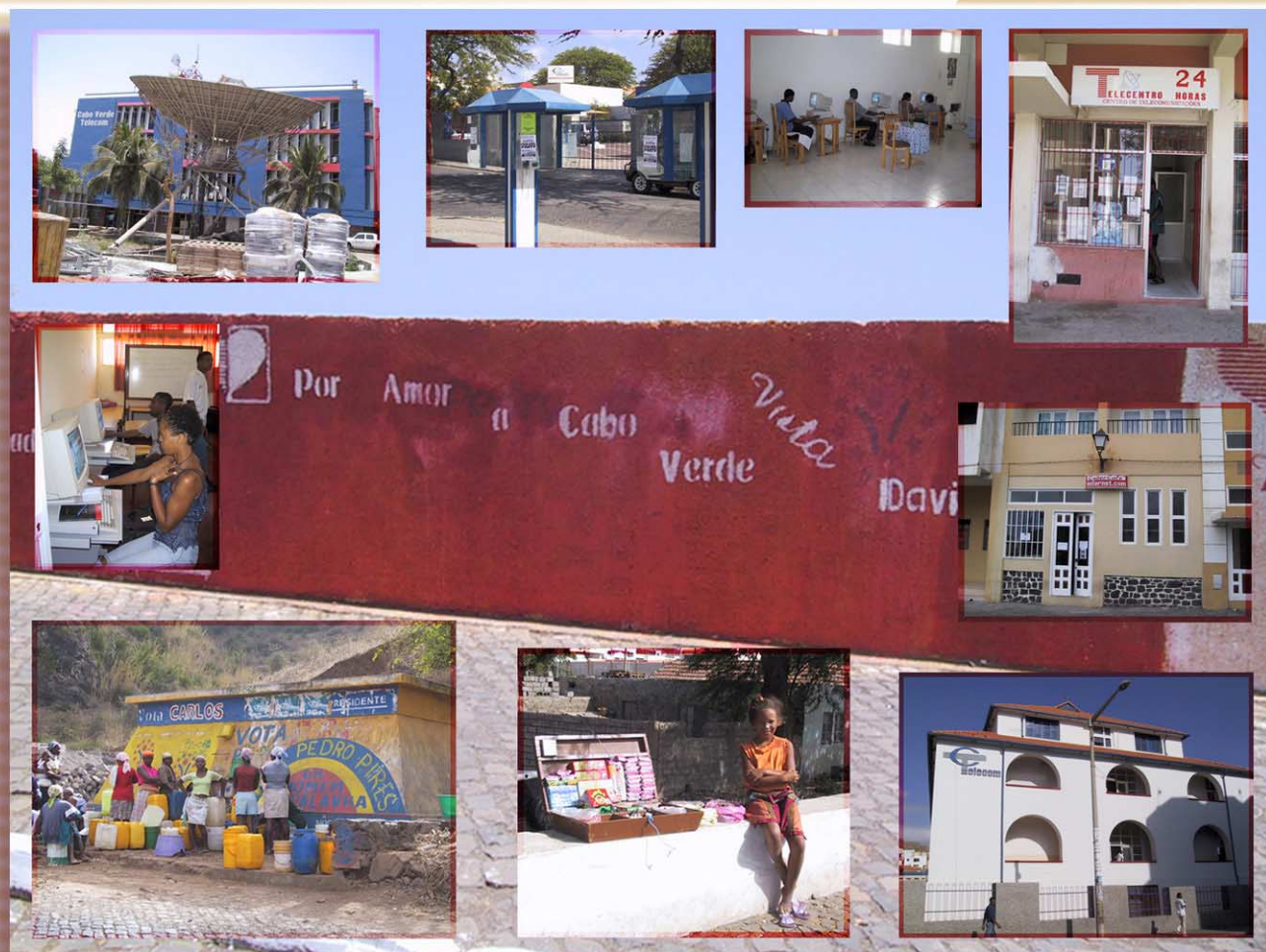


The Internet in a Lusophone LDC: Cape Verde Case Study



International Telecommunication Union



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THE INTERNET IN A LUSOPHONE LDC: CAPE VERDE CASE STUDY



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This report was prepared by Margarida Evora-Sagna, Vanessa Gray and Michael Minges. It is based on research carried out from 16 – 22 April 2002 as well as articles and reports noted in the document. The assistance of *Direcção Geral das Comunicações*, particularly David Gomes was indispensable and highly appreciated.

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The report may not necessarily reflect the opinions of the ITU, its members or the government of the Republic of Cape Verde.

The title refers to Cape Verde's national language Portuguese (Portuguese speakers are referred to as Lusophones) and the nation's classification as a Least Developed Country (LDC).

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1. Country background

1.1 Overview

The Republic of Cape Verde, located in the North Atlantic Ocean, is an archipelago some 455 kilometres west of Senegal in western Africa. It consists of ten islands and covers a land area of 4'033 square kilometres. The archipelago is geographically divided into two groups, the *Barlavento* or windward islands in the north (Santo Antão, São Vicente, Santa Luzia, São Nicolau, Sal and Boa Vista) and the *Sotavento*, or leeward islands, to the south (Maio, São Tiago, Fogo and Brava). The archipelago is of volcanic origin similar to other islands of the *Macaronesia* group (i.e.,

Azores, Canaries and Madeira). The islands of Sal, Boa Vista and Maio are extremely flat while the rest of the archipelago is mountainous.

Cape Verde is characterized by several geographic and historical particularities. Located in the Sahel zone, the country is an extension of the Sahara. While it is the coolest nation in West Africa, it has a history of long droughts. Although the southwest monsoon can bring rain between August and October, rainfall is sporadic and not always certain. The occurrence of droughts has had terrible consequences for Cape Verde, resulting in starvation during the past. Droughts are also one of the causes for large-scale emigration.¹ Cape Verde is also distinctive as being farther from the African mainland and closer to the Americas than any other African country. People wise, Cape Verde is unique as the islands were uninhabited when the Portuguese first arrived in 1456. Slaves were brought from the African mainland and today most Cape Verdeans are of mixed African and European origin.

Administratively, the country is divided into 17 "Concalhos" or districts.

1.2 Demography

A national census was carried out in 2000 and counted a population of 434'812.² The population is young, with over 42 per cent under the age of 14 and only six per cent over the age of 64. The average Cape Verdean is 17.3 years old. Many Cape Verdeans have emigrated and though estimates vary, there are at least as many Cape Verdeans abroad as in the country (see Box 1.1). The nation

Figure 1.1: Map of Cape Verde



Source: The World Factbook.

Table 1.1: Population indicators

Item	Year 2000
Total population	434'812
Growth (%) (1991-2000)	2.4
Urban population (%)	53
Age Distribution:	
Below 14 years (%)	42.3
15-64 years (%)	51.4
65 years and older (%)	6.3

Source: National Statistical Institut (INE).

became predominantly urban during the 1990s with the urban population standing at 53 per cent in 2000. Cape Verde's capital is Praia, with a

population of 106'052 and 54 per cent of the population live on the island of Santiago where Praia is located. With an annual growth rate of 2.4 per cent, the population is expected to reach 567'000 in 2015. Because of emigration and a higher female life expectancy, there are more women than men although the ratio (93.9 men for every 100 women in 2000) has improved over the last decade. Women head forty per cent of Cape Verde's 93'975 households. The average household size is 4.6 persons.

Cape Verde's national language is Creole ("Kriolu"), spoken by practically the entire population. Creole dates back to the 15th century and is derived from old Portuguese and languages spoken in

Box 1.1: The Cape Verdean Diaspora

Emigration from Cape Verde dates back some two hundred years. One factor is recurring droughts forcing citizens to go abroad in search of a better life. Another is the nation's sea faring tradition and its prime location between three shipping routes (Europe-Africa-South America). Yet another factor is the historical tie between Portugal and Cape Verde. Finally, a shortage of institutions of higher learning has forced students in search of education to go abroad, some of whom never return home.

There is much anecdotal evidence that there are more Cape Verdeans living abroad than in the country but few hard statistics. One problem is that some Cape Verdeans may be living abroad illegally and therefore not showing up in official statistics. Another measurement problem is assimilation into the foreign country. For example, there are allegedly more Cape Verdeans in the US than in any other country yet many are already US citizens so they are not counted distinctly. Another problem is that Cape Verde only became independent in 1975 so earlier emigrants may be classified as Portuguese.

Despite these measurement problems, there are bits and pieces of information that provide some idea of the Cape Verdean Diaspora. The national statistics office has an informal estimate of around 700'000. Linguistic research estimates that there are some 400'000 people outside of the country that speak Cape Verdean Creole. In terms of national statistics, the Portuguese Ministry of Internal Administration

reports that there were 43'797 Cape Verdeans living in Portugal in 1999.³ Data from the Community of Portuguese-speaking Countries (*Comunidade dos Países de Língua Portuguesa*, CPLP) state that there were 7'418 Cape Verdeans living in other lusophone African countries in 1996.

The country with the most Cape Verdean descendants is the US where "*Cape Verdeans make up the oldest community of voluntary African immigrants to the United States.*"⁴ Cape Verdeans first started coming to the US in the 19th century when whaling ships visited Cape Verde and picked up locals as sailors. Many settled in the New England region, where the whaling ships were headquartered. Exactly how many Cape Verdeans live in the US is unknown. According to the US Bureau of Census, there were only 14'368 people born in Cape Verde and residing in the US in 1990 who were not US citizens. However many Cape Verdeans would have become citizens and thus not be separately identifiable. One source puts the number of people of Cape Verde descent in the US at half a million.⁵ Ironically while Creole is not taught in Cape Verdean schools, some US jurisdictions require students to be taught in their mother tongue. As a result, Creole textbooks have been published in the US.⁶ Today, the link with the US is manifested mainly through money and telephone calls. The US is the number one source of overseas remittances as well as Cape Verde's top telephone traffic relation.

the coastal areas of West Africa.⁷ Portuguese is the official language, used in schools and publications. Cape Verde is a founding member of the *Comunidade dos Países de Língua Portuguesa*, the formal organization of Portuguese-speaking nations. Around one third of the population is comfortable with Portuguese while over half understands it.⁸ A portion of the population, particularly the educated, is also conversant in French due to until recently, use of French as a second language in school; study abroad; proximity to francophone Africa and the availability of French radio and television broadcasting. Along with Guinea-Bissau and Sao Tome and Principe, Cape Verde is one of three lusophone members of the *Organisation Internationale de la Francophonie*. English is understood by some, due to relatives abroad and overseas studies. English is also increasingly chosen as a second language at school.

1.3 Economy

Although classified as a Least Developed Country (LDC), Cape Verde's level of economic development places it into a lower middle-income nation rather than low income. Gross National Income (GNI) per capita was US\$ 1'330 in 2000, almost double the 1990 figure and five times higher what it was at independence in 1975. Economic growth averaged ten per cent a year between 1980-90 and six per cent a year between 1990-2000.

Cape Verde's economy is heavily service-oriented. Services accounted for 72 per cent of the country's US\$ 588 million Gross Domestic Product (GDP) in 2001. Agriculture only accounted for 11 per cent of GDP. There are few natural resources, a shortage of water and only ten per cent of the land is arable. Nonetheless, around half the population lives in rural areas and engages in small-scale agricultural activities and fishing. Industry accounts for 17 per cent of GDP, consisting mainly of construction and some manufacturing.

Despite Cape Verde's economic growth, the economy is fragile. It has few natural resources and limited agricultural possibilities. Food imports are critical, accounting for about a fifth of imports in 2000. The economy is heavily dependent on foreign assistance (Cape Verde has one of world's highest foreign assistance ratio of per capita at US\$ 319 in 1999) and overseas worker remittances (which account for about 20 per cent of GDP).

After pursuing a centrally-managed and state-run economy after independence, Cape Verde liberalized in 1991. The emphasis is now on private sector involvement, attracting foreign investment and developing exports to reduce the large trade deficit.

Reduction of poverty is a priority for the government. According to data from the early 1990s, about a third of the country lives in poverty, of which 14 per cent are classified as very poor. Poverty varies across the country with those in rural areas suffering more. However the increasing urbanization of the country and the consequent impact on infrastructure and services suggest that urban poverty is rising. Households headed by women tend to be the poorest. The government has a National Poverty Reduction Program with key strategies including promoting economic growth and enhancing human resource development.

With its world famous music, stunning landscape and historical sites, tourism holds considerable potential. Tourism accounted for 3.9 per cent of GDP in 1999 and for 27 per cent of service exports. The majority of foreign investment has been in this sector.

1.4 Human development

Cape Verde ranks 91st out of 162 in the United Nations Development Programme's Human Development Index (HDI), placing the country in the middle of the medium human development category. The HDI is composed of a basket of indicators

Table 1.2: Human Development Indicators

Cape Verde compared to other Lusophone economies, 1999

HDI Rank	Economy	Life expectancy at birth (years)	Adult literacy rate (%)	Combined school gross enrolment ratio (%)	GDP Per capita (PPP US\$)
28	Portugal	75.5	91.9	96	16'064
69	Brazil	67.5	84.9	80	7'037
91	Cape Verde	69.4	73.6	77	4'490
109	Sao Tome	64.7	73.2	59	1'977
146	Angola	45.0	42	23	3'179
156	Guinea Bissau	44.5	37.7	37	678
157	Mozambique	39.8	43.2	23	861

Source: United Nations Development Programme.

including life expectancy at birth, adult literacy, school enrolment and GDP per capita. Cape Verde ranks very high for an LDC and compared to other Portuguese-speaking nations, Cape Verde occupies a unique position. It is behind Brazil and Portugal but ahead of other African lusophone nations (see Table 1.2).

Cape Verde scores well in all indicators relative to its level of economic development. Life expectancy is higher than in Brazil by almost two years. Its literacy rate—at some three quarters of the adult population—is respectable and a reflection of the government's emphasis on education over the last decade. The focus now needs to be on increasing literacy among older adults. There is near universal primary school enrolment in Cape Verde and it has achieved the Millennium Development Goal⁹ in this area. The secondary school enrolment rate is 46 per cent. A shortage of higher education facilities constrains tertiary enrolment, where the rate is only 4.2 per cent.

1.5 Government

The Cape Verde islands were discovered and colonized by the

Portuguese in 1456. Cape Verde's status was changed from a colony to an overseas province of Portugal in 1951. The archipelago achieved independence from Portugal on July 5, 1975.

At independence, there was an intention of forming a joint nation with Guinea-Bissau but relations became strained and this never materialized. The government ruled under a one party system. Growing pressure for democracy led to the first multiparty elections in January 1991. Subsequent democratic elections were held in 1996 and in 2001. The *Partido Africano para a Independência de Cabo Verde* (PAICV) won a majority of seats in parliament and its candidate, Pedro Pires, was elected president by a margin of 13 votes. Both the president, who functions as head of state, and the national assembly serve for a five-year term. The prime minister, who functions as head of government, is nominated by the national assembly.

Cape Verde is heralded as a role model of good governance and stability in the region. Elections are democratic and violence-free. Corruption is low and kept so by tough anti-corruption measures.

- ¹ For more on the impact of droughts on Cape Verdean history see Annababette Wits. "Beating Malthus on Cape Verde Islands." *Islander Magazine*. Issue 3. January 1997. Available at www.islandstudies.org.
- ² Most of the demographic information in this section is from the Instituto Nacional de Estatística web site at www.ine.cv.
- ³ See "Estatísticas 1999", available on the following web site <http://www.mai.gov.pt/data/mai/index.php?x=estatisticas&PHPSESSID=5a77f5976ffc3b17a49995bb18432180>
- ⁴ See J. Lorand Matory. "Africans in the United States," Available at www.footstepsmagazine.com/AfricansinUSArticle.html.
- ⁵ "Some 500,000 people of Cape Verdean ancestry live in the United States, mainly in New England." See U.S. Department of State. "Background Note: Cape Verde." December 2001. www.state.gov/r/pa/ei/bgn/2835pf.htm.
- ⁶ "In Massachusetts twenty LEP students in one language group in a district will trigger native-language instruction, even if there are only two students in each grade in a separate classroom taught by a certified bilingual teacher... thousands of Cape Verdeans are instructed in a pidgin Portuguese-Crioulo—though the majority do not know the language; indeed in Cape Verde only Portuguese is taught since Crioulo is a spoken language, not a written one. Teachers in Massachusetts had to invent and print up Crioulo materials." See Peter J. Duignan. "Bilingual Education: A Critique." Available at www-hoover.stanford.edu/publications/he/22/22b.html.
- ⁷ For more on the origins and status of Cape Verdean Creole see Manuel Veiga. "Language Policy in Cape Verde: A Proposal for the Affirmation of Kriolu." www.umassd.edu/specialprograms/caboverde/cci-kproposal-e.html and Marlyse Baptista. "The sociolinguistic situation in the Cape Verde islands." www.capeverdeancreoleinstitute.org/articles_&_research.htm.
- ⁸ See "KABUVERDIANU: a language of Cape Verde Islands." on the Ethnologue web site at www.ethnologue.com/show_language.asp?code=KEA
- ⁹ For more information on the United Nations Millennium Development Goals, see <http://www.un.org/millenniumgoals/index.html>.

2. Telecom & Mass Media

2.1 Telecommunications

2.1.1 Policy and regulation

Cape Verde's telecommunication sector policy and regulation formally started after independence in 1975. Until this date, the country's telegraphy and telephony services, like in other colonies, fell under Portugal's telecommunication laws and legislation. A state-owned operator provided national communications while privately owned *Companhia Portuguesa Radio Marconi* (CPRM) provided international telecommunications. CPRM's operations were based on the terms of a Concession Agreement that it signed with the Portuguese government.

The country's geographic location helped develop its telecommunication infrastructure in several ways. The implementation of international Radio Regulations since the early stage of telecommunication development in Cape Verde has made the country's maritime coast stations well known for their service quality. This has long earned Cape Verde the reputation of being one of the most important African maritime coast stations of the Atlantic Ocean. In the 19th century, Mindelo Island was an important landing point for the first telegraphy copper submarine cables connecting Africa to Europe. The landing of the SAT 1 submarine cable in Sal in 1966, later connected to Mindelo and Praia through a troposcatter¹ system, provided the infrastructure to offer good quality voice services.

The rapid evolution of the telecommunication sector worldwide later led the young Cape Verde nation to establish telecommunications, broadcasting and Information and Communications Technologies (ICT) development programs. The technical and legal framework has been periodically revised and adapted to take

into account the evolution of technologies, and to adapt to the world market as well as to the socio-economic and political structure of Cape Verde.

