Office, ESCWA consultant, and reproduced without formal editing. The opinions expressed are those of the author and do not necessarily reflect the views of ESCWA.

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## INTRODUCTION

This report gives an overview of the progress in Saudi Arabia as it transforms itself into an information society. It is a known fact that the IT market in Saudi Arabia is the largest amongst all of the Arabic countries, with the expectations that it would grow even bigger in the coming years. The driving forces behind the expansion of the Saudi IT market is two folds:

- (a) The high population growth rate, which stands at more than 3%. Also, the population is very young with the sector that is younger than 15 years old comprising more than 43.4% of the total population<sup>1</sup>. This young population is expected to create strong demand on high tech products, particularly, on PCs and the Internet;
- (b) The strong economy of the country. This strength is expected to continue as it embarks on more projects to diversify its economical resources and with the continuing solid prices of oil.

In the last few years, further developments took place that should have positive impact on Saudi Arabia's quest to become an information society. These include the following:

- (a) A decision by the highest authority in the country that Saudi Arabia should have its own National Information Technology Plan. The work in the development of this plan started on March 2001;
- (b) The creation of a Ministry for Information and Communication Technology. This new Ministry was created in the new formation of the Cabinet in 2003;
- (c) The successive reduction in the cost of acquiring the mobile phone services from SR3500 back in 1999, to SR1500 in 2000, to SR800 in 2001, and finally, to only SR100 in 2003;
- (d) The start of the operation of several high-speed communication services to the businesses and the individuals. These include: ADSL, ISDN, and Frame Relay;
- (e) The establishment of a local factory for PCs in 2000. This factory has a capacity to manufacture about 200 units daily.

All of these developments (and few others more to be discussed in the report) increase the confidence that Saudi Arabia is moving forward strongly to become a respectable information society. This is to be accompanied with increasing efforts to harness the ICT technologies and utilize it more efficiently to support the development endeavors.

## I. POLICIES AND STRATEGIES

The IT policies and strategies are of two categories: (a) those on the national level; and (b) those on the corporate or sector level.

### A. ICT POLICIES AND STRATEGIES ON THE NATIONAL LEVEL

Two major developments can be reported here: (i) the approval of the Saudi Cabinet to the National Plan for Science and Technology, which contains many clauses related to ICT, and (ii) the start of the work on developing a National IT Plan for Saudi Arabia.

#### (i) The National Plan for Science and Technology

The National Plan for Science & Technology (NPST) for Saudi Arabia was developed jointly by King Abdulaziz City for Science & Technology (KACST) and the Ministry of Planning. The work on the development of the plan started in 1996, completed in 2000, and the plan was approved by the highest authority in the country (Council of Ministers) in 2002.<sup>2</sup>

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<sup>1</sup> UNDP, *Human Development Report 2001*

<sup>2</sup> Ministry of Planning/KACST, *The National Plan for Science and Technology*, 2001.

The NPST aims at identifying the action plans and projects needed to advance the status of science and technology (S&T) in all fields that contribute to the national wealth: agriculture, industry and services. In doing so it identified 10 strategic principles, underneath which a set of 90 recommendations were put forward. A closer look into these recommendations reveals that several ones would contribute to the evolvement of the IS in the society. These include (as examples):

- (a) A call for more support to R&D efforts in ICT fields,
- (b) Expansion of education and training in science and technology,
- (c) Review of curricula (K-12) to incorporate technology education,
- (d) Efficient utilization of IT and data base applications to support all types of activities;
- (e) A call to develop a national IT plan.

The detailed NPST is currently being completed where the specific goals will be developed. This is to be followed by identifying the programs and projects that need to be executed by the different sectors in the society. The normal process here is for all Ministries and governmental agencies to include in their annual budgets the needed projects and programs to fulfill to the NPST objectives.

## **(ii) The National IT Plan for Saudi Arabia:**

The National IT Plan (NITP) is being developed by the Saudi Computer Society (SCS) with on an authorization from the Crown Prince<sup>3</sup>. The work in this plan is proceeding over 2 major tracks, as follows:

**Track I:** The development of the Urgent IT Action Plans (UITAP). The work on this version of the NITP started in July 2002, and was completed in November 2002. UITAP contains 21 recommendations distributed over 6 axis:

1. Reorganization of the IT Sector (2 recommendations; one of them calls for the establishment of a high authority for IT);
2. Building ICT Capability;
3. Building ICT Infrastructure;
4. Utilization of IT to support development;
5. Enhancing the digitized Arabic and Islamic content;
6. Support the implementation of e-government.

Notably, we can mention here one recommendation that was met with fast action; a new Ministry of Communication and Information Technology was established in Saudi Arabia in the most recent new Cabinet that was formed in April 2003.

**Track II:** The development of the detailed strategic NITP. The work on this version of the NITP started also in July 2002, and it is expected to be completed in November 2003.

Although Saudi Arabia is somewhat late in developing its NITP, but this has the advantage that the plan may benefit from the experiences of other countries. The NITP should also benefit from the relative maturity of the technology, particularly, in the post dot-com collapse of 2000.

## B. ICT POLICIES AND STRATEGIES ON THE CORPORATE LEVEL

The concept of IT planning is starting to gain momentum amongst the managers of IT centers in the different institutions in the public and private sectors. A recent survey on 80 governmental institutions and agencies revealed that about 70% of them have medium- and/or long-range IT plans.<sup>4</sup>

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<sup>3</sup> [www.nitp.org.sa](http://www.nitp.org.sa)

Long-term IT plans, however, requires regular updating to accommodate the ever continuing advances in technology and in the society. The same study showed than more than 70% of the institutions in the public sectors complain from lack of enough funding to support their IT plans, and more than 86% complain from their inability to recruit highly trained IT professional because of the low salaries offered to them.<sup>5</sup>

## II. LEGAL AND REGULATORY FRAMEWORKS

Two type of laws and regulations will be discussed here: (a) the implemented laws related to information and ICT and those under development; and (b) ICT standards.

### A. LAWS THAT ARE IMPLEMENTED OR UNDER DEVELOPMENT

Saudi Arabia has the special characteristics that it relies on the Islamic teachings as the main source for its laws and regulations in all aspects of life. Hence, only those laws that conform to the Islamic teachings are accepted and implemented. As far as ICT is concerned, the legal and regulatory frameworks are still in their infancy; only few laws were developed and implemented as shown in Table 1.

TABLE 1. INFORMATICS LAWS AND REGULATIONS IMPLEMENTED IN SAUDI ARABIA

Title of The Law	Date	Issuing Body
Copyright Law	1999	Ministry of Information
e-Banking Law	2001	Saudi Arabian Monetary Agency
Internet Coffee shops	2001	Ministry of Municipal and Rural Affairs
e-Umra Centers	2000	Ministry of Hajj
ISP Requirements		KACST
Operational Regulation for Internet Coffee shops		KACST
Internet Access		KACST
Electronic Publishing		King Abdulaziz National Library
Electronic Publishing on the Islamic Sites		Ministry of Islamic Affairs
Salaries Scale for IT Professionals		Ministry of Finance

There are a few more laws that are currently under development. These include the following:

- (a) e-Commerce Law;<sup>6</sup>
- (b) Electronic Signature Law;
- (c) PKI regulation;
- (d) Electronic Security Law;
- (e) Information Privacy Law.

It is evident from the above that the efforts to develop IT laws and regulations are somewhat limited. The reason for that is, perhaps, because the responsibilities for these endeavors are distributed among several agencies and institutions without a central body to supervise these efforts. This situation could improve greatly, however, after the creation of the new Ministry of Information and Communication Technology in the last Cabinet.

### B. ICT STANDARDS

The agency that is responsible for the development and issuance of standards in all industrial and technological aspects is the Saudi Arabian Standards Organization (SASO)<sup>7</sup>. On the ICT front, SASO has accomplished the following:

<sup>4</sup> Yousuf J. Homaily, A Survey of Computer Applications in the Public Sector, Symposium on Computers in The Public Sector, Institute of Public Administration, 23 March, 2003, Table 5.

<sup>5</sup> Ibid, Table: 17.

<sup>6</sup> [www.e-commerce.gov.sa/ecommm/](http://www.e-commerce.gov.sa/ecommm/)

<sup>7</sup> [www.saso.org.sa](http://www.saso.org.sa)

- (a) Issuance of about 44 ICT Standards (of a total of 2000 Standards issued till now);<sup>8</sup>
- (b) Representing Saudi Arabia in the International Joint IT Committee IEC/ISO JTC1;
- (c) Act as a resource for the public on all matters related to Standards from international organizations.

Table 2 gives a comparison between the accomplishments of SASO and those of JTC1 until the end of 2001.<sup>9</sup>

TABLE 2. SASO AND JTC1 ACCOMPLISHMENTS AND ACTIVITIES

Area of Activity	SASO	JTC1
No. of ICT Standards	44	1700
No. of ICT Committees	0	19

As it is evident from the numbers in Table 2 above, the accomplishment of SASO with regard to ICT is very limited. The number of ICT Standards developed by SASO is only about 2.6% of the total ICT Standards developed by JTC1. Also, the fact that there are currently no active ICT committees working with SASO is an indication that SASO is, perhaps, not active in recruiting the local ICT experts to support her in developing ICT Standards.

### III. ICT INFRASTRUCTURE

#### A. ICT INDICATORS FOR SAUDI ARABIA

Table 3 gives some of the important ICT indicators for Saudi Arabia from 1999-2001 based on the data published by the International Telecommunication Union (ITU).<sup>10</sup>

TABLE 3. ICT INDICATORS FOR SAUDI ARABIA

Indicator	Unit	1999	2000	2001
Population	X 1000	20899	21607	22322
No. of households	X 1000	3080	3196	3320
GDP	SR Billion	604	707	698
Fixed telephone lines	X 1000	2706	2965	3233
Fixed phones per 100 inhabitants		12.95	13.72	14.48
Mobile telephone subscriptions	X 1000	837	1376	2529
Mobile phones per 100 inhabitants		4.00	6.37	11.33
Cost of fixed line installation	SR	500	500	500
Fixed line monthly subscription rate	SR	60	60	60
Cost of local call (3 min.)	SR	0.06	0.13	0.13
Cost of mobile subscription	SR	3500	1500	800
Mobile monthly subscription rate	SR	30	30	30
Cost of mobile call (3 min.)	SR	4.5	3.6	2.85
Telecom revenues	SR Billion	14.437	16.930	19.781
PCs	X 1000	1200	1300	1788
Internet hosts		4160	3745	11422
Internet users	X 1000	100	460	1016

The data in Table 3 above exhibited a definite growth in the number of telephone lines (both fixed and mobile) from about 16.95 phones per 100 inhabitants in 1999 to 20.09 in 2000, and to 25.81 in 2001.

