# 6.   Market

### 6.1   Overview

The *Ministry of Communications, Science and Technology* (MCST, <www.mcst.gov.mv>) is responsible for ICT sector policy.[1] There is no telecommunication law with needed guidelines issued through specific regulations or decrees. The Information Technology Development Project (ITDP, see Chapter 7) calls for the creation of a telecommunication law. A Telecommunication Policy was published in 2001.[2] This document has six main goals (Table 6.2) backed by specific objectives and actions. A number of the objectives have been met since the policy was issued and some are to be addressed by the ITDP.

The *Telecommunications Authority of Maldives* (TAM) was established in late 2003 as industry regulator. The functions had previously been carried out by the Post and Telecommunication Section of the MCST. The TAM covers both the telecommunication and postal sectors.

Its duties include licensing operators, tariff regulation and monitoring quality of service.

Although The Maldives is a member of the World Trade Organization (WTO), it did not participate in the negotiations on basic telecommunications services and therefore did not made a formal commitment to liberalization.

*Dhivehi Raajjeyge Gulhun Private Limited* (Dhiraagu, <www.dhiraagu.com.mv>) is the incumbent telecommunication provider. It began operation in October 1988 as a joint venture company, 55 per cent owned by the government and 45 per cent by Cable and Wireless of the United Kingdom. Dhiraagu provides fixed (including national and international long distance), mobile and Internet services with exclusivity for fixed services through 2008. Other services are open to competition although only one license, for Internet access service, has been issued thus far.

| Table 6.1: Maldives telecommunications milestones |
|---|
| Maldives international Internet bandwidth indicators, 2001 |

| | |
|---|---|
| 1943 | Wireless radio circuit established to Sri Lanka |
| 1955 | First telephone exchange installed in Male' |
| 1967 | Radiotelephone service begins to be introduced in atolls |
| 1968 | First public telephone exchange |
| 1977 | International satellite earth station established |
| 1988 | Dhiraagu created |
| 1996 | Commercial Internet services introduced |
| 1997 | Analogue mobile cellular service introduced |
| 1999 | All inhabited islands have telephone service |
| 1999 | GSM cellular mobile service introduced |
| 2003 | License issued for second ISP |

*Source*: ITU adapted from Dhiraagu, other sources.

## Table 6.2: Maldives Telecommunication Policy

| Policy | Objective | Action |
|---|---|---|
| 1. Reduce charges of all telecommunication services | 1.1: Reduce the disparity in telecommunication charges between Male' and the rest of the country. | 1.1.1 Abolish the differences in telecommunication charges among all inhabited islands, within a period of 3 years. In doing so, priority must be given to selected areas for economic activities, islands identified as growth centres, and densely populated islands. |
| | 1.2: Lower Internet charges | 1.2.1 Reduce charges for Internet dial-up service within the next three years.<br>• Separate Internet charges from telephone usage charge.<br>• Establish Internet 'access nodes' throughout the country.<br>• Introduce flat rate usage packages for Internet use instead of charging per minute.<br>1.2.2 Reduce charges for Internet leased lines. |
| | 1.3: Reduce International call charges | 1.3.1 Reduce the international call charges to destinations where there is main traffic from the Maldives so that collection charges at both ends are similar.<br>1.3.2 Seek to reduce accounting rates.<br>1.3.3 Introduce cheaper means of making international telephone calls.<br>1.3.4 Allow Internet phone service for public use. Introduce services such as GMPCS and Inmarsat service. |
| | 1.4: Reduce leased line charges | 1.4.1 Reduce leased line charges.<br>• Reduce leased line charges to a level comparable to that of other countries in the region.<br>• Allow resale of leased line capacity.<br>• Licence additional leased line service providers. |
| | 1.5: Reduce chargeable unit | 1.5.1 From 1st January 2002 chargeable unit shall be 6 seconds.<br>1.5.2 From 1st July 2002 chargeable unit shall be 1 second. |
| | 1.6: Set a cost related tariff for service provision | 1.6.1 With effect from 2002, telecommunication companies should implement accounting separation for each service they provide, in a manner required by the Government.<br>1.6.2 The Regulator shall determine the tariff. In determining the tariff, the Regulator will consider the tariff proposed by a service provider. The Regulator reserves the right to change a tariff if the existing tariff is deemed to be inappropriate.<br>1.6.3 The Regulator shall determine the need and level of subsidy required for the provision of a service.<br>1.6.4 Establish a 'Universal Services Fund'. All service providers must contribute to this fund. The Government will determine the amount of contribution. |
| 2. Expand telecommunication services and to reduce the disparity in service provision between Male' and the other islands. | 2.1: Provide country-wide telephone service on demand on an equal basis | 2.1.1 Telecommunication service providers shall make arrangements, in accordance with a schedule laid down by the Government, to provide telephone service on demand and on an equal basis.<br>2.1.2 Islands within mobile coverage area and where there is no telephone network, provide residential telephones using fixed mobile phones at a rate cheaper than normal mobile service.<br>2.1.3 In islands where Dhiraagu has not provided telephone networks, Government should encourage local communities to install and operate their own telephone network. Arrangements shall be made to facilitate the availability of trunk lines at a cheaper rate.<br>2.1.4 Increase the number of public telephone booths in relation to the size and population of the islands.<br>2.1.5 Facilitate the resale of telephone, fax and Internet services at local shops / small businesses and community centres. |
| | 2.2: Expand mobile telephone service to the whole country | 2.2.1 Provide mobile telephone service to all tourist resorts.<br>2.2.2 Provide mobile telephone service to all inhabited islands of an atoll where there is a tourist resort. In doing so, the entire atoll and the sea between the atolls where service is provided must be covered.<br>2.2.3 Expand the mobile telephone service to all islands. |
| | 2.3: Provide high speed Internet service throughout the country | 2.3.1 Establish at least one access node in each atoll, and an additional access node in Male' Atoll on an island other than Male'.<br>2.3.2 Provide cheaper leased lines between users and access nodes and introduce modern technology such as wireless LAN / WAN.<br>2.3.3 Use broadband technology such as DSL to provide high-speed Internet services.<br>2.3.4 Enhance the existing telecommunication infrastructure and establish a wideband data network throughout the country. |
| | 2.4: Increase capacity of international connections | 2.4.1 Carry out a feasibility study within the next 3 years to connect Maldives to the worldwide optical fibre submarine cable network. If feasible, make plans to implement it. |