2.1.1.1 From privatisation to nationalization: the early telecommunication sector

Immediately after independence in 1975, Cape Verde's new government declared the telecommunication sector crucial to the country's development and its promotion was made a top priority. Much of the telecommunication infrastructure belonged to CPRM. In order to maximize use of the infrastructure and ensure that it benefited everyone, national ownership was inevitable. For this reason, as well as to emphasize the new nation's independence, nationalization, that is transfer of the foreign-owned infrastructure to the government, became essential. Negotiations between the Cape Verde and Portugal were smooth and led to a new Protocol of Concession, which granted the Cape Verde government exclusive ownership.

The Protocol of Concession was signed between the Cape Verde government and CPRM on 21 January 1977. Four years later, when Cape Verde announced its intention to cancel the concession, CPRM did not challenge this request and on 12 December 1981 the two parties terminated the concession by signing the Cancellation Agreement. Clause 2 of the agreement obligated Cape Verde to compensate CPRM for the termination of the Concession. After deducting CPRM's debts (that it still owed Cape Verde from the 1976-1981 period), the compensation amount that Cape Verde had to pay CPRM came to about 30 million Cape Verde escudos (US\$ 616'000). This amount included:

- The residual value of the telecommunications equipment and buildings belonging to CPRM;
- The SAT 1 submarine cable International Right of Use; and
- CPRM's foregone profits from the early termination.

The Cape Verde government made the compensation payments between June 1982 and December 1983, as scheduled in the Cancellation Agreement. December 31, 1983, the day the last payment was made, has symbolic significance and marks the complete independence and financial autonomy of the Cape Verde telecommunications sector.

Nationalization of the telecommunication sector provided Cape Verde with new freedom and options. The government could now sign cooperation agreements with regional development agencies such as the African Development Bank (ADB) and the Kuwait and OPEC Funds. International development assistance and bilateral cooperation contracts contributed to the sector's phenomenal growth over the next years.

As a measure to accelerate telecommunication development, the post and telecommunication entity was granted autonomy to manage its own funds. This meant that after the approval of the annual telecommunication and postal budget, the management of the budget was shielded from the Ministry of Finance's sphere of influence, including lengthy administrative procedures. This put the post and telecommunication entity in an advantageous situation compared to other government agencies.

2.1.1.2 Creation of the first regulator

At independence, in 1975, both the telecommunication and the postal sectors were operated by the *Serviços dos Correios e Telecomunicações* (CTT). Immediately after indepen-

dence, in 1976, a separate body, the *Direcção Nacional dos Correios e Telecomunicações*, was created and put in charge of international telecommunication relations and to assist the government in defining policy strategies for telecommunication development. This new authority, which was dependent on the ministry in charge of telecommunication, also assumed responsibility for the country's frequency management.

In July 1981, *Direcção Nacional dos Correios e Telecomunicações* and *Serviços dos Correios e Telecomunicações* were merged into one public enterprise, called *Empresa Pública dos Correios e Telecomunicações SARL* (CTT-EP). This measure allowed the telecommunication sector to grow more independent and to be protected from the usual constraints of governmental intervention in day-to-day management. The government further hoped to overcome the lack of specialized staff by concentrating all telecommunication experts in one entity.

During the following years *Empresa Pública dos Correios e Telecomunicações* planned, developed, implemented and operated all national and international telecommunications in Cape Verde. In addition it accumulated regulatory functions, including spectrum management and number planning. It also played an important role at the international level.

One of the positive results of Cape Verde's successful foreign telecommunication relations was its election to the International Telecommunication Union Administrative Council, during the Plenipotentiary Conference in Nice, in 1989.² Cape Verde kept its place in the ITU Administrative Council until 1998.

Cape Verde also has a regional success story to tell. It has played an important role in helping to reach consensus on regional development and in seconding national experts for international, regional and bilateral cooperation.

2.1.1.3 Creation of second regulatory body

By 1991 Cape Verde had achieved nationwide and reliable telephone coverage. International telecommunications were secured by both submarine cable and satellite connections. The success of the sector is illustrated by the fact that the *Empresa Publica dos Correios e Telecomunications* was making enough profit not only to cover its expenses but also to pay off government loans that it had borrowed for telecommunication development.

In 1992, the government, responding to new telecommunication realities, decided to create a new regulatory body, the *Direccao Geral das Comunicações*. The new regulator, who took over regulatory functions from CTT-EP was first attached to the Ministry of Tourism, Industry and Commerce. A year after its creation it was transferred to the Ministry of Infrastructure and Transport.

Direccao Geral das Comunicações was, among other things, responsible for developing and enforcing the legal framework in the telecommunication and postal sector. It was also put in charge of guaranteeing the correct use of Cape Verde's frequencies.

2.1.1.4 The Legal Framework

In February 1994, the government approved the new *Basic Law for the Communication Sector (5/94)*, including the postal sector. The law covered a number of areas, including:

- Clear definition of public and private communication services;
- A telecommunication public service which should satisfy the communication needs of the population as well as national and international economic and social activities;
- The basic telecommunication infrastructure belongs to the state and can only be operated by a public enterprise, through a Concession Agreement;

- The separation of policy and regulatory functions from operational functions;
- The definition of competition rules;
- Conditions for new categories of services such as Value Added Services and mobile; and
- Liberalization of terminal equipment.

A special section of the law was dedicated to the telecommunications planning and development process, including new technologies and regional cooperation. In order to guarantee harmonized sector development and gradual market liberalization, the law further strengthened the government's responsibility in the definition of telecommunication sector policy and development strategies. For example, government responsibilities now included:

- Radio spectrum and orbital position management;
- Cape Verdean representation in all international and intergovernmental communication organizations;
- Definition of the general policy and overall telecommunication sector planning;
- Approval of all telecommunication legislation and regulation;
- Standardization and homologation of all telecommunications equipment;
- Concession, licensing, and authorization of all communication operators;
- Enforcement of all communication laws and regulations through charges, fines and penalties;
- Definition of tariff policy;

A major change called for by the law was the separation of telecommunication from postal services.

2.1.1.5 Separation of posts from telecommunications

The government, through the declaration for telecommunication reform, stated the need to respond to the rapid evolution of the technology and telecommunication market with efficiency, flexibility and very limited government intervention. On 16 February 1995, it approved Decree Law 9-A/95, which laid out the terms and conditions for the separation of posts from telecommunications. Based on this law, *Empresa Publica dos Correios e Telecomunicacoes* was split into two separate enterprises: *Cabo Verde Telecom Sarl* and *Correios de Cabo Verde Sarl*. Cabo Verde Telecom was reorganized based on a plan for partial privatization. At the same time a new committee was created to assist the government with the privatization of state-owned public enterprises, including the one in the telecommunication sector.³

Soon afterwards, on June 20 1995, the government approved the Telecommunication Privatization Decree Law 33/95, which called for the following steps concerning the privatization of Cabo Verde Telecom (CVT):

- Forty per cent of CV Telecom shares are to be sold to a strategic partner in an international tender;
- Twenty-five per cent of the shares are to be reserved for emigrants and CV Telecom employees;
- The Government is to keep a "Golden Share", independent of the amount of shares not sold;
- The signature of a Concession Agreement, based on the specific law for concessions.

After the international tender (in December 1995), 40 per cent of the shares were sold to Portugal Telecom (PT) for US\$ 20 million. A Concession Agreement was signed between the Government and CVT on February 17, 1996. This Concession Agreement

granted CVT a monopoly for the operation of basic services and the exclusivity for international communications for 25 years, that is, until 1 January 2021.⁴

2.1.1.6 Universal access

A universal access obligation was included in the Concession Agreement signed between the government and CVT. It calls for the installation of at least one telephone in each locality with more than 200 inhabitants. Clause 22 of the Concession Agreement states that a compensation fund shall be created for reimbursing losses resulting from universal access obligations. The incumbent and all other telecommunication operators or service providers shall contribute to this fund. The terms and conditions to establish the fund for universal access obligations was to be determined by specific legislation. However up to today this legislation has not been put in place.

By the year 2000 CVT, by providing at least one telephone in all 241 communities with more than 200 inhabitants, fulfilled its universal access obligation. In spite of the difficult topographical conditions of the islands, CVT in some cases even installed telephones in villages with less than 200 people. It has used up-to-date technology, including in the most remote areas. An example is Santo Antão, one of the most rural and mountainous islands. To fulfill the universal access obligation in one of its villages, where neither electricity nor roads exist and the easiest way to get there is by boat from the nearest island, CVT incised the mountains to install a fiber optical link. In addition CVT has covered most of the country with a GSM mobile cellular network.

Universal service—or the availability of a telephone in a household—has progressed steadily. The percentage of households with a fixed telephone line increased from 15 in 1992 to 60 in 2001, the third highest level in Africa (after Reunion and Mauritius).⁵ A major factor is growing wealth. The monthly fixed telephone subscription

charge—which has remained the same price at ECV 250 (US\$ 2.08)—amounted to two per cent of per capita income in 2000, down from almost five per cent in 1992. According to CVT, the fixed market is now saturated in terms of affordability and some people are not paying their bill. There is little mobile substitution because mobile service is costly compared to fixed. Although almost any family could probably afford a telephone as long as they do not make international calls, the barrier is the one-time connection charge of ECV 3'000 (US\$ 25). Another bottleneck constraining home telephone ownership is the lack of electrical energy. Only half the country's households had electricity in 2000. This is why mobile telephones, which run on batteries, might have a role to play in achieving universal service. For example, mobile phones could be recharged at the same location where pre-paid cards are purchased.

2.1.1.7 Tariff policy

Tariff regulation is only applicable to telecommunication services offered under the monopoly concession. Since competition is theoretically possible (although currently non-existent) for mobile and Internet services, tariff regulation for these services do not apply. In practice, tariff regulation has been non-existent since fixed telephone prices have not changed for a decade and international prices were reduced slightly only once, in 1997. CVT has asked to rebalance its tariffs by lowering international and raising local charges but so far this has not been accepted. One user-unfriendly aspect of telecommunication pricing in Cape Verde is that there is no fractional charging. Users are charged per unit of conversation whether they use it or not rather than by the actual time they talk. Since units are relatively long (3 minutes), this is to the disadvantage of the client.

2.1.1.8 Interconnection

The *Basic Law for Communications*, DL 5/94 (in article 26) establishes that the incumbent must interconnect all other telecommunication operators under the same competitive

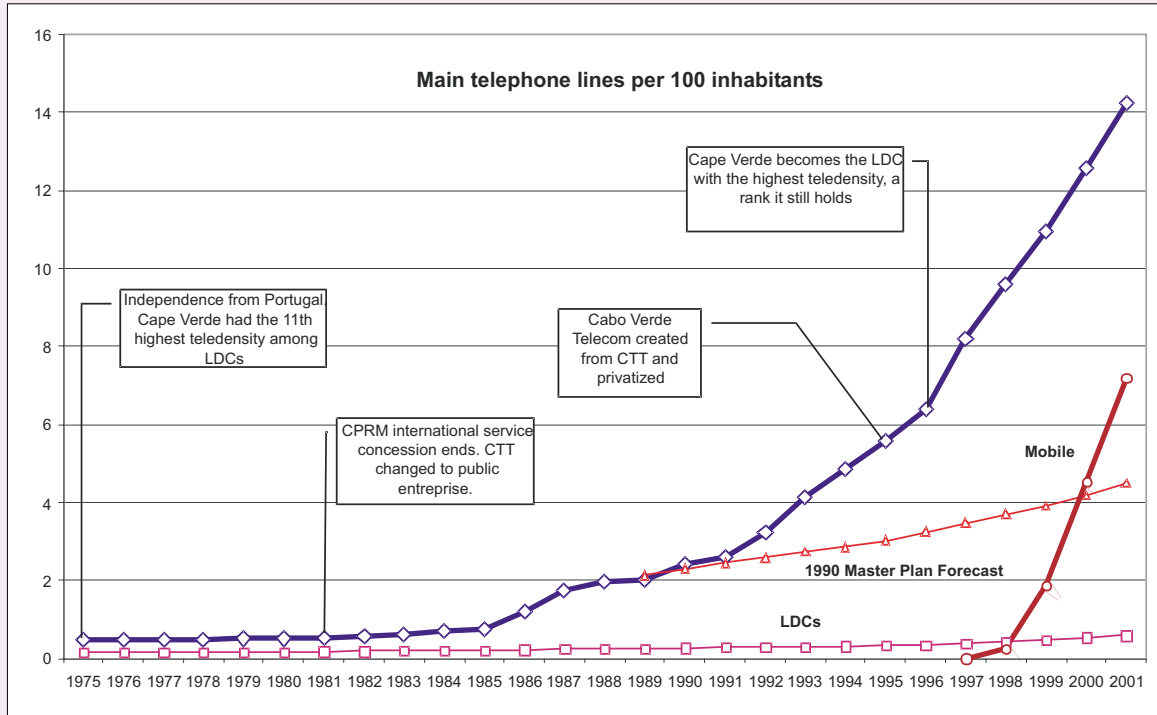
conditions. The incumbent is not allowed to take any measures that could restrict competition. The law also states that the incumbent is forbidden from abusing its power or dominance. Since there are no other telecommunication operators, this law is not actually applied.

2.1.2 Network

Cape Verde's introduction to telecommunications goes back to 1874 when it was a landing point for the first telegraph submarine cable installed between Europe and Brazil. The first telephones were installed in 1919. However not much was done to expand telecommunications for the next half century. In 1960, there were only 188 telephones in the whole nation and the first automatic telephone exchange was only installed a year later.⁶ Since independence in 1975, things have changed. Network growth has been spectacular and today Cape Verde has the highest telephone density of all LDCs (see Figure 2.1). The nation's telecommunication infrastructure features fully digitized local exchanges, national and international fiber optic links, ISDN services and a second-generation GSM mobile cellular network.

As mentioned above, telecommunication services in Cape Verde are a legal monopoly of Cabo Verde Telecom (CVT) with the concession running until 1 January 2021. CVT was created in 1995 when postal services were spun off from CTT-EP. It was partly privatized in December 1995 when 40 per cent was sold to Portugal Telecom for US\$ 20 million. Subsequent sales of shares have reduced the direct state holding to 3.4 per cent although it has indirect ownership through government-owned funds that have purchased shares in the company (see Figure 2.2, left chart). CVT has a major impact on the Cape Verdean economy. 2001 revenues were ECV 5'213 (US\$ 43) million and accounted for seven per cent of GDP (see Figure 2.2, right chart). CVT employs 466 persons (1.3 per cent of total private sector employment in the country) of which 154 (one third) are

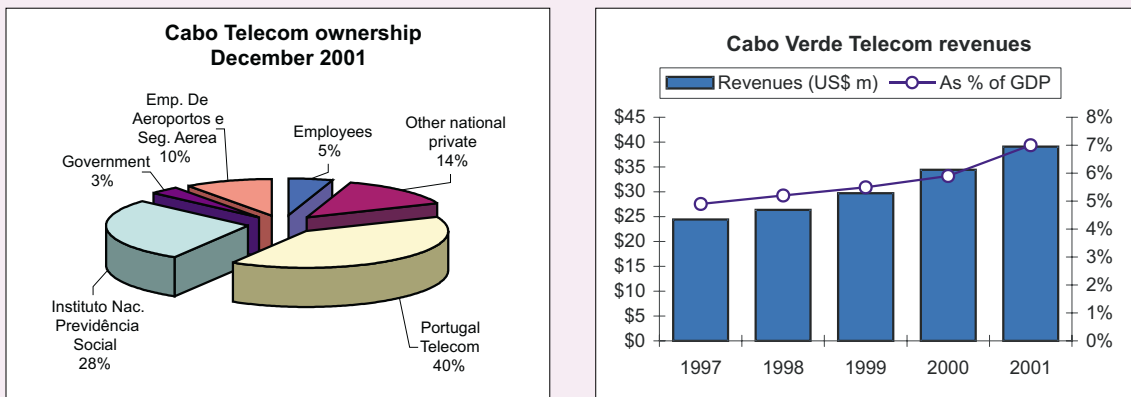
Figure 2.1: Upward trajectory



Note: "1990 Master Plan Forecast" refers to projections made in the 1990 Telecommunication Master Plan. "Mobile" refers to Cape Verde's mobile subscribers per 100 inhabitants. "LDCs" refers to main lines per 100 inhabitants in Least Developed Countries.
Source: ITU.

Figure 2.2: Cabo Verde Telecom owners and revenue

Cabo Verde Telecom share ownership, December 2001 and telecommunication revenues and revenues as a share of GDP, 1997-2001



Source: ITU adapted from CVT data.

women. CVT is one of the most efficient telecommunication operators in Africa, with 7.3 employees per 1'000 telephone lines. It has made major investments in the telecommunication sector, averaging around 45 per cent of its revenue over the last five years. Telecommunication capital expenditure in 2000 was US\$ 13.6 million, some 12.6 per cent of the country's gross domestic investment.

2.1.2.1 Fixed telephone network

Cape Verde had the world's fourth fastest growing telephone network between 1990 and 2000 (after Vietnam, China and Cambodia) raising teledensity from 2.4 in 1990 to 14.3 in 2001. The waiting list for a telephone line was reduced from over 10'000 to 2'914 at the end of 2001 with an average waiting time of just 3.4 months, down from over a year in 1997. The local network of 64'132 main lines is entirely connected to digital exchanges, a feat accomplished in 2000. The total capacity of the fixed network is 77'400 lines. Integrated Services Digital Network (ISDN) was introduced in 1999 and at the end of 2001 there were 550 basic rate ISDN subscribers and 23 primary rate.

A major challenge has been to connect the nation's dispersed islands with high speed fibre optic cable. Although 100 per cent digital microwave and satellite connections were available for inter-island communication, in 1997, CVT began linking the six most populated islands by a submarine cable fiber optic system. The US\$ seven million project was completed in 2002.