<sup>8</sup> See SASO Standards 2002.

<sup>9</sup> [www.jtc1.org](http://www.jtc1.org)

<sup>10</sup> ITU, Arab States Telecommunication Indicators, 1992-2001.

This shows an average annual growth rate of about 23.4%. Also, the number of PCs witnessed a growth of about 50% between 1999 and 2001, while the number of Internet users increased more than 10 times over the same period.

A study sponsored jointly by the Ar-Riyadh Development Authority and Riyadh Chamber of Commerce gives projections for many ICT indicators. The study was conducted as part of an ambitious project to establish a Center for Information Technology and Telecommunication Industries in Riyadh<sup>11</sup>. Table 4 shows the projections made by the above-mentioned study for some ICT indicators till year 2010.

TABLE 4. FUTURE PROJECTIONS FOR SOME ICT INDICATORS FOR SAUDI ARABIA

<b>Indicator</b>	<b>Units</b>	<b>2003</b>	<b>2005</b>	<b>2010</b>
Population	X 1000	22400	23900	28110
Fixed phones	X 1000	4641	5611	8386
Fixed phones per 100 inhabitants		20.72	23.48	29.83
Mobile phones	X 1000	4770	8824	16518
Mobile phones per 100 inhabitants	X 1000	21.3	36.9	58.8
Fixed and mobile phones per 100 inhabitants	X 1000	42.2	60.4	88.58
PCs	X 1000	2088	2696	4847
PCs penetration (PCs per 100 inhabitants)		9.32	11.28	17.24
Internet users	X 1000	1072	1975	7932
Internet penetration (Internet user per 100 inhabitants)		4.79	8.26	28.21

The projections in Table 4 above suggested large growth rates in the number of phones per 100 inhabitants, PCs penetration, and Internet penetration. These are all indications that the Saudi society is moving strongly and rapidly to become a prominent information society.

#### B. INTERNET USERS

Table 3 gave the number of Internet users in Saudi Arabia based on the ITU estimates. Another source for such estimates can be obtained from the Internet Service Unit (ISU) at KACST, which is the body responsible for the national Internet network in the country. The ISU estimated that for each Internet subscription, there are 2.5 users<sup>12</sup>. Hence, the number of Internet users is equal to the number of Internet subscriptions multiplied by 2.5. Based on this formula, Table 5 gives the estimates of Internet users over the period from 1998 to 2002. As can be seen the difference between the estimates made the ISU and those made by the ITU is about 15% which is reasonable, and give a good degree of confidence in these estimates.

TABLE 5. THE GROWTH IN THE NUMBER OF INTERNET USERS

<b>Year</b>	<b>No. of Subscribers*</b>	<b>No. of Users**</b>	<b>Growth Rate</b>
1998	15000	37500	-
1999	45000	112500	200%
2000	150000	375000	233%
2001	360000	900000	140%
2002	500000	1110000	40%

\* Based on STC estimates.

\*\* Assuming 2.5 users for each subscriber.

<sup>11</sup> Spiller Gibbins Swan Pty Ltd and The Consulting Center for Finance and Investment, A Report on Center for Information Technology and Telecommunication Industries, Ar-Riyadh Development Authority and Riyadh Chamber of Commerce and Industry, Sept. 2001, p. 36.

<sup>12</sup> [www.isu.net.sa](http://www.isu.net.sa)

### C. INTERNET PORTS AND INTERNATIONAL BANDWIDTH

The number of Internet ports is measured as the same number of digital modems provided by STC to the ISPs. It gives a measure of how many users can be connected to the Internet at any given time. Table 6 gives the number of Internet ports over a period of five years, and it shows that it grew from 5000 ports in 1998 to 130000 in 2002.

TABLE 6. THE NUMBER OF INTERNET PORTS<sup>13</sup>

<b>Year</b>	<b>Number of Ports</b>	<b>Growth Rate</b>
1998	5000	-
1999	8000	60%
2000	20000	150%
2001	90000	350%
2002	130000	45%

Since the number of Internet users is estimated to be between 1-1.2 millions, the current number of Internet ports indicates that each port serves about 9 users. However, as the number of users is expected to grow to 2 millions in 2005, and to more than 5 millions in 2010, and as the user spends more time connected to the Internet, it is necessary to plan for the necessary growth in these ports to avoid any degradation in the connectivity to the Internet.

Table 7 gives the international bandwidth between the national Internet network and the international network over a period of 5 years<sup>14</sup>. Although the bandwidth demonstrates considerable growth over that period, however, average bandwidth per Internet user is about 600 b/s. This figure is perhaps acceptable for most of the users who use the Internet for chatting or email services, however, the number of Internet users increases and as more serious applications over the Internet increases, it is necessary to provide more bandwidth per user. One way to accomplish this goal is to allow the ISPs to connect directly to the international Internet network without going through the bottleneck of KACST.

TABLE 7. THE INTERNATIONAL BANDWIDTH OF THE INTERNET

<b>Year</b>	<b>Bandwidth (Mb/s)</b>	<b>No of Users</b>	<b>Bandwidth/user (Kb/s)</b>
1998	5	37500	0.133
1999	70	112500	0.622
2000	330	375000	0.880
2001	480	900000	0.533
2002	640	1110000	0.577

### D. INTERNET DOMAIN NAMES

The local Internet domain names (that end with .sa) are issued by the ISU at KACST. Table 8 shows the growth in the local domain names over the period from 1998 till 2003.<sup>15</sup> Although the figures in the table indicates strong growth rates in these domains, however, the absolute value of these numbers is very small compared those in other countries. Furthermore, many of these domain domains were reserved only and they are not active. This means that the number of active local domains is even lower. This reflects the preference of the businesses in Saudi Arabia to register their domain names internationally rather than register them locally with KACST.

<sup>13</sup> Ibrahim Saleh Al-Furaih, Assessment of Internet Services in Saudi Arabia, ISU, KACST, March 2002. (see [www.isu.net.sa](http://www.isu.net.sa))

<sup>14</sup> [www.isu.net.sa/surveys-&-statistics/international-bandwidth.htm](http://www.isu.net.sa/surveys-&-statistics/international-bandwidth.htm)

<sup>15</sup> [www.saudinic.net.sa/ar/tools/StatisticAll.htm](http://www.saudinic.net.sa/ar/tools/StatisticAll.htm)

TABLE 8. THE LOCAL DOMAIN NAMES (.SA)

Year	Accumulative No. of Domains	Growth Rate
1998 (and before)	217	-
1999	1350	520%
2000	2825	109%
2001	3814	35%
2002	4901	25%
2003 (Feb. 19)	5001	2%

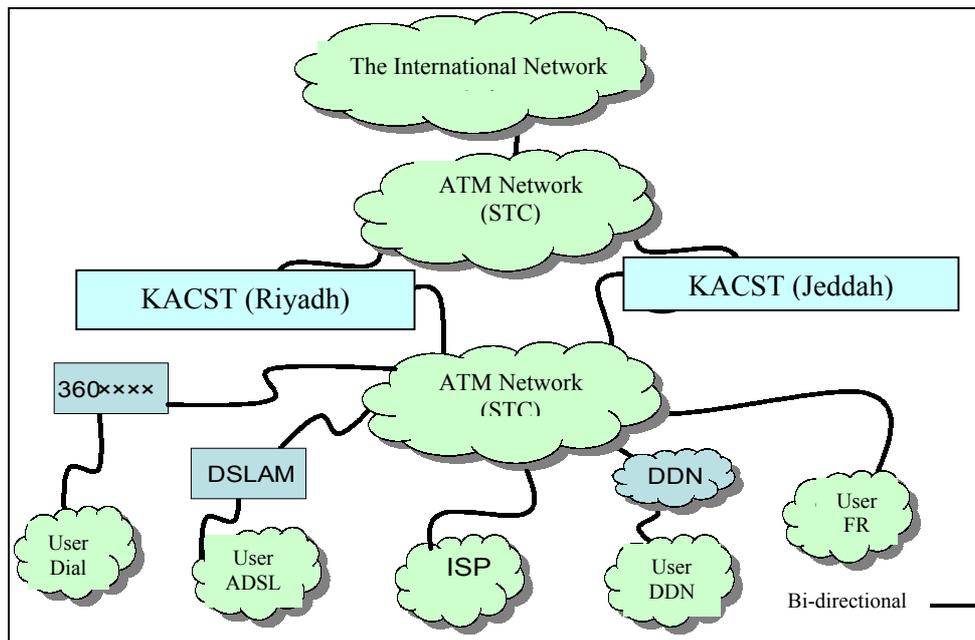
E. THE INTERNET INFRASTRUCTURE AND BACKBONE

There are three bodies that are responsible for providing Internet services in Saudi Arabia:

- (a) The Internet Service Unit (ISU) at KACST;
- (b) Saudi Telecommunication Company (STC);
- (c) And the Internet Service Providers (ISPs).

Figure 1 gives the topography of the Internet infrastructure in Saudi Arabia. In this set-up, the user connects to one of the ISPs by dialing the ISPs phone number (360xxxx), or via a high speed ADSL/DDN/Frame Relay connection. STC plays the role of connecting the user to the ISP and then connecting the ISP to the ISU at KACST. The ISU provides the connection to the international network. This ISU has two centres; one in Riyadh and the other one in Jeddah.

Figure 1. The Current Internet Topography in Saudi Arabia



F. THE MAJOR PROJECTS IN THE LAST THREE YEARS

Table 9 shows the major telecommunication infrastructure projects that were completed or started in the last three years. Some of these projects are operational now; and some are still under development.