## Table 6.2: Maldives Telecommunication Policy (cont'd)

| Policy | Objective | Action |
|---|---|---|
| 3. Provide the necessary means and powers to the Regulator through an appropriate legislative framework to strengthen the telecommunication sector | 3.1: Strengthen the legislative framework of the telecommunications sector | 3.1.1 Formulate a telecommunication legislative framework.<br>• This legislative framework should define the powers and responsibilities of the Regulator. It should also cover the rights and obligations of the consumers and the service providers as well as procedures for licensing, controlling and determining tariffs. |
| | 3.2: Distance the Regulator from the management of the telecommunication company. | 3.2.1 Government shareholding in a telecommunication company should be represented by an organisation other than the Regulator or the Ministry responsible for telecommunication policy.<br>3.2.2 No members of the Regulator or the Ministry responsible for telecommunication policy shall be on the Board of Directors of any telecommunication company. |
| | 3.3: Enhance and strengthen the Regulator | 3.3.1 Provide Regulator the freedom to discharge its regulatory functions. This would facilitate the implementation of international best practices in regulating the sector.<br>3.3.2 Enhance skills and resources of the Regulator in order to be effective in a competitive business environment. |
| Open the telecommunication sector and encourage competition | 4.1: Open telecommunication services for competition | 4.1.1 Open Internet service for competition.<br>4.1.2 Open mobile telephone service for competition.<br>4.1.3 Permit new licensees to build and operate their own national infrastructure and international connections to provide telecommunication services.<br>4.1.4 Carryout a feasibility study and work towards introduction of third generation mobile service (3G) in the Maldives.<br>4.1.5 Exclusivity will not be granted to any telecommunication service, after the expiry of the existing telecommunication operating licence and inform of this decision to stakeholders.<br>4.1.6 To open all telecommunication services for competition in accordance with the guidelines laid down by the Government. |
| | 4.2: Make available resources required for the telecommunication operators | 4.2.1 Formulate a new national numbering plan for telecommunication services. Such a numbering plan is required to allocate number blocks to various service providers in a fair and equitable manner. Frequent changes of the numbering plan would have a long-term detrimental effect to a large segment of the population. For these reasons, in other countries, the national numbering plan is managed by the regulators.<br>4.2.2 Assign the Regulator with the function of formulation and management of a long-term National Numbering Plan.<br>4.2.3 Assign and reserve the frequency band required for prospective mobile telephone operators.<br>• Not to allocate full mobile band to any one operator.<br>• If channels are used throughout the whole GSM mobile band, move the occupied channels to one end of the band and make room for a prospective mobile operators within a specified timeframe.<br>4.2.4 Establish a framework to facilitate interconnection among different networks and services.<br>4.2.5 Assign the Regulator with the function of registration and management of the Internet domain names of the Maldives. |
| 5. Make Government revenue from the telecommunication sector less dependent on the profit of the sector. | 5.1: Identify additional sources of revenue for the Government from the telecommunication sector | 5.1.1 Set the Licence Fee for telecommunication companies to a level that is appropriate to the financial position of a company.<br>5.1.2 Introduce a tax regime for telecommunication companies. If such a tax is levied, the licence fee shall be a fixed amount.<br>5.1.3 Radio frequency spectrum being a limited natural resource, introduce appropriate charges for the utilisation of the spectrum.<br>5.1.4 Charge the operators for telephone number blocks allocated to them.<br>5.1.5 Charge for the registration of Internet domain names. |
| 6. Facilitate the use of info-communication technology in all areas of development | 6.1: Reduce the digital divide within the country | 6.1.1 Conduct ICT awareness and training programmes to promote usage of infocommunication technology.<br>6.1.2 Establish community tele-centres throughout the country to provide affordable and easy Internet access.<br>6.1.3 Plan to establish a wideband data network connecting the entire country using the most appropriate technology.<br>6.1.4 Develop human resources required for info-communication needs of the country and retain them within the country. |

### 6.2 Fixed

Maldives is a relative latecomer to telecommunications with the first telephone only being installed in 1955 and the first public exchange in 1968. Since then, the market has grown tremendously with the average annual increase in main lines between 1980-2000 standing at 16 per cent. The growth rate has declined to half of that over the last few years as the addressable market approaches saturation and mobile becomes more popular. At April 2003, there were 29'081 fixed lines in service for a penetration of 10.1

Network usage grew rapidly in the late 1990s as more islands became connected to the backbone network and the volume of telephone traffic grew rapidly. However domestic fixed line traffic has been in decline the last few years as users migrate to using their mobile phones more. Outgoing international traffic has also been stagnant the last few years, with the volume of incoming traffic growing. This is a result of asymmetrical international tariffs with it being more expensive to make international calls from the Maldives than the reverse. Increased mobile roaming has also impacted international outgoing calls.

### 6.3 Mobile

Dhiraagu is currently the only mobile operator. It launched an analogue Advanced Mobile Phone System (AMPS) in 1997. At the time, forecasts called for no more than 300 subscribers by the year 2003. This forecast was exceeded and by 1999, the system had already reached its capacity. The decision was taken to replace the AMPS system with a digital Global System for Mobile (GSM) network, launched in November 1999. Existing AMPS subscribers were provided incentives to switch to the new network and the AMPS network was closed down. Pre-paid was launched in September 2001, expanding the opportunity for mobile access. In less than a year there were more pre-paid than post-paid subscribers. In April 2002, the number of mobile subscribers surpassed fixed

subscribers. At April 2003, the number of mobile subscribers was 48'204 for a penetration of 17.2 (31.8 when considering only the population covered by mobile service). The number of pre-paid subscribers was 35'765 or 74 per cent of the total.

Dhiraagu has steadily expanded coverage. Towards the end of 2003, population coverage stood at 71 per cent. The network covers 82 inhabited islands in 18 atolls and all 88 tourist resorts. Tourists are a lucrative market with roaming accounting for almost half of Dhiraagu's mobile revenue. Dhiraagu has roaming agreements with 99 mobile operators in 52 countries.

The Telecommunication Policy paper calls for opening the mobile market to competition. A tender for a second mobile operator should be issued in 2004.

### 6.4 Internet

Dhiraagu launched Internet service in October 1996. It brands the service as DhivehiNet. Dhiraagu offers dial-up, broadband (ADSL) and leased line access; web hosting; and also manages the .MV domain name. Regarding the latter, Dhiraagu is the administrative contact registered with Internet Assigned Numbers Authority (IANA) for the .MV domain name.[3] Registration information is available on the Dhiraagu web site.[4] Domain names are bundled with an email and cost a relatively high Rf 500 (US$ 38.91) to set up with a monthly subscription fee of Rf 100 per month (US$ 7.78 or US$ 93.39 per year).[5] Dhiraagu recognizes that the government should undertake domain name registration but it is waiting for the proper skills to be available before transferring responsibility. The Telecommunication Policy calls for transfer of domain management and administration to the regulator.

The first market segment where the telecommunication sector has been liberalized is Internet access. Following a tender, Focus InfoCom (majority-owned by a local company Focus Computers, www.focuscomp.com)

won the beauty contest for an Internet Service Provider (ISP) license. Despite the small market size, the tender for a second ISP attracted significant interest. There were initially six applicants of which two dropped out; the remaining ones included investors from Pakistan and Sri Lanka. The government selected the winner based on track record and plans for meeting universal service obligations (i.e., requirement to provide Internet services in the entire country within the next ten years). For three years, the market will remain a duopoly. Focus paid US$5'000 for the license and will pay annual fees amounting to five per cent of gross revenue.

Focus Computers was established in 1994. Business activities include integration services, distribution of PCs, and training courses. It has some 70 staff and three offices in the country. Focus Computers has an 83 per cent stake in Focus InfoCom. A local cable TV operator owns the other part but the shareholding might change, although Focus has to keep the majority (based on terms of license).

As part of the license award, Focus was granted the exclusive right to the 2.4 GHz frequency for the provision of Internet use for several years. This is the same frequency that the popular IEEE 802.1a standard (i.e., Wi-Fi) uses. The rationale was that this would offset the inherent advantage the incumbent has. It is logical to assume that Focus will be pursuing a wireless strategy in providing access to its customers.

[1]  The Ministry of Broadcasting covers radio and television broadcasting.

[2]  MCST. *Maldives Telecommunication Policy 2001-2005*. August 2001.
http://www.mcst.gov.mv/Downloads/Documents/Telecom%20Policy-Public.pdf. [Accessed 1 February 2004].

[3]  See the "Root-Zone Whois Information" for the Maldives on the IANA web site at
http://www.iana.org/root-whois/mv.htm. [Accessed 7 February 2004].

[4]  Dhiraagu's Domain Name Service is available at http://www.dhiraagu.com.mv/dhivehinet/domainnames/.
[Accessed 7 February 2004].

[5]  In contrast, domain names using .COM as well as other suffixes are available from the registrar Network
Solutions for US$ 34.99 per year with no set up costs. See http://www.networksolutions.com/en_US/name-it.
[Accessed 7 February 2003].