2.1.2.2 Mobile services

Mobile cellular communications came relatively late to Cape Verde. Unlike many other nations, analogue mobile technology was never introduced. CVT launched its digital mobile Global System for Mobile (GSM) network in late 1997. At the end of 2001, CVT had 31'507 subscribers for a density of seven per cent. The growth rate was up 60 per cent compared to 2000.⁷ The network is available on all the islands and population coverage is

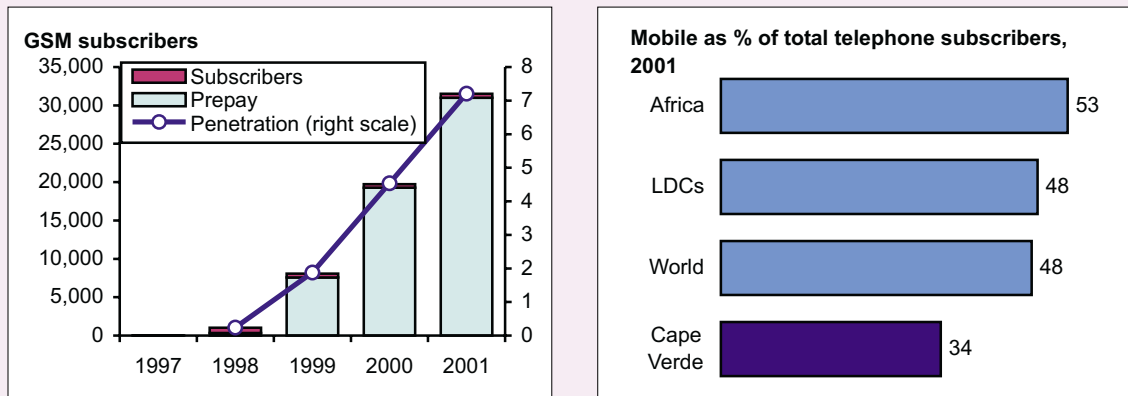
estimated at around 90 per cent. Pre-paid was launched in 1998 and by the year 2001 almost all new subscribers were pre-paid. In 2001, mobile revenues were ECV 989 million (US\$ 8.2 million), 18.6 per cent of total telecom revenues, and up 70.3 per cent over the previous year. CVT has roaming agreements with 33 foreign mobile operators. The rapid growth of tourism is boasting roaming revenues, which accounted for some 15 per cent of total mobile revenues.

The full potential of mobile however has not been realized. Worldwide, the number of mobile subscribers passed fixed telephone subscribers in early 2002 and more than 100 countries have more mobile than fixed subscribers. Yet in Cape Verde, the mobile base only accounted for 33 per cent of all telephone subscribers at the end of 2001, one of the lowest rates among LDCs and African nations (see right chart, Figure 2.3). Although this is partly due to the country's relatively high fixed line density, it also suggests restricted growth in the mobile sector.

The main reason for the limited success of mobile is the lack of competition. Here Cape Verde is in a distinct minority. At the end of 2001, 65 per cent of countries in the world had competitive mobile markets. Mobile competition has had a notable impact on lowering prices, increasing quality and expanding service options. Cape Verde has not followed this trend and partaken in its benefits. For example, there is little flexibility in Cape Verde mobile plans with basically only two options: either a subscription-based plan or a pre-paid package. There is only one subscription option with no free minutes. The connection charge is ECV 4'045 (US\$ 33.71), monthly subscription is ECV 3'000 (US\$ 28.41) and the call charge to another mobile is ECV 25 (US\$ 0.21). 100 minutes of mobile calls would cost US\$ 45.83 in Cape Verde, compared to US\$ 28.41 in Uganda, a much poorer nation but which has three mobile operators. Furthermore there is no per-second charging, no off-peak rate and pre-paid subscribers must recharge their

Figure 2.3: Mobile in Cape Verde

Number of mobile cellular subscribers, Cape Verde and mobile subscribers as a % of total telephone subscribers, Cape Verde compared to different regions



Note: GSM network was launched in late 1997.

Source: CVT, ITU.

cards every month or risk being cut off from the network. Indeed, the mobile churn rate was 31 per cent in 2001, particularly high considering that there is no competitor for subscribers to turn to. Over 8'000 subscribers were disconnected for not recharging their pre-paid cards in 2001.

There is no legal barrier to mobile competition as this service is not included in CVT's exclusivity. However the lack of an interconnection system and doubts about a potential competitor being able to offer international services have delayed the introduction of competition. Nonetheless strategic mobile investors active elsewhere on the African continent have expressed their interest in Cape Verde.

Short Messaging Service (SMS) was launched in 2000. 712'752 SMS messages were sent in 2001 or an average of 22 per subscriber per year. There are plans to introduce GPRS and WAP. Considering the relatively undeveloped nature of the mobile data market and the still considerable potential for GSM, third generation mobile seems a long way off.

2.1.2.3 International traffic

International telecommunications play an important role in Cape Verde because of the archipelago's isolated location and the need for maintaining contact with its large expatriate community. Revenues from overseas telephone calls have been credited as one reason for the country's telecommunication take-off beginning in the mid-1980s. This was because Portugal's Marconi lost its monopoly over international communications, allowing more of the revenues to be reinvested in the country. The installation of an Intelsat earth station in 1983 boosted capacity and increased traffic.

Despite the importance of international communications, incoming settlement payments only accounted for some 25 per cent of CVT's revenues in 2001. Though this is a significant amount, CVT is less reliant on international revenues than many other developing nations. CVT has a notable discrepancy in incoming and outgoing traffic. In 2001, there were 37 million minutes of incoming international telephone calls compared to eight million minutes of outgoing traffic, a ratio of 4.6:1. The

major reason is high international calling prices.

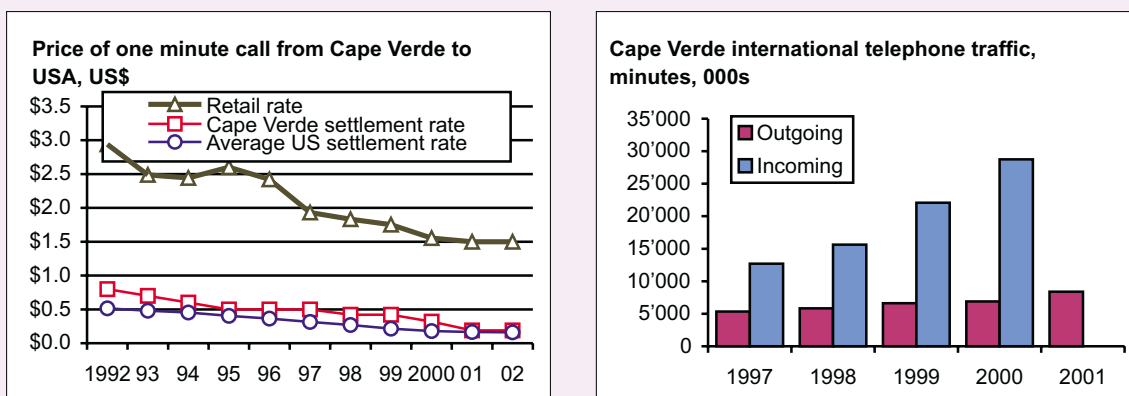
One problem that CVT faces is a growing volume of refile traffic.⁸ This results in countries sending telephone traffic to Cape Verde not paying the settlement fee, paying in depreciable currencies, or paying lower settlement fees than the origination country would have paid. Senegal has emerged as the third largest source of incoming telephone calls to Cape Verde, accounting for some 4.4 million minutes of traffic in 2001. One reason is that a large amount of refile traffic is being sent via Senegal even though the settlement rate between Cape Verde and Senegal is higher than that between Cape Verde and more developed nations.

The origin of incoming telephone traffic is becoming difficult to determine and the data more irreconcilable. For example, the US reported 17.6 million minutes of traffic to Cape Verde in 2000 and the UK 10.5 million minutes, an amount equivalent to what CVT reported as its total incoming traffic for that year.⁹ The large Cape Verdean community in the US is one major factor

explaining traffic from that country. The magnitude of the one-way traffic stream is mind-boggling, with traffic from the US to Cape Verde 28 times that in the other direction. The US is Cape Verde's largest source of incoming settlement payments, accounting for some US\$ four million net in 2000. Cape Verde has abided by the FCC Benchmark order and reduced its settlement rate with the US to the amount specified in the order, that is, US\$ 0.19 per minute.¹⁰ What is significant though is that this reduction has not been passed on to users. Tariffs remain the same in CVE terms as they have been since a slight reduction in 1997 (Ironically, the intent of the FCC Benchmark order was to create lower rates for US consumers. However US carriers are not passing much of the savings on to consumers with mark-ups of up to four times over the settlement rate for calls to Cape Verde). CVT's infrastructure could handle extra outgoing traffic thanks to a doubling of international circuits to 538 since the entering into service of the Atlantis II submarine fibre cable system in 1999. However existing tariffs levels are unlikely to generate considerable extra demand.

Figure 2.4: Cape Verde's international traffic and pricing

Price of a one-minute call and settlement rate from Cape Verde to USA and Cape Verde's international telephone traffic



Source: ITU adapted from FCC, CVT and MCI.

Figure 2.5: Cape Verde's umbilical cord

Atlantis II fiber optic submarine cable route and landing point at CVT headquarters in Praia



Source: Marconi, ITU.

The Atlantis-II fibre optic submarine cable and Intelsat satellite assure Cape Verde's international communications. Atlantis II is an 8'500 kilometer cable running from Las Tonifias, Argentina to Carcavelos, Portugal. It was commissioned in 1999. CVT is one of 8 co-owners of the cable which has a landing point in Praia at CVT's headquarters (see Figure 2.5).

2.2 Mass media

Access to mass media in Cape Verde is high considering the under-development of the sector and a lack of electricity in some locations. Over 90 per cent of adult males and around 70 per cent of females read a newspaper, listened to the radio, or watched television in 1998 (see Figure 2.6). This is due in part to the nation's relatively high level of literacy and education. Exposure to mass media rises sharply with education.

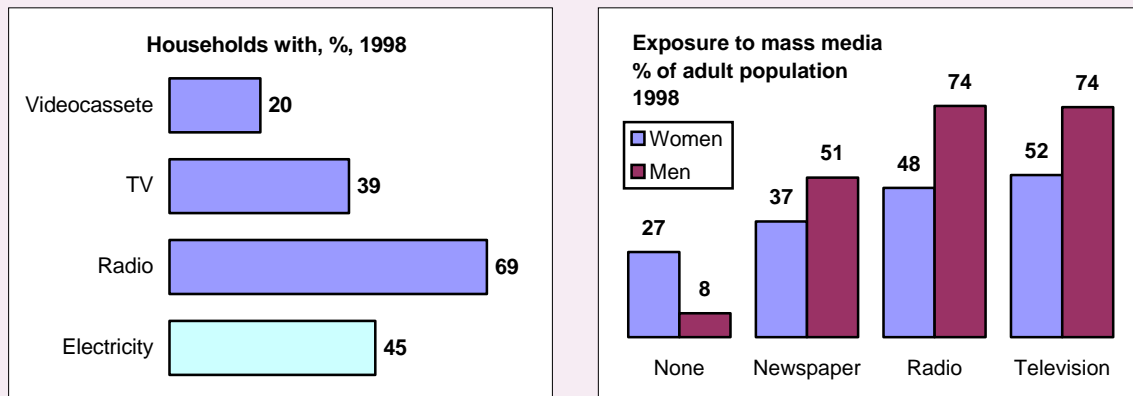
While in 1998 two thirds of adult females with no education were not exposed to any form of mass media, this figure drops to four per cent for those with a secondary education.

There is no daily newspaper published in Cape Verde. There are two weekly and several monthly newspapers, all published in Portuguese.¹¹ The most popular is *A Semana* with between 5-6'000 copies per week. UNESCO data from 1996 put newspaper circulation at 20'000 or 5.1 per 100 inhabitants. Inforpress is the national news agency. It has a web site at <www.inforpress.cv>.

Newspapers in Cape Verde face a number of obstacles. One is the high cost of newsprint, making newspapers expensive for many people. Another is the dispersed geographic situation of the nation, which necessitates delivery by air and adds to costs. Yet another is competition from daily

Figure 2.6: Access to mass media in Cape Verde

Percentage of households with consumer durables and exposure to mass media, % of adult population, Cape Verde, 1998



Note: Right chart shows percentage of population (15+) who read a newspaper or watch television at least once a week or listen to the radio daily.
 Source: ITU adapted from INE, IDSR 1998.

newspapers published in Brazil and Portugal. The Internet could help alleviate some of these problems by having copies sent over the Internet to the different islands and printed locally (or posted on community bulletin boards). The availability of web sites would also cut down on the need for paper copies and would enable local papers to compete more effectively with foreign news sites for readers. A big advantage would be attracting the large expatriate community, hungry for local news.

There is nationwide coverage of radio and TV broadcasting although there are areas of poor reception, especially in the mountainous regions. Some local TV and radio broadcasts are in the national Creole language. As with newspapers, local broadcasting companies face competition from Portuguese and French stations that have transmitters in the larger towns in Cape Verde.

Radiotelevisão de Cabo Verde (RTC) is the national radio and television broadcaster. It has some 200 staff and is financed by license fees paid through electricity bills. RTC does not have a web site of its own, although

its pages have been hosted by other sites. However this has been an ad-hoc arrangement. There is a proposed project, co-financed by *Rádiodifusão Portuguesa* (RDP) of Portugal, to informatize RTC. The project aims to improve quality and provide audio streaming over the Internet. Other plans include the publication of RTC's programme schedule on the Internet, the exchange of radio programs with other stations around the world, and digital production.

In addition to RTC, there are five other local radio stations, all broadcasting on the FM band (AM is not used in Cape Verde). There are also two overseas radio networks that broadcast using their own transmitters. *Rádiodifusão Portuguesa* (RDP) Africa service, which broadcasts to Portuguese speaking Africa, can be received on four different islands in Cape Verde.¹² *Radio France Internationale* (RFI), which broadcasts in French and Portuguese, has transmitters in Praia and Mindelo.¹³

Cape Verde has three television stations: RTC, *Rádiodifusão Portuguesa* (RTP, <www.rtp.pt>), and *TV5 Afrique* (<http://www.tv5.org/>

afrique/) (in French). The latter two thematic channels for Africa are broadcast 24 hours a day.

There is no local cable television. Thirst for multi-channel television is met by using satellite dishes for those that can afford them. Some people access Portugal's TV Cabo digital satellite service. This requires a large

antenna because the satellite is not optimized for delivery to Cape Verde. One must also have the means to obtain a decoder card from Portugal. There are no precise figures on the number of satellite antennas but it is estimated that there are less than 1'000. CVT has been examining the feasibility of introducing an MMDS based pay television service.

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- ¹ Troposcatter refers to "tropospheric forward scattering", a technique allowing radio signals to travel further than they would over conventional terrestrial microwave links.
 - ² Cape Verde joined the ITU on September 10, 1976.
 - ³ The World Bank played an influential role in this process through a Privatization and Technical Assistance Project.
 - ⁴ See the Telecom Portugal Press Release dated 11 December 1996 entitled "Assinado o contrato de concessão da Cabo Verde Telecom." http://www.telecom.pt/quemsomos/noticias/artigo.asp?id_artigo=46.
 - ⁵ A precise measurement of households with a telephone—typically carried out as a part of household surveys or census—is not yet available. The national statistical agency will include this in its next household survey with the results due in early 2003. In the meantime, a proxy for home fixed line telephone ownership is the number of residential telephone lines divided by the number of households. CVT estimates that some 90 per cent of all telephone lines in service are residential.
 - ⁶ The figure for the number of telephones in 1960 comes from AT&T. *The World's Telephones 1961*. ATT, New York. Out of the 188 telephones in Cape Verde at that time, 80 per cent (151) were in the capital Praia.
 - ⁷ One boon to mobile growth has been relatively low handset costs due to the practice of emigrants and travellers purchasing cell phones abroad and bringing them back to Cape Verde.
 - ⁸ Refile is the practice of routing international telephone traffic via a third country.
 - ⁹ References to US (FCC) and UK (OFTEL) reports.
 - ¹⁰ Cape Verde IS classified as lower middle income for FCC settlement rate benchmark. Therefore it is supposed to have a settlement rate of 19 cents per minute by 1 January 2001. Cape Verde's achieved this in January 2001.
 - ¹¹ One local newspaper, Resto das Ilas, has a web site at: <http://www.expressodasilhas.cv>.
 - ¹² <www.rdp.pt/frequencias/afrika_fm.html>
 - ¹³ <www.radiofranceinternationale.fr/frequences/portail_listefrequence.asp?codepays=AFC2>

3. The Internet

3.1 History

The Internet developed differently in Cape Verde than in many other nations. In most countries, the Internet started as an initiative of the academic community or a development assistance project. In Cape Verde it was the incumbent telecommunication operator, Cape Verde Telecom (CVT), who first introduced the Internet. What is also unique is that there was no preceding networking experience such as UUCP¹ for e-mail connectivity.² An experimental network was launched by CVT in October 1996 with a 64 kbps connection to Telepac in Portugal. The service was commercialized a year later. Cape Verde's entry into cyberspace was relatively late—it was the 29th African country to get connected to the Internet—which is surprising considering the rapid expansion it had made in other telecommunication areas (see chapter two).

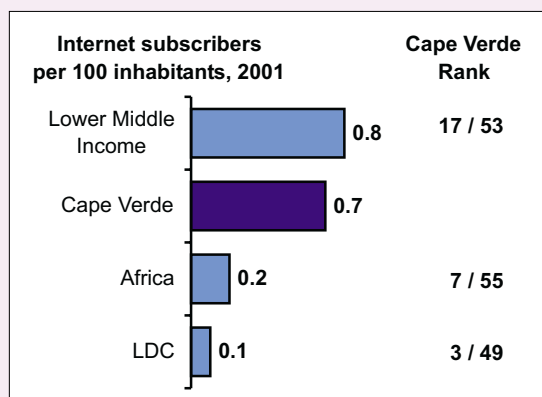
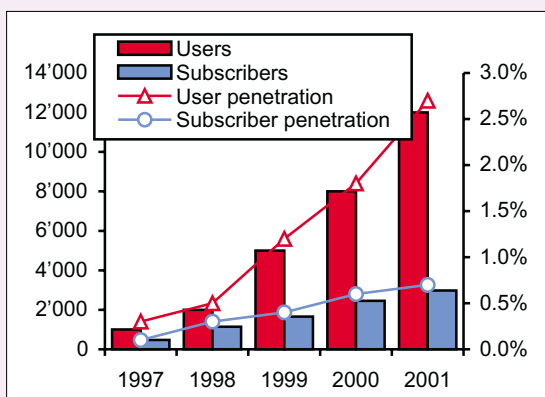
Even today, the Internet is hardly visible in Cape Verde. There are few Internet cafés and the existing ones are difficult to locate. Billboards or other signs advertising web sites or email addresses are rare and information about obtaining a "CV" domain name is not easily available. Nonetheless, there is a Cape Verdean cyberspace with a significant amount of information about the country on the Internet.