TABLE 9. THE MAJOR TELECOMMUNICATION INFRASTRUCTURE PROJECTS IN THE LAST THREE YEARS

<b>Year</b>	<b>Project</b>	<b>Description</b>
2000	Connecting Commercial Building with Fiber	By Oct. 2002 more than 178 commercial buildings were connected to the ISPs via fiber cables
2001	The ADSL Project	To provide more than 18000 ADSL connections to households and small and medium businesses
2002	The MPLS Project	A project that is under development to build high speed telecom infrastructure that is compatible with ATM.

## IV. ICT CAPACITY-BUILDING

### A. COMPUTER CURRICULA IN PRE-COLLEGE EDUCATION

The computer curricula in pre-college education have passed through several phases of development. Computer courses were introduced in high schools as early as 1985. Over a period of 19 years the computer curricula was modified several times. Currently, there are three computer courses that are taught in the boys' high schools; one course in each year with two lectures weekly. In the girls' high schools only two courses are taught: in the second and third years.

It can be observed here that there are no official computer courses in the stages below high school. However, unofficially many elementary and intermediate schools, and particularly private schools, introduced computer activities in their curricula either as independent courses, or into the non-curricular activities.

In order to control and develop computer education in elementary and intermediate schools, the Ministry of Education collaborated with the private sector in introducing computer courses in these schools on an experimental basis. The experiment started in 1999, and it has the following goals:

- (a) Provide computer education to students in the elementary and intermediate levels;
- (b) Allow the students to gain the necessary IT skills;
- (c) Allow the private sector to contribute in the development of education;
- (d) Allow the parents to contribute financially in enhancing the education of their children;
- (e) Train the teachers on the use of IT and how to incorporate it in the process of teaching and learning;
- (f) Using IT resources to improve the students' performance in other subjects.

The computer course is taught at the rate of one lecture weekly. It included giving the students the opportunity to use several useful productivity tools, such as: word processing, spreadsheets, multimedia, computer communication, electronic publishing, and programming.

The main obstacle confronting computer education is how to accommodate these new courses within a crowded curriculum schedule. In the above experiment, a lecture from an Art or a Reading course was converted into a Computer lecture.

### B. THE PROJECT TA'HEEL FOR HIGH SCHOOLS

Project TA'HEEL is an example of a national project that aims at building ICT capacity amongst the students in high schools. The project started in 2001 and was implemented into 20 schools throughout the Kingdom on an experimental basis. The project has the following objectives:<sup>16</sup>

<sup>16</sup> [www.taheel.org.sa](http://www.taheel.org.sa)

- (a) To prepare the students who join this program with advance IT skills through professional training programs from technology companies such as Cisco and Microsoft;
- (b) Prepare the students for the work environment and demands, and to enable them to get respectable jobs after high school if they choose to do so;
- (c) Allow the students to gain IT skills that may benefit them in their daily life.

The program has five tracks as follows:

- (a) Office Technologies: this track allows the student to gain professional skills in Office Productivity tools, such as: Word, Excel, Power Point, Project Management. This is in addition to mastering Windows 2000;
- (b) System Development: This track train the student on how to develop an application or an information system using Visual Basic and/or Access under Windows 2000;
- (c) Internet Tools: This track trains the student on using Web design and development tools, such as: Front Page and Photo Draw;
- (d) Computer Networks: In this track the student learns how to design a computer network and implement it using Cisco products;
- (e) Computer Maintenance: In this track, the student learns how assemble a PC, maintain it, upgrade it, and repair it.

On its face the project looks to be innovative and important for it aims at producing qualified IT professionals with certification from reputable IT companies such as Cisco and Microsoft. The certification from these companies is definitely one of the strong points of the project for it would make it easier for the students to find jobs in the IT field. Although the project was not thoroughly evaluated, however, its implementation over the last few years yielded several remarks:

- (a) Two lectures per week were allocated to program (a total of 90 minutes). This amount of time is hardly sufficient to give the students the basic IT skills. Hence, it definitely would not allow the average student to gain enough knowledge and training to acquire certification from Microsoft or Cisco;
- (b) Lack of qualified teachers. The teachers themselves must be certified professional as well as certified teachers and trainers of IT subjects;
- (c) Many of the schools participating in the project complained that they did not get the proper labs, equipment, and software for the successful implementation of the project.

### C. TEACHERS COLLEGES<sup>17</sup>

The Teachers Colleges and the Colleges of Education are the institutions in the country responsible for the preparation of teachers to the schools. Since the introduction of computer curricula in schools in the form of IT courses and as tools to support other activities requires qualified IT teachers, it is evident that the curricula in Teachers Colleges need to be developed to guarantee that graduated teachers have the necessary IT skills.

In Saudi Arabia there are separate educational institutions for the males and for the females. Computer courses were introduced into the curricula of the male Teachers Colleges as early as 1984 with the purpose to remove computer illiteracy among future teachers. Beginning in the late 90s, some of these colleges started to offer specializations that lead to the graduation of IT teachers.

As for the female Teachers Colleges, its curricula, as far as IT is concerned, is between 4-5 years behind the curricula in the male Teachers Colleges. This is expected because computer courses were introduced only recently in female secondary schools. In general, the demand for both male and female IT

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<sup>17</sup> [www.mou.gov.sa/teachers\\_colleges/](http://www.mou.gov.sa/teachers_colleges/)

teachers is high, and the Teachers Colleges cannot cope with the demand. Hence, more care and emphasis need to be given to the programs that prepare future IT teachers.

#### D. UNIVERSITY-LEVEL COLLEGES AND COMMUNITY COLLEGES

University-level colleges are those institutions that offer 4-5 years IT programs that lead to a B.SC degree. The community colleges on the other hand offer programs that are 2-3 years long, and lead to a Diploma degree. In the last four years some major developments took place that include the following<sup>18</sup>:

- (a) Four new IT colleges were founded in Ummulqura University in Makkah, King Abdulaziz University in Medina, Imam Mohammad Bin Saud University in Riyadh, and King Khalid University in Abha. Those are in addition to two IT colleges that were founded in the mid 80s;
- (b) Five private colleges started to operate: 3 colleges for males and 2 colleges for females. Most of these colleges have IT departments and offer programs that lead to B.SC degrees in IT related fields;
- (c) A leap in the number of Technical Colleges under the management of the General Organization of Technical Educational and Vocational Training (GOTEVOT) to reach about 20 colleges. Most of these colleges offer IT programs that lead to either B.SC or Diploma degrees;
- (d) A branch was opened for the Open Arab University in Riyadh. Classes started in 2002, and the University offers one IT specialization to lead to a B.SC degree;<sup>19</sup>.
- (e) Many Community Colleges were opened. Almost all of these colleges offer IT programs that lead to Diploma degrees.

From the above one can conclude that there is enough number of education institutions that specialize in preparing IT professionals either with Diploma degrees or with B.SC or higher degrees. The emphasis should be directed to designing the proper programs that produce graduates with proper and enough skills and experience to fulfill the demand in the market.

Also, special care should be given to improve the quality of education in the local educational institution, because a major concern about graduates from local universities and colleges is their low performance when compared with expatriate professionals. This may call for the enforcement of some quality standards on all local educational institutions.

### V. BUILDING THE ICT SECTOR

Globally, ICT companies occupy the front seats among the largest corporations. According to the ranking of Forbes Magazine for 2002<sup>20</sup>, IBM comes in 8<sup>th</sup> place with sales volume reaching more than 86 Billion \$, and in 6<sup>th</sup> place in profits with 7.7 Billion \$. The total assets of IBM is about 88 Billion \$. Microsoft occupies the 62<sup>nd</sup> position with sales of 26.8 Billion \$, the 11<sup>th</sup> position in profits with 6.1 Billion \$, and with total assets of 65 Billion \$. In the communication sector, we find SBC Communication occupying the 25<sup>th</sup> position with sales volume of 45.9 Billion \$, the 8<sup>th</sup> position in profits with 7.26 Billion \$, and with assets more than 96 Billion \$.

As for the Saudi ICT companies, a survey made by the Saudi Research & Marketing Group about the top 100 Saudi companies<sup>21</sup> showed that STC occupied the 3<sup>rd</sup> position with sales volume in excess of 19.781 Billion SR, and with assets more than 39 Billion SR.<sup>22</sup> Then, we find several ICT companies:

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<sup>18</sup> More information about university-level educational institutions can be found in the different publications of the Ministry of Higher Education; e.g. The 5th Annual Report on Higher Education, 2000.

<sup>19</sup> [www.arabou.org](http://www.arabou.org)

<sup>20</sup> [www.forbes.com/finance/lists/](http://www.forbes.com/finance/lists/)

<sup>21</sup> The Saudi Research & Marketing Group, The Top 100 Saudi Companies in 2002.

<sup>22</sup> [www.stc.com.sa](http://www.stc.com.sa)

Arabian Computer Systems in the 47<sup>th</sup> position with 694 Million SR in sales<sup>23</sup>, Al-Alamia Electronics Company in the 61<sup>st</sup> position with 510 Million SR in sales<sup>24</sup>, and Advanced Electronic Company in the 65<sup>th</sup> position with 464 Million SR in sales.<sup>25</sup>

The top 100 Saudi companies list included several companies of diversified activities that included ICT. As examples: we find Al-Faisalia occupying the 15<sup>th</sup> position with sales volume of 2.5 Billion SR; however no data is available about how much of this amount is related to ICT<sup>26</sup>. Also, we find El-Ajou Group at the 55<sup>th</sup> position with sales volume of 550 Million SR. Again, no data is available about how much of this amount is related to ICT.<sup>27</sup>

From the above data, we can conclude that, with the exception of STC, the companies that occupy the top positions among the largest Saudi companies are those whose activities related to petroleum industry, petrochemicals, banking, services, or investment.

On another note, the data coming from the Chambers of Commerce in the different cities in the Kingdom shows that there are about 1695 companies registered their fields of activities in ICT trade, projects, and maintenance. In addition to that we have 21 Internet service providers.