# 7.    Information Society

A number of different plans lead the Maldives on its path towards an information society.[1] The Maldives *Vision 2020*, introduced by the President in December 1999, guides the country's aspiration to be a top-ranked middle-income economy by the year 2020. Vision 2020 does not explicitly mention information society but notes, "*Modern technology will be widely used in the Maldives, facilitating progress and convenience in all spheres of life*."[2] The current National Development Plan (NDP) notes that ICT is important to both promote trade and business as well as an industry in its own right that could help diversify the economy and grow employment. The NDP calls for the ICT sector to be liberalized to "*create a knowledge based economy*."[3]

ICT-oriented documents include the 2001 *Science and Technology Master Plan* highlighting current and potential use of new technologies and the *Telecommunication Policy* 2001-2005. The latter, developed by the Ministry of Communication, Science and Technology (MCST), addresses policy related issues such as universal access and liberalization of the market. Currently the MCST, together with the UNDP, is working on a national ICT policy called *e-Maldives*, to develop an approach to move the Maldives towards becoming a "*knowledge-based society where ICT is the engine to propel economic growth and an effective bridge to digital divides and social development by the year 2010*".[4] Based on the country's main development challenges as well as its current ICT status, the framework has identified four key prerequisites that need to be established so that ICT can be a tool for development within four pillars (Figure 7.1, Box 7.1). Within this framework the document calls for a number of initiatives and goals that should be carried out and reviewed by the year 2010.

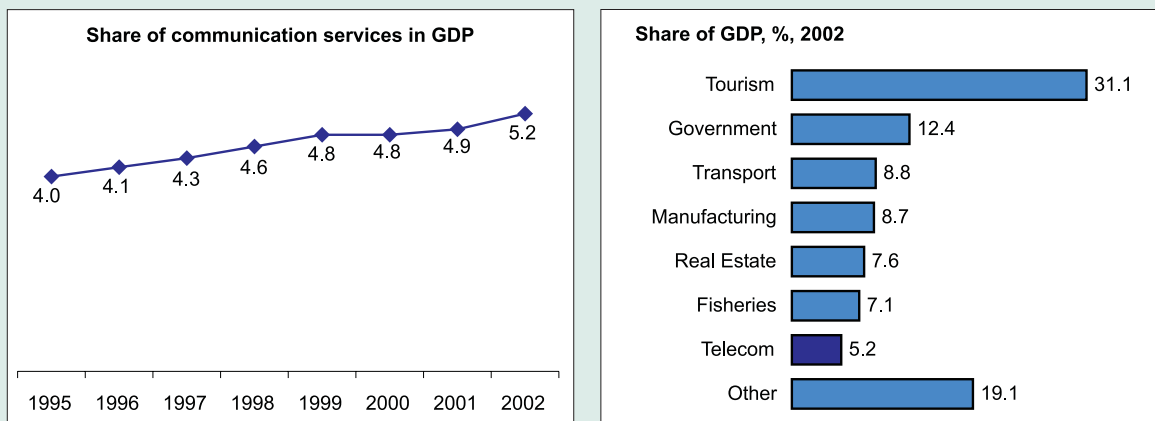## Figure: 7.1: Transforming the Maldives into an information society
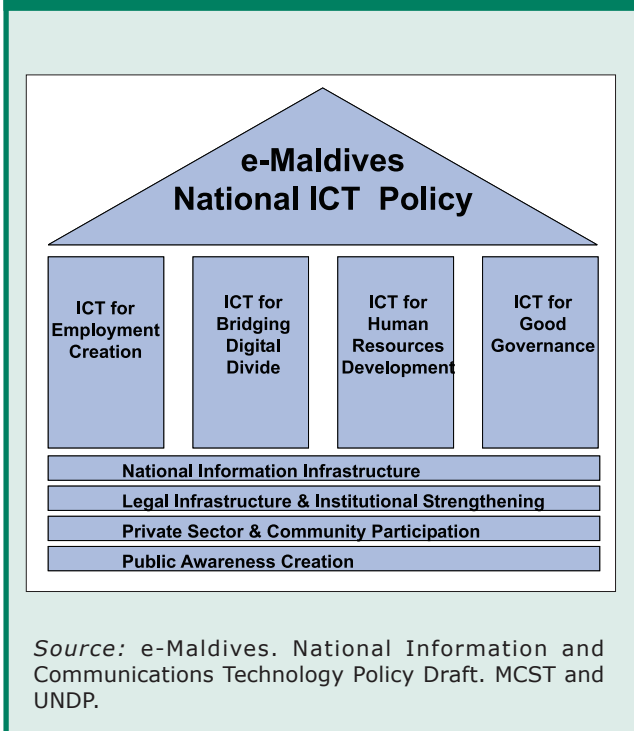


*Source:* e-Maldives. National Information and Communications Technology Policy Draft. MCST and UNDP.

## 7.1    Economic impact

There are no official statistics on the size of the overall ICT sector in the Maldives, although telecommunications would contribute the largest amount. The communications sector share of GDP was 5.2 per cent in 2002, up from four per cent in 1995 (Figure 7.1, left). A number of factors have contributed to this increase including completion of the nationwide backbone in 1999, increases in fixed and mobile telephone subscribers, launching of the Internet and growing tourism (and subsequent demand for international communications). Communications is the seventh largest direct contributor to the economy. In 2002, communications had the third highest sector growth rate after fishing and

## Figure 7.2: Telecom economic impact

Share of communications in GDP, per cent, 1995-2002 (left) and
share of various sectors in GDP, per cent, 2002 (right)

**Share of communication services in GDP**

| Year | Value |
|------|-------|
| 1995 | 4.0 |
| 1996 | 4.1 |
| 1997 | 4.3 |
| 1998 | 4.6 |
| 1999 | 4.8 |
| 2000 | 4.8 |
| 2001 | 4.9 |
| 2002 | 5.2 |

**Share of GDP, %, 2002**

| Sector | Value |
|--------|-------|
| Tourism | 31.1 |
| Government | 12.4 |
| Transport | 8.8 |
| Manufacturing | 8.7 |
| Real Estate | 7.6 |
| Fisheries | 7.1 |
| Telecom | 5.2 |
| Other | 19.1 |

*Source:* ITU adapted from MPND.

## Box 7.1: e-Maldives

The Ministry of Communication, Science and Technology has drafted an Information and Communication Technology (ICT) policy document with the support of the United Nations Development Programme. Subtitled *e-Maldives* the draft policy document lays out ICT benefits in four areas or what it calls *pillars*: 1) Employment creation; 2) Bridging the digital divide; 3) Human resource development; and 4) Good governance. The pillars in turn are dependent on four *foundations* to ensure success: 1) National information infrastructure; 2) Legal framework and institutional strengthening; 3) Private sector and community participation; and 4) Public awareness creation.

The draft policy envisions the following strategies for each of the pillars:

*Employment creation*: using ICT to achieve efficiency and productivity in existing activities and to create new ICT-based employment. In the case of the latter, this includes the development of new services in the Maldives traditional economic sectors, fisheries and tourism such as portals and information systems. It also calls for the creation of a Software Park with incentives to attract investors.

*Bridging the digital divide*: ICT is seen as a tool to reduce gaps between the capital and atolls through enhanced access to information and the delivery of electronic government, education and health services. In this regard, the policy calls for universal access to the Internet from the atolls at affordable prices.

*Human resource development*: ICT is important for delivering education as well as a subject in its own right. The policy identifies the use of ICT for training both those in the formal educational system as well as those outside it. Strategies include incorporating greater use of ICT in school curriculum, creating an ICT-based institute of higher education and expanding the use of distance education.

*Good governance*: ICT can improve government efficiency and transparency. The policy calls for the creation of a government network linking all agencies, access points for the public and the delivery of online services.

The policy mentions a number of areas for strengthening the foundations for successful implementation of ICT. In the area of national infrastructure, it advocates an integrated network with multiple uses in order to reduce duplication. Regarding the legal framework and institutional strengthening, the draft policy calls for the passage of necessary laws such as an electronic transaction act and the creation of new ICT agencies and chief information officers. The draft policy notes that in the area of private sector and community participation the involvement of business and those living in atolls are critical. The policy also calls for high-level initiatives to raise awareness such as a National ICT Year.

The draft policy has a timetable of 2010 for achieving its objectives and includes a number of indicators for measuring goals. The latter include indicators such as the percentage of new economy generated by ICT, percentage of knowledge workers and ICT indices.