3.2 The market

At the end of 2001, there were 2'974 dial-up Internet subscribers in Cape Verde, up 21 per cent over 2000. There are no scientific surveys regarding the number of users. Based on a multiplier of four users per account, it is estimated that there were some 12'000 users at end 2001 or 2.7 per cent of the population. Compared to other countries in its region or economic classification, Cape

Figure 3.1: Internet subscribers

Number of Internet subscribers, users and per 100 inhabitants, Cape Verde and Internet subscribers per 100 inhabitants, 2001, Cape Verde compared to other regions and economic categories



Source: ITU World Telecommunication Development Indicators Database.

Verde does fairly well in terms of Internet subscriber penetration (see Figure 3.1, right chart). However, considering the advanced state of its infrastructure, it is surprising that Cape Verde does not have a higher Internet penetration. These comparisons are based on subscribers rather than users because the data for the former tend to be more reliable. A comparison based on users would probably find Cape Verde somewhat behind since it probably has fewer users per subscriber than other developing countries due to a lack of public access outlets.

CVT is the only Internet Service Provider (ISP). CVT's revenue from dial-up Internet service was ECV 117.7 (US\$ 0.98) million in 2001, or 2.2 per cent of total revenue. Internet revenue was up 42.3 per cent over the previous year and Internet services are CVT's third fastest growing service (after data and mobile).

3.3 Connectivity

CVT is currently the only ISP so peering is not yet an issue. It is assumed that CVT has optimized the network so that national Internet traffic stays within the country rather than being routed overseas. CVT has also developed a portal to provide information locally to keep more Internet traffic within the country and hence reduce the need for expensive international connections.

CVT's international Internet connection is via the Atlantis-2 fiber optic submarine cable to Marconi's Internet Direct (MID) in Portugal. At April 2002, CVT had three Mbps of symmetrical international Internet capacity. It pays US\$ 22'000 per month for the international Internet circuit. This is somewhat similar to other countries but relatively high when one considers that CVT is a part owner of the Atlantis-2 cable.

One proxy for estimating demand for international Internet connectivity is the Bit-Minute Index. It is compiled by dividing international Internet capacity by minutes of international telephone traffic. It assumes that the

volume of international telephone traffic approximates demand for Internet capacity. The value for Cape Verde works out to 0.07, which is low by international comparisons with the median score worldwide being 0.35.³ Cape Verde would require 16 Mbps of international Internet connectivity to bring it up to the world average. In terms of quality of Cape Verde's international Internet connectivity, CPRM measures round trip latency to some of the ISPs for which it provides international Internet capacity. Cape Verde fairs fairly compared to other nations (see Figure 3.2, bottom right).

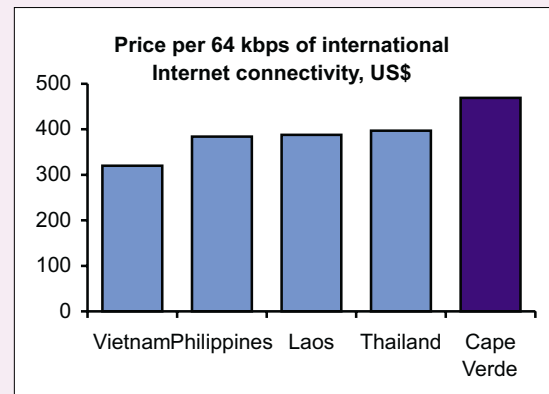
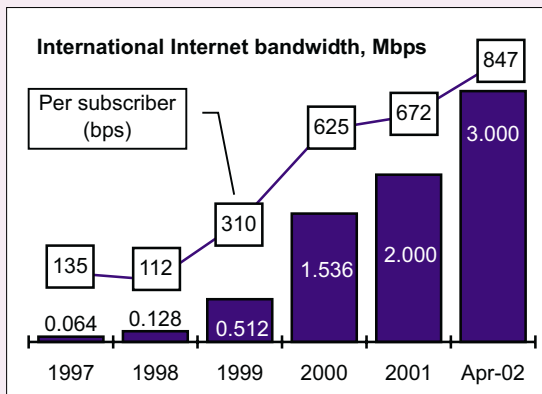
There is limited broadband access to the Internet in Cape Verde. Digital Subscriber Line (DSL) and cable modem access are not available. The former is not available because CVT claims the demand is not there and the latter because cable television does not exist in the country. Higher speed lines are either provided via Integrated Services Digital Network (ISDN) or leased circuits. ISDN is available with either basic rate (64 kbps) or primary rate interface (128 kbps). At the end of 2001, there were 550 basic rate and 23 primary rate subscribers. Many of these are using their ISDN line for Internet access. There were also 159 leased circuits though it is not known how many are used for Internet access. The highest leased circuit speed available is 256 kbps.

3.4 Pricing

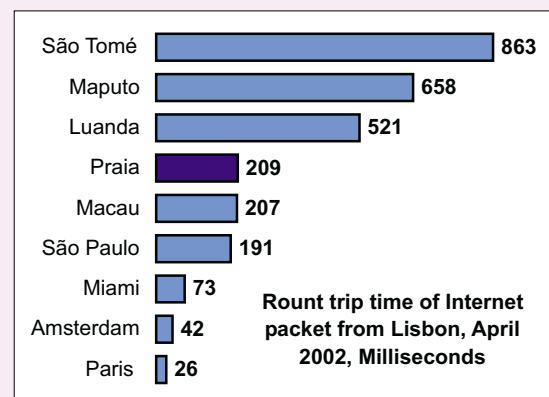
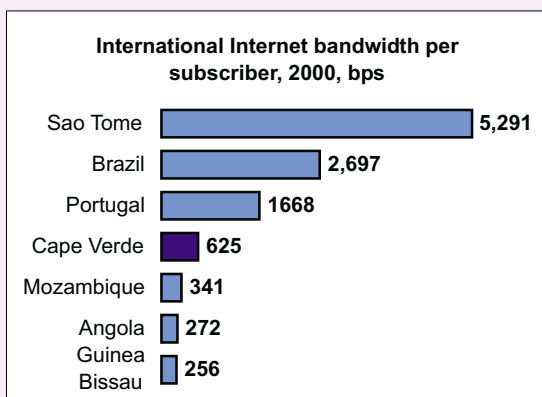
Dial-up Internet pricing plans in Cape Verde are fairly limited and do not encourage heavy surfing. There are three monthly plans based on the volume of usage: 1) less than 15 hours; 2) between 15-20 hours; and 3) between 20 – 30 hours. The price per hour drops marginally for each higher plan. Also, if a user exceeds the hour quota in the plan, each additional hour is charged at a relatively high ECV 120 (US\$ 0.96). There are no pay-as-you-go, flat rate or pre-paid pricing plans. In addition to the Internet access charge, dial-up users are charged telephone usage charges. The minimum peak time call charge is ECV 4.5 (US\$ 3.6) for three

Figure 3.2: Cape Verde's International Internet connectivity

Cape Verde's international Internet bandwidth is growing...



...but is it sufficient?



Source: CVT, CPRM, ITU.

minutes. Users are charged this regardless of whether they are on-line for one or three minutes. There is also no fractional charging after the third minute; users are charged ECV 4.5 for each multiple of three minutes. The off-peak charging unit is ECV 3.4 (US\$ 2.7) per four minutes. One advantage is that dial-up Internet access is available from anywhere in Cape Verde for the price of a local call.

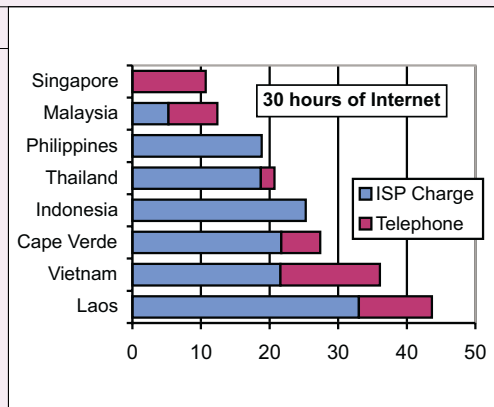
Dial-up prices are relatively high, particularly for an LDC. Thirty hours per month of Internet usage—split equally between peak and off-peak times—would cost US\$ 27.37 (US\$ 21.91 Internet charge and

US\$ 5.66 telephone usage charge). This puts Cape Verde on the high end when compared to other nations the ITU has examined (see Table 3.1).

Leased line pricing is steep. Four different speeds are available: 28, 64, 128 and 256 kbps. A 256 kbps leased line for Internet access involves an ECV installation charge of 180'000 (US\$ 1'447) and a monthly fee of ECV 480'000 (US\$ 3'859). ISDN pricing is ECV 10'000 (US\$ 80.41) for a basic rate connection charge and ECV 1'000 (US\$ 8.04) for the monthly fee. Primary rate connection charge is ECV 85'000 (US\$ 683.44) and the monthly subscription ECV 15'000

Table 3.1: Dial-up Internet pricing

	ECV	US\$
Connection charge	2'045	16.44
Monthly subscription:		
Less than 15 hours	1'600	12.86
Between 15 - 20 hours	2'000	16.08
Between 20 - 30 hours	2'700	21.71
For each minute over 30 hours	2.00	0.02
Telephone usage:		
One hour peak	30	0.24
One hour off peak	17	0.14
One hour at Internet Café	250	2.00



Source: CVT, ITU.

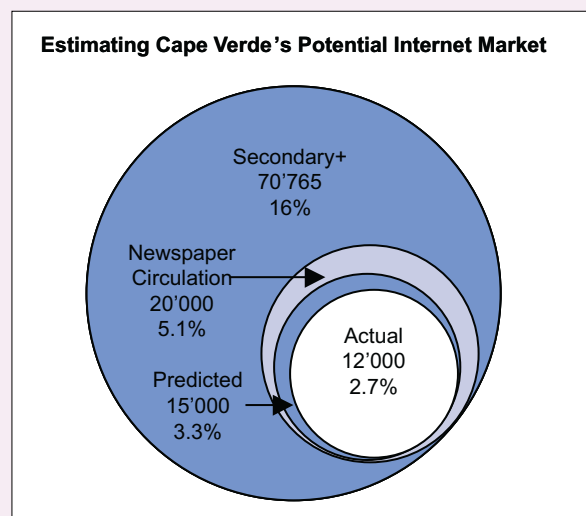
(US\$ 120.61). Telephone call charges must be added to that.

3.5 Potential market size

Cape Verde is under performing in terms of its Internet potential. The number of users per 100 inhabitants was 2.7 in 2001. A number of assumptions about the potential size

of the market suggest this figure is lower than it should be. For example, a linear regression of Cape Verde's Internet penetration and GDP per capita compared to 143 other countries forecasts that Internet penetration should be 3.3 per 100 or around another 3'000 users more than the estimated 12'000 current users. Another indicator that has been found to be a good proxy for Internet penetration is newspaper circulation. The figure for Cape Verde is 5.1 per 100 inhabitants suggesting that there could be around 20'000 Internet users in the country. Yet another proxy for the potential Internet market is education. Over 70'000 Cape Verdeans in the country have a secondary or greater education, which accounts for 16 per cent of the population. So why is the Internet penetration not higher? One reason is costs. CVT's entry level Internet package amounts to around 12 per cent of per capita income. To this must be added a telephone line rental, telephone usage charges and a PC, an amount clearly beyond the reach of most Cape Verdeans. However, potential users could avoid these expenses by using an Internet café where charges are around US\$ two per hour. Though still relatively steep by Cape Verdean incomes, this is an amount that is not onerous on an

Figure 3.3: Potential Internet users



Source: ITU.

occasional use basis (and is nine times cheaper than a mobile phone call).

Another reason that there are not more Cape Verdeans using the Internet is awareness. Many may not be aware of the Internet's benefits or existence particularly since Internet advertising is non-existent in Cape Verde and Internet cafés are scarce and hard to locate.⁴ Special initiatives have led to the opening of several Internet cafés (see Box 3.1). Considering that the Internet market has significant potential, efforts to lower tariffs and increase public access could yield significant growth in users.

3.6 Regulation

Decree 70, approved 20 November 1995, establishes terms and conditions for Value Added Services. According to the concept of Value Added Services stated in article 2, "*all telecommunication services whose unique support is the basic telecommunications services or complementary services, and do not require separate infrastructure but are different from the support conducting services, are Value Added Services*". This law also regulates the licensing of Internet Service Providers.

Licensing of an Internet Services Provider is made through a simple government authorization as indicated in article 3 of Governmental Order 69/95. This Governmental Order states that any Value Added Service provider may operate in Cape Verde. The appropriate authorization will be issued on request and on a case-by-case analysis. The service however must be offered according to the terms and conditions of the applicable laws and regulations.

The regulation of the Internet in Cape Verde foresees a Code of Practice, which all ISPs must subscribe to and respect. Informative services must be differentiated from commercial ones and from those for entertainment.

The Basic Law for Communications establishes in article 26 that the incumbent operator must interconnect all other telecommunication operators

under the same competitive conditions. It is strictly forbidden for the incumbent operator to take any measures that could inhibit competition in Cape Verde. In addition, the same law states that it is forbidden for the incumbent operator to either abuse its power or use dominant behavior. On the other hand, the same article 26 says that ISPs are not allowed to use leased circuits or dial up connections offered by the incumbent operator for any other use than the one they have been requested for.

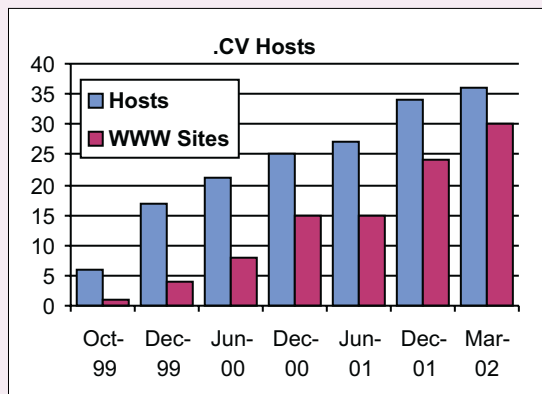
Although legally the Internet market is open, CVT is currently the only ISP. One reason may be uncertainty over interconnection and the use of leased circuits. Another is that it would appear that CVT has a legal monopoly over international connections preventing potential ISPs from establishing their own international gateways.

3.7 Curriculum Vitae

Cape Verde's Internet domain name, CV, is administered by the Instituto Superior de Engenharia e Ciências do Mar (ISECMAR), a technical institute of higher learning. Therefore all requests for a domain name must be addressed to ISECMAR. However ISECMAR only issues the domain name after consultation with a Portuguese organization, which is also in charge of the Portugal Domain Name System (DNS) as well.⁵ This situation is due to the lack of equipment in ISECMAR to manage the Cape Verde DNS. The name server and technical contact are located in Portugal, at *Fundacao Para A Computacao Cientifica Nacional* (www.fccn.pt). RIPE is the regional Internet registry for Cape Verde.

There is no fee for a CV domain name. Only organizations from Cape Verde can register a CV domain name. Trademarks are protected. Second level domain names (e.g., .gov.cv, .com.cv, etc.) are not used. At April 2001, there were some 60 registrations. Growth of the .CV domain has been sharp since RIPE began collecting statistics in October 1999. At that time there were only six hosts and one web site. By March

Figure 3.4: Cape Verde Internet hosts



Source: RIPE.

2002, these figures had risen to 36 and 30 respectively (see Figure 3.4).

In some countries, domain names are perceived to have value (e.g., .TV

stands for Tuvalu and is of commercial interest to TV operators). In the case of Cape Verde, the domain name is an abbreviation for curriculum vitae. The nation was approached by a company that wanted to purchase the domain name in order to use it for storing people's resumes. This request was turned down. However there is one web site using the .CV domain name that provides this service <<http://my.cv>>.

There is no content control in Cape Verde nor does this seem to be an issue of concern at this stage with so few domestic web sites. The use of Portuguese in Cape Verde expands the universe of web content. Although precise figures are not available, most Cape Verdeans surf to overseas sites, particularly in Portugal and Brazil (see Box 3.2). The large Cape Verdean expatriate community in the US has also created many web sites with www.visaonline.com reputed to be one of the most popular.

Box 3.1: Santa Catarina Telecentre

From the outside, the Telecentro Comunitario de Assomada does not look like an Internet café. It is a nondescript ochre colored building that looks like it could somebody's house. Paper posters advertising the telecentre keep on getting blown away in the steady wind so the staff is thinking about a more permanent neon sign. The telecentre is located in the town of Santa Catarina, the second largest on the island of Sao Tiago with a population of 42'000. A US\$ 50'000 project of the International Telecommunication Union (ITU, www.itu.int) and Cabo Verde Telecom (CVT, www.nave.cv), the incumbent telephone company, the telecentre opened in May 2001. CVT is providing 50 per cent discount on telecommunication and Internet access during the first year. The telecentre has a 64 kbps ISDN connection to the Internet.

Members of the some 3'000 strong Women's Association of Santa Catarina, operate the telecentre. Two people staff it during working hours, 8 am – 10 pm daily except Sundays. The only male involved



in the operations is the guard. Services available include recharge of mobile prepaid cards, purchase of telephone calling cards, public phone calls, Internet access, PC applications, photocopying, printing, and fax. Drinks and snacks are also available. The price of Internet access is 150 Cape Verde Escudos per hour (US\$ 1.25), less expensive than at the other two Internet cafes in town.

Clients of the five PC telecentre include students and professors from a nearby school as well as residents of the local community. There are around 60 users per day each using it on average of half hour. There is an extra table for people to wait, as the telecentre tends to get crowded during peak times.



PC and Internet access training for women is in the pipeline. There is also a plan to introduce an e-commerce component to sell handicrafts made by local women. This would include digitizing the products and displaying them on a web site.