The above data clearly suggest that indigenous industries related to ICT are very weak; most of the ICT products are imported through the ICT companies that act as local agents for the international companies. This conclusion calls for drastic measures to develop indigenous ICT industries to contribute more as another source of wealth to the Kingdom.

The development of mature indigenous ICT industries becomes even more vital since several studies predict huge growth in the demand to ICT products and services in Saudi Arabia. As an example, a study made by STC showed that the demand on ICT services in the Kingdom reached a value of 10.28 Billion SR in 2000 which equivalent to about 5.94% of GDP.<sup>28</sup> The study predicts that this demand would double to 20 Billion SR by year 2010 equivalent to about 9.5% of GDP, and to 40 Billion SR by year 2020 equivalent to 15.8% of GDP.

On the positive side, one can mention that some ICT industries have started in Saudi Arabia in recent years. For example, Al-Faisalia Group opened a factory for PCs in 2000. With an initial investment of 16 Million SR, the factory produces about 200 units daily. The brand name of the products is (ZAI), and its annual total sales of the factory is between 12000-14000 units which makes about 5% of the total consumption of the local market<sup>29</sup>.

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<sup>23</sup> [www.acs.com.sa](http://www.acs.com.sa)

<sup>24</sup> [www.al-alamia.com](http://www.al-alamia.com)

<sup>25</sup> [www.aecl.com](http://www.aecl.com)

<sup>26</sup> [www.alfaisalia.com](http://www.alfaisalia.com)

<sup>27</sup> [www.elagjougroup.com](http://www.elagjougroup.com)

<sup>28</sup> STC, Information and Communication Technology: Perspectives on the Saudi Arabia Economy, Sept. 2001, p. 17.

<sup>29</sup> Medina Newspaper, Issue # 14647, May 31, 2003.

## VI. APPLICATIONS IN GOVERNMENT ESTABLISHMENTS

### A. STATUS OF IT UTILIZATION IN THE GOVERNMENT SECTOR

A recent survey on 137 governmental establishments showed that about 20% of them do not have separate units to manage computer applications (e.g. computer centers).<sup>30</sup> Since most governmental establishments can be classified as medium to large entities, the above percentage is high, and calls for special consideration for it either indicates low level of computerization in those establishments that do not have computer centers, or that these establishment do not give the effort of computerization its due care and attention.

The same study showed that amongst the establishment that has computer centers, 35% of them still use mainframes, while the rest use departmental servers and/or PCs.<sup>31</sup> As for the applications, the study indicated that about 2/3 of it were developed internally, while the rest were developed by external contractors<sup>32</sup>.

The study also tried to measure the level of utilization on IT applications in the surveyed establishments that have computer centers. The results were reported as answers to a long list of statements; the respondents were asked to choose one answer out of five options: Very Strongly Agree, Strongly Agree, Agree, Hardly Agree, or Do Not Agree. In Table 10 below we give some of these results that are relevant to our analysis here as percentages of the answers underneath each answer choice.<sup>33</sup>

TABLE 10. MEASURING THE LEVEL OF IT UTILIZATION IN THE GOVERNMENTAL SECTOR

No.	Statement	V. Strongly Agree	Strongly Agree	Agree	Hardly Agree	Do Not Agree
1	The use of computers has resulted in the automation of work in the establishment	13.75%	50%	30%	6.25%	0
2	The user of computers resulted in process simplification and reduction of paper work	13.75%	38.75%	33.75%	13.75%	0
3	The use of computers has reduced the amount of processing time	18.75%	40%	30%	11.25%	0
4	The use of computers has reduced the amount of work on the head of dept.	5%	31.25%	41.25%	18.75%	3.75%
5	The use of computer has helped in providing accurate information to facilitate the decision making process	16.25%	45%	27.5%	11.25%	0
6	The use of computers helped our customers and allowed us to respond better and quicker to their concerns	20%	41.25%	25%	8.75%	5%
7	The use of computers provided better control of our resources, and resulted in higher quality and productivity	8.75%	40%	35%	12.5%	3.75%
8	The user of computers has provided us with more tools and information that can be used to better asses our performance	11.25%	32.5%	37.5%	16.25%	2.5%

<sup>30</sup> Yousuf J. Homaily, A Survey of Computer Applications in the Public Sector, Symposium on Computers in The Public Sector, Institute of Public Administration, 23 March 2000, page 22.

<sup>31</sup> Ibid, page 35.

<sup>32</sup> Ibid, Table 11.

<sup>33</sup> Ibid, Table 15.

In general, we see from the answers in the above table, that the percentage of respondents who are highly satisfied with computer applications in their establishments is about 53.3% (those who answered with Strongly Agree or Very Strongly Agree).

On the other hand, the percentage of those who are not happy with computer applications in their establishment is about 14.2% (those who answered with Hardly Agree or Do Not Agree). Since we have seen previously that about 20% of all governmental establishments do not have their own computer centers, then, we can conclude that about 34.2% (or 1/3) of all governmental sector either do not have computer centers, or are not satisfied with the current level of IT utilization at their establishments. This percentage is high and alarming, and calls for immediate action.

The study also tried to investigate the problems facing computer centers in the governmental sector. In Table 11 below we report on some of the findings of the study<sup>34</sup>.

As expected, the financial difficulties are major problems facing computer centers in the governmental sector. About 60% (those who responded with Strongly Agree or Agree) said that they face problems in securing enough fund to finance their IT projects and plans. More than 86% complained that they couldn't attract qualified IT professional because of the low salaries offered by their establishments. Also, 87% complained that they do not have enough job vacancies to hire IT people (jobs appropriations for all governmental establishments are allocated by the Ministry of Finance).

When trying to hire qualified IT professionals, 72% complained that they couldn't hire non-Saudi IT professionals (there are strong laws against assigning non-Saudi to jobs in the government sector). As for hiring Saudis, 88% complained that they couldn't find and attract qualified IT Saudi professional. This last fact collaborate another finding that indicate that local IT education programs vary considerably in their strength and quality. As a result, many of those who graduate from the weak programs lack the necessary IT skills demanded by the market.

TABLE 11. THE PROBLEMS FACING COMPUTER CENTERS IN THE GOVERNMENTAL SECTOR

No.	Statement	Strongly Agree	Agree	Not Sure	Do Not Agree	Strongly Do Not Agree
1	The IT hardware contractors do not follow international or Saudi Standards	2.5%	31.25%	28.75%	28.75%	8.75%
2	The software contractors do not follow international or Saudi Standards	6.25%	22.5%	36.25%	27.5%	7.5%
3	The communication infrastructure is not appropriate	36.25%	36.25%	6.25%	17.5%	3.75%
4	We face problems in getting support from the IT hardware contactors	13.75%	53.75%	17.5%	13.75%	1.25
5	We face problems in getting support from the IT software contactors	20%	43.75%	23.75%	11.25%	1.25
6	We do not have enough qualified Saudi IT professionals	61.25%	27.5%	3.75%	6.25%	1.25%
7	Our IT people tend to leave us and move to the private sector	42.5%	28.75%	16.25%	11.25%	1.25%
8	Our IT people tend to leave us and move to other governmental establishments	10%	23.75%	27.5%	32.5%	6.25%
9	We face difficulties in hiring non-Saudi IT professional	37.5%	35%	23.75%	3.75%	0
10	We do not have enough positions for IT professionals	56.25%	31.25%	5%	7.5%	0

<sup>34</sup> Ibid, Table 17.

TABLE 11 (CONTINUED)

No.	Statement	Strongly Agree	Agree	Not Sure	Do Not Agree	Strongly Do Not Agree
11	We cannot attract qualified IT professional because we offer low salaries	72.5%	13.75%	7.5%	5%	1.25%
12	We face problems in securing funds for our IT projects and plans	38.75%	21.25%	25%	15%	0
13	We cannot provide enough training for our IT staff	32.5%	36.25%	17.5%	13.75%	0
14	We cannot offer enough incentives to our staff to obtain better output from them	40%	41.25%	11.25%	7.5%	0
15	We do not have appropriate tools to enable us to measure the performance and productivity of IT people	21.25%	40%	13.75%	23.75%	1.25%

#### B. THE E-GOVERNMENT INITIATIVES

Despite the fact that Saudi Arabia is lagging other countries in implementing e-government applications, there are several attempts and initiatives that deserve mentioning here. On March 20, 2003, the Ministry of Finance, through its General Investment Fund, started an ambitious initiative to implement e-government in the Kingdom. The initiative stresses the need for good planning for e-government project in order to guarantee proper coordination between the different establishments, and to benefit from the experience of other countries in order to avoid any pitfalls that may be encountered. An extensive Action Plan for the initiative is being developed, and the major projects are being identified. One of such projects is the development of an e-gov portal through which different services can be offered to the citizens.

The strategic approach of the e-gov initiative is to implement e-gov applications in a decentralized way. Under this approach e-gov projects can be grouped into two groups:

- (a) Projects that belong mainly to a certain government establishment. These project would be executed by that particular establishment itself according to the principles and guidelines developed by the initiative;
- (b) Projects that involve several establishments. These projects would be executed by the initiative itself.

Another e-gov initiative is being promoted Prince Mugren Bin Abdulaziz, the Governor of Al-Madinah Al-Munawwara Region. In this initiative, the aim is to convert Al-Madina Al-Munawwara to become the first region in the Kingdom to adopt e-gov application to conduct government business throughout the whole region. This initiative is in its starting phases, where studies are being conducted to assess the readiness of the governmental establishment in the region for e-government.

In addition to the above, there are several applications belonging to different governmental establishment that are conducted over the Internet, and can be considered modes of e-gov applications. Table 12 gives a summary for these applications.