---

**Box 7.2: Tourism and telecommunications: A marriage made in heaven**

There is a symbiotic relationship between two of the largest sectors of the Maldivian economy, tourism and telecommunications. They both depend on each other and neither could be as successful alone. It is unlikely that the tourist industry could have blossomed as much as it has without an effective telecommunication network. The start of international telephone service in the Maldives can be traced to the beginning of tourism in 1972.[6] It is also unlikely that Dhiraagu, the national operator, could have expanded the telecommunication network without revenues from tourism. A common myth is that most phone lines are in tourist hotel rooms. In fact, only three per cent of telephone lines are in resorts in the Maldives. Nonetheless, all of Maldives 87 resorts have telephone service and are an important user of Dhiraagu's services. An analysis of Supply and Use Tables of the Maldivian economy reveal that the biggest user of telecommunication services is tourism, consuming 26 per cent of telecommunication sector output.[7]

The Maldives' relatively high level of international telephone traffic is also a result of tourism. Five of its top ten calling countries are those from which the Maldives receives the largest number of tourists

(UK, Italy, Germany, Japan and Switzerland). International mobile roaming has also been a boon to Dhiraagu. Although roaming was only launched in 2000, it already accounts for the majority of mobile revenue. This is not surprising given high roaming charges; a roamer can pay up to six times more than a local subscriber for telephone calls. One factor that helps is that almost 80 per cent of Maldives tourists hail from Europe where GSM, the system used in the Maldives, is the de facto standard. Dhiraagu has roaming agreements with 80 operators in 44 countries.[8]

Understanding the link between telecommunications and tourism is important for other small island states, many of which are keen to promote tourism. Good telecommunications is important for attracting and developing the tourism industry. Tourists make a high level of international calls and seem willing to pay a high price. They can be an important source of revenue helping to keep prices lower for local services and thus helping to expand national access. The tourism industry need for telecommunication is evolving beyond just international calls to include e-mail, web sites and international roaming. Support for these services can help boost local employment.

---

manufacturing. Dhiraagu dividend payments to the government account for 6.5 per cent of government non-tax revenue. Telecommunications also accounts for the third highest (non-tourist) stock of foreign direct investment valued at US$ 16.3 million at March 2002. There have also been foreign investments by India and Sri Lanka in the computer software sector.

Though the precise impact of ICT on the economy is difficult to measure, there is anecdotal evidence to suggest it is significant. For example, tourism, one of the pillars of the Maldives economy, is highly dependent on ICTs for marketing (web sites) and communications (telephone, fax and email reservations and communications by tourists, Box 7.2).[5] The government, which accounts for 12 per cent of the economy, is engaged in an US$ 12 million e-government project that will utilize ICT to enhance administration.

## 7.2    Employment impact

Another aspect of a country's evolution to an information society is

the need for ICT workers, which can help reduce unemployment. This is particularly important in the Maldives that has a growing pool of educated young people. Figures on overall employment in the ICT sector are not available. Dhiraagu directly employs 520 people as well as having an indirect impact on employment through areas such as vendors of mobile phones and pre-paid cards.

## 7.3    Social impact

Another perspective on the information society is how the use of electronic information is transforming citizen's lives. Access to ICT is increasing. In the year 2000, 57 per cent of homes had a television while 23 per cent had a telephone line and six per cent had a PC.

One limitation in gauging the social impact of ICT is a lack of data and surveys to understand how people are using it. There are certain proxies. One is a growing willingness to use electronic transactions. For example there are some 20'000 debit card

holders in Male' using their cards at over 250 restaurants and shops as well five Automated Teller Machines (ATM).[9] The volume of Internet traffic is rising with some 51 million minutes of dial-up use in 2002, an increase of 17 per cent over the previous year. However usage is still low at about one hour per year per user, suggesting limited experimentation on the Internet. Text messages sent over mobile phones is rising with an average of 11 per subscriber in December 2002, up from three at the end of 2001.

Many are still not aware of the benefits of ICT and there is a significant digital divide between Male' and the rest of the country (Box 7.3). There are a number of institutional issues that need to be resolved to expand the Maldivian information society such as the enactment of digital laws and the acceptance of free online government forms. There are several projects in the pipeline to make ICT more relevant for the population. One is an e-government project that would bring public services on-line. Another effort is to extend ICT access in the

## Box 7.3: ICT in the Atolls

The main digital divide in the Maldives is between the capital Male' and the atolls. According to the 2000 Census, overall household telephone penetration was 22.9 per cent but that ranged from 68.9 in Male' to 8.7 in the atolls. The divide for computers is also wide with an overall national rate of 6.2 per cent of households possessing one compared to 21.9 per cent in Male' and 1.3 per cent in the atolls. In November 2001, the UNDP, along with the ITU, carried out a fact finding mission to 21 islands to assess the level of ICT and get feedback from islanders about ICT requirements. While virtually all islands had computers, the penetration ranged from over three per 100 inhabitants to less than one, reflecting an island digital divide. The input obtained from the mission will be useful for a UNDP project to create an atoll portal with content reflecting the needs of those living on the islands.

| | Island | Population | ICT Status |
|---|---|---|---|
| SHAVIYANI (North Miladhunmadulu) | Feevah | 845 | 3 computers in total (1 at school, 1 office, and 1 private). 12 PCs will be installed in 2002 with parents' support<br>5 telephones in total (2 public telephone booths, 1 in office, 1 in school and 1 in court)<br>150 TV sets, which means every household has at least one set |
| | Maakadoodhoo | 1400 | 10 computers in computer lab at the school<br>3 telephones in total (2 public telephone booths, 1 in office)<br>226 households have sets, which means in every home there is a set |
| | Lhaimagu | 684 | 3 computers in total (1 in school, 1 in island office and 1 private)<br>3 telephones in total (2 public telephone booths, 1 in office) There is a high demand for telephones |
| | Funadhoo | 1297 | 42 computers in total. (1 in island office, 11 in island office, 1 in health centre, 1 in youth centre, 2 in project office, 1 in pharmacy and 12 private). There is a computer lab at the school with 13 computers<br>10 telephones in total (3 public telephone booths, 1 in island office, 1 in health center, 3 in island office, 1 in project office and 1 in NSS). Plans to have more public telephone booths in 2002.<br>200 households have TV set |
| | Komandoo | 1536 | 46 computers in total (42 PCs and 4 laptops). There is computer lab in the school and computer course is part of the curriculum. For outside, private computer course is being run.<br>6 telephones in total (3 public telephone booths, 1 in island office, 1 in school, 1 in health centre).<br>300 households have TV sets |
| | Maaugoodhoo | 915 | 6 computers in total (1 in island office, 2 in school and 3 private)<br>3 telephones in total (2 public telephone booths, 1 in island office). Telephones are very much in demand. The public phones are used to communicate with family members outside the island and for business matter (eg. What cargo to bring from Male' to the island)<br>110 households have TV sets |
| NOONU ATOLL | Kedhikulhudhoo | 1500 | 9 computers in total. In one part of the island, there is a total of 4 computers (1 in island office, 2 in school and 1 private). In the other part of the island, there is a total of 5 computers (1 in school, 1 in island office and 3 private).<br>5 telephones in total. In one part of the island, there are 2 telephones (1 public telephone booth and 1 in island office). In the other part of the island, there are 3 telephones (1 public telephone booth, 1 in island office and 1 in health centre. The public phones are used to communicate with family members outside the island, business matter and for advice/information on medical treatment.<br>174 households in total have TV sets. In one part of the island, there are 84 households. In the other part of the island, there are 90 households. |
| | Landhoo | 837 | 2 computers in total (1 in island office and 1 in school). There is no computer lab in school<br>3 telephones in total (2 public telephone booths, 1 in island office). The public phones are used to contact students studying outside the island and to contact husbands who are working in resorts<br>73 out of 130 households have TV sets |