Box 3.2: The Lusophone connection

Discovered by the Portuguese in the 15th century, Cape Verde is part of the lusophone world.⁶ Though Creole is the main language in Cape Verde, Portuguese is the official one, used in school and easily understood by around one third of the population.⁷ Portugal left its mark on some half a dozen countries around the world. Today these nations—Angola, Brazil, Cap Verde, Guinea-Bissau, Mozambique and Sao Tome and Principe—along with Portugal are formally grouped in the *Comunidade dos Países de Língua Portuguesa* (Community of Countries of the Portuguese Language).⁸

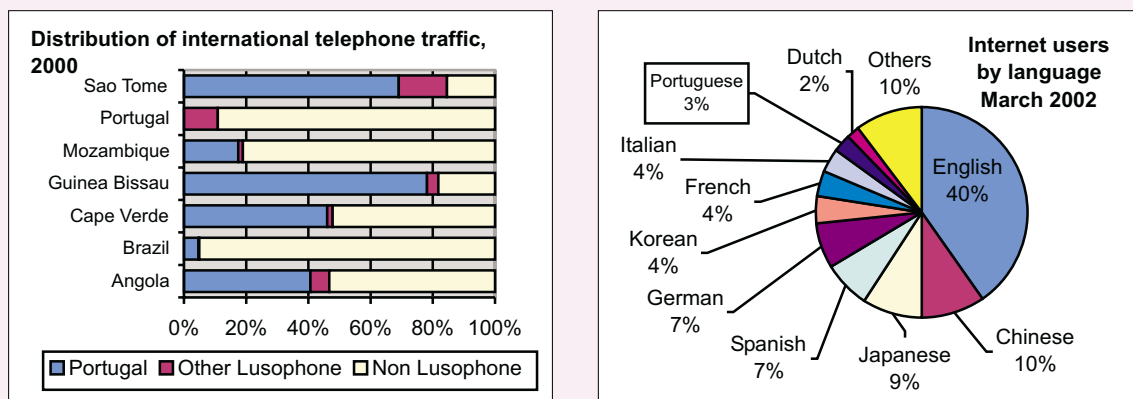
The ties extend into the ICT sphere. The *Associação dos Operadores de Correios e Telecomunicações dos Países e Territórios de Língua Oficial Portuguesa* (AICEP) unites postal and telecommunication organizations in the lusophone world.⁹ The relationship is also reinforced through Portugal Telecom’s (PT) part-ownership of telecommunication operators in all of the former colonies except Mozambique. There is also a digital tie with lusophone Africa connecting to the international Internet via PT’s Marconi Internet Direct (MID) service.¹⁰ The web of lusophone trade and travel is reflected in telephone traffic statistics. There were around 160 million minutes of international phone calls in Portuguese in 2000, or about a minute per

Portuguese speaker. For the African lusophone nations, roughly 50 per cent of their telephone traffic is with other Portuguese-speaking countries (see left chart below).

The Portuguese language is a large market with close to 200 million speakers in around 30 countries. Countries where the language is spoken can leverage on a growing electronic content base. Portuguese broadcasters beam radio and television programs around the clock via satellite that is downloaded and retransmitted over local stations in all lusophone nations. Portuguese is the 9th largest linguistic group on the Internet with some 15 million users, a figure forecast to almost double over the next few years (see right chart below).¹¹ As more Portuguese users go online, lusophone web sites will grow. Countries like Cape Verde can leverage on Portuguese content to expand the universe of information available to them. For example there are around 25 million Portuguese web pages around the world compared to some 1’500 Cape Verdean web sites. But this extra content may be a double-edged sword by discouraging the development of Cape Verdean web sites and content in the Creole language. One irony is that there is more promotion of Creole in the United States—home to many Cape Verdean emigrants—than in Cape Verde.¹²

Box Figure 3.1: Communicating in Portuguese

Distribution of international telephone traffic in lusophone nations, 2000 and distribution of Internet users by language, March 2002



Source: ITU DOT database, Global Reach (global-reach.biz/globstats).

- ¹ UUCP stands for UNIX-to-UNIX Copy Protocol. It refers to a technique that makes it possible to copy a file from one computer to another via a telephone line. It is used for Usenet news and electronic mail. Unlike TCP/IP (which is used for the Internet), UUCP requires that a session be established between the two computers in order to transfer files.
- ² SITA, the airline industry telecommunication provider, did provide Internet access for some private networks and it was possible to dial-up to Portugal. However these solutions were expensive substitutes for the lack of direct public Internet connectivity.
- ³ See TeleGeography. *Packet Geography 2002*. September 2001. TeleGeography. Washington DC.
- ⁴ It is estimated that there are roughly a dozen Internet cafes in Cape Verde (4 in Praia, 3 in Santa Catarina, 2 in Mindelo, 1 each on islands of St. Antao and Sal). The first opened in May 1998 at the Portuguese Cultural Centre in Mindelo. See Nuno Galopim. "Um cibercafé no Mindelo." » *Diário de Notícias*. Lisbon. 28 October 1998. www.instituto-camoes.pt/arquivos/geral/cibercafemindelo.htm.
- ⁵ Brief technical information about the CV DNS is available here including the ability to check whether a domain name is in use: <http://www.dns.cv>.
- ⁶ Lusophone is derived from the Latin word *Lusitanus*, referring to an area equivalent to today's Portugal.
- ⁷ See the Ethnologue web site at: http://www.ethnologue.com/show_language.asp?code=KEA.
- ⁸ The idea of creating a community of Portuguese-speaking nations was launched in Cape Verde in 1983 during a speech by the Portuguese Minister of Foreign Affairs. See "A História" on the CPLP web site: <http://www.cplp.org>.
- ⁹ Its 10th Forum was recently held in the Cape Verdean city of Mindelo. See <http://www.aicep.pt>.
- ¹⁰ <http://www.cprm.net>.
- ¹¹ <http://www.glreach.com/globstats/>.
- ¹² For example see the Capeverdean Creole Institute site at <www.capeverdeancreoleinstitute.org>.

4. Sector absorption

4.1 Government

The Cape Verde government is probably the country's major Internet user. This situation has come about in the last few years, primarily because of a World Bank financed project. While few computers within the government had a dial-up Internet connection in early 1999, Information and Communication Technologies (ICT) developed quickly. Six months later, ten ministries and 500 PCs had been connected to the Internet. By the end of 2000, all ministries (across 50 buildings in the capital, Praia) and 1'400 computers had connections to the Internet. Today the government Local Area Network (LAN) covers every ministry and gives Internet access to some 2'000 government employees (some 13 per cent out of a total 15 thousand).

ICT are starting to have an impact on the way the government works. E-mail is increasingly and routinely exchanged both between and within government agencies and it is estimated that there has been at least a five per cent reduction in paper. This could rise much higher if more personnel were connected and procedures were changed to discourage paper files. A number of online databases have also been created for use by government agencies. This has facilitated and improved administrative procedures.

A number of factors have contributed to this initial success. One is the high level of good governance and transparency in Cape Verde. There seems to be less resistance to the introduction of ICT than in other developing nations where government employees feel threatened, where ownership of information is perceived as a source of power or where some staff may even benefit from a lack of transparency. Another contributing

factor is the clever use of foreign assistance to develop government computer systems. This includes leveraging projects that do not have a direct ICT component but where the installation of computer infrastructure and training can be justified on the grounds of improved public administration. Skilled and dedicated personnel are another reason for success. There is a core of trained and motivated staff working to computerize the government. Yet, another factor is Cape Verde's small size that simplifies the task of connecting central government agencies.

Despite the achievement of creating a central government LAN, there are a number of problems. One is a limited high-level recognition of the importance of ICT and the lack of a national policy and strategy for promoting and developing e-government. Most government computerization is focused on the development of internal applications and there are only few, citizen type applications. Another problem is pricing, with few telecommunication discounts available for government agencies. This adds to the cost of developing the governmental network, particularly in areas outside the capital Praia. It also results in sub-optimum technical solutions because of a lack of options and the need to save money.

4.1.1 RAFE

RAFE (*Reforma da Administração Financeira do Estado*) <www.gov.cv/rafe> stands for the 'Public Finance Management Reform Group'. From its name, one would hardly guess that RAFE is the driving force behind Cape Verde's government computerization efforts. The reason is that it was not supposed to be. RAFE was created in

Figure 4.1: RAFE at Work



While the network was initially used as a tool to support financial systems, its success led to a new role for RAFE. Suddenly everyone wanted RAFE's services and they could not provide Internet connections fast enough. A project for computerizing the Ministry of Justice was entrusted to RAFE. The popularity of its technical services have accidentally made RAFE one of Cape Verde's driving ICT forces. Today RAFE is as much involved in technical issues as it is in providing financial applications. Within two years, RAFE's staff increased from three technicians to 50, around 30 of which have a university degree. And, according to their staff, they are still not enough to cope with all the work there is. Ultimately RAFE wants to connect all government agencies—including the local governments—across all of Cape Verde's islands to the government network, and provide schools and not-for-profit organizations with Internet access.

1998 within the context of a World Bank project on public sector reform. RAFE's initial tasks were to:

- i. Improve the quality and availability of public finance data;
- ii. Increase the accountability of the use of public resources by all public institutions;
- iii. Improve the management of external and internal debt; and
- iv. Develop capacity to manage public resources at the municipalities, which acquired financial autonomy with the 1998 Local Finance Law.¹

The development of computer systems and training were essential in order to carry out those activities. RAFE initially established a Local Area Network (LAN) to connect the Ministry of Finance with the main government building (*Palacio de Gobierno*) across town. Soon afterwards RAFE connected the government to the Internet via a 256 kbps leased line.

RAFE has created an internal database and applications to facilitate the municipalities' accounting system and a database on the government's human resources (including information on staff, their CV, photo, etc.). RAFE hosts some 20 government sites, with the server located in the Ministry of Finance. RAFE's tasks also include training on how to use the Internet, email and government databases. Some training modules are available online, and staff can follow them at their convenience.

RAFE is planning to make public administration more user-friendly by providing government forms and services on the Internet. This would include a one-stop portal uniting different activities in a single location. For example, importing and registering a car in Cape Verde requires completion of almost a dozen forms located at multiple locations. With RAFE's solution, the paperwork associated with an automobile might be as easy as a mouse-click. RAFE also wants to help Cape Verdeans living abroad to stay in touch with home, by creating useful content.

Box 4.1: The benefits of ICT in the government sector

The use of ICT by the Cape Verdean government has been greatly facilitated by World Bank assistance through the Public Sector Reform and Capacity Building Project (PSRCBP). This project has been instrumental in efforts to achieve the government's vision of "an efficient and modern public sector." The first project, with a budget of US\$ 8.1 million, ran from 1994-1999. According to the World Bank, achievements in the area of ICT included:

- "The PSRCBP has made progress in modernizing the civil service through extensive technical and computer training..."
- The PSRCBP has strengthened economic management through training and computerization of key ministries.
- A macroeconomic model (RMSM-X) has been installed, as well as a management information system for the Public Investment Program (PIP).

- The National Institute of Statistics (NIS) has been established with a broader capacity and mandate to coordinate statistical analysis across government agencies.
- The Ministry of Justice has been largely computerized and staff have been trained to become computer literate."

The World Bank concluded that the "extensive technical and computer training of civil servants, have led to an improvement in public administration efficiency and productivity."

A second PSRCBP project was approved in 1999 and is scheduled to run through the end of 2002. The project cost is US\$ 3.5 million of which US\$ 1.2 million is dedicated to computers, software and networking. US\$ 3 million is to be financed by the World Bank with operating costs covered by the Cape Verde government. One goal of the second phase is to improve the availability of information available to the public.

Despite RAFF's success, they still want to achieve more. According to one RAFF manager, Cape Verde is far from having an e-government: *"E-government is a political commitment. It is great because we have 2'000 people in the government on the Internet but this does not mean that this is good enough. These people are the management of the government but we need to provide access to everyone. Once we have universal access to the Internet, THEN we can start talking about e-government."* Comments such as this one help to understand the way Cape Verdeans think and work and suggest that it is vision, enthusiasm and the right amount of self-criticism that helps them to make progress.

RAFF does not receive a discount for telecommunication charges and pays regular access rates like any other customer. When RAFF first set up the government LAN, it used ISDN because the terminal equipment was relatively cheap and there were no other alternatives for dedicated connections. RAFF has since converted the ISDN connection to cheaper leased circuits and microwave wireless connections, reducing costs

to one tenth. Connecting sites in the capital is relatively cheap because leased line prices are charged at local rates, which are far less expensive than long distance leased lines. This has limited the network to Praia. Plans call for using wireless links to connect government nodes outside of Praia and then connect governmental services to the node at cheaper local leased line rates. For example, there is a plan to connect a police station in the middle of the island of San Tiago to the government network. Other governmental services such as schools and the local administration would then piggy-back off the police station's connection. One problem is extending the RAFF network to other islands since they are too far away to be connected by the wireless microwave connection. The logical choice would be to utilize CVT's inter-island fibre network that has considerable excess capacity. However, this can only be done if CVT provides concessionary prices for the government. In the meantime, government agencies outside Praia are using dial-up connections.

RAFF has gone far beyond what is was initially intended to be. Recognizing

its importance, the Prime Minister has agreed to institutionalize RAFE, to provide it with the necessary regulatory framework and to make it independent from the Ministry of Finance. As an independent entity, RAFE could start charging for its services and become financially sustainable. A development in this direction might also be welcomed by the private sector, which sometimes sees RAFE as a competitor. Since the government in Cape Verde is itself the major ICT market, and RAFE its only ICT provider, private companies feel left out.

4.1.2 The government online

The official Cape Verdean government web site is <www.governo.cv>. This site includes basic information about the government, decrees, news and links to other government ministries and agencies. Most government agencies that are online are part of the .gov.cv domain such as the Ministry of Finance and Planning <www.gov.cv/minfin>. Agencies that have their own web sites include the National Statistical Institute <www.ine.cv>, the central bank (*Banco de Cabo Verde*) <www.bcv.cv> and the Presidency <www.presidencia.republica.cv>. While some links, for example, those for the Ministry of Education, Science, Youth and Sports and the National Assembly were not active at the time of this report, other sites provide useful information and are clearly structured. Another site (www.gov.cv/segindex.html) is used by government employees to access internal databases and allows them to check their email when away from their office.

4.1.3 ICT strategy

The idea for a national ICT strategy for Cape Verde had its roots in a Conference of Ministers of the Economic Community of Africa in May 1995 that adopted a resolution on "Building Africa's Information Superhighway."² This led Cape Verde, along with eight other African nations, to draw up a plan for the development of Information and Communication Technologies. The Minister of Infrastructure formed a group consisting of representatives of the

General Direction of Plan, Pedagogical Institute, National Statistical Institute and Cape Verde Telecom to prepare the plan. A consultative meeting was held with different public and private sector representatives in October 1999 to obtain their input. The plan has been drafted and presented to the government.³ When approved, funding will be sought to carry out the projects identified in the plan.

The plan identifies a Cape Verdean vision for ICTs:

- A country equipped with infrastructure and modern ICT at the service of development and cultural, technological and economic integration;
- A country equipped with a strong and dynamic productive sector having as its base new technologies; and
- A country equipped with endogenous competency in the field of ICT.

The report outlines a number of general and specific objectives for ICT in the nation. It identifies national needs in a number of different areas including policy, education and training, communications, health, private sector and public administration and contains specific projects in those areas (see Table 4.1).

4.2 Education

The last decade has been characterized by an increased emphasis on education and efforts to invest in future generations. The educational sector has traditionally received the lion's share of the government's resources with some 18 per cent of the total government budget spent on education. The government, through the Ministry of Education, Science, Youth and Sports (MESYS) recognizes that only an educated and flexible population and work force will be able to respond to the country's social and economic needs. There has been remarkable progress in establishing and expanding the primary and secondary

Table 4.1: Cape Verde's ICT needs

Sector	Needs	Proposed projects
Policy	<ul style="list-style-type: none"> • Study on the development of a national strategic plan • Definition of a national policy on ICTs • Study on the regulation of informatics and ICT 	
Education and Training	<ul style="list-style-type: none"> • Creation of a national information system for education • Informatization of administrative and academic services • National educational network • National information system for tertiary institutions • National system of tele-education • National research and investigation centre • National plan for connecting secondary schools to the Internet • Creation of resource centres in secondary schools • Creation of wide area network and mass-media labs in basic schools • Creation of community mass media centres for education • Training in ICTs 	<ul style="list-style-type: none"> • Distance learning • National network of education and investigation
Communications	<ul style="list-style-type: none"> • Creation of a Centre of Excellence • Intelligent Network project in conjunction with spectrum control • Project for laboratory for equipment certification • Creation of Internet cafés both fixed and mobile • Creation of multiple use community telecentres • Study on the introduction of e-commerce 	<ul style="list-style-type: none"> • E-commerce portal • Mobile cyber café • Multiuse community telecentre • Installation of Internet access at post offices • E-mail to regular mail (and vice versa) service • E-commerce support for post office
Health / Agriculture	<ul style="list-style-type: none"> • Creation of a national information system for health • Informatization of administrative services • National network for health • Training 	<ul style="list-style-type: none"> • National system of health, investigation and training • Database on coastal areas
Private sector	<ul style="list-style-type: none"> • Study on the use of ICT in the private sector 	
Public administration	<ul style="list-style-type: none"> • Development of a national administrative network connecting all sectors and services 	<ul style="list-style-type: none"> • E-Citizen portal • Expansion of National Statistical Institute web services

Source: Plan National de Développement d'Infrastructure des TICs.

education system. In 1994, for example, the basic educational level was extended to six years and primary education was made compulsory. A series of reforms over the past few years have further improved the educational system and school enrolment has steadily increased.

Efforts to develop the human resource base of the nation and to modernize the educational system today include the use of Information and Communication Technologies (ICT). In 1998 the government, in Resolution 8/98, emphasized the importance of ICT in schools and came up with some concrete objectives. Students should have some contact with a personal computer by the time they reach their fifth year of schooling. Basic ICT training should be provided by seventh grade. The Resolution further highlights the importance of distance learning as an additional and complementary element of education.

As in other areas, the government has received funding and support from development agencies. Efforts to improve the educational sector are based on close cooperation between the Ministry and development partners and involve concrete and effective projects. In fact, most projects linked to ICT in the educational sector involve at least one development partner.