TABLE 12. EXAMPLES OF IT APPLICATION CONDUCTED OVER THE INTERNET

No.	The Gov. Establishment	Description of Application	Status
1	Ministry of Foreign Affairs	Electronic exchange of documents	Full implementation
2	Ministry of Foreign Affairs	Electronic issuance of visas	Full implementation
3	M. of Hajj, M. of Interior	Electronic exchange of pilgrimages data	Full implementation
4	M. of Hajj, M. of Foreign Affairs	Electronic exchange of Umra data	Full implementation
5	M. of Hajj, Umra companies, Umra Agents in other countries	Electronic exchange of Umra data	Full implementation
6	M. of Interior, M. of Foreign Affairs	Electronic exchange of foreign labor data	Full implementation
7	M. of Interior, M. of Foreign Affairs	Electronic transmission of foreign labor visas data	Full implementation
8	M. of Foreign Affairs, Riyadh Bank	Electronic exchange of data of payments of visas fees	Full implementation
9	M. of Foreign Affairs, Al-Rajhi Bank	Electronic exchange of data of payments of visas fees	Full implementation
10	M. of Interior, M. of Foreign Affairs	Electronic exchange of visas data and remote printing of passport	Under test

## VII. APPLICATIONS IN EDUCATION

### A. DISTANCE LEARNING

In general, there are only few attempts to offer distance learning in the educational institutions in the Kingdom. The reason for that is the slow acceptance of this mode of learning by the Ministry of Higher Education. The cases that can be considered forms of distance learning are the following:

- (a) Programs that are offered by many universities to part-time students. These programs are open in the humanities fields only. In this mode of education, the student studies at home; he only meet the instructor to get or submit assignment, and to perform tests and examinations. The use of IT to support learning or teaching, however, is limited;
- (b) The distance-learning program in medicine offered by Medu Net.<sup>35</sup> This program will be described in more detail in a following section;
- (c) The Arabic Open University (AOU). A branch for AOU was opened in Riyadh in 2002. The system at AOU calls for the students to attend 25% of the normal number of lectures for any specific course. The use of IT, however, is not emphasized at AOU.<sup>36</sup>

### B. E-CLASSES, E-COURSES AND E-LEARNING

In general the mode of formal e-classes or e-courses are limited in the Saudi educational institutions. In the following we review some of these implementations:

- (a) King Fahad University of Petroleum and Minerals (KFUPM) is experimenting with teaching a course on Data Structures remotely through the data network;
- (b) An e-learning lab is established at King Abdulaziz University in Jeddah. In this lab, the lectures of some selected courses are recorded using digital cameras; the recordings are saved in the storage devices of the server; these recordings are can be played back upon the request of the students through the data network;

<sup>35</sup> [www.medu.net.sa/](http://www.medu.net.sa/)

<sup>36</sup> [www.arabou.org/](http://www.arabou.org/)

- (c) Some private schools have built e-classes and are experimenting with e-learning. As an example, Al-Andalus school in Jeddah can be cited. More about this experiment will be given in a later section;
- (d) Some companies have built educational portals on the Internet. One example of these is Dawalej educational network. Any school can join the network of schools using this portal. Several courses are offered through the portal. Also more detail about these educational portals will be given later;
- (e) More schools are using educational material stored on CD-ROMs as support material for their courses.

### C. AL-ANDALUS PRIVATE SCHOOLS IN JEDDAH

Al-Andalus private schools in Jeddah is one good example of an educational institution that always strive to improve itself within the constraints imposed by the Ministry of Education in the Kingdom. Recently, the schools started an ambitious project to develop itself into a modern e-school.<sup>37</sup> The projected is implemented over five phases as follows:

**(a) Phase I (1994-1999) includes the following:**

- i. Building the network infrastructure and the computer labs;
- ii. Building a web site for the schools, and use the Internet as a communication tool;
- iii. Train the teachers on the using the Internet resources available to them;
- iv. Establish the core of IT specialist to take the responsibilities of activities related to IT and web application;
- v. Coordinate with the parents of a select of student who will participate in future e-learning experiment.

**(b) Phase II (2000-2001) includes the following:**

- i. Use the local intranet to automate the work in the schools;
- ii. Develop power point presentations for all courses as learning aids;
- iii. Convert a select of courses and textbooks into e-books;
- iv. Build the first e-class.

**(c) Phase III (2001-2002) includes the following:**

- i. Develop a portal for the schools on the local intranet;
- ii. Outsource the development of e-books a specialized company (RDI);
- iii. Build 3 more e-classes;
- iv. Sign an agreement with a specialized company (School City) to provide e-learning services for select courses.

**(d) Phase IV (2002-2003) includes the following:**

- i. Arrange with a local IT company (Zuhair Faiz) to develop the schools' portal on the local intranet to include DB applications;
- ii. Sign an agreement with an international specialized company (Blackboard) to help the schools implement e learning;
- iii. Increase the number e-classes to cover the whole of Intermediate stage;
- iv. Start preparing the Secondary stage for the implementation e-classes.

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<sup>37</sup> [www.alandalus-school.edu/](http://www.alandalus-school.edu/)

**(e) Phase V (2003-2004) includes the following:**

- i. Inaugurate e-classes in the Secondary stage;
- ii. Move the schools' portal which residing on the local intranet to the Internet;
- iii. Complete building the labs and classes to convert the schools into e-school;
- iv. Record the classes in video, and publish it through the schools' portal;
- v. Start the videoconferencing services.

**D. AL-DWALEJ EDUCATIONAL NETWORK**

Al-Dwalej is one the companies that specializes in educational technologies.<sup>38</sup> The company was established in 1992 with its core business to develop computerized educational courses in Arabic. Recently, the company inaugurated its educational portal on the Internet. The portal contains several e-courses for schools that so far covered the following:

- (a) Preliminary Stage: Mathematics, Sciences, and Arabic Language;
- (b) Intermediate Stage: Mathematics, Sciences, and Arabic Language;
- (c) Secondary Stage: Mathematics, Arabic, English, Physics, and Chemistry.

The business model of the educational portal is to offer its services to the participating schools that paid for the license to access the portal. Currently there are 15 schools that are participating with A-Dwalej. Since in the Kingdom there are more than 26000 schools,<sup>39</sup> it is evident that e-schools and e learning have still not found their way into the Saudi schools.

**E. FROM SCHOOLS' LIBRARIES TO LEARNING RESOURCES CENTERS**

The Ministry of Education started a project to develop the classical schools libraries and convert it to become Learning Resources Centers (LRC). A detailed specification for the LRC was developed that clearly describes what constitute a LRC. The modern LRC is expected to accommodate all available resources for knowledge whether printed, or non-printed including the necessary IT technologies that were proven to support learning; e.g. the Internet, CD-ROMs, video cassettes recordings, etc. By 2002, more than 1330 LRC was built in different schools all over the country.

**VIII. APPLICATIONS IN COMMERCE AND BUSINESS**

**A. E-BUSINESS**

The effort to spread e-business applications in the Kingdom is spearheaded by the Ministry of Commerce (MoC). In November 2001, MoC published a report that summarizes the efforts done in Saudi Arabia to promote e-business and spread the awareness about it among the public<sup>40</sup>. The report showed that over a period of two years, from May 1999 to May 2001, at least seven different symposiums and exhibitions were held to promote e-business and tackle the problems associated with it.

One of the milestones in developing e-business in the Kingdom is the establishment 1999 of a permanent technical committee fore e-business within the Ministry of Commerce. A year later, a royal decree was issued to make the membership in this committee on the level of deputy ministers headed by the Deputy Minister of Commerce.<sup>41</sup> The role of this committee was defined in the following:

- (a) To follow the developments in the field of e-business, and take the necessary steps to benefit from the experience of other countries;

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<sup>38</sup> [www.dwalej.com/](http://www.dwalej.com/)

<sup>39</sup> Ministry of Planning, The 7<sup>th</sup> Development Plan, p 287.

<sup>40</sup> Ministry of Commerce, E-Business in Saudi Arabia, Nov. 2001.

<sup>41</sup> [www.e-commerce.gov.sa/ecommm/](http://www.e-commerce.gov.sa/ecommm/)

- (b) To identify the requirements for the proper utilization from e-business technologies and applications to support the Saudi economy. Also, the necessary coordination tasks should be identified;
- (c) To follow up with other agencies, and report on the progress of tasks assigned to them.

The committee paid special care to the tasks of complete the infrastructure for e-business in the Kingdom. It developed a framework for its work, which included the following:

- (a) Complete the infrastructure for public key encryption (PKI), and electronic authorization and signature;
- (b) Develop the electronic payment system;
- (c) Complete the telecommunication infrastructure to provide high speed data communication needed for e-business transaction;
- (d) Complete all the regulations and laws needed to protect the parties dealing with each other through e-business;
- (e) Study the requirements of data security and privacy protection;
- (f) Complete the requirements for e-government applications;
- (g) Develop a system for electronic procurement for the government establishments;
- (h) Build a portal to market the products of local industries and businesses;
- (i) Spread the awareness about e-business, and encourage the investments in this field;
- (j) Provide all supporting services to ensure the success of e-business applications, such as: post services, naming the streets, and clear addresses for the businesses;
- (k) Promote the trust and confidence in doing business over the Internet;
- (l) Provide training programs on the different advanced technologies involved in e-business systems;
- (m) Conduct studies to investigate the best practices of e-business.

Realizing that the private sector plays an important role in promoting e-business, a consultative body made primarily of businessmen was established to help the E-business Committee. This consultative body acts as the link between the Committee and the business sector.

Although the progress to spread e-business applications is somewhat slow, however, a recent study conducted by Ernst & Young showed the size of B2C transactions was more than 278 Million \$ in 2002.<sup>42</sup> The study projected that this amount would double to more than 550 Million \$ by year 2005. The driving force behind this growth is the expected high growth in the number of Internet users.

As for the size of B2B transactions, the study estimated it was more than 5 Billion \$ in 2002, which is about 3% of the Kingdom GDP. Although the infrastructure for e-business is not complete yet, however, there are few large corporations that have implemented e-business successfully. This include companies like ARAMCO and SABIC.

## B. FINANCIAL TRANSACTIONS AND E-BANKING

The Saudi Arabian Monetary Agency (SAMA) developed an electronic system for financial transactions between the banks. This system, named SARIE, enables the banks to immediately execute the financial transactions between themselves through their accounts with SAMA.

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<sup>42</sup> Ernst & Young, *Gulf Cooperation Council eCommerce Study*, July 2002.