## Box 7.3: ICT in the Atolls (cont'd)

| | | | |
|---|---|---|---|
| **NOONU ATOLL** | Lhohi | 707 | 2 computers in total (1 in island office and 1 in school) There is no computer lab in school<br>3 telephones in total. (2 public telephone booths, 1 in island office).<br>50 out of 90 households have TV sets |
| | Manadhoo | 1500 | 23 computers in total (1 in island office, 3 in school, 5 in island office, 1 in health centre, 2 in project office and 3 private). There is computer lab with 8 computers, run by Pioneer company<br>11 telephones in total (2 public telephone booths, 1 in island office, 1 in school, 1 in health centre, 1 in the court, 4 in the island office and 1 in NSS). There is a high demand for public phones. Long queues are seen often. The phones are used to call family members, business and official matters<br>80 out of 216 households have TV |
| | Holhudhoo | 1945 | 30 computers in total (1 in island office, 4 in school, 4 in private centre and 6 private). There is a private computer training centre in the school run by Cyryx company (Pentium 3 model used) with 15 computers<br>6 telephones in total (3 public telephone booths, 1 in island office, 1 in school and 1 in the court)<br>201 out of 256 households have TV sets |
| | Velidhoo | 2067 | 38 computers in total (1 in island office, 3 in power house, 2 in staff room, 1 in administrative office, 1 in library and 15 private). There is a computer training centre in the school run by Computer Career Centre with 15 computers. Computer density is 1.5%<br>20 telephones in total (5 public telephone booths, 1 in island office, 1 in school, 1 in the court, 1 in power house, 1 bureau fax and 10 lines on cordless phones). Telephone density is 1%<br>220 out of 397 households have TV sets |
| **LAAMU ATOLL** | Maabaidhoo | 823 | There are 4 computers in the school, 5 in homes and no computer in the island office. There are also an additional 7 computers at the Island Computers Training Centre in the island.<br>4 telephones (2 public telephone booths, 1 in office, 1 in school).<br>Most of the houses have a TV (about 110). |
| | Kalhaidhoo | 626 | There are no computers in this island. However, the school is planning to buy a computer next year.<br>3 telephones (2 public telephone booths, 1 in office).<br>Many of the households have TV. However, the programmes and the hours of broadcast is not satisfactory. (about 95). |
| | Mathimaradhoo ward (Gamu) | 650 | There are 2 computers at Qatar Ameer School, and a number of computers in other places like, the island office, the atoll hospital, and individual homes.(a rough estimate of 10)<br>There is 1 telephone in the island office, 1 in the atoll hospital, 1 in the school and some telephone booths.(about 7)<br>Many of the households have TV.(about 85) |
| | Mukurimagu ward (Gamu) | 880 | Computer literacy: Many children from this ward who attend Qatar Ameer School in Mathimaradhoo have had some understanding of computers.<br>Students of grade 10 have done a basic computer course at school.<br>There is a cyber café run by Dhiraagu in this island (in Mathimaradhoo ward). The cyber café provides internet service from 7:30 to 5:00 for 5 days a week.<br>The rate of service is almost the same as Male'. |
| | Fonadhoo | 1654 | There is no computer lab in the island/school, however there are about 15-20 computers in the island (school, atoll office, island office, health centre, bank, and some private homes.)<br>There are about 10 telephone lines in this island which are mostly in various government offices (atoll office, island office, school, dhanal, bank, health centre, etc) and telephone booths.<br>Most house holds have TVs. (about 450) |
| | Kunahandhoo | 974 | There is one computer at school which is the only one in the island, in the island. This computer was financed and purchased by the students and the computer has been non-functional from the very beginning<br>There is one telephone in the island office and two booths. There is a very high demand for telephones and the two booths are not enough. |
| | Maamendhoo | 1047 | There are 3 computers in the island (1 in school, 1 in the island office and 1 in a private home).<br>There are three telephones in the island, (1 in the island office and two telephone booths). |
| **VAAVU ATOLL** | Fulidhoo | 367 | 6 computers in total. (2 in school, 2 public computers by committee and 2 private. There is no computer lab.  2% density<br>4 telephones in total (2 public telephone booths, 1 in island office, 1 in school)<br>Public telephones are high in demand. The phones are used for personal matters such as contacting students outside the island and for business matters.<br>1% density<br>52 TV sets in every household, which means 100% density. There is only one channel. |

*Source*: ITU Mission Report: Maldives UNDP Project, November 2001.

atolls and develop locally relevant content.

## 7.4 E-Government

Most ministries are online and can be accessed from the presidential web site that serves as a sort of informal portal <http://www.presidencymaldives.gov.mv/v3/pages/LinksList.php3>. Web sites provide information about the respective ministry, including public announcements, documents, speeches, and vacancies as well as contact details. Several web sites allow users to download forms, the main e-citizen application that is currently provided.[10] The availability of government forms online has been limited due to the tradition requiring citizens to pay for them. This has prevented some government agencies from providing online forms because they do not have payment systems to charge for the forms and if provided for free, it could be a violation of the rule.

### 7.4.1 Big plans

The Maldives recently launched a comprehensive e-government project. Financed by a US$ 12 million loan from the Asian Development Bank (ADB), the wide-ranging *Information Technology Development Project* (ITDP) covers infrastructure and access, services and content and ICT policies.[11] Specifically it includes setting up a network and connecting government agencies in Male' and 20 atolls; developing a portal and providing online services; establishing the National Computer Center (NCC) to coordinate ICT development, as well as implementing sector reform.

The government portal will centralize individual ministerial efforts to provide online services by providing integration and consistency. It will support electronic transactions between ministries and the delivery of government services to the public. To ensure that e-services will not be limited to the population in Male', the project envisions a public access scheme to equip every atoll with an Internet kiosk. Installed at the atoll office, the kiosk will be staffed by assistants trained to help citizens' access and use the applications.

The initial applications slated for delivery under the e-government project include:

- *National Citizens Identification*. This envisages the creation of a single database containing citizen identification records to be accessed by all ministries. This will result in efficiency from accessing one central database rather than maintaining local records. The average time saved has been estimated at 15 minutes per record; with an estimated 1.4 million accesses per year, this amounts to considerable efficiency. It is envisaged that the application would be extended to citizens allowing them to update their records and obtain relevant information remotely.

- *Hospital Information System*. This component forsees the creation of a medical records database with real-time access by health staff. It is estimated that productivity will be raised by 25 per cent for doctors and up to 90 per cent for other staff by having patient information available online.

- *Vessel, Vehicle, and Aircraft Registration*. This service will allow property owners to register or renew their applications online. This will cut down substantially on trips to carry out these activities with an estimated savings in the number of trips of 15 per cent in the initial phase of the project and rising to 70 per cent.

The conceptual phase of the e-government project has been completed and the government invited bids in November 2003 for development of the two main components: Government Network of Maldives and the Information Technology Architecture. The network

component involves linking ministries in Male' and 23 islands using fibre optic in the capital and a satellite system for the islands. The Information Technology Architecture deals with the software aspects including the development of initial e-citizen applications.

### 7.4.2  Atoll portal

Apart from the ITDP, there is also a UNDP project "Digitally Empowered Development in the Island Communities of Maldives."[12] This project envisions the creation of a community portal that would provide relevant information to and about islands in both Dhivehi and English. The idea is that local communities would provide content such as island profiles, travel information, discussion boards and employment and business opportunities.

### 7.5    Education

### 7.5.1  Enrolment and attainment

A significant determinant of a country's ability to transition to an information society is its knowledge base. Indicators such as school enrolment and educational attainment help determine the potential for ICT use.

Primary and secondary school enrolment are high and reflect government efforts to provide basic education, at least until the age of 15. Government spending on education amounted to 18 per cent of all expenditures in 2002. The Maldives ranks well when compared to other developing countries with 96 per cent of youth between the ages of 6-15 attending school. There is also very little gender disparity in education (Box 7.4).

There is almost universal literacy (97 per cent) in a population dispersed over 200 islands. Literacy was increased through a government project providing basic reading and writing courses to adults across the country.

In terms of educational attainment, there is a gap between secondary school attainment and the post-secondary level reflecting limited tertiary opportunities. While around 45 percent of the population has attended middle school, less than one percent of the population has a tertiary degree. The 2000 Census further reveals the difference in educational attainment between Male' and the atolls. While 37 percent of those living in Male' have at least a secondary education, the number stands at 15 percent for those living in the atolls. Two percent of the population in Male' has a tertiary degree, compared to 0.2 percent residing outside Male'.