4.2.1 PROMEF

The Education and Training Consolidation and Modernization Project (*Projecto de Consolidação e Modernização da Educação e Formação*, PROMEF, <www.gov.cv/promef>) has been intimately involved in promoting ICT in education. PROMEF is primarily financed by the World Bank (with US\$ six million the World Bank covers around 80 per cent of the project's costs) with the MESYS and the Portuguese Calouste Gulbenkian Foundation <www.gulbenkian.pt> as co-founders and financial supporters. The project was officially initiated in 1999 and its goals are to "maintain and consolidate the recent reforms in primary education and workforce

*development; undertake a comprehensive education sector review and evaluation of employment and training policies and programs; enable the field-testing and/or adaptation of new teaching and learning packages, technologies, and school based initiatives to improve quality and efficiency; and strengthen the institutional capacity of the Ministry of Education...in delivering their program."*⁴

PROMEF's role is not limited to analysing and it determines ways of improving and changing the educational system, especially through the exploitation of ICT. One of PROMEF's undertakings, the development of the Management Information Systems, involves creating databases containing information on the educational sector. So far, the following six databases have been or are in the process of being established:

1. A statistical database with basic information from each school (the number and name of students and teachers, grades, curricula, etc). The idea is that eventually every school will enter its own information.
2. A database for evaluating and tracking students' work. This database will provide success rates by age, grade, sex, subject, etc. and will help to understand the major problems students face and ways to improve the educational system.
3. A budgetary database for the MESYS, which will allow it to oversee its finances.
4. A human resource database with information on the MESYS's staff.
5. A database on scholarships, including the number of students studying abroad; the country they are studying in; the subjects and courses they take, etc. Students will also be able to access this database and find out how to apply for a scholarship.

Table 4.2: Cape Verde at school, yesterday and today

	1990/91	2000/01	Change
Primary education			
Total number of students	69'823	90'186	29%
Enrolment rate	89%	96%	8%
Number of teachers	2'186	3'110	42%
Secondary education			
Total number of students	9'766	48'437	396%
Enrolment rate	20.3%	45.8%	126%
Number of teachers	364	1'961	439%

Source: Ministério da Educação, Ciência, Juventude e Desporto, Gabinete de Estudos e do Desenvolvimento do Sistema Educativo.

- A student database with information on each student, including grades, evaluation, etc. This is currently being tested in one of the secondary schools with Internet access.

PROMEF, in cooperation with RAFE, was planning to provide all the schools in the country with an Internet connection but the necessary funding was not available. Despite the efforts the Cape Verdean government has made to promote the educational sector and the success it has had in improving the basic and secondary school system, there are no concrete plans to supply all schools with PCs or connection to the Internet. There is also a lack of coordination between projects in the educational sector. While RAFE has been able to achieve much and help the Ministry to make use of applications and spread ICT, it is also in charge of all the other government ministries. Its projects are therefore not specifically aimed at the educational sector and its possibilities are limited.

4.2.2 Primary and secondary education

Cape Verde has made tremendous strides in improving access to primary and secondary education. Primary

school enrolment was already high as far back as 1990 (89 per cent) and was nearly universal in 2001 (96 per cent) (Table 4.2). The secondary school enrolment rate, however, has drastically risen, by well over 100 per cent. While it stood at only 20.3 per cent in 1990, it is now at almost 46 per cent.

Basic education is six years, compulsory and free of charge. *Secondary education*, which is not compulsory but is free of charge, is another six years. It is divided into three cycles of two years each with vocational training in the final year. At the beginning of 2001, there were 424 primary schools, with 90'186 students (some 44'000 female and 46'000 male students) and 3'110 teachers. There are plans to train primary teachers basic ICT skills so that they can teach their students but currently only very few primary schools have PCs and access to the Internet. While there were only three secondary schools in 1980, there are 27 today, all of which have a PC. Nine have access to the Internet.

Schools with Internet access use dial-up service. While they pay the usual telephone usage charge, Cape Verde Telecom offers them a 50 per cent discount on the Internet access

Table 4.3: Institutes of higher education in Cape Verde

School	Number of Students	Subject	Web site
Instituto Pedagógico (IP)	613	Teacher training	www.gov.cv/ipcv
Instituto Superior de Engenharia e Ciências do Mar (ISECMAR)	310	Technical	www.isecmar.cv
Instituto Superior de Educação (ISE)		Teacher training	
Instituto Superior das Ciências Económicas Empresariais (ISCEE)		Business	
Instituto Nacional de Investigação e Desenvolvimento Agrário (INIDA)		Agriculture	
Jean Piaget University	500	University	

Source: ITU.

charge. A project called "Telésalas", initiated by the MESYS and in cooperation with Telecom Portugal and Cabo Verde Telecom, was to provide all secondary schools with Internet access but it was never implemented. RAFE is now planning to connect all secondary schools to the government network. Some secondary schools offer basic ICT courses but these courses, where available, remain optional. One problem the schools face is the lack of technical know-how. While some schools cannot exploit PCs because they do not know how to use the basic applications, other schools have problems with the configuration and basic maintenance. Many schools also have problems with viruses.

4.2.3 Tertiary education

Education at the tertiary level is limited. There are five institutes of higher learning and one recently opened university. There are an estimated 1'500 higher education students in Cape Verde. Most students pursuing higher studies must go abroad due to a lack of facilities in Cape Verde. The government, often in cooperation with donors, provides scholarships for overseas studies. Around 2'000 Cape Verdeans are pursuing tertiary studies abroad, primarily in Brazil and Portugal.

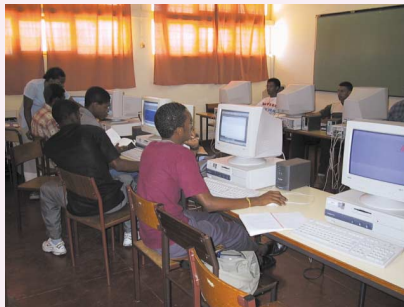
Unlike other nations, the introduction and nurturing of the Internet did not spring from the academic sector. However, Cape Verdean tertiary institutions are starting to enhance their information technology situation. All now have Internet access and a couple have web sites. The recently established university, Jean Piaget, has applied to be a Cisco Networking Academy (see Box 4.2). The nation's institute of higher education for technical subjects, ISECMAR, is responsible for the country's domain name.

4.2.4 Tele-education

Tele-education has great potential, especially in a country that is geographically separated and divided into several islands and that has a relatively under-developed tertiary educational system. The MESYS is aware of these benefits and initiated a tele-education project, in cooperation with the government in Brazil and the Instituto Pedagógico in Cape Verde.⁵ Currently, the project is on stand by, due to a lack of funding. There have been other tele-education projects in the past. One was a radio-based educational network for teachers sponsored by Dutch assistance. Cape Verde is also supposedly participating in the World Bank sponsored African

Box 4.2: Training IT professionals

If Cape Verde is to effectively participate in the Information Age, it needs a workforce with IT skills. Informatics training is available at small, private companies that typically offer courses in desktop applications such as word processing. RAFE (see section 4.1 above) also organizes basic IT courses for government workers and specialized training for its own staff. The calibre of RAFE's staff is reflected in a Microsoft training course. The teacher who was brought from Portugal noted that usually only half the students get half way through the course and maybe one or two finish it. In the case of RAFE, all fourteen students taking the course passed it. Why? According to a RAFE manager Cape Verdeans do not miss an opportunity when they have one.



Instituto Superior de Engenharia e Ciências do Mar (ISECMAR) <www.isecmar.cv>, has been the only institute of higher learning providing advanced technical training in engineering, informatics and telecommunications. Located in Mindelo on the island of Sao Vicente, ISECMAR started as a maritime academy (1984) but has existed in its current form since 1996. The number of students has been increasing and currently there are 310. PCs are available in a number of specialized labs and used to incorporate information technology with the subject being taught. There is also a PC room with free access to the Internet (see photo), although it is often slow, according to ISECMAR staff. ISECMAR has a 64 kbps ISDN line for Internet access; it does not receive a discount despite being an educational establishment. Courses are over three years, plus an additional six months training within a company. Students graduate with an

undergraduate degree and ISECMAR is hoping to offer a master's degree from 2003. ISECMAR is also formally charged with administering the .CV domain name though the actual server is located in Portugal.

The **Jean Piaget University** was founded as Cape Verde's first university in 2001. It has 500 students and offers 2- and 3-year degree programs in various fields including Computer Science. The University has two fully equipped computer labs with 18 PCs each. Both labs are networked and have a minimum 64 kbps dedicated Internet connection. The University also has an on-site computer maintenance team that looks after the information technology infrastructure.

In an effort to add to its IT training possibilities, Cape Verde has applied to the ITU's

Internet Training Centers Initiative for Developing Countries (ITCI).⁶ Launched in 2001, ITCI plans to establish 50 Internet Training Centers in developing countries to provide instruction on Internet Protocol (IP) networks and services. While ITCI will eventually work with different partners, it is starting as a venture with Cisco Systems which will provide its Cisco Networking Academy Program (CNAP). CNAP is a hands-on course designed to teach students the skills needed to design, build and maintain small to medium-size IP based networks. The program consists of a 280-hour curriculum delivered over approximately nine months (four 70-hour semesters). This prepares students for the Cisco Certified Network Associate exam, an industry standard certificate. The joint ITU/Cisco project, which is currently being discussed with the Cape Verdean government, and the Jean Piaget University, would provide a useful source of training.

Virtual University, but no information is available about this.⁷ Tele-education projects do not seem to have been successful and information about the experiences is lacking. This area merits further study to see what the barriers are to implementing tele-education in the country and how they can be overcome.

4.3 Health

The use of Information and Communication Technologies (ICT) within the Cape Verdean health sector is relatively basic. While the Ministry

of Health makes use of computers and the Internet – particularly email – ICT are not yet widespread tools for the improvement of health. Since the Ministry does not have its own web site, it cannot provide online information or applications.

The health network covers all of the country's 17 districts and consists of hospitals and clinics. Some of the clinics are small with limited facilities and staff. Although not all clinics have Internet access, every island has at least one hospital or clinic connected to the Internet, typically through dial-

up access. The country's two biggest and most modern hospitals are in Mindelo (on the island of Sao Vicente) and in the capital, Praia (on the island of Sao Tiago). Both have Internet access. There are plans to computerize the hospitals' and eventually the clinics' medical records and set up a database with the medical history of every patient.

There are three different types of health insurance, covering people depending on whether they work for a public enterprise, the government, or private institutions. Claims processing is all computerized.

Cape Verde does not have its own medical school. The government provides scholarships for students to study overseas. Cuba has been a popular destination for medical studies due to low tuition. Currently some 40 Cape Verdean medical students are being trained in Cuba and the number is projected to rise to 120 over next three years. Nurses do not need to go abroad for training since there are two nursing schools in Cape Verde.

A telemedicine project is under way to connect the hospital in Mindelo to Hospital Pulido Valente in Lisbon. Further financing has been provided to extend the project to hospitals in Praia and Sal. The telemedicine project, which should be launched by the end of 2002, will allow Cape

Verdean doctors to exchange information with experts in Portugal. Eventually it may link all of the Cape Verdean islands and provide a new level of health care. The greatest problem the project faces is the lack of technical skills. Cape Verdean doctors often do not have the technical know how that is necessary to use telemedicine, including the use of the Internet.

In a country such as Cape Verde, where people are spread across different islands and the necessary health care cannot always be provided locally, telemedicine offers great possibilities. According to one official from the Ministry of Education, telemedicine is a good way to "get rid of all that ocean between the islands."

4.4 E-commerce

For all intents and purposes, e-commerce does not exist in Cape Verde. On the Business-2-Business (B2B) side, there are hardly any examples of e-commerce activity. On the Business-2-Consumer (B2C) side, no Cape Verdean web site has the capability to process credit card payments. Consequently online sales cannot take place. Hardly any Cape Verdean sites publish prices of products or services, let alone provide ordering instructions. Despite this dearth of e-commerce activity, there is considerable potential for the development of business over the Internet.

Certification is one of the major concerns of banks and businesses in Cape Verde. Although the government passed an electronic documents and signatures law (adapted from the Portuguese one) in 2000, the law has never been applied and it seems that hardly anyone knew about it. The issue was addressed recently, at an e-commerce seminar organized by the ITU and the MIT and officials are working on a new legal framework that will allow electronic transactions to be performed with confidence.

A major barrier to e-commerce is the high cost of Internet access and

Table 4.4: Cape Verde Health Facts, 2000

Infant mortality rate (per 1'000)	54
Crude birth rate	44
Life expectancy at birth (years)	70
Female	73
Male	66
Number of hospital beds	694
Hospital beds to population ratio	1: 626
Number of doctors	167
Doctors to population ratio	1:2'603

Source: Instituto Nacional de Estatísticas Cabo Verde and International Planned Parenthood Federation.

the price of PCs, which are perceived as prohibitive for most Cape Verdean companies, the majority of which are Small and Medium Enterprises (SMEs).

Another problem is the relatively recent introduction of a private sector in Cape Verde. The government took steps to liberalize the economy in the early 1990s. The growth in the private sector has been impressive, with the number of firms rising by two hundred per cent between 1990 and 1997 from 2'182 to 6'591.⁸ However, a truly entrepreneurial mentality and understanding of the role of ICTs in business development is lacking. Over 95 per cent of Cape Verdean companies are SMEs and with a turnover of less than US\$ one million a year, they lack the expertise and resources to use e-commerce. While there is no data on the number of companies with PCs, let alone Internet access, it is estimated to be low. For example of the thirty or so web sites using the CV domain, less than half are business-oriented and of those, the majority do not have any or only scarce content.

The central bank, *Banco de Cabo Verde* is on the web at <www.bcv.cv> where it provides a variety of timely reports on the nation's financial situation. Most Cape Verdeans have a bank account and a growing number have a domestically issued debit card

providing them with a taste of electronic transactions (see Box 4.3). There is no online banking although this is in the pipeline. One bank has set up a web site—Caixa Economica, <www.caixaeconomica.cv>—but so far does not provide any information on it.⁹ The other three banks operating in the country do not have web sites. But some are foreign-owned so they could eventually leverage on their home country online banking experience. Online banking could extend access to finance, reducing the need for banks to establish branches and complement the existing network of ATMs (which are available on four of the ten islands). Online banking would also have synergy with large volume of overseas remittances sent back every year. For example, a Credit Union in Brockton, Massachusetts, which claims to be the most Cape Verdean city in the US, launched a money transfer service for a flat fee of US\$ 15.¹⁰

There are some examples of e-commerce-like activity. There is an online "yellow pages" at <www.paginasamarelas.cv> providing a directory of businesses operating in the country. The company providing the service, Directel, is a joint venture of Portugal Telecom, which provides similar online directory services in several other African nations. One drawback with an online

Box 4.3: Cape Verde's Own Debit Card



Vinti4 (24) is Cape Verde's answer to the debit card. It can be used to purchase goods in gas stations and shops that have the necessary Point of Sales equipment with the amount directly debited from the user's account. Launched in 2000, there are some 30'000 Vinti4 cards in circulation. They can also be used at the some 20 Automatic Teller Machines (ATM) installed on four of Cape Verde's islands to withdraw cash. The Vinti4 card makes up for the lack of conventional credit cards in the country. Credit cards are difficult to obtain and few people have them. The Vinti4 card is providing the populace with experience of making electronic transactions and should make the transition to making online transactions easier. One idea is to leverage the Vinti4 card for online transactions by developing a card reader that can be attached to a PC. While this might help develop local business-to-consumer or government-to-consumer applications, it would not allow oversea buyers to purchase goods and services from Cape Verdean sites. Nor will it allow Cape Verdeans to make purchases from overseas sites.

service like this is that so few Cape Verdean companies have web sites of their own to link to.

Another example is the customs service that is using the UNCTAD developed software (ASYCUDA, Automated SYstem for CUstoms Data) to receive electronic filings from importers and exporters.¹¹ There are plans to link this system to the central bank and Ministry of Commerce. PROMEX, the nation's investment promotion board, has also launched a web site and has found that providing information to potential investors over the Internet has reduced the need for participation at trade fairs or for maintaining overseas offices.¹²

The Chambers of Commerce for the northern and southern islands are exploring potential e-commerce projects with other Macaronesia islands and with some ECOWAS countries.¹³ One idea is to make a Portuguese version of the portal used by the Canary Islands Chamber of Commerce. The portal would provide information about West African countries and be useful for doing business in the region. It would also advertise services such as transport and translation. The Chambers of Commerce are also providing awareness seminars in e-commerce.

Another planned initiative is to start an e-commerce pilot project in the town of Santa Catarina on San Tiago

island. The idea is to digitize handicrafts and display them over the web by using the facilities of an Internet café operated by women. The e-commerce component will be implemented before the end of 2002.

Three attractive areas for e-commerce in Cape Verde are tourism, expatriate services and off shore software development. Cape Verde's tourism potential is immense and providing information over the Internet could facilitate promotion of the country as a tourist destination. PROMEX provides limited information over its web site and only one hotel has its own web site so the potential is barely tapped.¹⁴ Cape Verde's large expatriate community—bigger than the number of people living in the country itself—is a huge market for business to consumer e-commerce. Possibilities for services include money transfer, providing news and information, and offering the ability to order and deliver gifts to friends and family. Cape Verde also has an increasingly educated and young population and could turn towards the development of information technology services and software. A World Bank project planned to develop teleports using VSAT technology but it never materialized, perhaps because of regulatory barriers. This idea should be resurfaced and regulatory barriers could be overcome, for example, by allowing potential investors the right to provide their own infrastructure in special software development parks.

Box 4.4: How to become a development haven

The amount of development projects that Cape Verde has been able to attract are impressive. In 1999, the country received no less than US\$ 319 per capita in aid. This placed it in fifth position, just behind French Polynesia, New Caledonia, Federated States of Micronesia and the Netherlands Antilles.¹⁵ Considering the first four receive large aid remittances from more developed countries that they are associated with (i.e., France, US and Netherlands), Cape Verde obtains the highest amount of aid of any independent country.

What is it that attracts donors and who are they? While Cape Verde obtained independence from Portugal in 1975, it had been not simply been a colony of Portugal but an overseas province with the right to vote and be represented in the government, since 1951. This status explains its strong ties with Portugal, the country that is Cape Verde's top donor (with a total of US\$ 22 million in 1999/2000). Another reason is the country's large diaspora (see Box 1.1), which also creates special links, beyond Portugal, to countries across the world. A special relationship seems to exist between Cape Verde and Luxembourg, who was the third biggest donor (with over US\$ 8 million in 1999). Cape Verde was the largest source of Luxembourg foreign aid in 2001, at 16 per cent, a significant share considering Cape Verde's size.¹⁶ Oddly enough, the two countries have almost exactly the same amount of inhabitants (435'000 in Cape Verde and 430'000 in Luxembourg), which may partially explain Luxembourg's compassion for its 'twin'. Though there are no precise figures on the number of Cape Verdeans residing in Luxembourg, the anecdotal evidence suggests it is significant. The Portuguese are the largest immigrant group in Luxembourg (58'400 in 2001) and the fact that there is already a large Portuguese speaking community could explain part of the attraction for Cape Verdeans. In 2002, 274 Cape Verdeans applied for regularization of their situation ('sans papiers') in Luxembourg making them the 2nd largest group. The development projects financed in Cape Verde are primarily centred on the areas housing, water, electricity and education. One of the most expensive projects was the construction of a technical school in Santa Catarina,

on the island of Santiago (see photo). The school now trains some 653 students, 112 of which live in the adjacent boarding school. The school also houses a teacher-training centre. Luxembourg also financed the construction of the Ribeira Grande hospital on the island of Santo Antão.