In addition to the above, there is available now a host of electronic services that can be executed over the Internet or by phone. These include the following:

- (a) A system developed by SAMA, called TADAWUL, help execute stocks and bonds trading.<sup>43</sup> The operation of this system started in October 2001. This system allowed same-day execution of all trading transactions;
- (b) Automatic transfer of employees' salaries to their bank accounts;
- (c) Almost all banks provide e-banking services to their customers;
- (d) Payment of utilities bills or traffic violations can be paid over the Internet.

## **IX. APPLICATIONS IN HEALTHCARE**

The level of computerization in healthcare varies considerably depending on the sector to which the healthcare belongs (civil, military, governmental, or private sector). In the following we shall examine IT applications in healthcare underneath those different sectors.

### **A. CIVIL GOVERNMENTAL HOSPITALS**

The Ministry of Health (MoH) supervises all civil governmental hospitals in the Kingdom.<sup>44</sup> It is the responsibility of MoH to provide staffing for these hospitals and finance their operations and projects.

Unfortunately, most of the civil governmental hospitals do not have proper basic hospital management systems. Thus, they lack most of the other advanced IT applications in medicine. A recent study showed that only 13 out of 186 hospitals have Hospital Management systems.<sup>45</sup> Also, one out of 1756 Primary Health Center have a computerized management system, whereas non of the Blood Banks, Medical labs, or Medical Colleges are computerized.

The main obstacle facing MoH in attempting to computerize the establishment under its supervision is the lack of sufficient budgeting for IT projects. Realizing that they cannot get much help from MoH, many governmental hospitals tried to automate their operations through the initiatives of their directors. This have lead to the existence of low cost IT applications that are often not developed or implemented in a professional way. This caused yet other problems for it made difficult to connect the hospitals though a homogeneous data network.

### **B. IT APPLICATIONS AT KING FAISAL SPECIALIST HOSPITAL AND RESEARCH CENTER**

Although King Faisal Specialist Hospital and Research Center (KFSHRC) is governmental hospital, however, it enjoys separate budgeting that is allocated directly from the Ministry of Finance.<sup>46</sup> KFSHRC started implementing IT applications to support its operations since its inauguration in 1975. Since that time the hospital management continued to improve its IT assets through the adoption of the latest IT technologies in support of medical operations.

KFSHRC was the first hospital in Saudi Arabia to adopt the Internet to support its work and implement telemedicine as far back as 1993. The hospital has a modern data network that contains more than 5000 connections. As a matte of fact, KFSHRC offers telemedicine services to other hospitals in the Kingdom. Now, about 12 governmental hospitals are connected to the data network of KFSPRC and they

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<sup>43</sup> [www.tadawul.com.sa/](http://www.tadawul.com.sa/)

<sup>44</sup> [www.moh.gov.sa/](http://www.moh.gov.sa/)

<sup>45</sup> Fahad Saud Al-Otaiby, Computer Applications in the Ministry of Health: Current Status and the Aspirations, Symposium on Computers in The Public Sector, Institute of Public Administration, 23 March, 2003.

<sup>46</sup> [www.kfshrc.edu.sa/](http://www.kfshrc.edu.sa/)

benefit from telemedicine services. Figure 2 shows a diagram of the hospitals connected to KFSHRC data network.

KFSHRC is one of the few hospital that developed and IT Strategic Plan for itself. Currently, the hospital is implemented a new Medical Management System developed by Cerner, which is an international company specializing in medical information systems. Figure 2 gives a diagram showing the hospitals connected to KFSHRC data network.

**Figure 2. The Hospitals connected to the Telemedicine Network**



Source: King Faisal Special Hospital and Research Center.

### C. IT APPLICATIONS IN PRIVATE HOSPITALS AND PHARMACIES

The private hospitals and clinics can be classified into two groups: (1) medium to large establishments; and (2) small establishments. As for the first group, most of those hospitals and clinic have hospital management systems. These systems, however, come from different vendors, and generally they lack the connectivity to each other or external systems, such as, the information system at the Ministry of Health of information systems at the insurance companies. As for the small hospitals and clinic, most of them do not have computerized management systems. It is clear here that the Ministry of Health need to develop the necessary regulations and standards to ensure that IT applications are utilized properly in all private hospitals and clinics.

The above assessment applies also to the private pharmacies. Most of the large pharmacies utilize IT application to support their operations; whereas few of the smaller ones do that. In general, however, most of the IT applications are rudimentary to manage the inventory or accounting, very few implements advanced IT application.

### D. IT APPLICATIONS IN MILITARY HOSPITALS AND EDUCATIONAL HOSPITALS

The military or educational hospitals are governmental hospitals, but they are not managed by Ministry of Health. The military hospitals include all hospitals that are under the management of Ministry of Defense, The Presidency of National Guards, or Ministry of Interior. The educational hospitals are those under the management of the Saudi universities that have medical colleges.

In general, all the hospitals in these two groups enjoy separate budgets for their operations, and hence they do not suffer from the problem of low budgets, as it is the case with the governmental hospitals under the management of Ministry of Health. Accordingly, those hospitals have much better IT applications.

For example, the hospitals that fall under the management of the Department of Medical Affairs of the National Guards<sup>47</sup> have modern data networks that include over 8000 points. All the hospitals are connected to each other via a network of leased lines. Currently, the hospitals information systems are being replaced by a new system from Per-Se Technologies Inc. This unified system should facilitate the connectivity between all the hospitals in addition to provide further automation for the work in these hospitals.

Similarly, all of the military hospitals fall under the management of the Department of Medical Services at the Ministry of Defense.<sup>48</sup> Although not all the hospitals in this group have automated management systems, however, the department is currently completing an IT strategic plan for all the hospitals under its management. Once this plan is implemented, all the hospitals in this group will be connected to each other through a unified healthcare system.

The Ministry of Interior also manages a few hospitals and clinics<sup>49</sup>. Each of these hospitals and clinics has an automated management system, however, these systems are not connected. The same story applied to the educational hospital under the management of the universities. Each one has a computerized management system, but they are not connected. The lack of connectivity between all of these hospitals, or at least between the hospitals belonging to a certain establishment, greatly limits the exchange of data between the institution within the healthcare industry.

#### E. SULTAN BIN ABDULAZIZ MEDICAL & EDUCATIONAL TELECOMMUNICATIONS PROGRAM (MEDUNET)

MeduNet is a program of the Sultan Bin Abdulaziz Al-Saud foundation that provides advanced technology solutions that include the following:<sup>50</sup>

- (a) Telemedicine;
- (b) Health Information Systems;
- (c) Distance Learning;
- (d) Content Providing.

By bringing the powers of modern technology, such as video conferencing and Internet access, to the region, MeduNet gives voice to the creative and intellectual abilities of many millions. Medical and educational resources that were once underutilized in some regions and scarce in others will be available through the Internet and via conferencing to communities across the region. One of the objectives of MeduNet is to deploy satellite, fiber optic, cable, and digital microwave telecommunications facilities to provide access to remote villages. This access should facilitate exchanges between individuals across the country or around the world.

One of the prominent clients of MeduNet is King Faisal Specialist Hospital and Research Center (KFSHRC) described in a previous section. The network of KFSHRC acts as a hub to which about 12 other hospitals are connected, and hence, they benefit from the services of MeduNet. As more clients connect to MeduNet, it should play an important role in providing advanced IT services to the healthcare industry.

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<sup>47</sup> [www.ngha.med.sa](http://www.ngha.med.sa)

<sup>48</sup> [www.msd.gov.sa](http://www.msd.gov.sa)

<sup>49</sup> [www.sfh.med.sa/](http://www.sfh.med.sa/)

<sup>50</sup> [www.medu.net.sa/](http://www.medu.net.sa/)

## X. DIGITAL ARABIC CONTENT

Global Internet statistics about the number of users online and the content of the Internet in different languages indicates that the digital Arabic content represent about 1% of the total content on the Internet,<sup>51</sup> while more than 68.8% of the content is in English. Although the number of Internet users in the Arab world is on the rise, but the percentage of the Arabic content is almost unchanging because it cannot compete with the flood of content in other languages, particularly, English and Chinese.

What is important here is to increase the useful Arabic content on the Internet. This necessitates that we first digitize the huge Islamic and Arabic culture produced over the last 1500 years. Second, more resources should be dedicated to publish this culture on the Internet. It is evident that the responsibility of these tasks is on all Arab and Muslim nations, not only on Saudi Arabia.

### A. ENRICHING THE INTERNET VIA ARABIC WEBSITES

We have seen in a previous section that the presence of local businesses and institutions on the Internet is still very low. One indication to that is the number of local domains (that ends with .sa), which was shown in Table 8 to not exceed 5000 names only. What makes the matter worse is the fact that only a fraction of these names is active; most of them were reserved only without being activated.<sup>52</sup>

Among the 5000 local domain names, we find only about 200 domain names for educational institutions (those that end with .edu.sa and .sch.sa). Since the number of schools and educational institutions in Saudi Arabia exceeds 26000,<sup>53</sup> the above figure indicates that less than 1% of these institutions have a presence on the Internet. Similar conclusions can be said about other establishments and institutions in Saudi Arabia.

It is obvious here that in order to increase the useful Arabic content on the Internet, the educational institutions and governmental agencies must be encouraged to have a presence on the Internet, and publish their intellectual products on it. To accomplish that, proper laws and incentives must be implemented.

### B. THE EFFORTS TO DIGITIZE THE ARABIC CULTURE

Recent studies have suggested that there are some 2 million books and volumes that represent the Arabic and Islamic culture and heritage that were generated over 1500 years. These include more than 70000 thesis published by Arab and Muslim universities. These studies estimate that only about 5000 books of these are available in digital form.<sup>54</sup> This means that less than 0.25% of the Arabic and Islamic culture and heritage is available in a digital form.

The above conclusions are a saddening fact and call for immediate action. Aggressive regulations and laws need to be developed and enforced to encourage all institutions and establishments to digitize their intellectual publications and documents, and publish it on the Internet. Publishing houses, in particular, should be enforced to digitize all of their publications and books. Since the use of word processors has been very common for at least the last 10 years, it should be easy to have digital copies of all what has been published during this period. In addition to that, incentives should be offered to the efforts to digitize the old Arabic and Islamic culture and heritage.