There is a strong link between education and Internet access. This is drawn out in numerous surveys that show that those in school or with high levels of education have more elevated Internet usage rates than others. In the case of the Maldives, it would appear that there is a large untapped Internet market. According to Dhiraagu estimates there were some 15'000 Internet users at the end of 2002. This figure is less than the number of people aged 15-19 attending school (21'101 according to the 2000 Census). In addition, there are another 32'625 people aged 15-59 who have at least a secondary education. These two groups, prime Internet users, equal 53'726 people. Thus there is a gap of 38'726 between those currently using the Internet and those who probably have the skills or can be taught fairly quickly how to use it. There is also often a close relation between newspaper circulation and Internet users. The country's leading newspaper claims a daily circulation of 86'000. The difference between this group and the existing number of Internet users is 71'100. Thus the potential Internet market is between three to five times larger than current estimates of the number of users (Figure 7.3). On the other hand, the number of Internet users may be underestimated.

## Box 7.4: ICT potential for women

The Maldives is progressive in gender issues. The rights of women are constitutionally protected and there is a Ministry of Women's Affairs. The country scores high compared to peer countries on indicators measuring female participation in education. Educational enrolment and attainment figures for the Maldives show slight gender-related differences. However after the age of 20, there is a small drop off in female school attendance. One issue is that most post-secondary educational opportunities are in Male'. Families in the atolls are more reluctant to send females off to study in the capital. Females also tend to get married earlier than men. Household duties and the arrival of babies make it more difficult for women to purse educational opportunities.[13] A positive trend is that the age of marriage has been rising, giving women more opportunity for education (Box Figure 7.4, right).

The participation of women in the formal labour market is much lower than men. While 72 per cent of men over the age of 15 works, the corresponding figure for women is only 37 per cent. Similar to post-secondary education, marriage and children affect the ability of women to work. The diffusion of Information and Communication Technology (ICT) could have a big impact on female labour participation in the Maldives. If ICT access can be provided in homes, then it would give more women the ability to participate in new economy activities. Since the younger generation of women almost all complete mandatory schooling they have a good starting background for using ICT. The availability of online government applications can also make women less dependent on men for obtaining public services, enhancing their empowerment. [14] There is also scope for women to operate atoll Internet kiosks as part of the Women Community Associations. In a report on gender in the Maldives, the Asian Development Bank has also emphasized the potential of information technology for boosting female employment.[15]
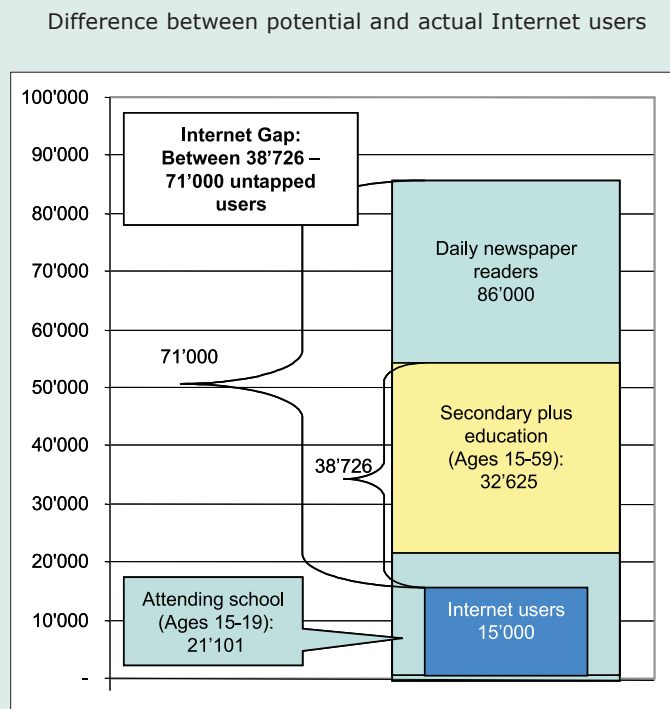
### Box Figure 7.4: Gender in the Maldives

Percentage of population attending school, by age and sex (left) and
mean age at marriage, by location and sex (right)
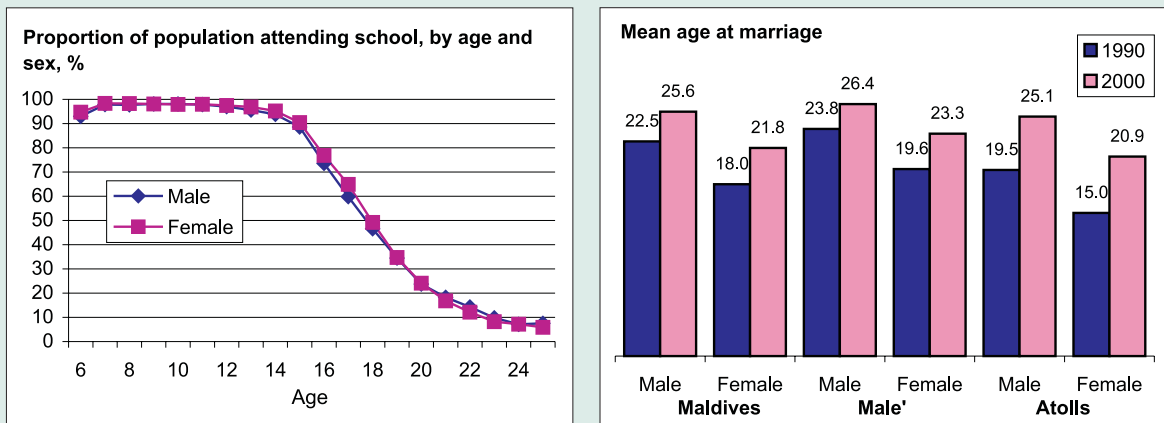


*Source:* ITU adapted from Ministry of Planning and National Development.

## Figure 7.3: Maldives untapped Internet market

Difference between potential and actual Internet users



Internet Gap: Between 38'726 – 71'000 untapped users

Daily newspaper readers 86'000

71'000

Secondary plus education (Ages 15-59): 32'625

38'726

Attending school (Ages 15-19): 21'101

Internet users 15'000

*Note:* The chart shows the gap between the estimated number of Internet users in 2002 and those believed to have the ability to use the Internet (age 15+ attending school, those with at least a secondary school education and those who read a newspaper). For example the difference between estimated Internet users (15'000) and those who read a newspaper every day (86'000) is 71'000.
*Source*: ITU adapted from Dhiraagu Internet user estimate, Ministry of Planning and National Development and Haveruu newspaper.

### 7.5.2 ICT education in schools

The Sixth National Development Plan[16], which defines government policies for the period 2001-2005, highlights the need to expand and promote ICT in education, including computer literacy.

The Ministry of Education's draft *Information Technology and Education, Policy and Strategies*, recognizes "*the promise of IT for education for all*" and the need to move from "*natural-resource-based primary products, towards knowledge-based and human-resource intensive goods and services*".[17] The draft discusses ways of teaching IT in schools and tertiary institutions as well as using IT as a tool to improve educational institutions by making them more efficient und improving communication. A number of goals are aimed at turning the Maldives into a knowledge-based economy. These include making all secondary school leavers computer literate, expanding computer studies to the lower secondary level, training a cadre of specialist IT teachers, establishing a school network to share educational resources and making greater use of distance education. The draft sets a number of objectives for the years 2001-2005, such as providing all schools with a computer, providing all teachers with email, teaching students IT two hours per week and providing Internet access to all schools. A shortage of funding and skilled teachers has been the main problems in realizing the objectives.

ICT courses were introduced in secondary schools as early as 1986, but limited to a small number of students. Today ICT classes are provided in all higher secondary schools. The importance that policy makers attach to ICT is demonstrated through a presidential decree, stipulating that from 2004 every secondary school graduate must be computer literate. There are plans to integrate ICT into the primary school curriculum but a lack of trained teachers is a barrier. One way around this has been outsourcing training to the private sector.