Other major donors include the World Bank (with US\$ 17 million in 2000), Germany, Japan, the Netherlands, the African Development Fund, France and the European Union.¹⁷ While Cape Verde's special ties to certain countries helps to explain the large amount of development projects, it is also something else, we might say something very Cape Verdean that attracts attention. First, Cape Verde is able to formulate concrete project proposals relevant to its development needs. As opposed to many other developing countries, Cape Verdeans are involved in their projects, from the beginning to the end. They also tend to contribute to projects, which makes them more than beneficiaries, but partners. Not surprisingly, there are stories about development projects that failed because they were planned and carried out without the inclusion of local staff.

Another typically Cape Verdean characteristic is the ambition to do better. People will often say, 'What we have achieved is good, but it is not good enough'. This critical attitude is very beneficial because Cape Verdeans will not allow themselves to rest but instead to come up with ways of improving what is already adequate. One Cape Verdean explains, "We do not have a lot of opportunities but when we have one, we use it."

It is not surprising that development agencies like to invest in Cape Verde, where their assistance shows concrete results. The irony is that the success Cape Verde has had, may now work against it. Since Cape Verde has been a development star with rising per capita income, some donors might decide that their support is no longer necessary. While Cape Verde received a total of US\$ 137 million in 1999, this amount dropped to US\$ 94 million in 2000.



Luxembourg's most expensive development project in Cape Verde: The Santa Catarina (Santiago) technical school (right), which is equipped with a state-of-the-art-computer room (left)

- ¹ See World Bank. Project Appraisal Document on a Proposed Credit in the Amount of SDR 2.3 Million (US\$ 3.0 Million Equivalent) to the Republic of Cape Verde for a Second Public Sector Reform and Capacity Building Project." 26 October 1999. Report No: 19824-CV. Available online at: http://www-wds.worldbank.org/servlet/WDServlet?pcont=details&eid=000094946_99110505400927.
- ² <http://www.uneca.org/itca/initiatives.htm>.
- ³ Plan National de Développement d'Infrastructures des TICs.
- ⁴ "World Bank Approves US\$ 22.1 Million in Financing for the Republic of Cape Verde." News Release. 25 May 1999. www.worldbank.org/html/extdr/extme/2206.htm.
- ⁵ According to the Cape Verde embassy in the US "As part of this effort, the Embassy will be working with the government to facilitate long-distance learning. The traditional university environment is costly and, especially for a small country like Cape Verde. Yet, education and technical training are the key to the future. Therefore, an important focus for the country is to find new ways and methods to provide quality education and technical training without incurring the cost of establishing a new traditional university. Distance learning is therefore a key priority for Cape Verde and the Embassy will actively seek to establish linkages with American schools and institutions that can assist in this endeavor." See "Strategic Agenda of the Embassy of Cape Verde to the United States of America-Overcoming Cape Verde's Development Challenge" accessed on 6 June 2002 on the embassy web site at: http://www.capeverdeusaembassy.org/strategic_agenda_of_the_embassy_.htm.
- ⁶ For more information on the ITU's Internet Training Centers Initiative for Developing Countries (ITCI), please see: www.itu.int/itudoc/itu-d/hrdqpub/hrdq/hrdq84/itci-dc_ww7.doc.
- ⁷ "Lusophone countries participating in the AVU project are Cape Verde and Mozambique." See Jant Nima. "The Promises of Distance Education." Legacy. <http://ngilegacy.com/educationspring99.htm>. The African Virtual University (AVU) web site is here: <http://www.avu.org/>.
- ⁸ Data are from the INE web site at: http://www.ine.cv/estatisticas_cv_empresas.htm#empresa1.
- ⁹ Caixa's web site was developed by Brava Telecom, a US-based company operated by Cape Verdean expatriates. They also developed the web sites of VisaoOnline and CaboVerdeOnline, two popular portals. See http://www.bravatelecom.com/internet/internet_portfolio.asp. This highlights the dearth of web skills in Cape Verde and the danger that poses by driving business overseas.
- ¹⁰ Jorge Soares. "Brockton Credit Union inaugura sistema de transferência de dinheiros para Cabo Verde." Available on the VisaoOnline web site at http://www.visao-online.com/s/economia/2001/negocios/ANG_05_DEC05.asp.
- ¹¹ See www.asycuda.org.
- ¹² <http://www.promex.org>.
- ¹³ Macaronesia includes Canary Islands, Azores, Madeira and Cape Verde. ECOWAS refers to Economic Community of West African States. <http://www.ecowas.int/>.
- ¹⁴ The only hotel with a web site using the .CV country domain is at <http://www.pousadadaluz.cv>. Note that there may be other hotels with web sites using other domain names.
- ¹⁵ The source of the data is the World Bank. World Development Indicators. "Aid Per Capita."
- ¹⁶ <http://www.lux-development.lu/f/prscindex.htm>.
- ¹⁷ <http://www1.oecd.org/dac/images/AidRecipient/cpv.gif>.

5. Conclusions

5.1 State of the Internet

The Mosaic Group <www.agsd.com/gdi97/gdi97.html> has developed a framework for characterizing the state of the Internet in a nation (Annex 3). They consider six dimensions, each of which has five values ranging from zero (non-existent) to four (highly developed). The dimensions are as follow:

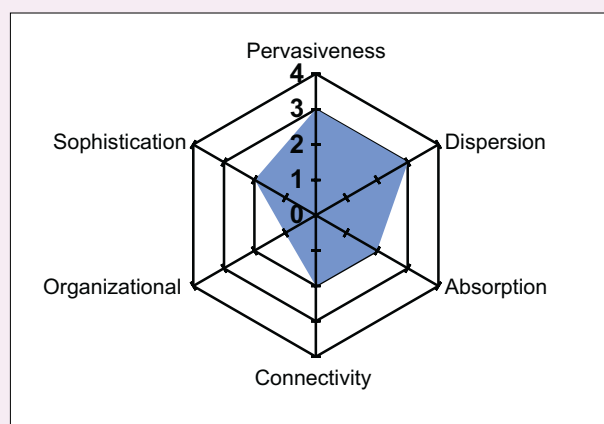
- **pervasiveness:** a measure based on users per capita and the degree to which non-technicians are using the Internet.
- **geographic dispersion:** a measure of the concentration of the Internet within a nation, from none or a single city to nationwide availability.
- **sector absorption:** a measure of the degree of utilization of the Internet in the education, commercial, health care and public sectors.
- **connectivity infrastructure:** a measure based on international and intranational backbone bandwidth, exchange points, and last-mile access methods.
- **organizational infrastructure:** a measure based on the state of the Internet Service Provider (ISP) industry and market conditions.
- **sophistication of use:** a measure characterizing usage from conventional to highly sophisticated and driving innovation.

Cape Verde values for these dimensions are shown below.

Pervasiveness is rated at level 3, *Common*. At December 2001, there were an estimated 12'000 Internet users in the country or 2.8 per cent of the population.¹

Figure 5.1: State of Internet in Cape Verde

Dimension	Value
Pervasiveness	3
Geographic Dispersion	3
Sectoral Absorption	2
Connectivity Infrastructure	2
Organizational Infrastructure	1
Sophistication of Use	2
TOTAL	13



Note: The higher the value, the better. 0 = lowest, 4 = highest.
Source: ITU.

Geographic Dispersion is rated at level 3, *Highly dispersed*. Internet access is available from any location with a telephone line and PC with a modem and charged at local call rates. However, rural telephone lines are lacking. In addition, Internet cafés are not widespread.

Sector Absorption is rated at level 2 *Moderate*. This ranking is a function of the type of connectivity in education, government, health care and business. All institutes of higher learning have Internet access. One third of secondary schools are connected to the Internet (9 out of 27). A few primary schools are connected. By the end of 2000, all ministries were connected through the government Intranet. Connectivity at the local administrative level is less. Few businesses are connected to the Internet let alone have web sites. There is limited connectivity in the health sector.

The **Connectivity Infrastructure** is at level 2, *Expanded*. International connectivity is three Mbps via fibre optic submarine cable. There is a nationwide fibre/microwave/satellite backbone—built for the telephone network—that operates at various speeds and over which data traffic can flow. However

there is no dedicated national Internet backbone. There is no Internet exchange since there is only one ISP. High-speed local access options are limited to ISDN and leased lines since broadband access via DSL or cable modem is not available.

The **Organizational Infrastructure** is at level 1, *Single*. One ISP has a legal monopoly for international communications. The monopoly was granted for a 25-year period, until 2025.

Sophistication of Use is at level 2, *Conventional*. The most popular applications are e-mail and information retrieval. There are a number of government databases and plans to develop online government applications.

An examination of Cape Verde's Internet dimensions shows that it is relatively strong in terms of infrastructure and potential accessibility but weak in market structure and the sophistication of Internet use (see Figure 5.1). Its Internet market is judged to be the most constrained when compared to other nations to which this framework has been applied (see Table 5.1). This indicates that efforts should be focused in the latter areas. Injecting

Table 5.1: Framework comparisons

Country comparisons using Mosaic framework

	Perva- siveness	Disper- sion	Absorp- tion	Organi- zational	Connec- tivity	Sophis- tication	Total
Singapore	4	4	4	3.5	3	3.5	22
Malaysia	4	3.5	2.5	3.5	2.5	2.5	18.5
Indonesia	3	3	1.5	3.5	2.5	2	15.5
Thailand	3	3.5	2.5	2	2.5	2	15.5
Philippines	3	2.5	2	3	2.5	2	15
Cape Verde	3	3	2	1	2	2	13
Vietnam	2	2	1.5	2	1.5	1.5	10.5
Laos	2	1.5	1	2	1.5	1	9
Cambodia	1	1.5	1	1.5	1.5	1	7.5

Source: ITU.

liberalization into the market would attract more players, additional applications and ways of using the Internet in order to capture new customers, and would likely have a positive impact on the number of Internet users.

5.2 Recommendations

Cape Verde has made enviable gains in its telecommunication market since independence from Portugal. It has risen to the top of the Least Developed Countries (LDCs) in terms of network infrastructure. However, Cape Verde now needs to consolidate the gains from infrastructure development and move to a higher level. This includes building value-added services on top of the infrastructure. One necessity is opening up the ISP market—in line with government aims to liberalize the economy—and developing content services such as web design and hosting, portal development and e-businesses. It also involves developing more content for the public such as e-citizen services.

A move in this direction will constitute the first step towards an information society and eventual knowledge-based society.⁶ It is essential that the Cape Verdean government instigate this process as soon as possible. With scarce natural resources, Cape Verde's main asset is its people. This is an essential resource since ICT is essentially a brain-oriented activity. ICT offer considerable potential for Cape Verde's economic and social development, poverty alleviation and integration into the global economy. This can assist Cape Verde to make the transition from an LDC to a higher level of economic prosperity. First, ICT offer considerable potential for adding to domestic economic growth through the creation of new e-services. Second, ICT can assist in economic development by enhancing the dissemination of information. Third, ICT can assist Cape Verde to overcome its geographic discontinuity through services such as distance education and telemedicine. Fourth, ICT can add to export driven growth through services such as off-shore

software development, selling of Cape Verde goods and services and by attracting foreign investment.

Cape Verde's strengths and weaknesses are identified in Table 5.2. The table summarizes Cape Verde's considerable strengths and opportunities in the ICT area. Though the nation has certain weaknesses, through proper attention, these can be overcome. Finally, the consequences of not quickly embracing ICT are listed.

The recommendations below outline the steps the government needs to take to accelerate the development of the Cape Verdean Information Society.

5.2.1 Change CVT concession

Cabo Verde Telecom (CVT) has performed well and provided the country with an up-to-date telecommunication infrastructure. Nonetheless, there are the inevitable consequences of a monopoly situation, including higher prices, shortage of ancillary firms and deficiencies in innovation. The report has described a number of sectors such as mobile and Internet access, where Cape Verde's prices are above comparator countries. CVT's telecommunication revenues as a share of GDP are also well above international standards suggesting above average pricing. High prices discourage access and also lead to convoluted solutions to avoid them. For example, the government Intranet is developing alternative connectivity solutions to avoid the high costs of leasing capacity from CVT. The company's de facto monopoly over the Internet market and high leasing costs have discouraged new ISPs as well as ancillary companies such as web hosting, web page designers, etc. from entering the market. This in turn has contributed to a shortage of innovation, critical if Cape Verde is to transition to an information society and successfully harness ICTs for its development needs.

There are certainly few logical arguments for maintaining CVT's monopoly that is not due for expiration

Table 5.2: Cape Verde's ICT SWOTs

Strengths, weaknesses, opportunities and threats in Information and Communication Technology

STRENGTHS	WEAKNESSES
<p>EDUCATION: The nation's relatively high literacy rate, growing level of school enrolment and rising number of post-secondary graduates are essential prerequisites for successfully exploiting ICTs.</p> <p>EXPATRIATE / LUSOPHONE COMMUNITY / STUDENTS STUDYING ABROAD: The large number of people overseas with ties to Cape Verde are a rich source of resources in knowledge and investment. Membership of the wider Portuguese-speaking community offers linguistic and assistance synergies. Both of these groups also give Cape Verde an outward-looking perspective. The great number of Cape Verdeans studying abroad further strengthens ties with foreign countries and provides the country with an open-minded and educated youth and work force that often speaks English, French and other languages.</p> <p>GOOD GOVERNANCE: The nation has been lauded for its stability, transparency and tough anti-corruption measures.</p> <p>SMALL SIZE / REGIONALISM: The nation's small size makes it easy to govern and creates a sense of identity. Its geographic features have forced it to deal with matters on a regional/local basis, which has facilitated implementation processes and leads to efficiency.</p> <p>INFRASTRUCTURE: Cape Verde's ICT infrastructure is top quality and fairly well dispersed.</p> <p>LOCATION / TOURISM: The archipelago is strategically placed at the crossroads between southern Europe, west Africa and South America. It is also a popular tourist destination.</p>	<p>LDC: Despite Cape Verde's success it is still an LDC and faced with particular hardships</p> <p>GEOGRAPHICAL DISCONTINUITY: The fact that Cape Verde is spread across ten different islands raises connectivity costs and means that most infrastructure must be duplicated.</p> <p>HIGH ICT COSTS: Relatively high telecommunication and Internet prices discourage market development and investment in other sectors of the economy.</p> <p>LACK OF INTERNET CULTURE: The Internet was introduced relatively late and there is not a large supporting value-added market in web hosting, content creation, etc. There are few Internet cafés and not a high level of awareness among the public.</p> <p>SMALL SIZE: Small population limits market size and may discourage investors.</p> <p>Entrepreneurship: Cape Verde is in transition from a state-run economy to a free market economy and private sector involvement and initiative is still limited.</p> <p>ENGLISH: English is not widely spoken, which can be a weakness considering that much ICT software, content and manuals are in English.</p>
OPPORTUNITIES	THREATS
<p>SOFTWARE DEVELOPMENT: Cape Verde's increasingly educated population is well suited for data entry, software development and, with time, higher valued-added computer applications for export. The large expatriate community and other lusophone countries are potential markets.</p> <p>B2C E-COMMERCE: There are major opportunities here waiting to be exploited. The large Cape Verdean expatriate community is a potential captive market for all things typically Cape Verdean that can be sold over the Internet. This includes everything from news to media streaming to services aimed at friends and family (e.g., delivering flowers, money transfers, etc.). Another opportunity is for Cape Verdean products that could be advertised and sold over the web such as music and tourism information.</p> <p>FOREIGN INVESTMENT: Cape Verde's location, stability and status as an LDC and African nation provide advantages to potential investors. The former makes it a good base for exports to Europe, Latin America or West Africa, while the latter includes incentives such as duty free import preferences. The availability of good quality and competitively priced telecommunication services would go far to attract potential investors. One developing kinship is with the Macaronesia islands of the Azores, Canaries and Madeira. These more economically developed locations are keen to invest in Cape Verde, provided the right incentives are there.</p>	<p>GLOBALIZATION: The increasingly integrated world economy gives less control to national authorities and places a premium of country's competitiveness and e-readiness. There is growing competition to attract investment.</p> <p>TECHNOLOGICAL BYPASS: Refile and VoIP are just two examples of using technology to get around high communication costs. These types of bypass cannot be effectively prevented and threaten to impact investment in the ICT sector.</p> <p>COMPLACENCY: Cape Verde's impressive network growth may lead it to rest on its laurels.</p> <p>TIME: The Internet world moves fast. Delays in developing its ICT sector will make it more difficult for Cape Verde to catch up.</p> <p>COMPETITORS: The world is becoming an increasingly competitive place. Nations compete for resources and investment. Cape Verde risks becoming less competitive due to ICT constraints.</p> <p>BRAIN DRAIN: A lack of ICT opportunities at home will drive educated workers overseas. This is a particularly serious threat for Cape Verde that already has a tradition of emigration, making it easier for potential leavers to hook up with overseas friends and family.</p> <p>SOCIAL STABILITY: A lack of ICT opportunities as well as the natural attraction to the social aspects of ICT (e.g., e-mail, chat, gaming) may increase disillusionment for youth if they do not have ICT access.</p>

Source: ITU.