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<sup>51</sup> [www.gtreach.com/globstats/refs.shtml](http://www.gtreach.com/globstats/refs.shtml)

<sup>52</sup> [www.isu.net.sa/](http://www.isu.net.sa/)

<sup>53</sup> Ministry of Planning, The 7<sup>th</sup> Development Plan 1999-2004, page 287.

<sup>54</sup> Survey studies that were prepared as part of the work done in developing the National IT Plan for Saudi Arabia (unpublished).

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14. Spiller Gibbins Swan Pty Ltd and The Consulting Center for Finance and Investment, *A Report on Centre for Information Technology and Telecommunication Industries*, Ar-Riyadh Development Authority and Riyadh Chamber of Commerce and Industry, Sept. 2001.
15. STC, *Information and Communication Technology: Perspectives on the Saudi Arabia Economy*, Sept. 2001.
16. UNDP, *Human Development Report 2001*.
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18. Internet Sites that are indicated in the text.

Annex 1

**INFORMATION SOCIETY INDICATORS FOR SAUDI ARABIA**

Indicator	Y2000	Y2001	Y2002
<b>1. Basic Background Indicators<sup>55</sup></b>			
1.1 Population (million)	20.7	21.4	22.1 <sup>56</sup>
1.2 Area (million square kilometer)	2.1	2.1	2.1
1.3 Density (per square kilometer)	9.86	10.2	10.5
1.4 Urban population	86%	87%	88% <sup>57</sup>
1.5 Adult Literacy	76.2%	77.1%	78% <sup>57</sup>
1.6 Poverty			
1.7 GNI per capita, Atlas method (\$)	8120	8460	8630 <sup>58</sup>
1.8 GDP Growth	4.9%	1.2%	3.16% <sup>59</sup>
<b>2. Telecom Infrastructure<sup>60</sup></b>			
2.1 Fixed lines (total million)	2.965	3.233	4.195 <sup>61</sup>
2.2 Domestic (lines per household)	.584	.623	
2.3 Urban (%)			
2.4 Waiting list (total number)	206000	86000	
2.5 Waiting time (average)			
2.6 Revenue per line (\$)	991	899	
2.7 Cost of local call (\$ per 3 minutes)	.035	.035	.04
2.8 Cost of call within region (\$ per 3 minutes)	.16	.16	.16
2.9 Cost of call to US (\$ per 3 minutes) <sup>62</sup>	7.2	6.4	2.4
2.10 Number of fixed lines operators			
2.11 ISDN lines			
2.11.1 Initial cost (\$) (+ charges of calls) <sup>63</sup>	-	266.7	266.7
2.11.2 Monthly charge (\$) (+ charges of calls)	-	26.7	26.7
2.12 DSL lines			
2.12.1 Initial cost (\$) (for 128 Kb/s line) <sup>63</sup>	-	800	800
2.12.2 Monthly charge (\$) (for 128 Kb/s line)	-	512	512
2.13 Leased lines			
2.13.1 Initial cost (\$) (2 wire) <sup>63</sup>	320	320	320
2.13.2 Monthly charge (\$) (2 wire for up to 10 km)	177.8	177.8	177.8
2.14 Cable			
2.14.1 Initial cost (\$)	-	-	-
2.14.2 Monthly charge (\$)	-	-	-
2.15 Outgoing traffic (minutes per subscriber)			
2.16 Incoming traffic (minutes per subscriber)			
2.17 Mobile lines (total million)	1.376	2.529	3.217 <sup>61</sup>

<sup>55</sup> The World Bank, World Development Indicators database, April 2003. Accessed at ([www.worldbank.org](http://www.worldbank.org)).

<sup>56</sup> Estimated assuming growth rate of 3.4%.

<sup>57</sup> Estimated based on the trend in previous years.

<sup>58</sup> Estimated assuming growth rate in GNI of 2.0%.

<sup>59</sup> An estimate of The 7<sup>th</sup> Development Plan, Ministry of Planning, Saudi Arabia, page 83.

<sup>60</sup> ITU, Arab States Telecom Indicators 1992-2001.

<sup>61</sup> Spiller Gibbins Swan Pty Ltd and The Consulting Center for Finance and Investment, A Report on Centre for Information Technology and Telecommunication Industries, Ar-Riyadh Development Authority and Riyadh Chamber of Commerce and Industry, Sept. 2001, p. 36.

<sup>62</sup> The rates published in the Telephone Directory.

<sup>63</sup> See Saudi Telecom General Tariff at [www.stc.com.sa](http://www.stc.com.sa)

*Annex 1 (continued)*

<b>Indicator</b>	<b>Y2000</b>	<b>Y2001</b>	<b>Y2002</b>
2.18 Number of mobile operators			
<b>3. Media Infrastructure<sup>60</sup></b>			
3.1 Radios			
3.2 Television (x 1000)	5700	5907	
3.3 Satellites (x 1000)	1986	2061	
3.4 Daily Newspapers	12	13	13
<b>4. Computers and the Internet<sup>60</sup></b>			
4.1 Personal computers (x 1000)	1300	1788	2000 <sup>57</sup>
4.2 Personal computers in education			
4.3 Percentage of computers that are networked			
4.4 Internet subscribers (x 1000) <sup>64</sup>	150	360	500
4.5 Internet users (x 1000) <sup>65</sup>	375	900	1110
4.6 Internet hosts	3745	11422	13000 <sup>57</sup>
4.7 ISP's	29	29	21 <sup>66</sup>
4.8 ISP monthly charges (\$) (for 128 Kb/s DSL) <sup>67</sup>	-	453.3	453.3
4.9 Telephone usage charges (\$)	-	58.7	58.7
4.10 Available national bandwidth (Mb/s) <sup>64</sup>	330	480	640
4.11 Hosting availability			
4.12 Secure servers			
<b>5. ICT expenditure<sup>68</sup></b>			
5.1 Telecom expenditure (billion \$)		Included in 5.2 below	
5.2 ICT expenditure (billion \$)	10.28	11.4 <sup>69</sup>	12.5 <sup>69</sup>
5.3 Percentage of GDP (%)	5.94%	6.8% <sup>69</sup>	7.6% <sup>69</sup>
5.4 ICT per capita (\$)	470	520 <sup>69</sup>	580 <sup>69</sup>
<b>6. Capacity building</b>			
6.1 Scientists and engineers in R&D			
6.2 R&D expenditure (% of GNI) <sup>70</sup>	.15%	.15%	.15%
6.3 ICT related university graduates per year			
<b>7. ICT government and business environment</b>			
7.1 e-readiness index		3.80 <sup>71</sup>	3.77 <sup>72</sup>
7.2 e-government index	1.86 <sup>73</sup>		
7.3 IPR enforcement			
7.5 Compliance with WTO			
7.6 Basic telecom agreement			

<sup>64</sup> Estimates from Internet Services Unit at KACST, see ([www.isu.net.sa/](http://www.isu.net.sa/)).

<sup>65</sup> The number of Internet users is estimated to be 2.5 times the number of Internet subscribers.

<sup>66</sup> Several ISPs were merged together.

<sup>67</sup> Average cost based on quotations from local ISPs.

<sup>68</sup> STC, Information and Communication Technology: Perspectives on the Saudi Arabia Economy, page 17.

<sup>69</sup> Ibid. An estimate using projected figures in 2010.

<sup>70</sup> An estimate based on total budget of KACST and budget allocated to Research Centers in the Saudi Universities.

<sup>71</sup> [www.ebusinessforum.com/](http://www.ebusinessforum.com/), 08 May 2001.

<sup>72</sup> Economist Intelligence Unit, The 2002 e-readiness Rankings. (Available at [www1.worldbank.org/publicsector/egov/2002eReadAss.pdf](http://www1.worldbank.org/publicsector/egov/2002eReadAss.pdf))

<sup>73</sup> [www.unpan.org/e-government/](http://www.unpan.org/e-government/)

Annex I (continued)

<b>Indicator</b>	<b>Y2000</b>	<b>Y2001</b>	<b>Y2002</b>
7.7 Reference paper			
<b>8. Laws and regulations</b>			
8.1 Patent law	Yes	Yes	Yes
8.2 Trademark law	Yes	Yes	Yes
8.3 Copyright law	Yes	Yes	Yes
8.4 IT Agreement			
8.5 e-Commerce law	No	No	No
8.6 e-Signature law	No	No	No
8.7 Piracy rate			
<b>9. ICT Policy</b>			
9.1 ICT strategy <sup>74</sup>	No	No	No
9.2 ICT Plan of action <sup>74</sup>	No	No	No
9.3 National initiatives	No	Yes	Yes

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<sup>74</sup> The Saudi Computer Society was entrusted in 2001 with the development of A National IT Plan for Saudi Arabia. The Plan is currently under preparation. (see [www.nitp.org.sa/](http://www.nitp.org.sa/)).