An Internet culture has spread among students, particularly in the capital. Most teenagers in Male' have basic computer skills and know how to use the Internet, although schools may not be their main access location. Some attend classes at one of the some dozen private computer training centres. Others learn at local Internet cafés. Dhiraagu also offers free Internet courses to school classes (Box 7.3). In the atolls, parents have purchased computers for some schools and in a few cases paid for private companies to provide training.[18]

## Box 7.5: Increasing awareness and attracting new customers

Dhiraagu has been utilizing off-peak times at its Internet café to increase awareness among the young. Since 2002, it has provided free Internet courses to school classes. In October 2003 the initiative was extended to five classes per week at its Male' cyber café[19], the largest in the capital.

Students between the ages of 10-14 are invited during so-called 'happy hours', times when there are relatively few other customers. The Internet café staff use the one-hour course to show students how to access web sites and find educational material.

In addition to access to Internet cafes, another advantage students in Male' have is that their language of instruction is English, both in primary and in secondary schools. Although this is officially the case nation-wide, primary students in the atolls are most often taught in Dhivehi, the local language. English is taught simply as a subject, and students from the atolls often find it difficult to switch to English when they commence secondary school.

### 7.5.3 ICT workforce

Post-secondary education is provided by the Maldives College of Higher Education (MCHE, <www.mche.edu.mv>), established in 1998 through an Asian Development Bank project. The MCHE was created as an umbrella organization to consolidate and manage seven existing and largely independent post-secondary educational institutions.

The Sixth National Development Plan foresees the eventual transformation of the Maldives College of Higher Education into a university. The College has six faculties and two Centres. While the fields of tourism, health, education and engineering provide the greatest number of courses, most are one-year or less certificate courses. A bachelor's degree is offered in tourism, management and education while the Faculty of Tourism offers a Master's degree. The degrees are offered in cooperation with foreign universities and include study abroad. Over 6'800 students are currently enrolled at the MCHE, of which some 4'000 are part-time.

Every student enrolled in the college has to take a course to become *computer literate*. Precise skills are outlined covering hardware, data processing, operating systems, word processing and spreadsheets. The estimated teaching time to become computer literate is 16.5 hours. Apart from these skills, a computer literate student is also expected to have a certain attitude towards using the knowledge. This attitude includes having "*a desire for self-learning, a willingness to seek information and use that information, and a positive inclination towards fast desirable changes, reskilling and technology*."

According to the results of a questionnaire filled out by students and academic staff, the main barriers for using ICT is the lack of available resources. Twenty percent, for example, said it was difficult or impossible to find a computer most of the time. The main reason students and staff do not use the Internet is not because of the lack of skills but because of non-availability. While most staff said they had basic ICT skills, they lacked more advanced training. Seventy-seven percent further noted that they had no help desk to turn to for assistance and many depended on a 'learning by doing' method.

The Faculty of Management and Computing (FMC) offers diploma and certificate programmes in Information Technology as well as a bachelor degree in Business Information Systems in conjunction with a UK university.[20] FMC will host a CISCO Networking Academy Program under the ITU / CISCO Internet Training Centres Initiative for Developing Countries.[21] Two MCHE staff attended CISCO instructors training at MCHE's

parent academy in Hyderabad, India in September 2003. The parent academy trains the instructors of local academies and gives them technical support.

The College, which has over 300 staff, is under the Office of the President, rather than the Ministry of Education. Its 2002-2004 Information Technology Strategic Plan outlines the current ICT situation and defines the college's objectives for the coming years. The goals laid out in the Strategic Plan include the integration of technology into all aspects of teaching, learning, and research; the improvement of the network infrastructure and the coordination of IT resources; the use of technology to improve access to information and user support services; and the enhancement of management and administration through the use of ICT. Each goal has specific strategies, including concrete actions and quantitative targets.

Dhiraagu, the telecommunication operator, has an in-house training programme, providing its employees with required ICT skills. Dhiraagu's part owner, Cable & Wireless of the UK, has played an important role and many employees have been sent abroad to receive specialized training. Dhiraagu

has been discussing the possibility of jointly establishing a two-year course in telecommunication engineering with MCHE. One bottleneck is the cost of equipment for the course that Dhiraagu would have to purchase.

Since tertiary education options in the Maldives are limited, the nation relies on foreign education institutions. Between 1998 and 2003, the government sent some 1'500 students abroad on scholarships. Top destinations include Malaysia, India, Sri Lanka, Australia and the United Kingdom. Most scholarships are funded by development assistance. The majority of students studying IT abroad obtained diplomas or bachelor degrees with only a few doing post-graduate work (Figure 7.4). In addition many more Maldivians study abroad without government funding. In 2003 some 500 students were registered with the Ministry of Education as studying abroad but since students are not obliged to register, the number is estimated to be at least twice this high.

The Maldives is not as affected by brain drain as other developing countries. Despite the fact that students are free to chose where to work after their scholarship ends, and do not have to pay back grants, it is estimated that 99 percent return home. One of the reasons might be that few students obtain post-graduate degrees, which are particularly high in demand on the international job market. It also means that the amount of time spent abroad is limited and students have less time to become accustomed to a new country and culture.

ICT training by the private sector is widely available in the capital, and provided by some 15 centres. Participants can obtain certificates and diplomas. These take between one and three years respectively. To ensure quality the Maldives Accreditation Board certifies IT courses provided by the private sector. At November 2003, it had approved some thirty ICT courses from five training centres (Table 7.1).

**Figure 7.4: Going abroad for higher education**

Difference between potential and actual Internet users



Number of scholarships to study abroad, 1998-2003
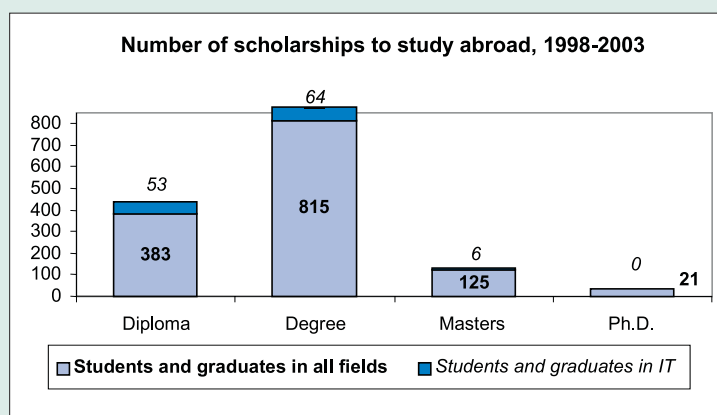
*Source*: Maldives Ministry of Human Resources, Employment and Labour.

## Table 7.1: Private sector ICT courses

Maldives Accreditation Board approved ICT courses, November 2003

**Comtronics Training Centre**

| | |
|---|---|
| Advanced Course in Architectural Drawing with Auto Cad | Advanced Certificate |
| Basic Course in Computer Application | Cert 1 |
| Certificate Course in Computer Application | Cert 2 |
| Advanced Computer Course in Office Management | Cert 3 |
| Certificate Course in Web Designing and Hosting | Cert 3 |

**Cyryx Computer Training Centre**

| | |
|---|---|
| Advanced Certificate in Information Technology | Advanced Certificate |
| Certificate 1 in Information Technology | Cert 1 |
| Certificate 2 in Information Technology | Cert 2 |
| Certificate 3 in Information Technology | Cert 3 |
| Diploma in Information Technology | Diploma |

**Focus Education Centre**

| | |
|---|---|
| Certificate in Office Application | Cert 1 |
| Certificate in Basic Office Management | Cert 1 |
| Foundation Course in Computing | Cert 1 |
| Certificate of Secretariat Skills | Cert 2 |
| Certificate in PC Competence | Cert 2 |
| Certificate 2 in Microsoft Office Management | Cert 2 |
| Advanced Certificate in Computer Studies | Advanced Certificate |
| Diploma in ICT System Support | Diploma |

**International Business Systems Overseas (IBS)**

| | |
|---|---|
| PC networking using Microsoft Windows 2000 | Cert 1 |
| Graphic Specialist Course | Cert 1 |
| PC Troubleshooting and Configuration | Cert 1 |
| Certificate 2 in Microsoft Office | Cert 2 |

**Mandhu Learning Centre (MLC)**

| | |
|---|---|
| First Certificate in Information Technology | Cert 1 |
| Advanced Certificate in Information Technology | Advanced Certificate |
| Diploma in Mathematics and Information Technology | Diploma |
| Diploma in Information Technology | Diploma |

**Win Information Technology Training Centre**

| | |
|---|---|
| Certificate 1 in Computer Application | Cert 1 |
| Certificate 2 in Microsoft Office | Cert 2 |
| Certificate 3 in Microsoft Office management | Cert 3 |

*Source:* Maldives Accreditation Board.