Box 5.1: ICT serving development

ICTs can help Cape Verde's development process. Three examples show how ICTs can be applied to the nation's specific social, geographic and economic situation:

Distance learning: Cape Verde has invested heavily in education and the results are bearing fruit. There is near universal primary education. Secondary school enrolment is rising, a remarkable achievement considering there were only three secondary schools a decade ago. However, in the area of higher education, the nation suffers from a lack of institutions and shortage of qualified teachers. There are just five institutes of higher education and one recently established university. This is not enough to meet demand, and consequently many students go abroad for higher education. ICTs could help alleviate the shortage of higher education options through distance learning. This could also overcome the geographic discontinuity of the nation by making cyber education widely available from across the archipelago. Although there have been some initiatives to develop distance education in Cape Verde, none have borne fruit. The failure of these initiatives have not been analysed so it is not clear what the problems were. The successful experiences of other countries in this area suggest that if applied appropriately, distance learning could be of immense benefit for Cape Verde.²

Fishing: Fishing is an important source of livelihood in Cape Verde, yet its full potential has not been achieved.³ Much fishing is carried out on a small-scale basis and techniques could be improved

through access to information. One way is through wider dissemination of information about efficient, appropriate and self-sufficient fishing techniques. The Food and Agricultural Organization (FAO) has a project in Cape Verde to improve fish catches, by using low-cost, technologically appropriate fish-aggregating devices. The devices attract mackerel, tuna and other fish in the Cape Verdean waters and the catch has doubled at locations equipped with the device. Information about building the device is on the web and if more fishers had access to the Internet, it could help improve their livelihood.⁴

Connecting to the Diaspora: One of the consequences of Cape Verde's large-scale emigration was strained communication between those who left and those who stayed behind. Without the contact, the two communities grew apart but now with ICT, there are increasing signs of *rapprochement*. Intensification of efforts to link those within Cape Verde to those outside the country could have a significant impact on the country's development. For example, expanding Internet access to more Cape Verdeans would allow them to correspond more frequently and cheaply with friends and family abroad through email. At the same time, there is a considerable amount of Internet use, web site development and content by overseas Cape Verdeans. Their expertise needs to be drawn on to assist the country in its ICT development.⁵ Also, students studying abroad want to keep in touch with their family back home. ICTs make 'keeping in touch' easy, for relatively little money.

until 2025. Concerns about market size are not valid as there are countries with smaller populations than Cape Verde's that have competitive telecommunication sectors. Equally, concerns about duplicate infrastructure can be laid to rest assuming appropriate interconnection and resale policies are in place. Assuming there is excess capacity, it would hardly be in the economic interest of CVT to not lease it to competitors.

Furthermore, CVT may actually be willing to give up its monopoly. There is considerable evidence that former telecommunication monopolies actually increased revenues following the introduction of competition as a result of larger market size, increased

visibility of ICT from advertising and interconnection revenues. CVT may also want to avoid being the sole source of criticism for problems in the ICT sector. CVT may also benefit by no longer being solely responsible for universal access. Legally, there is already the precedent of Cape Verde ending CPRM's monopoly of international services earlier than expected. There are also other countries where the introduction of competition has been advanced.⁷

The most efficient preference is for CVT to willingly cede its monopoly. In the meantime or if that is not possible in the short run, there are other policy tools available for introducing competitive proxies. One option is to open up the resale market. Indeed

there is nothing in the concession agreement that suggests CVT should not be obligated to provide wholesale pricing for resellers. Another option would be to impose far more universal access obligations on CVT. This might include requirements to provide free Internet access to all schools, providing public Internet access in all localities and similar obligations to enhance public access to ICTs. If the monopoly cannot be ended in the short-run, then CVT pricing should be benchmarked against international standards and it should be obligated to remain competitive. The government should also make an effort to clarify the situation in the ISP market. If CVT does not legally have a monopoly in the ISP market, this should be made clear and other companies should be encouraged to enter the market.

5.2.2 Government promotion, support and policy for ICT

By default, RAFE has been in charge of developing government networking. It has made admirable advances in connecting government agencies and developing internal applications. But as RAFE points out, Cape Verde does not yet have e-government. For that, the government will have to develop a vision, policy and strategic plans for e-government. This includes developing citizen applications that can drive greater awareness and necessity for using the Internet.

5.2.3 e-culture

Signs of the Internet in Cape Verde are scarce. There are few Internet access outlets and rare outside advertising of Internet products and services. The benefits of the Internet need to be more widely disseminated. There is a significant gap between Cape Verde's actual and potential Internet users, part of which can be explained by a lack of awareness. At one level, this would include the government giving greater visibility to the Internet for national development. Steps to be taken—some of which are already in the pipeline but which need to be accelerated—include the

adoption of a national ICT strategy, the creation of digital laws and the creation of a unified ICT ministry and regulator. Cape Verde's growing private sector also needs to take more initiative in lobbying for ICT, for example by emphasizing the importance of passing e-commerce laws and developing e-commerce solutions. The private sector also needs to incorporate ICT more deeply in their business and the government needs to give them incentives to do so. Steps should also be taken to benefit from the ICT skills of Cape Verde's large diaspora.

5.2.4 Enhancing access to information on the Internet

There is much that needs to be done to expand public access to the Internet. A start has been made in connecting all institutes of higher learning and around a third of the secondary schools. This needs to be expanded and the existing level of access improved. In addition policies need to be designed for public access to the Internet. Regulatory and other barriers to the establishment of Internet cafés need to be lifted and the provision of wholesale Internet access should be encouraged. The country also needs to move ahead in broadband connectivity including the launching of Digital Subscriber Line (DSL) technology.

5.2.5 Coordination of development projects with ICT component

Many exciting ICT developments in Cape Verde have come about through international assistance. For example the RAFE project creating a government network is funded through the World Bank. However there is a lack of knowledge about all such projects. One problem is that the projects may have a wider intent with the ICT component not widely known (such as the RAFE). There needs to be better coordination of all projects that have an ICT component in order to avoid duplication, achieve synergies and share the results.

5.2.6 Tariff conundrum

Cape Verde faces a difficult situation with respect to its fixed telephone tariff structure. Fixed tariffs have essentially remained the same for the last decade. International tariffs are high and need to be lowered if Cape Verde is to be competitive in attracting foreign investment. Furthermore, high international call prices are ultimately unsustainable and encourage bypass through refile and IP telephony. CVT needs to rebalance its tariffs. However, higher local telephone tariffs would impact universal service by making telephone ownership more expensive and reverse Cape Verde's impressive strides made in increasing home ownership of telephones. It would also negatively impact dial-up Internet pricing, already high by international comparisons. One solution might be to lower or even eliminate the fixed telephone connection charge—cited as

being a barrier to telephone subscribership—while raising local tariffs. At the same time, Internet dial-up pricing could be charged separately than voice telephone calls at either the existing or lower rate. The most Internet friendly policy would be to completely eliminate the local call charge for Internet access. Alternatively, the local call charge could be maintained but Internet access prices eliminated as in Portugal. In any case, the tariff rebalancing exercise should be carefully thought out because of its potential detrimental impact on telephone subscribership and Internet access. Cape Verde should seek advice from other countries that have been facing similar problems. This would help the government and the private sector to evaluate the possible consequences of different policies and guidelines.

- ¹ Formal surveys regarding the number of users do not exist. The number of subscribers was 2'974 at December 2001. The figure of 12'000 is based on multiplying the number of subscribers by 4, a common ratio in developing countries where access is often via shared accounts and public locations. The national statistical agency is carrying out a household survey that includes a question on whether the home has Internet access. Results should be available in January 2003.
- ² One approach would be for Cape Verde to collaborate with other partners. The CAERENAD distance education network links universities in six different nations including Brazil. As a result, course material is available in Portuguese. The University of the Indian Ocean links five nations off the east coast of Africa in a network that offers graduate programs via distance education. A similar project for Portuguese-speaking Macaronesia islands including Cape Verde is supposedly also under discussion. See William Saint. *Tertiary Distance Education and Technology in Sub-Saharan Africa*. The World Bank, Washington, D.C. September 1999. http://www.adeanet.org/publications/wghe/tert_disted_en.pdf.
- ³ Fish makes up between 70-90 per cent of the animal protein in the Cape Verdean diet. Fishing contributes around 5 per cent of GNP and employs some 7'000 fishermen and 3'200 traders. It is estimated that only about a quarter of the potential is exploited. See José Manuel Lima Ramos. "Chemical and Physical Properties of Synthetic Fibres most Commonly Used in Fishing Gear, with Reference to their Use in Cape Verde Fisheries." Available at www.unuftp.is/images/Ramos99-lei%F0r1FF.pdf.
- ⁴ FAO. "Small cost yields big catch for fishers in Cape Verde." 18 January 2001. www.fao.org/News/2001/010102.htm.
- ⁵ A UN agency project to connect the African Diaspora with local citizens, particularly for the development of women ICT skills, may be relevant here. See http://www.unifem.undp.org/press/pr_afr_digital.html.
- ⁶ "The Information Society is a society where the ability to access, search, use, create and exchange information is the key for individual and collective well-being." See "Creating a Knowledge Society in New Zealand" on the Ministry of Research, Science and Technology web site at www.newuses.net/docs/Kaplan_IS%20definition.doc. Knowledge-based society "describes a society where creating, sharing and using knowledge are key factors in the prosperity and well-being of people." See <http://www.morst.govt.nz/guide/knowledge.html>.
- ⁷ See ITU Internet Case Study on Singapore, at www.itu.int/ict/cs.

Annex 1: List of meetings

No.	DATE	TIME	Appointment with
1	16/04/02	14:00	<i>Ministerio de Infraestructura e Transportes (MIT):</i> Ministry for Infrastructure and Transportation
2	16/04/02	15:30	<i>Direcção Geral das Comunicações.</i> The regulatory agency.
3	16/04/02	17:30	Société Internationale de Télécommunications Aéronautiques (SITA)
4	17/04/02	09:00	Cabo Verde Telecom (CVT)
5	17/04/02	14:00	<i>Instituto Nacional de Estatística (INS).</i> National Institute of Statistics
6	17/04/02	15:00	<i>Reforma da Administração Financeira do Estado (RAFE).</i> Public Finance Management Reform Group.
7	17/04/02	17:00	Chamber of Commerce representing Sotavento, Customs. D.G. de Commerce, D.G. des Douanes.
8	18/04/02	09:00	Ministry of Health
9	18/04/02	10:00	Ministry of Education and PROMEF (<i>Projecto de Consolidação e Modernização da Educação e Formação</i>): the Education and Training Consolidation and Modernization Project
10	18/04/02	14:30	Private Sector Representatives: NT2000, INFOTEL, SOPROINF, MULTIDATA, CABONET, ENITEL, BOUTIQUE INFORMATICA. CECV, BCA, BANCO TOTA E AÇORES, B. INTERATLANTICO, BCV, SISP
11	18/04/02	16: 00	Mass Media Representatives: RTC, RTPA, EXPRESSO DAS ILHAS, JORNAL HORIZONTE, JORNAL A SEMANA, INFOPRESS, RÁDIOS PRIVADAS
12	19/04/02	09:30	RAFE
13	19/04/02	11:30	PROMEX. The investment promotion board.
14	19/04/02	14:00	Visit to the Santa Catarina Technical School and Cybercafé
15	22/04/02	11:00	Instituto Superior de Engenharia e Ciências do Mar (ISECMAR). Technical institute of higher learning.
16	22/04/01	15:00	Chamber of Commerce representing <i>Barlavento</i> .

Annex 2: Acronyms and abbreviations

ADB	African Development Bank
ATM	Automatic Teller Machines
B2B	Business-2-Business
B2C	Business-2-Consumer
CCNA	Cisco Certified Network Associate exam
CNAP	Cisco Networking Academy Program
CPLP	Comunidade dos Países de Língua Portuguesa
CPRM	<i>Companhia Portuguesa Radio Marconi</i>
CTT	<i>Serviços dos Correios e Telecomunicações</i>
CTT-EP	<i>Empresa Publica dos Correios e Telecomunicações SARL</i>
CVT	Cabo Verde Telecom. The national telecommunication operator.
DNS	Domain Name Server
DSL	Digital Subscriber Line
ECV	Cape Verde Escudo. The national currency. A value of ECV 120 per one US dollar has been used for calculations in this report.
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GNI	Gross National Income
GPRS	General Packet Radio Services
GSM	Global System for Mobile communication
HDI	Human Development Index
ICT	Information and Communication Technologies
INE	<i>Instituto Nacional de Estatística</i> . National Institute of Statistics.
ISDN	Integrated Services Digital Network
ISECMAR	Instituto Superior de Engenharia e Ciências do Mar.
ISP	Internet Service Provider
ITCI	ITU's Internet Training Centers Initiative for Developing Countries
ITU	International Telecommunication Union
kbps	Kilo bites per second
LAN	Local Area Network
LDC	Least Developed Country
Mbps	Mega bites per second.

MESYS	Ministry of Education, Science, Youth and Sports
MID	Marconi's Internet Direct
MIT	Ministerio de Infraestructura e Transportes. Minister for Infrastructure and Transportation
MMDS	Multichannel Multipoint Distribution Service
OPEC	Organisation of Petroleum Exporting Countries
PAICV	Partido Africano para a Independência de Cabo Verde
PIP	Public Investment Program
PROMEF	<i>Projecto de Consolidação e Modernização da Educação e Formação</i> : The Education and Training Consolidation and Modernization Project
PT	Portugal Telecom
RAFE	Reforma da Administração Financeira do Estado
RDP	Rádiodifusão Portuguesa S.A.
RFI	<i>Radio France Internationale</i>
RIPE	Réseaux IP Européens
RTC	<i>Rádiatelevisão de Cabo Verde</i>
RTP	<i>Rádiatelevisão Portuguesa</i>
SME	Small and Medium Enterprises
UUCP	UNIX-to-UNIX Copy. Refers to a UNIX protocol that makes it possible to copy a file from one UNIX computer to another via a telephone line or direct connection
WAP	Wireless Application Protocol

Annex 3: Framework dimensions

Level 0	<i>Non-existent:</i> The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. There may be some Internet users in the country; however, they obtain a connection via an international telephone call to a foreign ISP.
Level 1	<i>Embryonic:</i> The ratio of users per capita is on the order of magnitude of less than one in a thousand (less than 0.1%).
Level 2	<i>Established:</i> The ratio of Internet users per capita is on the order of magnitude of at least one in a thousand (0.1% or greater).
Level 3	<i>Common:</i> The ratio of Internet users per capita is on the order of magnitude of at least one in a hundred (1% or greater).
Level 4	<i>Pervasive:</i> The Internet is pervasive. The ratio of Internet users per capita is on the order of magnitude of at least one in 10 (10% or greater).

Level 0	<i>Non-existent.</i> The Internet does not exist in a viable form in this country. No computers with international IP connections are located within the country. A country may be using UUCP connections for email and USEnet.
Level 1	<i>Single location:</i> Internet points-of-presence are confined to one major population centre.
Level 2	<i>Moderately dispersed:</i> Internet points-of-presence are located in at least half of the first-tier political subdivisions of the country.
Level 3	<i>Highly dispersed:</i> Internet points-of-presence are located in at least three-quarters of the first-tier political subdivisions of the country.
Level 4	<i>Nationwide:</i> Internet points-of-presence are located in all first-tier political sub-divisions of the country. Rural dial-up access is publicly and commonly available and leased line connectivity is available.

Sector	Rare	Moderate	Common
Academic - primary and secondary schools, universities	>0-10% have leased-line Internet connectivity	10-90% have leased-line Internet connectivity	>90% have leased-line Internet connectivity
Commercial-businesses with > 100 employees	>0-10% have Internet servers	10-90% have Internet servers	>90% have Internet servers
Health-hospitals and clinics	>0-10% have leased-line Internet connectivity	10-90% have leased-line Internet connectivity	>90% have leased-line Internet connectivity
Public-top and second tier government entities	>0-10% have Internet servers	10-90% have Internet servers	>90% have Internet servers

Table 3b: The Sectoral Absorption of the Internet

Sectoral point total	Absorption dimension rating	
0	Level 0	<i>Non-existent</i>
1-4	Level 1	<i>Rare</i>
5-7	Level 2	<i>Moderate</i>
8-9	Level 3	<i>Common</i>
10-12	Level 4	<i>Widely used</i>

Table 4: Connectivity Infrastructure of the Internet

		Domestic backbone	International Links	Internet Exchanges	Access Methods
Level 0	<i>Non-existent</i>	None	None	None	None
Level 1	<i>Thin</i>	≤ 2 Mbps	? 128 Kbps	None	Modem
Level 2	<i>Expanded</i>	>2 - 200 Mbps	>128 kbps -- 45 Mbps	1	Modem 64 Kbps leased lines
Level 3	<i>Broad</i>	>200 Mbps -- 100 Gbps	>45 Mbps -- 10 Gbps	More than 1; Bilateral or Open	Modem > 64 Kbps leased lines
Level 4	<i>Immense</i>	> 100 Gbps	> 10 Gbps	Many; Both Bilateral and Open	< 90% modem > 64 Kbps leased lines

Table 5: The Organizational Infrastructure of the Internet

Level 0	<i>None:</i> The Internet is not present in this country.
Level 1	<i>Single:</i> A single ISP has a monopoly in the Internet service provision market. This ISP is generally owned or significantly controlled by the government.
Level 2	<i>Controlled:</i> There are only a few ISPs because the market is closely controlled through high barriers to entry. All ISPs connect to the international Internet through a monopoly telecommunications service provider. The provision of domestic infrastructure is also a monopoly.
Level 3	<i>Competitive:</i> The Internet market is competitive and there are many ISPs due to low barriers to market entry. The provision of international links is a monopoly, but the provision of domestic infrastructure is open to competition, or vice versa.
Level 4	<i>Robust:</i> There is a rich service provision infrastructure. There are many ISPs and low barriers to market entry. International links and domestic infrastructure are open to competition. There are collaborative organizations and arrangements such as public exchanges, industry associations, and emergency response teams.

Level 0	<i>None:</i> The Internet is not used, except by a very small fraction of the population that logs into foreign services.
Level 1	<i>Minimal:</i> The small user community struggles to employ the Internet in conventional, mainstream applications.
Level 2	<i>Conventional:</i> The user community changes established practices somewhat in response to or in order to accommodate the technology, but few established processes are changed dramatically. The Internet is used as a substitute or straight-forward enhancement for an existing process (e.g. e-mail vs. post). This is the first level at which we can say that the Internet has "taken hold" in a country.
Level 3	<i>Transforming:</i> The user community's use of the Internet results in new applications, or significant changes in existing processes and practices, although these innovations may not necessarily stretch the boundaries of the technology's capabilities. One strong indicator of business process re-engineering to take advantage of the Internet, is that a significant number (over 5%) of Web sites, both government and business, are interactive.
Level 4	<i>Innovating:</i> The user community is discriminating and highly demanding. The user community is regularly applying, or seeking to apply the Internet in innovative ways that push the capabilities of the technology. The user community plays a significant role in driving the state-of-the-art and has a mutually beneficial and synergistic relationship with developers.