Annex II

**MAIN ICT STAKEHOLDERS**

	<b>Name</b>	<b>Phone</b>	<b>Fax</b>	<b>Mail Address</b>	<b>Email Address</b>	<b>Web Site</b>
<b>A. The Governmental and Semi-Governmental Sectors</b>						
1	Ministry of Information and Communications Technology	01 4522999	01 4506333	P. O. Box 75606, Riyadh 11588		
2	Communications and Information Technology Commission	01 4618000	01 4618002	P. O. Box 75606, Riyadh 11588		<a href="http://www.citc.gov.sa">www.citc.gov.sa</a>
3	King Abdulaziz City for Science and Technology (KACST)	01 4883555		P. O. Box 6086, Riyadh 11442	<a href="mailto:webmaster@kacst.edu.sa">webmaster@kacst.edu.sa</a>	<a href="http://www.kacst.edu.sa">www.kacst.edu.sa</a>
4	Internet Service Unit (ISU) - KACST	01 4883555		P. O. Box 6086, Riyadh 11442	<a href="mailto:info@isu.net.sa">info@isu.net.sa</a>	<a href="http://www.isu.net.sa">www.isu.net.sa</a>
5	Ministry of Commerce and Industry	01 4012222			<a href="mailto:info@commerce.gov.sa">info@commerce.gov.sa</a>	<a href="http://www.commerce.gov.sa">www.commerce.gov.sa</a>
6	E-commerce Committee, Ministry of Commerce	01 4012222			<a href="mailto:info@commerce.gov.sa">info@commerce.gov.sa</a>	<a href="http://www.e-commerce.gov.sa/ecommm/">www.e-commerce.gov.sa/ecommm/</a>
7	Saudi Arabian Monetary Agency (SAMA)					<a href="http://www.sama.gov.sa/">www.sama.gov.sa/</a>
8	Saudi Computer Society	01 4880707	01 4881963	P. O. Box 56112, Riyadh 11554	<a href="mailto:webmaster@computer.org.sa">webmaster@computer.org.sa</a>	<a href="http://www.computer.org.sa/">www.computer.org.sa/</a>
9	Secretariat of the Nation Information Technology Plan	01 4625004	01 4625003	P. O. Box 6218, Riyadh 11482		<a href="http://www.nitp.org.sa/">www.nitp.org.sa/</a>
10	Saudi Arabian Standards Organization (SASO)	01 4520000	01 4520086	P. O. Box 3437, Riyadh 11471	<a href="mailto:enquiries@saso.org.sa">enquiries@saso.org.sa</a>	<a href="http://www.saso.org.sa/">www.saso.org.sa/</a>
11	National Computer Center, Ministry of Interior	01 4792585	01 4623358	P. O. Box 6831, Riyadh 11452		<a href="http://www.nic.gov.sa/">www.nic.gov.sa/</a>
12	College of Computer and Information Sciences	01 4676993	01 4675630	P. O. Box 51178, Riyadh 11543		<a href="http://www.ccis.ksu.edu.sa/">www.ccis.ksu.edu.sa/</a>
13	Ar-riyadh Development Authority	01 4883331	01 4829331	P. O. Box 94501, Riyadh 11614		<a href="http://www.riyadhksa.gov.sa/">www.riyadhksa.gov.sa/</a>
14	Institute of Public Administration	01 4768888		P. O. Box 205, Riyadh 11141		<a href="http://www.ipa.edu.sa/">www.ipa.edu.sa/</a>
<b>B. Private Sector</b>						
15	Saudi Telecommunication Company (STC)			P. O. Box 7790, Riyadh 11472		<a href="http://www.stc.com.sa/">www.stc.com.sa/</a>
16	Arabian Satellite Communication Organization	01 4820000	01 4887999	P. O. Box 1038, Riyadh 11431	<a href="mailto:market@arabsat.com">market@arabsat.com</a>	<a href="http://www.arabsat.com/">www.arabsat.com/</a>
17	Riyadh Chamber of Commerce	01 4040044	01 4021103	P. O. Box 596, Riyadh 11421	<a href="mailto:rdchamber@rdcci.org.sa">rdchamber@rdcci.org.sa</a>	<a href="http://www.rdcci.org.sa/">www.rdcci.org.sa/</a>
18	Jeddah Chamber of Commerce	02 6515111	02 6516644	P. O. Box 1264, Jeddah 21431	<a href="mailto:info@jcci.org.sa">info@jcci.org.sa</a>	<a href="http://www.jcci.org.sa/">www.jcci.org.sa/</a>
19	Easter Region Chamber of Commerce	03 8571111			<a href="mailto:info@chamber.org.sa">info@chamber.org.sa</a>	<a href="http://www.chamber.org.sa/">www.chamber.org.sa/</a>
20	Chambers of Commerce in other cities					
21	Mandurah Consulting Office	01 4193789	01 4193462	P. O. Box 60695, Riyadh 11555	<a href="mailto:mmm@mcgsite.com">mmm@mcgsite.com</a>	<a href="http://www.mcgsite.com">www.mcgsite.com</a>
22	Microsoft Arabia	01 2180808	01 2180809	P. O. Box 17100, Riyadh 11484		<a href="http://www.microsoft.com/">www.microsoft.com/</a>
23	Oracle, Saudi Arabia	01 4811551	01 4880263	P. O. Box 94590, Riyadh 11614		<a href="http://www.oracle.com/">www.oracle.com/</a>

Annex II (continued)

	<b>Name</b>	<b>Phone</b>	<b>Fax</b>	<b>Mail Address</b>	<b>Email Address</b>	<b>Web Site</b>
24	Hewlett Packard Arabia	01 4811551	01 4880263	P. O. Box 94590, Riyadh 11614		<a href="http://www.alfaisalia.com/">www.alfaisalia.com/</a>
25	Saudi Business Machines (SBM)	02 6600004	02 6651163	P. O. Box 5648, Jeddah 21432	<a href="mailto:info@sbm.com.sa">info@sbm.com.sa</a>	<a href="http://www.sbm.com.sa/">www.sbm.com.sa/</a>
26	Al-Faisaliah Group	01 4610077	01 4640498	P. O. Box 16460, Riyadh 11464		<a href="http://www.afg.com.sa/">www.afg.com.sa/</a>
27	Arabian Computer Systems	01 4762777	01 4763196		<a href="mailto:info@acs.com.sa">info@acs.com.sa</a>	<a href="http://www.acs.com.sa/">www.acs.com.sa/</a>
28	Al-Alamiah Electronics Company	01 4770106	01 4784893			<a href="http://www.al-alamiah.com/">www.al-alamiah.com/</a>
29	Advanced Electronics Company	01 2201350	01 2201355	P. O. Box 90916, Riyadh 11623	<a href="mailto:info@aecl.com">info@aecl.com</a>	<a href="http://www.aecl.com">www.aecl.com</a>
<b>C. Internet Service Providers</b>						
30	ArabNet	02 6647472	02 6641628	P. O. Box 3828, Jeddah 21481	<a href="mailto:info@arab.net.sa">info@arab.net.sa</a>	<a href="http://www.arab.net.sa/">www.arab.net.sa/</a>
31	Atheer	01 4198000	01 4192031	P. O. Box 419, Riyadh 11323		<a href="http://www.atheer.net.sa/">www.atheer.net.sa/</a>
32	Awalnet	01 4600111	01 4601110		<a href="mailto:info@awalnet.net.sa">info@awalnet.net.sa</a>	<a href="http://www.awalnet.net.sa/">www.awalnet.net.sa/</a>
33	DigiNet	01 4192009	01 4191942		<a href="mailto:sales@digi.net.sa">sales@digi.net.sa</a>	<a href="http://www.digi.net.sa/">www.digi.net.sa/</a>
34	Cyberia	01 4647114	01 4654735		<a href="mailto:info@cyberia.net.sa">info@cyberia.net.sa</a>	<a href="http://www.cyberia.net.sa/">www.cyberia.net.sa/</a>
35	Eznet	01 2180218	01 2180217	P. O. Box 53060, Riyadh 11563	<a href="mailto:info@vodatel.com">info@vodatel.com</a>	<a href="http://www.ez.net.sa/">www.ez.net.sa/</a>
36	International Computer Company (ICC)	02 6646160	02 6602724		<a href="mailto:info@icc.net.sa">info@icc.net.sa</a>	<a href="http://www.icc.net.sa/">www.icc.net.sa/</a>
37	Jeel	01 2920606	01 4725436		<a href="mailto:sales@jeel.com">sales@jeel.com</a>	<a href="http://www.jeel.net.sa/">www.jeel.net.sa/</a>
38	Nesma	01 4633100	01 4626302	P. O. Box 9260, Riyadh 11423	<a href="mailto:info@nesma.net.sa">info@nesma.net.sa</a>	<a href="http://www.nesma.net.sa/">www.nesma.net.sa/</a>
39	NourNet	01 4728900	01 4727727		<a href="mailto:Info@nour.net.sa">Info@nour.net.sa</a>	<a href="http://www.nour.net.sa/">www.nour.net.sa/</a>
40	Sahara	03 8322299	03 8345652	P.O.Box 5480, Dammam 31422	<a href="mailto:sales@sahara.com.sa">sales@sahara.com.sa</a>	<a href="http://www.sahara.net.sa/">www.sahara.net.sa/</a>
41	SaudiNet	01 2180300	01 2180315	P. O. Box 997, Riyadh 11351	<a href="mailto:info@saudi.net.sa">info@saudi.net.sa</a>	<a href="http://www.saudi.net.sa/">www.saudi.net.sa/</a>
42	SaudiOnline	01 4602055	01 4602112		<a href="mailto:marketing@saudionline.com.sa">marketing@saudionline.com.sa</a>	<a href="http://www.saudionline.com.sa/">www.saudionline.com.sa/</a>
43	SBM	800 2440360	800 2440361	P. O. 5648, Jeddah 21432	<a href="mailto:helpdesk@sbm.net.sa">helpdesk@sbm.net.sa</a>	<a href="http://www.sbm.net.sa/">www.sbm.net.sa/</a>
44	Shabakah	01 4602247	01 4602281		<a href="mailto:info@shabakah.com">info@shabakah.com</a>	<a href="http://www.shabakah.net.sa/">www.shabakah.net.sa/</a>
45	Shaheer	01 4601410	01 4601911	P. O. Box 67076, Riyadh 11596	<a href="mailto:sales@shaheer.net.sa">sales@shaheer.net.sa</a>	<a href="http://www.shaheer.net.sa/">www.shaheer.net.sa/</a>
46	SOL	01 4603031	01 4603130		<a href="mailto:sales@sol.net.sa">sales@sol.net.sa</a>	<a href="http://www.sol.net.sa/">www.sol.net.sa/</a>
47	SPS	02 6824556	02 6824016		<a href="mailto:sales@sps.net.sa">sales@sps.net.sa</a>	<a href="http://www.sps.net.sa/">www.sps.net.sa/</a>
48	Suhuf	01 4870911	01 4871120		<a href="mailto:info@suhuf.net.sa">info@suhuf.net.sa</a>	<a href="http://www.suhuf.net.sa/">www.suhuf.net.sa/</a>
49	Zajil	01 4628562	01 4623465	P. O. Box 52707, Riyadh 11573	<a href="mailto:sales@zajil.net">sales@zajil.net</a>	<a href="http://www.zajil.net/">www.zajil.net/</a>
50	Zajoul	01 4603322	01 4626070			<a href="http://www.zajoul.net.sa/">www.zajoul.net.sa/</a>