Given the shortage of local labour, the Maldivian economy is dependent on expatriate workers. In May 2003 there were a total of 32'241 foreigners working in the Maldives. This represents more than 30 percent of the total workforce, which stood at about 88'000 according to the 2000 census. The greatest number of expatriates was found in business (3'987), education (2'642), and hotels and restaurants (2'074).

A breakdown of the type of work foreigners are performing, such as ICT, is not available. This is also not available for the economy as whole. The entire area of ICT workforce statistics and their relation to training is lacking. This makes it difficult to plan ICT training and evaluate the impact of ICT on employment. In that respect it would be extremely useful to compile a database of the existing ICT workforce, those receiving training in ICT and carry out an analysis of future needs.

### 7.5.4 The public at large

The draft Information Technology report by the Ministry of Education calls for ICT courses for the general public since there have not yet been significant government initiatives in this area. Dhiraagu has several initiatives to promote the Internet to the public at large. It organizes Internet fairs where free introductory Internet courses are provided. Local companies use these fairs to present and demonstrate new hardware and software products. Dhiraagu also organizes web design competitions with the winners receiving prizes such as PCs or mobile phones.[22] The winning sites were hosted for free for one year. Dhiraagu also organizes seminars for the government as well as the private sector. These sessions feature representatives from Dhiraagu who make presentations on how people can use the Internet. The presentations, which are given for free, have been provided to almost ten ministries.

Those with a secondary education have a relatively good grasp of English since it is the language of instruction in secondary schools. People with only primary education, on the other hand, will most likely have limited English language skills and thus find it difficult to use the Internet.[23] The official language of the Maldives, Dhivehi, uses a unique, Arabic influenced script called Thaana. The Maldives Internet Task Force (MITF, at www.mitf.net) and others have been promoting the use of Dhivehi and Thaana in electronic format. Thaana has now been added to the Unicode Standard, used for representation of text for computer processing. Maldivians are now able to type and read documents in Dhivehi, as well as create and use websites based on Thaana.

1   The World Summit of the Information Society describes the information society as an environment "…where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life." See WSIS Declaration of Principles at http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0004!!MSW-E.doc. [Accessed 8 February 2004].

2   President Maumoon Abdul Gayoom. "Address on the Occasion of the 34th Anniversary of Independence Day." 26 July 1999. http://www.presidencymaldives.gov.mv/v3/pages/body.phtml?ID=30&Table=Head3&PTID=30.

3   Ministry of Planning and National Development. *Sixth National Development Plan 2001-2005*. 2002.

4   Ministry of Communication, Science and Technology. *e-Maldives: The Republic of Maldives National Information and Communications Technology Policy*. Draft. 2003.

5   Searches on the phrases "Maldives tourism" and "Maldives hotels" using the Google search engine returned 112'000 and 398'000 hits respectively. [Search executed on 12 June 2003].

6   "The tourism industry of the Maldives was introduced in 1972 and this boosted the demand for more sophisticated international telecommunication services. As a result of rapidly-growing demand for both local and international telephone services, the first automatic exchange with the capacity of 300 lines was installed in the capital Male' in 1976. In the following year, the first Earth Station (NEC Standard B) came into operation allowing the general public to have access to International Telecommunications services for the first time." See "History" on the Dhiraagu web site at www.dhiraagu.com.mv/about_us/history.php.

7   This is based on the 1997 Supply and Use tables, the latest year for which data is available. Total use of post and telecommunications services was Rf 579.99 million of which resorts consumed Rf 151.45 million. See the Supply and Use Tables included in the 2003 Maldives Statistical Yearbook at http://www.planning.gov.mv/yrb2003/YearBook/allFrames.htm. [Accessed 8 February 2004].

8   One issue that Dhiraagu hopes to address is roaming for Japanese and Republic of Korea visitors. These two countries account for over ten per cent of tourists but do not use the GSM system so their mobiles will not work in the Maldives.

9   Information on credit card holders, point of sale outlets and the number of ATMs is from the Bank of Maldives http://www.bankofmaldives.com.mv [Accessed 8 February 2004].

10  At the Ministry of Transport and Civil Aviation web site http://www.transport.gov.mv, for example, users can download the vehicle and vessel registration form. At the Ministry of Youth and Sports web site http://www.youthsports.gov.mv/application/application1a.htm applications for joining a Youth Centre can be submitted online and the Department of Immigration and Emigration http://www.immigration.gov.mv/forms/index.htm has made different forms available online, including the application for a passport.

11  Asian Development Bank. "Helping Islanders Access Public Services Through The Internet In Maldives." *News Release*. 17 December 2001. http://www.adb.org/Documents/News/2001/nr2001197.asp.

12  UNDP. "Digitally Empowered Development in the Island Communities of Maldives."

13  "But perhaps the more compelling reason for the lower educational status of women is the cultural expectation for women to marry at a young age…Having done so, it becomes difficult for them to continue their studies and more so when they start having babies…" Ministry of Planning and National Development. 2002. *Analytical Report. Population and Housing Census of the Maldives 2000*.

14  "Further, their traditional dependence and reliance on men to help them obtain public services will give way to independence and self-reliance as they can directly access public services…In this way it is highly likely that the provision of public services through the Internet, and the overall improvement in communications will provide greater incentives for women to participate in economic activities and enhance their social position." Asian Development Bank. November 2001. *Report and Recommendation of the President to the Board of Directors on a proposed loan to the Republic of Maldives for the Information Technology Development Project*.

[15] Asian Development Bank. April 2001. *Women in the Republic of Maldives. Country Briefing Paper*. http://www.adb.org/Documents/Books/Country_Briefing_Papers/Women_in_Maldives/default.asp?p=gender.

[16] Ministry of Planning and National Development. *Sixth National Development Plan 2001-2005*. http://www.mv.undp.org/docs/6NHDR/index.htm.

[17] Ministry of Education. March 2001. *Information Technology and Education, Policy and Strategies*. Draft. Is this the latest version? Has it been published yet?

[18] Ministry of Communication, Science and Technology. April 2001. *Republic of Maldives Science and Technology Master Plan*. http://www.mcst.gov.mv/Documents/mplan.htm. [Accessed 4 February 2004].

[19] The Dhiraagu Cyber Café was the first in the Maldives when it began operations in mid-1998. It has a 256 kbps dedicated leased line and 24 recent model PCs. Trained assistants are available to assist users to set up an email account or help out with other questions. See the website at http://www.cybercafe.com.mv. [Accessed 4 February 2004].

[20] For information on program, see the description at the Middlesex University web site: http://www.mdx.ac.uk/subjects/cit/bis.htm. [Accessed 4 February 2004].

[21] CISCO. 2 December 2002. "Cisco and ITU Narrow Gap in Internet and New Economy Skills Worldwide: Internet Training Centers Initiative for Developing Countries helps bridge digital and gender divides." *Press Release*. http://newsroom.cisco.com/dlls/ts_120202.html. [Accessed 4 February 2004].

[22] http://www.dhiraagu.com.mv/newsdesk/index.php?newsid=108.

[23] Apart from the primary schools in the capital, the dominant language of instruction in primary schools is Dhivehi.